APPENDIX B

BERA Report

ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

REMEDIAL INVESTIGATION REPORT APPENDIX B – BASELINE ECOLOGICAL RISK ASSESSMENT REPORT

Newark Bay Study Area
Newark Bay, New Jersey

May 2022

ARCADIS Design & Consultancy for natural and built assets

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FINAL

BASELINE ECOLOGICAL RISK ASSESSMENT

Newark Bay Study Area

Newark Bay, New Jersey

July 2020

CONTENTS

Acronyms and Abbreviations xvi
1 Introduction 1
1.1 Site Setting and Study Area Description 1
1.2 Superfund Site History and Participation 2
1.3 Remedial Investigation Objectives 4
1.4 Report Organization 5
2 Ecosystem Characterization 6
2.1 Environmental Setting 6
2.1.1 History 6
2.1.2 Land Use and Shoreline Characterization 7
2.1.3 Contamination 8
2.1.4 Habitats 9
2.1.4.1 Terrestrial (Shoreline) and Intertidal Wetland Habitats 10
2.1.4.2 Shallow Subtidal and Deepwater Habitats 13
2.2 Plankton 14
2.3 Benthic Invertebrates 15
2.3.1 Benthic Invertebrate Community 15
2.3.2 Shellfish 17
2.4 Fish 19
2.4.1 Newark Bay Fishery Characterization 20
2.4.2 NBSA Fish Community Characterization: 2014 - 2016 22
2.5 Birds 24
2.6 Mammals 25
2.7 Amphibians and Reptiles 26
2.8 Threatened, Endangered, and Special Status Species 26
3 Problem Formulation 28
3.1 Assessment and Measurement Endpoints 28
3.1.1 Invertebrates 29
3.1.2 Fish 30

3.1.3 Birds 32
3.1.4 Mammals 32
3.1.5 Reptiles 33
3.2 Representative Ecological Receptors 33
3.3 Ecological Conceptual Site Model 35
3.3.1 Ecological Exposure Pathways 35
3.3.2 Assessment Zones 35
3.4 Summary of SLERA and Selection of COPECs 36
3.5 Risk Analysis Framework for the BERA 39
3.5.1 Lines of Evidence 39
3.5.2 Consistency Between the NBSA (OU3) and Lower Passaic River (OU4) BERA 40
3.5.3 Weight of Evidence Approach for Drawing Risk Conclusions 41
4 Data Results and Evaluation 44
4.1 Data Used in the Baseline Ecological Risk Assessment 44
4.2 Data Reduction Rules 45
4.2.1 Field Duplicates 45
4.2.2 Calculated Totals 45
4.2.3 TEQ Methodology 47
4.2.4 Normalization 48
4.2.4.1 Sediment Data Normalization 48
4.2.4.2 Biota Tissue Normalization 48
4.2.5 Significant Figures 49
4.2.6 Calculating Upper Confidence Limits 49
4.2.7 Treatment of Non-Detects in Risk Calculations 49
4.2.8 Graphical and Statistical Evaluations 50
4.3 Phase III RI/BERA Data Collections and Results 51
4.3.1 Shoreline/Habitat Survey 51
4.3.2 Surface Water Chemistry Data 51
4.3.3 Sediment Quality Triad and Porewater Chemistry Data 53
4.3.4 Sediment Chemistry Data 53
4.3.5 Sediment Toxicity Data 54

4.3.6 Porewater Chemistry Data 54
4.3.7 Tissue Chemistry Data 55
4.3.7.1 Polychaete Bioaccumulation Tests 55
4.3.7.2 Crab and Clam Sampling Program 55
4.3.7.3 Fish Sampling Program 56
4.3.8 Biological Survey Data 57
4.4 Data Summary for COPECs and BERA Assessment Zones 57
4.4.1 Surface Sediment, Invertebrates & Fish 57
4.4.2 Evaluation of Urban Background 59
4.5 Whole-Body Crab Calculation 59
4.6 Historical Data 60
5 Surface Water Assessment 61
6 Benthic Invertebrate Assessment 63
6.1 Sediment Quality Triad Assessment 63
6.1.1 SQT Evaluation 64
6.1.1.1 BIC 65
6.1.1.2 Toxicity 66
6.1.1.3 Sediment and Porewater Chemistry 68
6.1.1.3.1 Sediment Scoring 68
6.1.1.3.2 Porewater Scoring 69
6.1.1.3.3 Sediment and Porewater Chemistry Summary 70
6.1.1.4 Summary of the SQT Evaluation 70
6.1.2 Quantitative Effects Assessment 70
6.1.2.1 Spearman Rank Correlation 70
6.1.2.2 Multivariate Analysis 71
6.1.2.3 Sediment 72
6.1.2.3.1 Principal Component Analysis of Sediment Chemistry 72
6.1.2.3.2 Dose Response Modeling: Sediment 73
6.1.2.3.3 Factor Analysis of Sediment Chemistry 76
6.1.2.3.4 Sediment Conclusions 77
6.1.2.4 Porewater 77

6.1.2.5 Non-metric Multidimensional Scaling 79
6.1.2.6 Summary of Quantitative Effects Assessment 79
6.1.3 Integrated Benthic Community Risk Characterization 80
6.2 Benthic Invertebrate Tissue Assessment 80
6.2.1 Exposure 81
6.2.2 Effects 81
6.2.3 Risk Characterization 81
6.3 Additional Lines of Evidence for Benthic Invertebrates 83
6.4 Uncertainties Assessment 84
6.4.1 SQT Uncertainties 84
6.4.2 Invertebrate Tissue Risk Uncertainties 88
6.5 Weight of Evidence Risk Findings for Benthic Invertebrates 89
7 Fish Assessment 93
7.1 Fish Community Assessment 94
7.1.1 Available Data 94
7.1.2 Qualitative Evaluation of Fish Community Data 94
7.1.2.1 Water Quality and Habitat Information 94
7.1.2.2 Adult and Juvenile Fish Community 95
7.1.2.2.1 Abundance 95
7.1.2.2.2 Diversity 96
7.1.2.3 Ichthyoplankton (Egg/Larvae) Community 97
7.1.3 Risk Characterization 98
7.2 Fish Tissue Assessment 99
7.2.1 Exposure 99
7.2.2 Effects 99
7.2.3 Risk Characterization 102
7.2.3.1 Whole-Body Tissue 102
7.2.3.2 White Perch Liver Tissue 104
7.3 Fish Dietary Assessment 106
7.3.1 Exposure 106
7.3.1.1 Methods 107

7.3.1.2 Body Weights, Ingestion Rates, Prey Composition, Site Use Factors, Exposure Areas 107
7.3.1.3 Exposure Point Concentrations 109
7.3.1.4 Estimated Doses 109
7.3.2 Effects 109
7.3.3 Risk Characterization 109
7.4 Fish Egg Tissue Assessment 110
7.4.1 Exposure 111
7.4.1.1 CFs for Total PCBs, Dioxin/Furan TEQ, and Dioxin/Furan/PCB TEQs 111
7.4.1.2 CFs for Methylmercury 112
7.4.1.3 Modeled Egg Concentration 112
7.4.2 Effects 112
7.4.3 Risk Characterization 112
7.5 Fish Pathology Findings/Observations 113
7.6 Uncertainties Assessment 114
7.6.1 Fish Community Risk Characterization Uncertainties 116
7.6.2 Fish Tissue Risk Characterization Uncertainties 117
7.6.2.1 Toxicology/TRVs 117
7.6.2.2 Treatment of Non-Detects 118
7.6.3 Fish Dietary Risk Characterization Uncertainties 118
7.6.3.1 Toxicology/TRVs 119
7.6.3.2 Quantitative Exposure Uncertainty Assessment 120
7.6.3.2.1 Site Use Factor 120
7.6.3.2.2 Treatment of Non-Detects 120
7.6.3.2.3 Fish Prey Sizes 120
7.6.3.3 Other Uncertainties 121
7.6.4 Fish Egg Tissue Risk Characterization Uncertainties 122
7.7 Weight of Evidence Risk Findings for Fish 123
7.7.1 Localized Resident Forage Fish (Combined Mummichog and Killifish) 125
7.7.2 American Eel 129
7.7.3 Summer and Winter Flounder 133

7.7.4 White Perch 135
7.7.5 Summary of WOE Risk Findings for Fish 139
8 Bird Assessment 144
8.1 Dietary Assessment 144
8.1.1 Exposure 144
8.1.1.1 Dietary Dose Model 145
8.1.1.2 Body Weights, Ingestion Rates, Prey Composition, Site Use Factors, Exposure Areas 145
8.1.1.3 Exposure Point Concentrations 146
8.1.1.4 Estimated Doses 147
8.1.2 Effects 147
8.1.3 Risk Characterization 147
8.2 Egg Tissue Assessment 150
8.2.1 Exposure 151
8.2.2 Effects 151
8.2.3 Risk Characterization 151
8.3 Uncertainties Assessment 152
8.3.1 Bird Dietary Risk Characterization Uncertainties 155
8.3.1.1 Avian Toxicology/TRVs 155
8.3.1.2 Exposure Assumptions 156
8.3.1.2.1 Site Use Factors 156
8.3.1.2.2 Polychaete Worm EPCs 157
8.3.1.2.3 Treatment of Non-Detects 157
8.3.1.2.4 Lesser Scaup Diet 158
8.3.1.2.5 Fish Prey Size 158
8.3.1.2.6 Other Uncertainties 159
8.3.2 Bird Egg Tissue Risk Characterization Uncertainties 160
8.3.2.1 Egg Tissue TRVs 161
8.3.2.2 Exposure Assumptions 162
8.4 Weight of Evidence Risk Findings for Birds 162
8.4.1 Spotted Sandpiper 164

8.4.2 Great Blue Heron....165
8.4.3 Double-crested cormorant....167
8.4.4 Lesser Scaup....170
8.4.5 Summary of Risk Findings for Birds....171
9 Mammal Assessment....174
9.1 Dietary Assessment....174
9.1.1 Exposure....174
9.1.1.1 Dietary Dose Model....174
9.1.1.2 Body Weights, Ingestion Rates, Prey Composition, Site Use Factors, Exposure Areas....175
9.1.1.3 Exposure Point Concentrations....176
9.1.1.4 Estimated Doses....177
9.1.2 Effects....177
9.1.3 Risk Characterization....177
9.2 Uncertainties Assessment....180
9.2.1 Mammalian TRVs....182
9.2.2 Exposure Assumptions....183
9.2.2.1 Site Use Factors....183
9.2.2.2 Polychaete Worm EPCs....184
9.2.2.3 Treatment of Non-Detects....185
9.2.2.4 Fish Prey Size....185
9.2.2.5 Other Uncertainties....185
9.3 Weight of Evidence Risk Findings for Mammals....186
9.3.1 River Otter....187
9.3.2 Muskrat....189
9.3.3 Harbor Seal....190
9.3.4 Summary of Risk Findings for Mammals....190
10 Diamondback Terrapin (Reptile) Assessment....192
10.1 Qualitative Risk Characterization....192
10.2 Uncertainties Assessment....192
11 Risk Summary and Conclusions....194

11.1 Integrated Risk Findings 194
11.2 Summary of Key Uncertainties 196
11.3 Weight of Evidence Conclusions and Risk Driver Recommendations 196
12 References 198

TABLES

Table 2-1 History of Dredging Activities within Newark Bay
Table 2-2 Area Coverage in the Newark Bay Study Area (in text)
Table 2-3 Vegetation Species Observed During the 2013 Reconnaissance (in text)
Table 2-4 Wildlife Species Observed During the 2013 Reconnaissance (in text)
Table 2-5 Essential Fish Habitat Designations by Life Stage for Newark Bay (in text)
Table 2-6 Dominant Benthic Invertebrate Species in Newark Bay
Table 2-7 Historical Benthic Community Indices from REMAP (in text)
Table 2-8 2015 Benthic Community Metrics for Newark Bay
Table 2-9 2015 Benthic Index of Biotic Integrity Metrics for Newark Bay
Table 2-10 Size Ranges of Softshell Clam from Other Estuaries (in text)
Table 2-11 Size Ranges of Blue Crab from Other Estuaries (in text)
Table 2-12 Annual Ichthyoplankton Catch 1999-2006
Table 2-13 List of Fish and Shellfish Collected 2014-2016
Table 2-14 Fish Sampling Method Summary (in text)
Table 2-15 Fall 2014 Target Fish Collection Summary
Table 2-16 Fall 2014 Non-Target Fish Collection Summary
Table 2-17 Spring 2015 Target Fish Collection Summary
Table 2-18 Spring 2015 Non-Target Fish Collection Summary
Table 2-19 Spring 2016 Target Fish Collection Summary
Table 2-20 Spring 2016 Non-Target Fish Collection Summary
Table 2-21 Inventory of Bird Observations in the Newark Bay Region
Table 2-22 Threatened and Endangered Species in the NBSA (in text)
Table 3-1 Assessment and Measurement Endpoints
Table 3-2 Representative Ecological Receptors (in text)

Table 3-3	Summary of Zone-Specific Exposure Risk Analyses for the Representative Receptors (in text)
Table 3-4	SLERA Identified COPECs
Table 3-5	COPECs evaluated for Shellfish, Fish, and Wildlife Receptors in the BERA (in text)
Table 3-6	Lines of Evidence for the BERA (in text)
Table 4-1a	Summary of NBSA Phase I-III Risk Assessment-Related Sampling Programs
Table 4-1b	Summary of NBSA Phase III Biota Tissue Samples
Table 4-2	Chemical Analytes for the NBSA Sampling Programs
Table 4-3	Phase III Surface Water Chemistry Summary Statistics
Table 4-4	Phase III Surface Sediment Chemistry Summary Statistics
Table 4-5	Organic Carbon Normalization Evaluation of Phase III Sediment Chemistry Data
Table 4-6	Porewater Chemistry Summary Statistics
Table 4-7a	Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation
Table 4-7b	Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)
Table 4-7c	Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)
Table 4-7d	Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)
Table 4-7e	Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)
Table 4-7f	Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)
Table 4-7g	Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)
Table 4-7h	Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)
Table 4-7i	Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)
Table 4-7j	Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)
Table 4-7k	Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)
Table 4-8	Lipid Normalization Evaluation of Phase III Tissue Chemistry Data
Table 4-9	Sediment and Biota Sample Numbers by BERA Assessment Zone (in text)
Table 4-10	Sediment Samples Included in the Risk Assessment
Table 4-11	Tissue Samples Included in the Risk Assessment
Table 4-12	Data Summary for COPECs by BERA Assessment Zone
Table 4-13a	Sediment ANOVA Results
Table 4-13b	Blue Crab ANOVA Results
Table 4-14	Comparison of NBSA Surface Sediment Concentrations to Jamaica Bay Urban Background

Table 4-15	Mass and Fractional Weights of Thirty-four Individual Blue Crab Specimens in the NBSA
Table 4-16	Historical Datasets for Newark Bay
Table 4-17	Summary of Historical Fish and Crab Concentrations for Selected Chemicals in the NBSA
Table 5-1	Surface Water Assessment Results
Table 6-1	Scoring Methods for the Sediment Quality Triad Data
Table 6-2	Benthic Invertebrate Community Scores
Table 6-3	Comparison of Benthic Invertebrate Community Metrics to Jamaica Bay Reference
Table 6-4	Sediment Toxicity Scores
Table 6-5	Comparison of 10-day Amphipod Survival to Jamaica Bay Reference
Table 6-6	Exceedances of Sediment Quality Guidelines
Table 6-7	Exceedances of Water Quality Criteria and Screening Values in Porewater
Table 6-8	Sediment and Porewater Chemistry Scores
Table 6-9	Sediment Quality Triad Scoring Summary
Table 6-10	Chemicals with Maximum or Second Largest Concentrations at Locations 151 or 154
Table 6-11	Spearman Rank Correlation of Sediment Chemistry and Benthic Effects
Table 6-12	Spearman Rank Correlation of Porewater Chemistry and Benthic Effects
Table 6-13	List of Potential Contaminants of Concern to the Benthic Invertebrate Community
Table 6-14	Models for Growth, Reproduction and BIC Metrics vs. Sediment Principal Components
Table 6-15	Models for Toxicity Endpoints vs. Sediment Factors
Table 6-16	Models for Toxicity Endpoints vs. Porewater Chemistry
Table 6-17	Summary Lines of Evidence from SQT Evaluation
Table 6-18	TRVs for Benthic Invertebrate Tissue Assessment
Table 6-19a	Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)
Table 6-19b	Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (North Zone)
Table 6-19c	Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (Southeast Zone)
Table 6-19d	Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (Southwest Zone)
Table 6-20	Summary of TRV Exceedances for Benthic Invertebrate Tissue (in text)
Table 6-21	Summary of Preliminary COCs for Benthic Invertebrate Tissue Assessment (in text)

Table 6-22	Weight of Evidence Risk Summary for Benthic Invertebrates
Table 7-1	Relative Abundance of Adult and Juvenile Fish in the NY/NJ Harbor Estuary Subregions: December-March (Winter) 2001-2011 (in text)
Table 7-2	Relative Abundance of Adult and Juvenile Fish in the NY/NJ Harbor Estuary Subregions: April-July (Spring) 2001-2011 (in text)
Table 7-3	Relative Abundance of Eggs and Larval Fish in the NY/NJ Harbor Estuary Subregions: December-March (Winter) 2001-2011 (in text)
Table 7-4	Relative Abundance of Eggs and Larval Fish in the NY/NJ Harbor Estuary Subregions: April-July (Spring) 2001-2011 (in text)
Table 7-5	TRVs for Fish Tissue Assessment
Table 7-6	TRVs for White Perch Liver Assessment (in text)
Table 7-7a	Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)
Table 7-7b	Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (North Zone)
Table 7-7c	Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (Southeast Zone)
Table 7-7d	Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (Southwest Zone)
Table 7-8	Summary of TRV Exceedances for Fish Tissue Assessment (in text)
Table 7-9	Calculated White Perch Liver Tissue HQs (in text)
Table 7-10	Exposure Parameters for Representative Fish Receptors
Table 7-11	TRVs for Fish Dietary Assessment
Table 7-12a	Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide)
Table 7-12b	Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone)
Table 7-12c	Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone)
Table 7-12d	Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone)
Table 7-13	Summary of TRV Exceedances for Fish Dietary Assessment (in text)
Table 7-14	TRVs for Fish Egg Tissue Assessment
Table 7-15	Calculated Tissue HQs for Fish Eggs with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)
Table 7-16	Summary of TRV Exceedances for Fish Egg Assessment (in text)
Table 7-17	Summary of Fish Pathology Assessment Findings
Table 7-18	Summary of Quantitative Fish Uncertainty Evaluations (in text)

Table 7-19	Summary of Preliminary COCs for Fish Tissue, Dietary, and Egg Assessments (in text)
Table 7-20	Summary of LOAEL HQs ≥ 1 for Mummichog/Killifish (in text)
Table 7-21	Summary of LOAEL HQs ≥ 1 for American Eel (in text)
Table 7-22	Summary of LOAEL HQs ≥ 1 for Flounder (in text)
Table 7-23	Summary of LOAEL HQs ≥ 1 for White Perch (in text)
Table 7-24	Weight of Evidence Risk Summary for Fish
Table 8-1	Exposure Parameters for Representative Avian Receptors
Table 8-2	TRVs for Bird Dietary Assessment
Table 8-3a	Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)
Table 8-3b	Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)
Table 8-3c	Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)
Table 8-3d	Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)
Table 8-4	Summary of TRV Exceedances for Bird Dietary Assessment (in text)
Table 8-5	TRVs for Bird Egg Tissue Assessment
Table 8-6	Calculated Tissue HQs for Bird Eggs with NBSA and LPR FFS Selected TRVs (NBSA-wide)
Table 8-7	Reproductive Endpoints for Double-Crested Cormorant Examined in Parsons (2003) (in text)
Table 8-8	Summary of Quantitative Bird Uncertainty Evaluations (in text)
Table 8-9	Comparison of NBSA-wide Cormorant Egg Tissue HQs Using Species-Specific TRVs (in text)
Table 8-10	Summary of Preliminary COCs for Bird Dietary Assessment (in text)
Table 8-11	Exceedance of TRVs for Spotted Sandpiper Dietary Assessment (in text)
Table 8-12	Exceedance of TRVs for Great Blue Heron Dietary Assessment (in text)
Table 8-13	Exceedance of TRVs for Double-Crested Cormorant Dietary Assessment (in text)
Table 8-14	Exceedance of TRVs for Lesser Scaup Dietary Assessment (in text)
Table 8-15	Weight of Evidence Risk Summary for Birds
Table 9-1	Exposure Parameters for Representative Mammal Receptors
Table 9-2	Bioaccumulation Factors Selected for Sediment-to-Plants

Table 9-3 TRVs for Mammal Dietary Assessment

Table 9-4a Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Table 9-4b Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Table 9-4c Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Table 9-4d Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Table 9-5 Summary of TRV Exceedances for Mammal Dietary Assessment (in text)

Table 9-6 Summary of Quantitative Mammal Uncertainty Evaluations (in text)

Table 9-7 Summary of Preliminary COCs for Mammal Dietary Assessment (in text)

Table 9-8 Weight of Evidence Risk Summary for Mammals

Table 9-9 Exceedances of TRVs for River Otter Dietary Assessment (in text)

Table 9-10 Exceedances of TRVs for Muskrat Dietary Assessment (in text)

Table 9-11 Exceedances of TRVs for Harbor Seal Dietary Assessment (in text)

Table 11-1a Weight of Evidence Risk Summary for NBSA BERA

Table 11-1b Sediment Quality Triad Evaluation Weight of Evidence Summary and Conclusions

FIGURES

Figure 1-1 Newark Bay Regional Map

Figure 1-2 Newark Bay Regional Features

Figure 2-1 NBSA Land/Shoreline Habitats Map

Figure 2-2 USEPA REMAP Locations – 1993 through 2013

Figure 2-3 Historical Benthic Index of Biotic Integrity

Figure 2-4 Benthic Index of Biotic Integrity Results

Figure 2-5 Crab, Clam, and Sediment Sampling Locations

Figure 2-6a Average Percent Species Catch Per Unit Effort (CPUE) of Demersal Fish in Newark Bay (2002-2010)

Figure 2-6b Average Monthly Catch Per Unit Effort (CPUE) of Demersal Fish in Newark Bay (2002-2010)

Figure 2-7 Summary of Seasonal Catch in Mid-Water Trawls in Newark Bay, 2006 and 2011-2013

Figure 2-8 Fish Sampling Locations – Fall 2014
Figure 2-9 Fish Sampling Locations – Spring/Summer 2015
Figure 2-10 Fish Sampling Locations – Spring 2016
Figure 2-11 Bird Nest and Mammal Observation Locations
Figure 3-1 Eight-Step Ecological Risk Assessment Process for Superfund (USEPA 1997)
Figure 3-2 Conceptual Food Web Diagram
Figure 3-3 Ecological Conceptual Site Model
Figure 3-4 Newark Bay Sampling Locations and Assessment Zones
Figure 4-1 Surface Water Sample Locations
Figure 4-2 SQT and Porewater Sampling Locations
Figure 4-3 Phase III Sediment Sampling Locations
Figure 4-4 Locations of 2014-2016 Sediment Samples Used for Risk Assessment
Figure 4-5 Sediment and Biota Tissue Boxplots
Figure 4-6 Fish Tissue Boxplots
Figure 5-1 Surface Water Results
Figure 6-1 SQT Sampling Locations
Figure 6-2 Sediment Toxicity Results
Figure 6-3 Principal Component Analysis of Sediment Chemistry
Figure 6-4 Sediment Chemistry Principle Component Scores
Figure 6-5 Probit Model of 10-Day Amphipod Mortality: Sediment
Figure 6-6 Model Predicted 10-Day Amphipod Survival
Figure 6-7 Gompertz Model of 28-Day Amphipod Mortality: Sediment
Figure 6-8 Model Predicted 28-Day Amphipod Survival
Figure 6-9 Factor Analysis of Sediment Chemistry
Figure 6-10 Principal Component Analysis of Porewater Chemistry
Figure 6-11 Factor Analysis of Porewater Chemistry
Figure 6-12 Probit Model of 10-Day Amphipod Mortality: Porewater
Figure 6-13 Probit Model of 28-Day Amphipod Mortality: Porewater
Figure 6-14 Non-metric Multidimensional Scaling for Benthic Invertebrate Community
Figure 6-15 Magnitude of NBSA-wide NOAEL and LOAEL HQs ≥ 1 for Invertebrate Tissue Assessment (in text)

Figure 7-1 Magnitude of NBSA-wide NOAEL and LOAEL HQs ≥ 1 for Fish Tissue Assessment (in text)

Figure 8-1 Magnitude of NBSA-wide NOAEL and LOAEL HQs ≥ 1 for Bird Dietary Assessment (in text)

Figure 8-2 Sediment to Polychaete Worm Tissue Regression

Figure 9-1 Magnitude of NBSA-wide NOAEL and LOAEL HQs ≥ 1 for Mammal Dietary Assessment (in text)

APPENDICES

Appendix A Sediment Quality Triad Assessment

Appendix B Species Life History Profiles and Exposure Factors

Appendix C Food Web/Exposure Point Concentration Calculations

Appendix D Toxicity Profiles and Selection of Toxicity Reference Values

Appendix E Hazard Quotient Calculations

Appendix F Sensitivity & Uncertainties Analyses of Risk Estimates

ATTACHMENTS

Attachment 1 Screening-Level Ecological Risk Assessment (SLERA) for the Newark Bay Study Area (Battelle 2008)

Attachment 2 Problem Formulation for the Newark Bay Study Area (Tierra 2013a)

Attachment 3 Newark Bay Study Area Reconnaissance Report (Tierra 2015a)

Attachment 4 Newark Bay Study Area Environmental Sample Collection Report (Normandeau 2017)

Attachment 5 Newark Bay Study Area Fish Sampling and Analysis, Amended Pathology Reports (EPL 2016a, 2016b)

Attachment 6 Chemical Residues in Cormorants from New York Harbor and Control Location (Parsons 2003)

ACRONYMS AND ABBREVIATIONS

2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-*p*-dioxin
ABS	Aquatic Biological Survey
ADD	average daily dose
AE	assessment endpoint
AhR	aryl hydrocarbon receptor
AIC	Akaike's Information Criteria
ANCOVA	analysis of covariance
ANOVA	analysis of variance
AOC	Administrative Order on Consent
ASMFC	Atlantic States Marine Fisheries Commission
BAF	bioaccumulation factor
Bay	Newark Bay
BAZ	biologically active zone
BERA	baseline ecological risk assessment
BHHRA	baseline human health risk assessment
B-IBI	Benthic Index of Biotic Integrity
BIC	benthic invertebrate communities
CBR	critical body residue
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CF	conversion factor
cfs	cubic feet per second
cm	centimeters
COC	constituent of concern
COPC	constituents of potential concern
COPEC	constituents of potential ecological concern
CPG	Cooperating Parties Group
CSM	Conceptual Site Model
CV	coefficient of variation
cy	cubic yards

DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DF	dietary fraction
dw	dry weight
EFH	essential fish habitat
EPC	exposure point concentration
EPL	Experimental Pathology Laboratories, Inc.
ERL	effects range-low
ERM	effects range-median
FOD	frequency of detection
FS	feasibility study
FFS	Focused Feasibility Study
GSH	Glenn Springs Holdings, Inc.
HDP	Harbor Deepening Project
HQ	hazard quotient
HMW	high molecular weight
IR	ingestion rate
kg/kg bw-day	kilogram per kilogram body weight per day
LD50	lethal dose 50%
LMW	low molecular weight
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOE	line of evidence
LPR	Lower Passaic River
LPRSA	Lower Passaic River Study Area
MDD	minimum detectable difference
ME	measurement endpoint
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg bw/day	milligrams per kilogram body weight per day

mm	millimeters
NAVD88	North American Vertical Datum 1988
NBSA	Newark Bay Study Area
ng/g	nanograms per gram
ng/kg	nanograms per kilogram
ng/kg-day	nanograms per kilogram per day
ng/L	nanogram per liter
NJDEP	New Jersey Department of Environmental Protection
NMDS	non-metric multidimensional scaling
NMFS	National Marine Fisheries Service
NOAEC	no observed adverse effects concentration
NOAEL	no observed adverse effect level
NOAA	National Oceanic and Atmospheric Administration
Normandeau	Normandeau Associates, Inc.
NY/NJ	New York/New Jersey
NYSDEC	New York State Department of Environmental Conservation
OCC	Occidental Chemical Corporation
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PC	principal component
PCA	principal component analysis
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-*p*-dioxin
PCDF	polychlorinated dibenzofuran
PE	polyethylene
pg/L	picograms per liter
POM	polyoxymethylene
ppth	parts per thousand
PRC	performance reference compound
PSU	practical salinity units
QAPP	Quality Assurance Project Plan

QA/QC	quality assurance/quality control
REMAP	Regional Environmental Monitoring and Assessment Program
RI	remedial investigation
RIWP	Remedial Investigation Work Plan
ROD	Record of Decision
SE3	Saline Estuarine Category 3
SLERA	screening level ecological risk assessment
SI	site investigation
SOC	Species of Concern
SQuiRT	Screening Quick Reference Table
SQT	sediment quality triad
SSD	species sensitivity distribution
SUF	site use factor
SumTU	sum of toxic units
SWQC	Surface Water Quality Criteria
TEF	toxic equivalency factor
TEQ	toxic equivalency
Tierra	Tierra Solutions, Inc.
TOC	total organic carbon
TRV	toxicity reference value
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
Windward	Windward Environmental LLC
WOE	weight of evidence
ww	wet weight
µg/kg	micrograms per kilogram
%	percent

1 INTRODUCTION

The Diamond Alkali Superfund Site was added to the Superfund National Priorities List on September 21, 1984 because of contaminants present at the Site. Four different operable units (OUs) are associated with the Site (Figure 1-1): the former manufacturing plant and surrounding properties at 80 and 120 Lister Avenue (Operable Unit 1 [OU1]), the lower 8.3 miles of the Passaic River (Operable Unit 2 [OU2]), the Newark Bay Study Area (NBSA; Operable Unit 3 [OU3]), and the lower 17 miles of the Passaic River (Operable Unit 4 [OU4]; Lower Passaic River Study Area [LPRSA]; U.S. Environmental Protection Agency [USEPA] 2016).

Pursuant to the Administrative Order on Consent (AOC) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; Index 02-2004-2010; USEPA 2004), Glenn Springs Holdings, Inc., (GSH), on behalf of Occidental Chemical Corporation (OCC; the successor to Diamond Shamrock Chemicals Company [formerly known as Diamond Alkali Company]), has conducted a Baseline Ecological Risk Assessment (BERA) for the NBSA. The results and findings of this BERA will be incorporated into the Remedial Investigation (RI) for the NBSA, and evaluated with respect to potential remedial goals and options in the Feasibility Study (FS).

Baseline human health risk assessments (BHHRA) and ecological risk assessments (BERA) have been conducted for both the LPRSA and NBSA. These are on separate but parallel tracks, with coordination by the USEPA to ensure that the assessment approaches and structure are as comparable as possible so that Diamond Alkali Superfund Site-wide risk management decisions can be made in a consistent manner.

This document presents the BERA for the NBSA. The objectives of the BERA are to evaluate potential exposure risks for aquatic organisms and wildlife (i.e., representative benthic invertebrates, fish, birds, mammals, and reptiles) that inhabit or utilize the Newark Bay environs, and provide a risk characterization that can be used to make informed risk management decisions for the NBSA.

1.1 Site Setting and Study Area Description

Newark Bay (Bay) is a 6.3-square-mile enclosed embayment on the western side of the New York/New Jersey (NY/NJ) Harbor Estuary. The Bay is adjacent to four large cities (Newark, Elizabeth, Bayonne, and Jersey City), and is fringed on its western side by port facilities, industrial facilities, and the Newark Liberty International Airport. On its northern side, the Hackensack and Passaic Rivers flow into the Bay, while on the southern side, the Bay is connected to NY Harbor (NY) and Raritan Bay (NJ) through two tidal straits: the Kill van Kull and Arthur Kill, respectively. The NBSA has been defined as the Bay and portions of key tributaries, including the Hackensack River, Arthur Kill, and Kill van Kull. The Bayonne and Goethals Bridges are not the OU3 boundaries themselves (Figure 1-2). The Passaic River is not included in the definition of the NBSA, as it is presently being investigated as a separate OU (OU4). However, investigations of the Passaic River and NBSA OUs are being conducted in a comparable manner and with careful consideration of their linkages for the purposes of CERCLA management decision-making and broader environmental management considerations.

The Bay is a partially mixed estuary, meaning that there is some density stratification of saline and freshwater (Suszkowski 1978; U.S. Army Corps of Engineers [USACE] 2007b). Salinity in the Bay has been reported to range from approximately 14 to 24 parts per thousand (ppth), with an average annual salinity of approximately 20 ppth (USACE 2007b). Salinity measured in Newark Bay as part of the Physical Water Column Monitoring program between April and July 2010 ranged from 3.7 to 24.7 practical salinity units (PSU) with an average of 18.6 PSU[1] (AECOM 2019). Estuaries can have a wide range in salinity from freshwater to marine environments (0.5 to 30 ppth; USACE 2007b). The tides in the Bay area are semi-diurnal, with a mean tide range of 5.1 feet and a spring tide range of 6.1 feet. The mean tide level is 5.9 feet above North American Vertical Datum of 1988 (USACE 1997). Tidal currents are the primary mechanism of water flow within the Bay and are strongest (both ebb and flood) in the Arthur Kill and Kill van Kull. The dominant freshwater contributions to the Bay are from the Passaic and Hackensack Rivers at the northern end of the Bay, while other freshwater sources to the Bay include smaller tributaries like the Elizabeth River, Peripheral Ditch, and Piersons Creek, among others (Figure 1-1). Annual flow computations by Blumberg et al. (1999) show that approximately 60 percent (%) of annual flows into the Bay come from the Kill van Kull and 34% come from the Hackensack and Passaic Rivers combined, while net discharge to the Raritan Bay occurs through the Arthur Kill. Salinity is highest and density stratification is weakest in the Kill van Kull due to high volume exchange with NY Harbor (Suszkowski 1978).

The Newark Basin, in which the NBSA is located, is underlain by sedimentary rocks (sandstones, shales, limy shales, and conglomerates), igneous rocks (basalt and diabase), and metamorphic rocks (schists and gneiss). Sediments found on the bottom or just below the bottom of the Bay are mostly fine-grained within the range of silt and clay-sized particles (USACE 1997), which is consistent with the grain size analysis from Phase I, II (Tierra Solutions, Inc. [Tierra] 2014c) and III (GSH 2020); however, some parts of the Bay consist of 50% to 75% fine sands (GSH 2020). The pattern of sediment types (sand/gravels versus silt/clays) is indicative of fluvial sediment input at the northern end of the Bay and tidal exchange sedimentation at the southern end.

Hydrodynamics within the Bay are influenced primarily by four inter-related physical forces: 1) tributary flows from the Passaic and Hackensack Rivers; 2) astronomical forcing (tides); 3) local and regional meteorological events (wind and storm effects); and 4) gravitational forcing (density-driven circulation) (Chant 2006; Herrington et al. 2002; Wakeman 2006). These primary influences are responsible for the variations in hydrodynamic and sediment transport characteristics within the system (Herrington et al. 2002).

A description of the environmental history of the Newark Bay region, and detailed characterization of the Bay ecosystem are provided in Section 2.

1.2 Superfund Site History and Participation

The NBSA is part of the Diamond Alkali Superfund Site, which was added to the Superfund National Priorities List on September 21, 1984 because of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)

[1] PSUs are a more modern way to express salinity based on electrical conductivity, but are nearly identical to older salinity measures in ppth.

present at the Site. The USEPA's response began at the former facility located at 80 and 120 Lister Avenue in Newark, New Jersey (OU1). 2,3,7,8-TCDD was a by-product of one of the manufacturing processes (USEPA 2016a).

Four different OUs are associated with the Diamond Alkali Superfund Site today (Figure 1-1):

- OU1: 80 and 120 Lister Avenue
- OU2: Lower 8.3 miles of the Passaic River
- OU3: NBSA
- OU4: Lower 17 miles of the Passaic River.

In 1990, a Consent Decree was entered into by the USEPA/State of New Jersey and OCC to implement and maintain an interim remedy, documented in a 1987 Record of Decision (ROD), at 80 and 120 Lister Avenue for OU1 (United States District Court for the District of New Jersey 1990). The primary constituents of concern identified in the ROD for OU2 are polychlorinated dibenzo-p-dioxins and dibenzofurans (dioxins and furans, or PCDD and PCDFs), polychlorinated biphenyls (PCBs), mercury, dichlorodiphenyltrichloroethane and its primary breakdown products, dichlorodiphenyldichloroethane and dichlorodiphenyldichloroethylene (referred to as total DDx), copper, dieldrin, and polycyclic aromatic hydrocarbons (PAHs).

In 2007, an AOC was signed by the USEPA and the Cooperating Parties Group (CPG; USEPA 2007a) to conduct an remedial investigation (RI)/feasibility study (FS) for OU4 (and OU2). The primary contaminants of concern identified for the Diamond Alkali Superfund Site in the 2007 AOC include PCDDs, PCDFs, PCBs, PAHs, pesticides, and inorganics/metals.

In 2004, the USEPA and OCC signed an AOC under CERCLA (Index 02-2004-2010; USEPA 2004) in which OCC agreed to conduct an RI/FS for the NBSA (USEPA 2004). This work was formerly implemented, through April 2017, by Tierra on behalf of OCC. GSH is currently performing the work on OCC's behalf.

Cleanup activities performed or planned to date at the Diamond Alkali Superfund Site include the following:

- On September 30, 1987, the ROD for OU1 was finalized. The USEPA-selected interim remedy, which was completed in 2001, included constructing slurry and flood walls, capping the properties, and pumping and treating of groundwater to reduce its migration.
- In June 2008, the USEPA and OCC signed an agreement to remove 200,000 cubic yards (cy) of contaminated sediment from the river adjacent to OU1. Phase I was completed in 2012 and included dredging, dewatering, and offsite disposal of 40,000 cy of contaminated sediment. Phase II was intended to include removal of the remaining 160,000 cy with disposal in a confined disposal facility. Remediation of the Phase II area is being integrated with the OU2 remedy.
- In June 2012, the USEPA and CPG signed an agreement to address contaminants found at the surface of a mudflat on the east bank of the Passaic River at river mile 10.9 in Lyndhurst, New Jersey. In 2013 and 2014, surface sediment was dredged and a cap was constructed.

- On March 3, 2016, the ROD for OU2 was finalized. The selected remedy consists of capping with sediment dredging to accommodate cap construction. The design of the OU2 remedy is underway (USEPA 2018).

The NBSA, which is the subject of this BERA, is presently in the RI/FS process. In addition to this BERA, an RI and BHHRA are being conducted for the NBSA, and the FS will follow.

1.3 Remedial Investigation Objectives

The RIs in the NBSA, designed and conducted according to the requirements specified in the RI/FS AOC and associated statement of work, were developed to generate additional data that will be used to produce the RI Report, an FS Report, and ultimately support the development of a ROD for the NBSA. The NBSA AOC defined three RI-related goals:

1. Nature and Extent of Sediment Contamination: Determine the horizontal and vertical distribution and concentrations of PCDDs, PCDFs, PCBs, PAHs, pesticides, and metals for NBSA sediments.
2. Risk Assessment: Determine the primary human and ecological receptors (endpoints) of PCDD-, PCDF-, PCB-, PAH-, pesticide-, and metals-contaminated sediments in the NBSA.
3. Source Identification: Determine the significant direct and indirect continuing sources of PCDDs, PCDFs, PCBs, PAHs, pesticides, and metals to the sediments in the NBSA (USEPA 2004).

As described in the RI/FS Phase I Investigation Work Plan (Phase I RIWP; Tierra 2005) and Phase II Remedial Investigation Work Plan (Phase II RIWP; Tierra 2007), sediment and related investigation activities were carried out in two initial phases. On September 9, 2015, the USEPA submitted a memorandum to Tierra that described a need to characterize subunits of the Bay at an appropriate scale for RI/FS decision-making because the existing data only allowed for Bay-wide decision making (USEPA 2015a). A Phase III surface sediment investigation was designed and implemented in 2016 Newark Bay Study Area Phase III Sediment Investigation Quality Assurance Project Plan Amendment (Phase III QAPP; Tierra 2016). Sampling was conducted in a systematic, stratified manner to collect sufficient data to characterize and statistically compare surface sediment data in the various geomorphic zones and defined subunits of the Bay, and a number of previous Phase I/II locations were resampled to provide data for recent (i.e., previous decade) trend analyses. This program was also designed/intended to provide a baseline surface sediment sampling grid for the NBSA to utilize for future sampling events to conduct long-term trend analyses.

In addition to the RI, a number of focused investigations were conducted to provide the necessary data and information to conduct a BHHRA and BERA for the NBSA. These include the development of the Screening-Level Ecological Risk Assessment (SLERA) Report (Attachment 1; Battelle 2008), the Problem Formulation Report (Attachment 2; Tierra 2013a), the Newark Bay Study Area Reconnaissance Survey Report (Attachment 3; Tierra 2015a), sediment quality triad (SQT) and porewater sampling and analyses (GSH 2017a), crab and clam sampling and analyses (GSH 2017b), and fish sampling and analyses (Tierra 2017). All work for this BERA was carried out in accordance with USEPA-approved sampling and quality assurance project plans (Tierra 2014a, 2014b, 2015b). Section 4 describes the various investigations and their application to this BERA.

1.4 Report Organization

Together with this introductory section, this document is organized as follows:

- Section 2 – Ecosystem Characterization
- Section 3 – Problem Formulation
- Section 4 – Data Results and Evaluation
- Section 5 – Surface Water Assessment
- Section 6 – Benthic Invertebrate Assessment
- Section 7 – Fish Assessment
- Section 8 – Bird Assessment
- Section 9 – Mammal Assessment
- Section 10 – Diamondback Terrapin (Reptile) Assessment
- Section 11 – Risk Summary and Conclusions
- Section 12 – References.

2 ECOSYSTEM CHARACTERIZATION

The following is a summary of the present NBSA environmental setting, and the history of changes to the Bay that have created the present ecosystem under investigation in the RI/FS and this BERA. Detailed descriptions of the NBSA system are provided in the RI Report presently being developed (GSH 2020).

2.1 Environmental Setting

The Bay is central to one of the most urbanized and industrialized areas in the United States. It has experienced more than two centuries of environmental degradation attributable to many factors, including shoreline and land development (USACE 2006a), wetlands/habitat loss, garbage and sewage disposal, dredging and dredged material disposal, and releases of contaminants from a variety of sources and locations (Iannuzzi et al. 2002).

2.1.1 History

The environmental history of Newark Bay parallels the development of the New York City metropolitan area. Most shipping and economic development in the 19th century clustered around Manhattan and Brooklyn, but as the pace of development quickened in the first half of the 20th century, the Bay eventually supplanted Manhattan as the primary port by the middle of the 20th century. Over that period of development, approximately 80 to 90% of the pre-existing shoreline of the Bay was developed and ecological habitats correspondingly diminished (Iannuzzi et al. 2002; USACE 2007a, 2009a).

Newark and Elizabeth (known in its early history as Elizabethtown and Elizabethport), much like surrounding communities, started as small towns surrounded by farms, forest, and wetlands (Hassler 1844). By the 1840s, railways bisected wetlands and connected Newark to Jersey City and Elizabeth, setting the pre-conditions for future industrial development. Newark was home to several chemical companies producing various chemical products and raw materials by 1850 (Cunningham 1954; Zdepski 1992). By 1900, Newark was the largest industrial-based city in the United States, with well-established industries, including petroleum refining; shipping; tanneries; creosote wood preservers; metal recyclers; and manufacturers of materials, including rubber, rope, textiles, paints and dyes, pharmaceuticals, raw chemicals, leather, and paper products (Meyers 1945; Cunningham 1954, 1966; Brydon 1974; Halle 1984; MacRae's Blue Book, Inc. 1986; Galishoff 1988). By the early 20th century, housing developments covered most of the Bayonne peninsula, and the cities of Newark and Elizabeth on the west side were greatly expanded as the growing industrial manufacturing complex in the Newark region replaced agriculture and large numbers of people moved to the area. The Bay continued to evolve into what is now a highly modified, major shipping port.

The development of the Bay port system required extensive land development, achieved through "reclamation" of the meadowlands (wetlands) along the Bay and the Hackensack River during the 20th century. As the area's population and industrial development grew, transportation needs increased, and a large network of roads, bridges, airports, and port facilities was constructed. Today, Newark—the largest city in New Jersey—is a trade and transportation center. One of Newark's important functions as a transportation center is the transfer of goods from cargo vessels in the Bay ports to the many railroad and

truck lines that serve the region and beyond. Land use along the northern, western, and southern shoreline of the Bay is high-density commercial and industrial/commercial development. A highly developed network of highways, combined sewer overflows, storm sewer outfalls, and publicly owned treatment works also exist within the Bay and its watershed (Mueller et al.1982).

Industrialization of the Bay was facilitated by development of navigational channels in the NY/NJ Harbor Estuary starting in the mid-1800s through channel deepening and widening by the USACE New York District (see Figure 1-2 for current navigation channel system). Table 2-1 presents the Bay's history of dredging, navigation channel widening, and wetlands alteration. Bathymetry surveys have been conducted since the early 1900s by the National Oceanic and Atmospheric Administration (NOAA) and USACE, and historical nautical charts prepared by the NOAA illustrate the shaping of the Bay.

The depth and width of the navigational channels have grown continually since the early 1900s (USACE 2006a), although channels in some adjacent water bodies (e.g., the Lower Passaic River [LPR] and Hackensack River) are no longer maintained to their previously authorized depths. The navigation channel in the LPR above river mile 1.7 (i.e., above the Route 1-9 Lincoln Highway Bridge shown in Figure 1-2) has been deauthorized. The navigation channel in the Bay north of the port channels is not maintained to previously authorized depths, even though it is still subject to large vessel traffic (e.g., wastewater treatment sludge barges). Substantial maintenance dredging of the existing channels is required. During the most recent maintenance dredging (2016), approximately 285,000 cy of material were removed from critically shoaled areas of the Port Newark approach channels. Currently, channel conditions are being monitored.

2.1.2 Land Use and Shoreline Characterization

A present land use map of the NBSA is presented on Figure 2-1. The NBSA shoreline is primarily comprised of the following types:

1. Bulkhead – Extent of shoreline where majority of vertical face consists of wood timbers, metal sheet pile, or large stone/cement blocks; ~40% of the NBSA shoreline is classified as bulkheads.
2. Mixed Intertidal – Extent of shoreline where a combination of riprap, sand, and/or emergent vegetation is present. Mixed intertidal shorelines comprise ~10% of the NBSA shoreline.
3. Riprap – Extent of shoreline dominated by sloped banks that are covered by cobble to boulder sized stones and/or concrete rubble. Riprap covers ~30% of the NBSA shoreline.
4. Vegetation – Extent of shoreline with greater than 50% emergent vegetation; ~20% of the NBSA shoreline is classified as vegetated.

Human use of the NBSA upland areas is primarily industrial and commercial. Recreational use is limited due to access limitations of the shoreline types and surrounding land use. Based on a reconnaissance survey (Tierra 2015a), five human use categories were established and described as follows along with the percentage of upland characterization adjacent to the shoreline where each was observed:

- Disturbed Uplands – open space areas that have been abandoned and overgrown with terrestrial vegetation (e.g., trees, scrub/shrub) - ~20%

- Undisturbed Uplands – areas consisting of natural vegetation that provides habitat for wildlife species (natural vegetation does not include landscaped vegetation which is part of the Residential category described below) – ~25%
- Industrial/Commercial – areas consisting of industrial/commercial use, such as, but not limited to, manufacturing facilities, ports, and shipyards – ~35%
- Recreational – areas where recreational activities are dominant (e.g., parks, fishing spots, walking trails) – ~10%
- Residential – areas consisting of, but not limited to, residential homes, apartment complexes, and schools – ~10%.

2.1.3 Contamination

Numerous former and current industrial and manufacturing facilities in the Newark metropolitan area serve(d) as potential point and non-point source discharges to the sediment environment. These industries include (but are not limited to) metals refining, dye manufacturing, tanning, soap and candle making, lumber processing, hat manufacturing, carriage building, shoe making, petroleum processing, chemical manufacturing, pesticide and herbicide production, paper and textile manufacturing, copper rolling, wire manufacturing, coke making, and manufactured gas plants (Tierra 2013a; Iannuzzi et al. 2002). Industrial dischargers located along the waterfront and inland areas of the Passaic River, Hackensack River, Arthur Kill, and Newark Bay have contributed to sediment contamination in the NBSA.

The NBSA is known to be contaminated with a wide variety of organic compounds and inorganic chemicals (i.e., PCDD/PCDFs, PCBs, PAHs, pesticides, herbicides, semivolatile organic compounds, volatile organic compounds, inorganics/metals, and other organic compounds). There are many known sources of contaminants to the Bay, including:

- Industrial discharges
- Publicly owned treatment works, combined sewer overflows, storm sewers, and other non-point sources
- Spills, leaks, and accidental discharges from marine and industrial sources
- Atmospheric deposition and groundwater discharges
- Tributary inputs from each of the sources listed, and transport of re-mobilized legacy sediments from tributaries.

Existing contamination in the NBSA is primarily from historical and present sources from each of these categories, which in combination have been released over more than a century paralleling the urban and industrial history of the Bay. The relative influence or importance of these various sources is not easily quantifiable, and likely varies depending on the geographic area, contaminant group, temporal fate and transport processes, and the depth of the contaminated sediment layer under consideration. Additional

information regarding sources of contaminants in the Bay is provided in the RI Report (GSH 2020) and Report on Investigation of Sources of Pollutants and Contaminants (Tierra 2006[2]).

Sediment-based risk in this BERA is evaluated using sediment chemistry data from surface sediment samples (0 to 6 inches below sediment surface). In some areas of the Bay, higher concentrations of contaminants are found in deeper sediments, particularly in areas of the subtidal flats that have been historically disturbed (i.e., former channels or structures). However, evidence presented in the RI Report (GSH 2020), indicate that there are no expected changes to the ecosystem in the foreseeable future that would alter the exposure conditions for the species evaluated in this BERA. Evaluation of long-term trends using data from deep sediment cores indicates that contaminant concentrations have been declining. Temporal trends evaluated over the period of RI sediment sampling (i.e., 2005 to 2016) indicate that a declining trend continues (GSH 2020). Therefore, the potential for exposure of receptors to deeper sediments are not evaluated in this BERA.

2.1.4 Habitats

The following is a characterization of ecological habitats in the NBSA. Data and information for this characterization are integrated from the Problem Formulation (Attachment 2; Tierra 2013a) and Reconnaissance Survey (Attachment 3; Tierra 2015a) reports. Collectively, the data and information compiled to date under the RI process provides a good understanding of the Bay ecosystem.

Wetland and tributary losses, and present-day shorelines covered by bulkheads, riprap, buildings, and impervious surfaces (e.g., pavement and concrete) limit the available wildlife habitat in the NBSA, particularly nesting and foraging areas for birds and mammals (Iannuzzi et al. 2002). Table 2-2 provides the acreages of the geomorphic areas of the Bay. Subtidal flats, including the portions that were historically disturbed, are the primary habitat areas for aquatic organisms in the Bay. Intertidal areas (Table 2-2) and vegetated wetlands (Figure 2-1) comprise only a small portion of the overall shoreline area. Degraded structures and pilings offer some habitat for aquatic species. Shooters Island offers some forested and wetland habitat for birds. North and south of the NBSA, there are extensive tidal wetlands associated with the Hackensack River and the Arthur Kill that provide wildlife habitat for birds and mammals. Despite the changing habitat conditions in the ecosystem during the 20th century, the Bay acts as a spawning ground, migratory pathway, and a nursery/foraging area for a variety of aquatic organisms.

Table 2-2. Area Coverage in the Newark Bay Study Area

Geomorphic Area	Area (acres)	Percent of NBSA Area	Average Depth[a] (feet NAVD88)
Subtidal Flats	1737.9	42.6	7.5
Historically Disturbed Subtidal Flats	251.4	6.2	8.4
Transitional Slopes	411.1	10.0	26
Navigation Channels/Port Channels	1277.3	31.3	50[b]
Intertidal Areas	28.9	0.7	3.2

[2] This document has not been approved by the USEPA.

Geomorphic Area	Area (acres)	Percent of NBSA Area	Average Depth[a] (feet NAVD88)
Industrial Waterfront Areas	346.4	8.5	17
Confined Disposal Facility[c]	27.4	0.7	6.1

Notes:
[a] Average depths were tide-corrected from the 2012/2013 bathymetric survey (Tierra 2013b).
[b] Average depth of the Navigation Channels/Port Channels is estimated based on the Harbor Deepening Project completed in 2016.
[c] The acreage of the confined disposal facility is shown separately, however it is part of the subtidal flats geomorphic area.
NAVD88 = North American Vertical Datum of 1988

2.1.4.1 Terrestrial (Shoreline) and Intertidal Wetland Habitats

Upland vegetation along the NBSA generally consisted of a patchy mixture of early successional and ruderal plant species, indicative of the high level of shoreline disturbance. Dominant canopy species included eastern cottonwood (*Populus deltoides*), locust trees (*Gleditsia* spp. or *Robinia* spp.), and catalpa (*Catalpa speciosa*) with an understory of honeysuckle (*Lonicera* spp.) and sumac (*Rhus* spp.). A total of 22 common plant and tree species were identified during the reconnaissance survey (Table 2-3). While this list is not comprehensive, it provides a good representation of the types of plant and tree species observed along the shoreline.

Table 2-3. Vegetation Species Observed During the 2013 Reconnaissance

Common Name	Scientific Name
Aspen	*Populus* spp.
Birch	*Betula* spp.
Black locust	*Robinia pseudoacacia*
Boneset (unidentified)	*Eupatorium* spp.
Catalpa	*Catalpa speciosa*
Chokecherry	*Prunus virginiana*
Common reed	*Phragmites australis*
Eastern cottonwood	*Populus deltoides*
Goldenrod (unidentified)	*Solidago* spp.
Groundsel tree	*Baccharis halimifolia*
Honeysuckle	*Lonicera* spp.
Jewelweed (unidentified)	*Impatiens* spp.
Locust (unidentified)	*Gleditsia* spp. or *Robinia* spp.
Pokeweed	*Phytolacca americana*
Princess trees	*Paulownia tomentosa*

Common Name	Scientific Name
Ragwort	*Jacobaea vulgaris, syn. Senecio jacobaea*
Red maple	*Acer rubrum*
Smooth cordgrass	*Spartina alterniflora*
Sumac	*Rhus* spp.
Sunflower	*Helianthus annuus*
Sycamore	*Platanus occidentalis*
Willow	*Salix* spp.

As is characteristic of disturbed upland habitats, species diversity was low and dominated by fast-growing invasive and/or short-lived vegetation. These upland habitats were small in size, lacked a consistent canopy and understory, and were surrounded by a mixture of commercial, industrial, and residential areas. Due to the limited size and complexity of these habitats, upland areas adjacent to the NBSA do not provide much in the way of suitable habitat for ecological receptors beyond cover, resting, or limited foraging.

The intertidal wetlands (intertidal areas) of the NBSA primarily consist of emergent common reed (*Phragmites australis*) and saltmarsh cordgrass (*Spartina alterniflora*). In general, the cordgrass occupies the more waterward areas of the intertidal zone, while common reed is present in the more landward areas of the intertidal zone and transition into the upland shoreline areas.

Shooters Island, located in the southern portion of the Bay, is one of the major forested areas of the Bay. It is partially wooded with species such as black locust (*Robinia pseudoacacia*), tree-of-heaven (*Ailanthus altissima*), and Japanese honeysuckle (*Lonicera japonica*). Small patches of saltmarsh containing a mix of common reed and cordgrass occur around the island's shoreline, intermixed with scattered debris, rotting docks, abandoned buildings, shipwrecks, and barges (U.S. Fish and Wildlife Service [USFWS] 1997). Despite its impacted condition, Shooters Island continues to serve as a bird sanctuary and refuge for migratory birds such as gulls, cormorants, and osprey, which have recently been observed on the island (Bernick and Craig 2008).

Additional forested areas occur along the eastern tip of Kearny Point, just south of the Elizabeth Marine Terminal, along the eastern side of Bayonne Park, and in Richard A. Rutkowski Park. Sporadic forested areas also occur between Veterans and City Parks, in Mariners Marsh, and around the Newark Bay Bridge (Figure 2-1).

Barren lands, consisting of recently cleared or disturbed areas where soils have been disturbed (e.g., coal cinders are often a major soil constituent), are common around the Bay shorelines. Vegetation consists of tolerant, often introduced, species. Vegetation is present in scattered patches, offering little cover for wildlife, particularly in winter. Garbage and debris items are present in the vacant lots/fields. Typical plant species include goldenrod (*Solidago canadensis* or *Solidago virgaurea*), mugwort (*Artemisia vulgaris*), raspberry (*Rubus* spp.), Asian bittersweet (*Celastrus orbiculatus*), pokeweed (*Phytolacca americana*), and saplings of royal paulowina (*Paulownia tomentosa*), mulberry (*Morus* spp.), tree-of-heaven, and black

locust. Typical wildlife observed includes terrestrial, urban-tolerant species (United States Coast Guard 2010).

Despite the highly developed shoreline, the NBSA provides habitat for some wildlife, primarily birds. A total of 34 different species of wildlife were observed during the 2013 NBSA reconnaissance survey (Table 2-4; Tierra 2015a). While the majority of observations were birds, several mammals (primarily urban opportunistic species, such as rats and coyotes) were observed throughout the NBSA. Also, one turtle was observed along an area of emergent vegetation. More detailed discussions of aquatic organisms and wildlife that inhabit or utilize the NBSA are presented in Sections 2.3 through 2.8.

Table 2-4. Wildlife Species Observed During the 2013 Reconnaissance

Common Name	Scientific Name
Birds	
American crow	*Corvus brachyrhynchos*
Belted kingfisher	*Megaceryle alcyon*
Black duck	*Anas rubripes*
Blue-winged teal	*Anas discors*
Brant	*Branta bernicla*
Canada goose	*Branta canadensis*
Grey Catbird	*Dumetella carolinensis*
Common sandpiper	*Actitis hypoleucos*
Common tern	*Sterna hirundo*
Double-crested cormorant	*Phalacrocorax auritus*
Great blue heron	*Ardea herodias*
Herring gull	*Larus argentatus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Laughing gull	*Leucophaeus atricilla*
Little green heron	*Butorides virescens*
Mallard	*Anas platyrhynchos*
Northern mockingbird	*Mimus polyglottos*
Mourning dove	*Zenaida macroura*
Osprey	*Pandion haliaetus*
Pied-billed grebe	*Podilymbus podiceps*
Red-winged blackbird	*Agelaius phoeniceus*

Common Name	Scientific Name
Ring-billed gull	*Larus delawarensis*
White egret	*Ardea alba*
Mammals	
Cottontail rabbit	*Lepus sylvaticus*
Domestic cat	*Felis catus*
Domestic dog	*Canis lupus familiaris*
Eastern coyote	*Canis latrans*
Muskrat	*Ondatra zibethicus*
Norway rat	*Rattus norvegicus*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis*
White-tailed deer	*Odocoileus virginianus*
Reptile	
Diamondback terrapin	*Malaclemys terrapin*

2.1.4.2 Shallow Subtidal and Deepwater Habitats

Nearly half of the NBSA bottom area is composed of shallow subtidal flats (< 8 feet average depth), and an additional 40% is maintained navigation channels and their transitional side slopes (Table 2-2). These maintained navigation channels are regularly dredged deep water areas between approximately 40 and 50 feet in depth, and contain recently deposited sediments that are likely derived from sloughing of sediments from their transitional slopes and, to a lesser extent, general sediment transport processes in the water column (GSH 2020).

The subtidal flats are the most stable and important aquatic habitat in the NBSA, providing long-term stability for established benthic invertebrate communities, and important foraging areas for aquatic (fish, shellfish) and semi-aquatic (diving birds and mammals) organisms. The maintained deep water navigation channels are an important, but more transient habitat type, providing refuge and foraging areas for various aquatic organisms, including preferential foraging for some fish such as sturgeon and flounder. These are a less stable environment than other habitats in the NBSA, as the sediments are dredged on a fairly regular basis by the USACE to maintain and deepen the navigation capabilities to the Ports within the Bay. The combination of ship activity and maintenance dredging may limit the establishment of a stable (i.e., Stage III) benthic invertebrate (i.e., infaunal) community in the maintained navigation channels (Table 2-1). The regular removal of sediments by dredging also influences the contaminant exposure potential in these channels, as discussed in Section 6.

Despite the changing habitat conditions in the ecosystem during the 20th century, the Bay acts as a spawning ground, migratory pathway, and a nursery/foraging area for a variety of aquatic organisms. Essential fish habitats were identified for 19 finfish species in the Bay (USACE 2013a; NMFS 2019),

which are presented by life stage in Table 2-5. The identified fish species have habitats designated in the Bay for one or more important life stages (i.e., eggs, larvae, juveniles, adults, or spawning adults). The shortnose and Atlantic sturgeon (*Acipenser brevirostrum* and *A. oxyrhynchus*) are federally listed as protected species in the NBSA (USACE 2013a).

Table 2-5. Essential Fish Habitat Designations by Life Stage for Newark Bay

Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Summer flounder (*Paralichthys dentatus*)	–	✓	✓	✓	–
Winter flounder (*Pseudopluronectes americanus*)	✓	✓	✓	✓	✓
Windowpane flounder (*Scopthalmus aquosus*)	✓	✓	✓	✓	✓
Atlantic mackerel (*Scomber scombrus*)	–	–	✓	✓	–
King mackerel (*Scomberomorus cavalla*)	✓	✓	✓	✓	–
Spanish mackerel (*Scomberomorus maculates*)	✓	✓	✓	✓	–
Dusky shark (*Carcharhinus obscurus*)	–	✓	✓	–	–
Sand tiger shark (*Carcharias taurus*)	–	✓	✓	–	–
Sandbar shark (*Carcharhinus plumbeus*)	–	✓	✓	–	–
Clearnose skate (*Raja eglanteria*)	–	–	✓	✓	–
Little skate (*Leucoraja erinacea*)	–	–	✓	✓	–
Winter skate (*Leucoraja ocellata*)	–	–	✓	✓	–
Atlantic butterfish (*Peprilus triacanthus*)	–	✓	✓	✓	–
Atlantic sea herring (*Clupea harengus*)	–	✓	✓	✓	–
Black sea bass (*Centropristis striata*)	–	–	✓	✓	–
Bluefish (*Pomatomus saltatrix*)	✓	✓	✓	✓	–
Cobia (*Rachycentron canadum*)	✓	✓	✓	✓	–
Red hake (*Urophycis chuss*)	✓	✓	✓	✓	–
Scup (*Stenotomus chrysops*)	✓	✓	✓	✓	–

Notes:
✓ indicates habitat is suitable for life stage.
– indicates habitat is not suitable for life stage.

Source: (USACE 2013a, National Marine Fisheries Service [NMFS] 2019)

2.2 Plankton

There have been limited studies on the planktonic organisms present in the NBSA. The available data suggest that the Bay supports a variety of phytoplankton and algal communities that are typical of the NY/NJ Harbor Estuary. The plankton are periodically surveyed by the New Jersey Department of

Environmental Protection (NJDEP 2009). In 2005, as in previous years, the plankton communities were dominated by a diverse assemblage of diatoms in mild to full bloom proportions. Dinoflagellates detected during this season were *Gyrodinium undulans*, *Olisthodiscus luteus*, and *Prorocentrum micans*. In addition, *Pseudo-nitzschia* spp. and *Dinophysis* spp., both potentially toxic species, were detected below bloom or toxic concentrations (NJDEP 2009).

The zooplankton community of the NBSA can be divided into two major categories: permanent holoplankton (which include various forms of small, sometimes microscopic organisms, such as protozoans and copepods) and temporary meroplankton (which include larval stages of shallow-water invertebrates and fish). Among the meroplankton are the ichthyoplankton, consisting of egg, larval, and juvenile stages of fish. A discussion of the ichthyoplankton surveys that have been performed in the NBSA are presented in Section 2.4. Potential risks to planktonic communities in the NBSA are evaluated in Section 5.

2.3 Benthic Invertebrates

A number of historical studies have been conducted on the benthic invertebrate communities of the NBSA (Tierra 2004). These studies typically demonstrated that the benthic invertebrate communities throughout the Bay were characterized by relatively low diversity and abundance, and that the benthic environment was stressed from various pollutants and anoxic conditions. Species lists in the historical studies were dominated by polychaete worms, oligochaete worms, and small bivalves (clams/mussels). These organisms serve as a forage base for a variety of crustaceans, fish, and wading birds. A characterization of the infaunal benthic invertebrate communities in the NBSA, synthesized from these various studies, is provided in Section 2.3.1. A discussion of the shellfish communities (i.e., mollusks and crustaceans) in the Bay is provided in Section 2.3.2.

2.3.1 Benthic Invertebrate Community

A survey of benthic habitats in the NY/NJ Harbor Estuary conducted in June and October 1995 (Iocco et al. 2000) indicated that Newark Bay bottom sediments were predominantly characterized as silt with occasional sand. Grab samples from approximately one-half the stations sampled contained benthic infauna, consisting of predominantly polychaetes (e.g., *Streblospio benedicti*) and bivalves (e.g., *Mulinia lateralis* and *Mya arenaria*). Benthic habitats, such as large clam beds and mats of amphipods (*Ampelisca abdita*) that were seen elsewhere in the NY/NJ Harbor Estuary, were not observed in the Bay. Sediment gas content at several stations in the Bay indicated high pollutant or organic content. Surveys conducted by NOAA in 1993 and 1994 and USACE in 1995 and 1996 also found the Bay to be dominated by polychaetes and small clams, with a low diversity and abundance of pollution-indicative species (NOAA 1994b; USACE 1997). Benthic infaunal abundance and species composition were also found to increase in the late winter and early spring months and decline in the summer (USACE 1997). Dominant species from the various studies conducted to date in Newark Bay are presented in Table 2-6.

A study conducted in October 2005 at 14 stations in Newark Bay utilized sediment profile imagery and supplemental grab samples to determine the biologically active zone (BAZ; Tierra 2008b). Results of the study indicate that the surface sediment is structured by physical (e.g., currents and sediment movement) and biological processes (e.g., movement of infaunal organisms), both of which can affect the

bioavailability of chemical constituents. The fauna and biogenic structures observed were sufficient to bioturbate sediment to the estimated total BAZ depths of 13.7 to 16.4 centimeters (cm; average of approximately 6 inches or 0.5 foot). The deepest vertically burrowing species observed were large individuals of *Macoma balthica* and *M. arenaria* clams. The species with the potential to create the deepest convoluted burrow galleries were *Glycera* spp. and *Nereis* spp. Other species found in the grab samples were the burrowing isopod *Cyathura polita* and large-bodied, tube-building polychaetes (*Diopatra cuprea*), maldanids (*Pectinaria gouldii*), and the amphipod Ampelisca spp. Most of the stations sampled in this investigation were composed of benthic assemblages in a Stage III (relatively well-developed) successional stage that suggests stability in the sediment structure (Tierra 2008b).

In 1993 to 1994, 1998 to 1999, 2003, 2008, and 2013, USEPA (under the Regional Environmental Monitoring and Assessment Program [REMAP]) collected 140 randomly located benthic invertebrate samples in the area referred to as the Newark Bay sub-basin, which, in addition to the Bay, included stations in the Arthur Kill, Lower Passaic River, and Hackensack River (Adams 2016; USEPA 2003a) (Figure 2-2). A total of 28 locations were sampled within the Newark Bay sub-basin each year of the study, and between 11 and 18 stations (sampling year dependent) were within the NBSA. A summary of the benthic community indices calculated under the REMAP by year are presented in Table 2-7 (NBSA stations only). The pre-NBSA RI period (i.e., prior to 2004) REMAP studies concluded that the overall benthic invertebrate community was characterized by low abundance and diversity and dominated by pollution-indicative species. The 1993 to 2003 Benthic Index of Biotic Integrity (B-IBI) values, an index calculated based on various structure and abundance metrics, indicated that as much as 90% of Newark Bay was classified as moderately to highly impacted (Figure 2-3). In the 1998 study, all but one station within the NBSA boundaries was considered highly impacted (USEPA 2003a).

Table 2-7. Historical Benthic Community Indices from REMAP

Metric	REMAP Study Year					BERA
	1993/94	1998	2003	2008	2013	2015
Number of NBSA Stations	**18**	**13**	**11**	**11**	**11**	**30**
Species Richness						
Number of Species	73	53	73	71	22	106
Means of Benthic Variables (± 90% confidence interval)						
Species Richness (as number species/sample)	19 (±2.5)	14 (±2.4)	22 (±4.8)	22 (±3.5)	6.7 (±1.2)	23 (±2.9)
Pollution-Sensitive Species (%)	0.5 (±0.5)	1.7 (±1.8)	2.4 (±2.2)	3.5 (±3.4)	0	1.7 (±0.8)
Pollution-Indicative Species (%)	57 (±7.5)	47 (±13)	42 (±8.5)	20 (±9.2)	41 (±12)	31.2 (±4.9)
Species Diversity (Shannon-Wiener)*	1.5 (±0.14)	1.8 (±0.21)	1.8 (±0.19)	1.9 (±0.13)	1.3 (±0.16)	2.2 (±0.10)

Notes:
* Natural Log Calculation
All values calculated from raw data.
NBSA = Newark Bay Study Area
SQT = sediment quality triad

More recent studies on infaunal benthic communities conducted during the period of the NBSA RI—which include the 2008 and 2013 REMAP studies, and surveys conducted in 2015 as part of the SQT and Porewater Study (Tierra 2017b) for this BERA—have shown a substantial improvement in benthic community conditions in the Bay (Figure 2-4). An apparent downward trend in the species diversity (richness) and B-IBI values for the 2013 REMAP dataset may be due to the short-term effects of Superstorm Sandy on benthic communities. The values from the 2015 program show a return to the relatively unimpacted conditions similar to those from the 2008 REMAP study.

In the 2015 SQT and porewater investigation, a cumulative total of 106 individual taxa were found throughout the Bay, with a range between 8 and 46 taxa identified per individual sample location. The ten most abundant taxa are compared to historical abundant taxa on Table 2-6. A comparison of benthic community indices from the BERA (SQT) dataset to those from the REMAP program are provided in Table 2-7. In each program, specimens were identified to the lowest practicable taxonomic level, usually genus and species (Tierra 2015b; USEPA 2003a).

Similar to previous investigations, polychaetes, amphipods, and small clams continue to dominate the species composition. Metrics on the diversity and abundance of invertebrates have also improved (i.e., more diversity and evenness of species found) in recent years (Table 2-8). Shannon-Wiener Diversity values from the 2015 surveys ranged from 1.5 and 3.0, with an overall mean of 2.2 (n = 30). And community density calculations produced values ranging between 406 and 11,237 individuals per square meter, with a mean of 4,771 (n = 30). Compared to historical REMAP studies, the B-IBI for the 2015 surveys indicates as much as 70% of the Newark Bay benthos are considered to be not impacted, with a single station considered highly impacted (Table 2-9; Figure 2-4). Improvements to benthic community conditions are likely due to improving conditions in the Bay in terms of water and sediment quality. Improvements in the incidence of acute toxicity based on 10-day amphipod survival have also been observed. In a toxicity study conducted by NOAA (1995), 88% of samples in the NBSA were toxic. The percentage of toxic samples generally declined over the years of the REMAP studies: 22% in 1993/1994, 54% in 1998, 9% in 2003, 9% in 2008, and 0% in 2013 (see Appendix A). A more detailed evaluation of the benthic invertebrate community metrics relative to sediment chemistry and toxicity is provided in the SQT assessment (Appendix A) and Section 6.

2.3.2 Shellfish

Historically, communities of large invertebrates in the channels and shoals of the Bay are mainly dominated by blue crab (*Callinectes sapidus*), which are present year-round in the Bay. Blue crabs at shallow water stations (subtidal flats) appear to be more abundant in the summer and fall (May to November) and are nearly absent during the other months when they migrate to the deeper channels or offshore (USACE 1997). Bivalve mollusks in the Bay include the softshell clam (*Mya arenaria*), dwarf surfclam (*Mulinia lateralis*), ribbed mussel (*Geukensia demissa*), Eastern oyster (*Crassostrea virginica*), and Baltic clam (USACE 1997).

As part of the 2013 reconnaissance survey, a sampling program was conducted to evaluate the locations in the NBSA where bivalves were present to establish formal target sampling locations for the subsequent 2014 clam and crab sampling program. The bivalve collection results from various intertidal survey locations confirmed the presence of softshell clam, ribbed mussel, Eastern oyster, and Baltic clam in Bay

sediments. Softshell clams that were found, which represents the target species for the BERA sampling, were counted and measured, then returned to the sediments.

Blue crab and softshell clam collection surveys in support of the BERA were collected in late summer/early fall 2014 throughout the NBSA. Blue crabs were collected from 12 intertidal locations and an additional 25 locations throughout the three geographic zones of the Bay and softshell clams were collected from 18 intertidal sample locations (Figure 2-5). Additional details of the sampling program can be found in the NBSA Crab and Clam Data Report (GSH 2017b) and the NBSA Environmental Sample Collection Report (Normandeau 2017). The latter is provided as Attachment 4.

A total of 312 blue crab were collected during the course of the intertidal area collection effort with 68% of individuals being male. An additional 481 blue crab were collected during the geographic collection efforts, with 79% of the individuals identified as male. Carapace width among all individuals collected ranged between 112 and 198 millimeters (mm; 4.4 and 7.8 inches) with an overall mean of 139 mm (5.5 inches) (Normandeau 2017). A total of 1,159 softshell clam were collected with a mean shell length of 49.3 mm (1.9 inches) and range between 31.0 and 92.0 mm (1.2 and 3.6 inches) (Normandeau 2017). Softshell clam lengths and blue crab carapace lengths from other comparable estuaries are summarized in Tables 2-10 and 2-11. The size of the softshell clams collected in the NBSA may be indicative of young (< 2 year old) clams when compared to the sizes in mid-Atlantic estuaries (Table 2-10). The range of shell lengths of the sampled softshell clam population could be due to various environmental factors, including (but not limited to) the specific habitat characteristics of the Bay intertidal and shallow subtidal areas where softshell clam samples were collected, competition with other clam species, predation by upper trophic level organisms, pathogens, and/or exposure to chemical contaminants. The size of blue crabs collected in the NBSA appear to indicate that they are comparable in size to adult crabs from other mid-Atlantic estuaries (Table 2-11).

Table 2-10. Size Ranges of Softshell Clam from Other Estuaries

Location	Life Stage	Size Class	Softshell Clam Length (millimeters)	Source
Mid-Atlantic	Adult (5+ years)	Average	75-100	Abraham and Dillon 1986
Mid-Atlantic	Adult (~ 8 years)	Max	150	Abraham and Dillon 1986
Mid-Atlantic	Juvenile (late veliger stage)	Average	0.2	Abraham and Dillon 1986
Mid-Atlantic	Juvenile (before burrowing)	Max	12	Abraham and Dillon 1986
Mid-Atlantic	Juvenile (first winter)	Average	30	Abraham and Dillon 1986
Mid-Atlantic	Young (1.5 - 2 years)	Minimum commercial	50	Abraham and Dillon 1986

Table 2-11. Size Ranges of Blue Crab from Other Estuaries

Location	Life Stage	Size Class	Carapace Width (millimeters)	Source
Mid-Atlantic	Second larval stage (megalops)	Average	2.5	Hill et al. 1989
Mid-Atlantic	Mature females	Min	55	Hill et al. 1989
Mid-Atlantic	Mature females	Max	204	Hill et al. 1989
Mid-Atlantic	Mature males	Max	209	Hill et al. 1989
Chesapeake Bay	Adult	Average	178	Hill et al. 1989; Van Den Avyle 1984
Chesapeake Bay	4 months	Average	64	Hill et al. 1989; Van Den Avyle 1984
Chesapeake Bay	12-16 months	Average	127	Hill et al. 1989; Van Den Avyle 1984
South-Atlantic	Mature females	Min	51	Van Den Avyle 1984
North and South Carolina	Adult	Average	203	Van Den Avyle 1984
Florida	Immature females	Max	177	Van Den Avyle 1984
St. Johns River, FL	Adult	Min	102	Van Den Avyle 1984
St. Johns River, FL	Adult	Max	178	Van Den Avyle 1984

2.4 Fish

The finfish assemblage that resides in or is transient to the Bay is typical of large coastal estuaries and inshore waterways located along the Mid-Atlantic Bight. Situated in the transition zone between northern coldwater (boreal) and temperate (warm) water with low to moderate salinity, the Bay acts as a spawning ground, migratory pathway, and a nursery/foraging area for a variety of estuarine, marine, and anadromous fish species.

An essential fish habitat (EFH) designation exists in the Bay for several finfish species (USACE 2013a). The entire Bay is identified as EFH for one or more important life stages (i.e., eggs, larvae, juveniles, adults, and spawning adults) of 19 fish species (Table 2-5). The shortnose and Atlantic sturgeon are federally listed as protected species in the NBSA (Tierra 2015a; USACE 2013a). The latest EFH data, as presented in Table 2-5, was extracted from NOAA's online EFH data mapper for the Hudson River/Raritan/Sandy Hook Bays area (http://www.nero.noaa.gov/hcd/est.htm).

Several species found in the NBSA are designated NOAA Species of Concern (SOC), including alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), and rainbow smelt (*Osmerus mordax*). SOCs are species for which NOAA's NMFS has concerns regarding danger of extinction or risk of becoming endangered but for which insufficient information is available to indicate a need to list. Alewife and blueback herring are obligate estuarine-dependent species commonly found in NY Harbor, while rainbow smelt are diadramous fish that are relatively uncommon in NY Harbor (USACE 2015a, 2015b).

Many of the seasonally abundant fish species in the Bay are transient or migratory, passing through the Bay to upstream spawning grounds or entering the area seasonally from nearby ocean waters. These

include estuarine migratory species, such as striped bass (*Morone saxatillis*), that depend on the estuary as a nursery and a forage area for juveniles and adults. Species that frequent the Bay during similar life history stages include both marine and estuarine predators, such as winter flounder (*Pseudopluronectes americanus*), bluefish (*Pomatomus saltatrix*), and summer flounder (*Paralichthys dentatus*). These fish migrate in and out of the Bay seasonally depending on spawning area (i.e., marine, estuarine, or freshwater) and season (USFWS 1997; Woodhead 1991).

A few fish species, primarily forage fish, such as the mummichog (*Fundulus heteroclitus*) and striped killifish (*Fundulus majalis*), are year-round residents in the Bay. These species generally begin spawning in late spring and continue throughout most of the summer. Other forage fish species in Newark Bay include bay anchovy (*Anchoa mitchilli*), Atlantic silverside (*Menidia menidia*), and the river herring species alewife and blueback herring. Bay anchovy, alewife, and blueback herring are very common in Newark Bay; Atlantic silverside are present in smaller numbers (USACE 2015b). Bay anchovy, a facultative estuarine-dependent species, is likely resident in the Bay and is most common in spring. Blueback herring and alewife are anadramous, entering estuaries in the spring and migrating to freshwater to spawn. Atlantic silverside are found in estuarine and near-shore habitats and are most common in the Bay in winter (USACE 2105b). These species provide an important forage base for larger predatory species.

2.4.1 Newark Bay Fishery Characterization

Several fisheries surveys have been conducted in Newark Bay since the 1990s. The goals and sampling approach of these surveys differed but, together, they provide a sound information base to characterize the seasonal distribution and composition of the fish community in various habitats and areas of the Bay.

The NMFS conducted a major fish sampling program in Newark Bay as part of an evaluation of a flood control project for the Passaic River Basin (NOAA 1994a). This study provided information on the habitat preferences of species (e.g., channel vs. shoal [subtidal] areas). Monthly fish sampling was conducted from May 1993 through April 1994. Juvenile and adult fish were sampled with bottom trawls and gill nets. A total of 56 species of fish and invertebrates were identified from 299 otter trawl tows, 105 shrimp trawl tows, and 92 gill net sets. The dominant species caught in the channels were striped bass and Atlantic tomcod (*Microgadus tomcod*). The dominant species caught in the shrimp trawl were bay anchovy (*Anchoa mitchilli*), Atlantic herring (*Clupea harengus*), and Atlantic tomcod. The dominant species caught in the gill nets were Atlantic menhaden (*Brevooria tyrannus*) and striped bass. From the seven shoal stations on the east side of Newark Bay (relative to the main channel), 28 species of fish were collected with a bottom trawl. Six species – striped bass, winter flounder, bay anchovy, Atlantic herring, Atlantic tomcod, and Atlantic silverside (*Menidia menidia*) dominated the catch from all shoal stations combined (NOAA 1994a). Most species, whether resident or transient, were found throughout Newark Bay. The notable exception is white perch (*Morone americana*). Few to no white perch were collected in Newark Bay during July and August, likely because they migrate into streams from Newark Bay in spring to begin spawning and remain there until fall when they return to winter in the deeper waters of Newark Bay (Stanley and Danie 1983).

In order to describe the species composition and relative abundance of fish in shoal areas of Newark Bay, Lawler, Matusky and Skelly Engineers, Inc. conducted sampling trawls from April 1995 to March 1996 (Lawler, Matusky and Skelly Engineers, Inc. 1996). Four shoal areas in Newark Bay were sampled to

provide information on the fish community. Species collected from the shoal stations were dominated by relatively few species. Eight species – bay anchovy, striped bass, winter flounder, windowpane flounder (*Scophthalmus aquosus*), Atlantic silverside, summer flounder, northern pipefish (*Syngnathus fuscus*), and white perch – dominated the catch. Most species occurred infrequently and in very low numbers during the 12-month study. However, there was a consistent seasonal pattern for fish among the shoal stations. Fish were relatively abundant from April through October, but much less abundant from November through March. During the period when fish were most abundant, only four species—striped bass, winter flounder, summer flounder, and bay anchovy—occurred during each month.

The USACE collected fish community data from within the Bay annually between 2001 and 2011, using a 30-foot otter trawl, as part of the NY/NJ Harbor Deepening Project (HDP). Both bottom and mid-water trawl sampling was conducted to evaluate demersal and pelagic species assemblages. Together with the earlier datasets described above, these surveys provide a valuable long-term dataset to assess the consistency of fish communities amid changing conditions and anthropogenic alterations in the Harbor. The USACE data are reported in annual Aquatic Biological Survey Reports from 2001 through 2011 (USACE 2002, 2003, 2004c, 2005, 2006b, 2007c, 2008, 2009b, 2010, 2011, 2013b) and summarized in the USACE's Migratory Finfish Summary Report (2015). The latter report primarily focuses on the results of mid-water trawls during migratory finfish sampling in 2006, 2011, 2012, and 2013. The number of trawls conducted during each of these years throughout the Bay ranged from 311 to 440, with 23 to 38 finfish species collected in any given year. In Newark Bay, species abundance has varied from year to year, but is generally dominated by a few species (e.g., white perch, striped bass, and bay anchovy).

The aggregate available fish community data collected by the USACE in bottom trawls from Newark Bay between 2002 and 2010 are summarized in Figures 2-6a (overall species composition of multi-year catch) and 2-6b (average monthly composition of multi-year catch). The seasonal data from mid-water trawls collected between 2006 and 2013 are summarized in Figure 2-7. Numbers of some species, such as American eel (*Anquilla rostrata*) and mummichog, may be under-represented in these studies due to the types of fishing methods used. Success rates for capturing such species may be higher with appropriate minnow or eel traps, rather than tow/otter trawls or gill nets.

As shown on Figure 2-6a, during nine years of sampling, the following nine species dominated the overall composition of Newark Bay finfish community: white perch (44%); bay anchovy (13%); Atlantic herring (13%); striped bass (12%); spotted hake (8%); winter flounder (3%); red hake (*Urophycis chuss*) (2%); alewife (*Alosa pseudoharengus*) (2%); blueback herring (*Alosa aestivalis*) (2%). The remaining species each represented less than 1% of the catch. The shortnose sturgeon (*Acipenser brevirostrum*), although federally listed as a protected species in Newark Bay, has not been documented in any of the studies in Newark Bay or adjacent waters (USACE 1997).

The seasonality of the finfish community is shown in Figures 2-6b (bottom trawl sampling) and 2-7 (mid-water trawl sampling). Bottom trawl sampling shows that white perch and striped bass populations peak in the winter and decline in the summer. Both Atlantic herring and spotted hake peak in spring and bay anchovy peaks in the summer. Mid-water trawl data also show the large increase in bay anchovy composition in summer and fall.

A major ichthyoplankton survey conducted in Newark Bay between 1993 and 1994 by the NMFS collected larvae of 20 different species of fish. Only two species, bay anchovy and one unidentified goby (*Gobiosoma* sp.), were collected in substantial numbers at any time during the study year. Both species

were present from June through September. More thorough ichthyoplankton surveys were also conducted by USACE from seven stations within Newark Bay during sampling events for the HDP (USACE 2011). Data collected between 1999 and 2006 (USACE 2003, 2004c, 2005, 2006b) are presented in Table 2-12. Forty-two species of ichthyoplankton were identified at various life stages (i.e., egg, larvae, or juvenile), including eggs and larvae from unidentified species These surveys targeted the egg and larval life stages and were conducted on a seasonal basis, primarily from January to June each year; therefore, some species, as well as the juvenile life stage, may be under-represented in this dataset. Bay anchovy dominated the catch across all 8 years. All life stages were captured for bay anchovy, winter flounder, weakfish, and windowpane flounder, indicating that these species are spawning and have early life stages in Newark Bay.

2.4.2 NBSA Fish Community Characterization: 2014 - 2016

A fish sampling program was implemented as part of the BERA and BHHRA sampling activities. The objective of this program was to collect fish tissue samples from various target species at different trophic levels throughout the Bay to support the BERA and BHHRA.

A quantitative fish community characterization was not conducted under this program, but both target and non-target species captured as part of these sampling efforts were identified, counted, measured (length), and weighed. Given the substantial fishing efforts associated with this program, the various gear types used, and the different habitat sampled (i.e., intertidal, shallow subtidal, deepwater channels), these data provide additional perspectives to the historical studies on the species assemblages inhabiting or utilizing Newark Bay during different seasons. The fish collected were also evaluated for their apparent health and condition by a fish pathologist, as discussed in Section 7.

Under the BERA/BHHRA sampling program, fish were collected and identified over three sampling events in fall 2014, spring/summer 2015, and spring 2016. During these fish sampling events, 43 fish species were collected. A listing of the identified species is provided in Table 2-13. Additionally, three species of decapod crustaceans (blue, mud, and spider crabs), as well as horseshoe crab (a chelicerate arthropod) were collected as bycatch; blue crab was the most abundant species collected. Additional details of the sampling program can be found in the NBSA Fish Data Report (Tierra 2017) and Normandeau (2017) (Attachment 4).

Fish sampling activities were conducted within the three Newark Bay geographic zones (north, central, and south) during three fish sampling events: fall 2014, spring/summer 2015, and spring 2016. Fish were collected from various locations along the subtidal flats, transitional slopes, and navigational channel throughout each of the three zones in the NBSA. Fish were collected from each of the different geographic areas to provide spatial coverage across the entire NBSA. Figures 2-8, 2-9, and 2-10 present the various fish sampling locations throughout the NBSA.

Additionally, 12 intertidal areas were targeted for up to 19 forage fish samples (mummichog, striped killifish, Atlantic menhaden, or bay anchovy). These areas are consistent with those selected for clam and sediment sampling (refer to the Crab and Clam QAPP; Tierra 2014a). Forage fish were targeted at 16 sampling locations and three supplemental sampling locations (Intertidal Areas 124, 125, and 126). Additional details regarding forage fish collected during this event are provided in the Normandeau (2017).

Fish sampling methods employed during each of the three sampling events include at least one of the following: trawls, gillnets, eel pots, minnow traps, seine, traditional angling, and trotlines. A summary of sampling method by event is provided in Table 2-14. Additional details regarding sampling methods used during fish sampling activities are provided in the Normandeau (2017).

Table 2-14. Fish Sampling Method Summary

Sampling Method	Fall 2014	Spring/Summer 2015	Spring 2016
Trawl	X	X	X
Gillnet	X	X	X
Eel pot	X	X	
Minnow Trap	X		
Seine	X		
Angling		X	
Trotline		X	

The fall 2014 fish sampling event was conducted from October 6 through 24, 2014. Thirty-one fish species, represented by 6,454 individuals, were collected during this event. Sampling locations are presented on Figure 2-8. Tables 2-15 and 2-16 summarize target and non-target fish species collected during the fall 2014 fish sampling event, respectively. Additional details regarding the fish collected during the fall 2014 fish sampling event are provided in Normandeau (2017).

The spring/summer 2015 fish sampling event was conducted from March 30 through August 5, 2015. Four separate collection efforts were conducted March 30 through April 10, April 27 through May 8, June 1 through June 8, and July 27 through August 5, 2015, each targeting specific fish species. Thirty fish species, represented by 2,243 individuals, were collected during this event. Sampling locations are presented on Figure 2-9. Tables 2-17 and 2-18 summarize target and non-target fish species collected during the spring/summer 2015 fish sampling event, respectively. Additional details regarding the fish collected during the spring/summer 2015 fish sampling event are provided in Normandeau (2017).

Due to an error during homogenization of white perch tissue samples at the analytical laboratory in late 2015, a fish sampling event was conducted from March 14 through 24, 2016, targeting collection of white perch to compensate for the compromised samples. Twenty-five fish species, represented by 3,821 individuals, were collected during the spring 2016 fish sampling event. Sampling locations are presented on Figure 2-10. Tables 2-19 and 2-20 summarize target and non-target fish species collected during the spring 2016 fish sampling event, respectively. Additional details regarding the fish collected during the spring 2016 fish sampling event are provided in Normandeau (2017).

Overall, the 2014 to 2016 BERA fish sampling program confirmed the results of the more formal fisheries surveys—that the Newark Bay fishery is primarily migratory, with a variety of species occurring on a seasonal basis. Of particular note, on March 17, 2016 the fish sampling yielded an incidental capture of a single Atlantic Sturgeon. This species of fish is listed as endangered. The fish was captured in a gillnet set on the bottom of Newark Bay in approximately 40 feet of water. The fish appeared to be in good condition and was identified and returned, unharmed, to the water. Additional information regarding the

incidental capture of this fish is provided in the NBSA Environmental Sample Collection Report (Normandeau 2017).

2.5 Birds

Despite the highly developed shoreline, the NBSA provides various habitats for birds. Populations of birds that inhabit or utilize the forested (and other) areas of the Bay are mainly water birds, including piscivorous species like cormorants (Phalacrocoracidae), osprey (*Pandion haliaetus*), egrets, herons, and terns; omnivorous species including ducks, geese; sediment-probing invertivorous species including sandpipers (Scolopacidae), plovers (*Charadrius melodus*); and other invertivores such as oystercatchers (Haematopus).

Sediment-probing invertivores and piscivorous wading birds like egrets and herons can be found foraging in mudflats along the Lower Passaic and Hackensack Rivers and in tidal marshes within the region, particularly the Hackensack Meadowlands and marshes to the south of Newark Bay adjacent to the Arthur Kill and Staten Island (Iannuzzi and Ludwig 2004; Ludwig et al. 2010; Windward Environmental LLC [Windward] 2011). They are not expected to be a major component of the bird fauna of the relatively restricted confines of Newark Bay, but they do likely forage on the few intertidal mudflats of Newark Bay. Piscivorous species such as cormorant forage in the open waters of the NBSA. Omnivorous bird species, primarily waterfowl, use the subtidal areas and open waters of the NBSA for foraging and loafing.

Many of the water bird species found in the Newark Bay region (and NY/NJ Harbor Estuary as a whole) are migratory. The area is part of the Atlantic Flyway, a major north-south migration route that is used by migrant species as a seasonal stopover (Elphick et al. 2001). The birds utilize open waters of the Bay and intertidal areas, feeding and resting for a few days to a few weeks in route to northern breeding grounds or southern wintering areas. Sandpipers, plovers, and their relatives are abundant migrants, and some are winter residents (Walsh et al. 1999). Bird species observed in the NBSA from several bird surveys that have been conducted in the region are identified in Table 2-21.

Some species, including mallard (*Anas platyrhynchos*), American black duck (*Anas rubripes*), gadwall (*Anas strepera*), and double-crested cormorant (Walsh et al. 1999) are known to breed in the NBSA; however, adequate nesting grounds are limited due to the highly urbanized shoreline of the Bay and its tributaries (i.e., the Passaic River, Hackensack River, Arthur Kill, and Kill van Kull). Therefore, most water birds primarily build their nests for breeding offshore on the 17 islands located within the NY/NJ Harbor Estuary. Two of the islands are located in the Arthur Kill/Kill van Kull complex (Prall's Island and Isle of Meadows), while Shooters Island is located in the southern portion of the Bay. These islands and, to a lesser extent, mainland areas of the NY/NJ Harbor Estuary, have been surveyed for decades to quantify and characterize the nesting and trends in water bird populations.

During the 2013 Reconnaissance Survey, no bird nests were observed along any portions of the shoreline; rather, they were observed/located on structures in the water (e.g., mile markers, abandoned/dilapidated wooden and metal pier structures). Both large and small nests were observed during the survey, which was limited to shoreline areas where field biologists were able to complete survey activities on foot, while looking for bird nests and signs of mammal use (e.g., scat, tracks). The large nests consisting of hard sticks are likely to be osprey nests. The smaller nests consisting of softer grasses and seaweed that are also located on structures in the NBSA are likely to be double-crested

cormorant (*Phalacrocorax auritus*) nests. Bird nest locations observed during the limited survey are shown on Figure 2-11 (Tierra 2015a).

2.6 Mammals

Several primarily omnivorous and herbivorous mammals (primarily urban opportunistic species, such as rats and coyotes) were observed throughout the NBSA during the Reconnaissance Survey. Direct mammal sightings were documented, as well as any signs of mammals present along the shoreline (e.g., tracks, scat). Most mammals observed are species that are frequently found in urban areas, including Norway rat (*Rattus norvegicus*), skunk (e.g., *Mephitis mephitis*), coyote (*Canis latrans*), deer (e.g., *Odocoileus virginianus*), rabbit (e.g., *Sylvilagus* spp.), cat (*Felis catus*), and muskrat (*Ondatra zibethicus*) (Tierra 2015a). Locations of mammal observations observed during the limited survey are shown on Figure 2-11.

USACE (1997) identified nine species of bats, a muskrat, and a harbor seal as “possible” mammalian species utilizing the Subtidal Flats of Newark Bay. There have been recent sightings of harbor seals (*Phoca vitulina*) and harp seals (*Pagophilus groenlandicus*) in the Hackensack River (New Jersey Meadowlands Commission 2010, 2011; Frazier 2011; Baldwin 2018). These seals would have had to traverse Newark Bay to get to foraging grounds in the Meadowlands. Although they are not common in the NBSA, they are a potential visitor.

Several primarily piscivorous mammal species may potentially use the NBSA. The river otter is a potential inhabitant of the marine reaches of NY/NJ Harbor Estuary. Although commonly called a "river” otter, the name can be misleading, as the animal inhabits marine, as well as freshwater environments, and some populations permanently reside in marine shoreline habitats. The North American river otter (*Lontra canadensis*) is found in a wide variety of aquatic habitats, both freshwater and coastal marine, including lakes, rivers, inland wetlands, coastal shorelines and marshes, and estuaries. The river otter's main requirements are a steady food supply and easy access to a body of water. The North American river otter has been extirpated from much of its historical range due to a number of factors including habitat loss and pollution (Dewey and Ellis 2003).

Piscivorous harbor seals and gray seals (*Halichoerus grypus*) are observed in the New York Bight. They winter in New York Harbor and haul out onto islands in Staten Island, Long Island, Governor’s Island, Manhattan, Sandy Hook, Jamaica Bay, the Westchester and Connecticut shorelines of Long Island Sound, as well as more recently on Hoffman and Swinburne Islands, two small artificial islands off the coast of Staten Island (NJ Sea Grant 2014). Harbor seals have been sighted in the Arthur Kill as well as the Hackensack River in recent years, but are generally uncommon visitors to Newark Bay (USACE 1997) and observed rarely in the Hackensack Meadowlands (Kiviat and MacDonald 2002).

Other marine mammals, such as cetaceans, may potentially be found near Newark Bay. Whales are rarely observed in Newark Bay; one baleen whale species was found dead in Newark Bay in 1975 (NY Times 1975); one humpback whale (*Megaptera novaeangliae*) was observed in the Hackensack River and Newark Bay in 1990 (Murphy 1990), and one fin whale (*Balaenoptera physalus*) was struck and killed by a boat in Newark Bay in in 2016 (Beckford 2016). Whales have also been observed in the New York Bight and New York Harbor (New York State Department of Environmental Conservation [NYSDEC] 2019). Bottlenose dolphins (*Tursiops truncatus*) have also been observed in New York New Jersey

Harbor and the Hackensack River (New York State Department of Environmental Conservation [NYSDEC] 2019).

There is limited available aquatic habitat for these marine mammals in the NBSA. In addition, the noise and traffic of cargo ships entering and leaving Newark Bay would likely deter these animals from intentionally entering it. As discussed by Battelle (2008), the possibility of cetaceans entering Newark Bay is remote.

2.7 Amphibians and Reptiles

In freshwater wetlands, reptiles and amphibians are typically abundant. However, given the estuarine nature of the water of Newark Bay, amphibians, such as salamanders and frogs, are unlikely to be present (USFWS 1997). During the 2013 Reconnaissance Survey, the only reptile observed was a diamondback terrapin (*Malaclemys terrapin*) along an area of emergent vegetation (Tierra 2015a). The diamondback terrapin is likely a transient visitor to the NBSA as it moves between the Hackensack Meadowlands Complex and marshes and tidal creeks along the Arthur Kill (USACE 1997). Other than the observation of the terrapin noted above during the Reconnaissance Survey, there are no documented observations of amphibians or reptiles using the Bay during the various ecological surveys that have been performed over the years.

USACE (1997) also notes the possibility for three species of marine turtles – loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), and the green sea turtle (*Chelonias mydas*) – to utilize the shoal areas (i.e., subtidal flats) of Newark Bay. However, there is no documented evidence of these species in the NBSA.

2.8 Threatened, Endangered, and Special Status Species

The state listed threatened and endangered species consist mainly of birds, but also include three insects, one plant, and one fish species. The State of NY also lists one habitat. The only federally endangered species are the Atlantic and shortnose sturgeon (*Acipenser oxyrhynchus* and *brevirostrum*, respectively). The species and habitat are identified in Table 2-22.

To identify these species, a request was submitted to the National Heritage Program for the State of New Jersey, and an online search using the NYSDEC Nature Explorer was conducted with a user-defined subject area for the State of New York. The online search area consisted of the southern portion of Newark Bay and portions of the Kills, which are the areas of Newark Bay that fall under New York state jurisdiction.

Although the diamondback terrapin is not currently listed on federal or state-level threatened and endangered species lists, it has been under review for possibly listing (NJDEP 2016) and is found in the Hackensack River watershed.

Table 2-22. Threatened and Endangered Species in the NBSA

Species	Common Name	Federally Listed	State Listed
Birds			
Nycticorax	Black-crowned night heron		NJ
Bubulcus ibis	Cattle egret		NJ, NY
Plegadis falcinellus	Glossy ibis		NJ, NY
Sterna antillarum	Least tern		NJ
Egretta caerulea	Little blue heron		NJ, NY
Pandion haliaetus	Osprey		NJ
Falco peregrinus	Peregrine falcon		NJ
Egretta thula	Snowy egret		NJ, NY
Egretta tricolor	Tricolored heron		NJ
Nyctanassa violacea	Yellow-crowned night heron		NJ, NY
Ardea alba	Great egret		NY
Tyto alba	Barn owl		NY
Insects			
Pontia protodice	Checkered white butterfly		NJ
Somatochlora linearis	Mocha emerald dragonfly		NY
Ischnura ramburii	Rambur's forktail damselfly		NY
Plants			
Elocharis quadrangulata	Angled spikerush		NY
Fish			
Acipenser brevirostrum	Shortnose sturgeon	X	NJ
Acipenser oxyrhynchus	Atlantic sturgeon	X	
Habitats			
Colonial Waterbird Nesting Area			**NY**

3 PROBLEM FORMULATION

The USEPA Superfund eight-step process for conducting ecological risk assessments (ERAs) is depicted on Figure 3-1 (USEPA 1997). The Problem Formulation (Step 3) for this BERA was completed in 2013 and is provided as Attachment 2 (Tierra 2013a). As part of the Problem Formulation process, the following activities were conducted:

- Refined the preliminary list of constituents of potential ecological concern (COPECs)
- Preliminarily characterized the potential ecological effects of COPECs
- Reviewed and refined information on the fate and transport of COPECs, potential exposure pathways, and receptors potentially at risk
- Selected assessment and measurement endpoints
- Refined the ecological conceptual site model (CSM) with testable hypotheses (i.e., risk questions) that this BERA will address.

This BERA consists of Steps 3 through 7 of the USEPA's eight-step ERA process (Figure 3-1; USEPA 1997) and builds on the results of the SLERA (Battelle 2008) to provide a more accurate and realistic estimate of potential ecological risk in the NBSA. To do this, the Problem Formulation was used to guide the collection of site-specific data for use in estimating potential risks to invertebrates, fish, and wildlife. A risk analysis plan is also included in this section that presents the various lines of evidence (LOEs) and overall weight of evidence (WOE) process that was used to draw risk conclusions in this BERA. Results of this BERA will then be used to inform the remedial action decision-making process (Step 8 of the risk assessment process).

3.1 Assessment and Measurement Endpoints

Assessment endpoints (AEs) are defined as "an explicit expression of the environmental value that is to be protected" (USEPA 1997). Because it is not practical or possible to directly evaluate risks to all of the individual components of the ecosystem, AEs focus the risk assessment on particular components of the ecosystem that could be adversely affected by site-related constituents. The AEs were selected based on various discussions and document exchanges among Tierra, the USEPA, and the Partner Agencies, as summarized in the Problem Formulation (Tierra 2013a) and refined in the November 2015 Technical Memorandum entitled Risk Assessment Field Sampling and Analysis Program – Newark Bay Study Area (Arcadis 2015). They include:

1. Survival, growth, and/or reproduction of invertebrates
2. Survival, growth, and/or reproduction of fish
3. Survival, growth, and/or reproduction of birds
4. Survival, growth, and/or reproduction of mammals
5. Survival, growth, and/or reproduction of reptiles.

Following the selection of AEs, testable hypotheses are developed to determine whether or not a potential risk to the AE exists (USEPA 1997). A testable hypothesis is an operational statement of an investigator's research assumption made to evaluate logical or empirical consequences (USEPA 1997, 1998). Similar to the LPRSA, the testable hypotheses for the NBSA are presented as a series of risk questions about the relationship between each of the AEs and the responses of the receptors when exposed to chemicals within Newark Bay. Hypotheses usually postulate that there is no effect or no difference (among groups or measurements), and data are collected to confirm or refute that hypothesis. Consistent with USEPA guidance on the formulation of hypothesis tests (USEPA 2006a, 2006b), all hypothesis tests comparing site metrics to reference metrics were conducted as one-sided tests where the alternative hypothesis is that the site metric demonstrates degradation. A potential consequence of hypothesis testing is a Type II error, (i.e., accepting the null hypothesis, when it is, in fact, false). Adequate sample size is the best way to avoid such an error.

A measurement endpoint (ME) is defined as the "measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint" (USEPA 1997). Each ME represents a LOE that, along with consideration of the LOE strengths and uncertainties, is used in the WOE approach to draw risk conclusions. In some cases, additional LOE were available (e.g., site-specific toxicity data from the published literature), which were also included in the WOE. Final MEs were selected based on various discussions and document exchanges among Tierra, the USEPA, and the Partner Agencies, as summarized in the Problem Formulation (Tierra 2013a) and refined in Arcadis (2015).

Table 3-1 presents the final selected AEs, MEs, risk questions, and a brief summary of data collected to support this BERA. In addition to the identified AEs, this BERA addresses the perspectives on potential risk from sediment or water exposures to other organisms, including plankton, algae, and aquatic vegetation. These are discussed in Section 11. The following subsections describe the AEs and MEs by receptor group in more detail.

3.1.1 Invertebrates

Assessment Endpoint 1: Survival, growth, and/or reproduction of invertebrates.

> Invertebrates form the base of the food web for fish and other upper-trophic level organisms. There are a variety of taxonomic feeding guilds for aquatic and benthic invertebrates including filter-feeders, deposit-feeders, detritivores, and omnivores. Each taxonomic feeding guild has a unique exposure potential to COPECs in NBSA media that is evaluated in this BERA.

Risk Question: *Are invertebrate communities in the NBSA different from those found in similar nearby water bodies with chemical concentrations at regional background levels?*

> This question is addressed by comparing community structure data (e.g., total invertebrate abundance, species richness, and abundance of species or specific taxonomic groups) from Newark Bay to reference populations from Jamaica Bay via statistical comparisons of community indices. This LOE is part of the SQT assessment (Appendix A; Section 6), which is a sediment assessment technique that incorporates information about sediment chemistry, toxicity, and benthic community metrics.

Risk Question: *Are COPEC residues in invertebrate tissues from the NBSA greater than tissue (whole-body) toxicity benchmarks for the survival, growth, and/or reproduction of invertebrates?*

This question is addressed by comparing chemical concentrations in laboratory-exposed and/or site-collected invertebrate tissues to literature-based toxicity reference values (TRVs). The data use objective for this ME is to assess the adverse effects of COPECs on the invertebrate community. Field-collected tissue data from softshell clams and blue crabs from the NBSA are analyzed and compared to literature-based TRVs. In addition, data from the limited number of polychaete worm (*Nereis virens*) bioaccumulation tests conducted are also compared to available TRVs.

Risk Question: *Are the COPEC concentrations in sediments from the BAZ greater than benchmarks for the survival, growth, and/or reproduction of invertebrates?*

Chemical concentrations in sediment are compared to toxicological sediment benchmarks from the literature. The data use objective for this ME is to evaluate the effects of chemical concentrations in sediment on the benthic invertebrate community of the NBSA. Surficial sediment was collected from the BAZ, which is estimated to be the top 6 inches, and chemically analyzed. This LOE is part of the SQT assessment (Appendix A; Section 6).

Risk Question: *Is the survival, growth, and/or reproduction of invertebrates exposed to sediments from the BAZ of the NBSA significantly lower than that in reference sediments?*

Laboratory toxicity tests using NBSA surface sediment were conducted, including 10-day and 28-day studies with *Leptocheirus plumulosus* for survival, growth, and reproduction. Amphipods are considered to be a sensitive biological organism for representing potential risk to the benthic community. The data use objective for this ME is to assess the adverse effects of chemicals (and evaluation of conventional parameters, such as grain size, total organic carbon [TOC], sulfide, and ammonia) in sediment to the benthic invertebrate community. The results of the toxicity tests are also evaluated using existing background data from similar studies conducted in Jamaica Bay. This LOE is part of the SQT assessment (Appendix A; Section 6).

Risk Question: *Are COPEC concentrations in porewater and/or surface water from the NBSA greater than toxicological benchmarks for the survival, growth, and/or reproduction of invertebrates?*

This question is addressed by comparing COPEC concentrations in porewater and surface water to available toxicological criteria and benchmarks. The data use objective for this ME is to estimate the exposure of the benthic invertebrate community to COPECs in sediment porewater and overlying surface water. This LOE is part of the surface water assessment (Section 5) and SQT assessment (Appendix A; Section 6).

3.1.2 Fish

Assessment Endpoint 2: Survival, growth, and/or reproduction of fish.

The fishery of the NBSA includes species at various trophic levels of the food web. They consume invertebrates and other lower-trophic level organisms but, in turn, are fed upon by upper-trophic level birds and mammals. Similar to invertebrates, there are various taxonomic feeding guilds for fish including benthic-feeding (i.e., benthivores), omnivorous forage fish, and pelagic predatory fish. Each feeding guild has a unique exposure potential to COPECs in NBSA media that are evaluated in this BERA.

Risk Question: *Are fish communities in the NBSA different from those found in similar nearby water bodies?*

This question is being addressed by taking advantage of a substantial spatial and temporal fish community dataset that was generated over more than a decade by the USACE and Port Authority of NY/NJ as part of the NY/NJ HDP. Information from the associated survey reports and literature was used to evaluate the distribution, diversity, abundance, and seasonal patterns of adult fish and ichthyoplankton in the NBSA compared to other areas in the NY/NJ Harbor region. The fish community LOEs are presented in Section 7.

Risk Question: *Are COPEC concentrations in fish tissues from the NBSA greater than tissue (whole-body) toxicity benchmarks for the survival, growth, and/or reproduction of fish?*

Identified fish receptors were collected throughout the NBSA for whole-body chemical analyses. These data are compared to literature-based TRVs and/or to whole-body fish tissue chemical concentrations of selected receptors from background reference locations. Specific species of fish were targeted so that representative species from each of three trophic levels are captured: forage fish, benthic/demersal, and pelagic predatory. Concentrations of COPECs in the tissues (whole-body, liver) of fish from the NBSA were measured, and associated data to help interpret the findings (e.g., percent lipids, fish species, length, weight, age, sex) were collected. Egg concentrations for PCDD/PCDF TEQ and PCBs were also estimated via modeling from existing sediment data. External health observations (gross histological analysis) were conducted on captured fish to provide information on fish population health. The fish tissue LOEs are presented in Section 7.

Risk Question: *Are COPEC concentrations in porewater, surface water, and sediment from the NBSA greater than benchmarks for the survival, growth, and/or reproduction of fish?*

Data on COPECs in porewater and surface water collected from the NBSA are compared to criteria and toxicological benchmarks. Data on COPECs from sediments are used to provide perspectives, relative to the tissue assessment described above, on potential exposure-risks from sediment ingestion. The sediment data are also used to model potential uptake of metals and PAHs into fish to help assess potential risk from chemicals that are taken up, but do not accumulate in the bodies of fish. The data use objective for this ME is to estimate the exposure of fish to COPECs via the surface water, sediment, and sediment porewater exposure pathways. The surface water LOE is presented in Section 5, and the sediment and sediment porewater LOEs are presented in Section 7.

Risk Question: *Does the daily dose of COPECs received by fish (including forage fish, benthic omnivore, pelagic invertivore, and pelagic piscivore) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of fish? If yes, what are the probabilities of effects of differing magnitude for survival, growth, and/or reproduction of fish?*

This ME is evaluated by comparing receptor-specific modeled daily doses associated with the ingestion of chemicals in sediment and prey tissue with literature-based dietary dose TRVs. The data use objective for this ME is to estimate exposure of fish receptors via various exposure pathways to chemicals in sediment and prey tissue. Four different feeding guilds are evaluated: forage fish, benthic omnivore, pelagic invertivore, and pelagic piscivore. Surface sediment COPEC data (from the BAZ) and benthic invertebrate and/or fish prey tissue COPEC data, depending on receptor-specific

diet, are used to develop the dietary model for each fish receptor. The fish dietary LOEs are presented in Section 7.

3.1.3 Birds

Assessment Endpoint 3: Survival, growth, and/or reproduction of birds.

Birds are part of the upper trophic levels of the food web. There are three feeding guilds of birds evaluated in this BERA: benthivores (consume benthic invertebrates), omnivores (consume plant and animal matter), and piscivores (consume fish). Each feeding guild has a unique exposure potential to COPECs in NBSA media that are evaluated in this BERA.

Risk Question: *Does the daily dose of COPECs received by birds (including piscivorous, benthivorous/sediment probing, and omnivorous species) from consumption of tissues of prey species and other media in the NBSA exceed toxicity benchmarks for survival, growth, and/or reproduction of birds? If yes, what are the probabilities of effects of differing magnitude for survival, growth and/or reproduction of birds?*

This ME is evaluated by comparing receptor-specific modeled daily doses associated with the ingestion of chemicals in sediment and prey tissue with literature-based dietary dose TRVs. The data use objective for this ME is to estimate exposure of bird receptors via various exposure pathways to chemicals in sediment and prey tissue. Three different feeding guilds are evaluated: piscivorous, benthivorous/sediment-probing, and omnivorous. Surface sediment COPEC data (from the BAZ) and benthic invertebrate and/or fish prey tissue COPEC data, depending on receptor-specific diet, are used to develop the dietary model for each bird receptor.

Risks to birds are also assessed by evaluating field-collected tissue residues of birds (specifically egg tissue) collected from an existing study from Shooters Island (Parsons 2003). The egg tissue data collected from this study are compared to literature-based TRVs for avian eggs, and the study's findings regarding reproductive endpoints are included as direct measures of effects. The bird dietary and egg LOEs are presented in Section 8.

3.1.4 Mammals

Assessment Endpoint 4: Survival, growth, and/or reproduction of mammals.

Mammals are part of the upper trophic levels of the food web. There are two feeding guilds of mammals evaluated in this BERA: omnivores (consume plant and animal matter), and piscivores (consume fish). Each feeding guild has a unique exposure potential to COPECs in NBSA media that are evaluated in this BERA.

Risk Question: *Does the daily dose of COPECs received by mammals (including omnivorous and piscivorous mammals) from consumption of the tissues of prey species and from other media at the NBSA exceed toxicity benchmarks for survival, growth, and/or reproduction of mammals? If yes, what are the probabilities of effects of differing magnitude for survival, growth, and/or reproduction of mammals?*

This ME is evaluated by comparing receptor-specific modeled daily doses associated with the ingestion of COPECs in sediment and prey tissue with literature-based dietary dose TRVs. The data use objective for this ME is to estimate exposure of aquatic and semi-aquatic mammals to COPECs

in NBSA sediment and prey tissue. Two feeding guilds are evaluated: omnivorous and piscivorous. The mammal assessment is presented in Section 9.

3.1.5 Reptiles

Assessment Endpoint 5: Survival, growth, and/or reproduction of reptiles.

Risk Question: *Are COPEC concentrations in site surface water and sediment at levels that might adversely affect survival, growth, and/or reproduction of reptiles?*

This question is primarily addressed qualitatively by discussing the possibility of reptiles inhabiting the NBSA, particularly the diamond-backed terrapin, which is the only species observed or noted in the Bay. In addition, concentrations of COPECs in surface water and surface sediment from subtidal and intertidal areas are compared to available, relevant toxicity-based benchmarks. Finally, the potential risks to reptiles are put into perspective based on a bounding of the results from the bird and mammal assessments, based on the potential relative exposure pathways/magnitude for reptiles compared to these other organisms. The data use objective for this ME is to estimate the exposure of reptiles via direct contact and uptake of COPECs in surface water and sediment. The reptile LOE is presented in Section 10.

3.2 Representative Ecological Receptors

Representative receptor species for the AEs in this BERA were selected based on the available reports, biological surveys, habitat data, and other information from the NBSA, as discussed above. The following factors were considered for the selection of proposed ecological receptors:

- Potential for exposure to sediment-associated chemicals – Ecological receptors exposed to sediments through direct and incidental ingestion of sediment, ingestion of sediment-exposed prey, or direct contact with sediments have the greatest potential for exposure to sediment-associated chemicals, as opposed to species with less direct sediment contact. In addition, ecological species with small home ranges and whose site use is limited to the NBSA (e.g., mummichog) have a greater potential for exposure to site-related chemicals in sediment than do migratory species (e.g., bluefish), species with large home ranges, or species that do not exclusively use aquatic habitats (e.g., raccoon).
- Relative ability to bioaccumulate/biomagnify site-related chemicals – Species from upper-trophic levels (e.g., piscivores) have a greater potential for long-term exposure to bioaccumulative chemicals and a greater potential for the biomagnification of those chemicals.
- Societal and cultural significance (including species that are highly valued by society) – Federally and State-listed threatened and endangered species have special consideration in the selection of receptors. Table 2-20 provides the animal and plant species listed for the NBSA in the states of NJ and NY. Also, species that are considered commercially and recreationally important receive greater consideration in the selection of receptors.
- Ecological significance (including species that serve a unique ecological function) – Species with unique foraging preferences, such as those that primarily feed in shallow mudflat areas or are bottom-dwellers, receive special consideration.

- Sensitivity to site-related chemicals – Species with known sensitivities to particular chemicals (e.g., piscivorous birds sensitive to dichlorodiphenyltrichloroethane, mink sensitive to dioxins/furans and PCBs) receive special consideration in the selection of receptors.

Ecological receptors may be directly exposed to chemicals through contact (e.g., direct contact to sediment and/or surface water), through ingestion of chemicals in water or sediments, or indirectly through the ingestion of contaminated food items. For an exposure pathway to be complete, a chemical must be able to travel from the source to receptors that utilize or inhabit the site and be taken up by the receptors via one or more exposure routes.

As described in Section 3.1, the receptor groups that may be exposed to COPECs in sediment, surface water, and/or tissue from the NBSA include benthic invertebrates, fish, birds, mammals, and reptiles. Most of these organisms are subject to being exposed to multiple habitats and areas within the NBSA. Aside from infaunal benthic invertebrates, most species are not sessile and will actively move in and out of different habitats/geomorphic areas, thus exposing them to a wide range of COPECs within NBSA sediments and surface water. For instance, blue crabs inhabit the subtidal flats and intertidal areas in the summer, but will overwinter deep in the navigation channels. Species with known locational (i.e., site) fidelity for all or part of their life history were considered in the selection of receptors. Species were also selected based on feeding guild (e.g., benthic-feeders vs. piscivorous), which reflects differences in exposure. The representative organisms selected to represent each receptor group for this BERA are listed in Table 3-2. Life history profiles, which summarize the key information regarding the life stages, life cycles, habitat use, and feeding strategies for these receptors, are provided in Appendix B.

Table 3-2. Representative Ecological Receptors

Receptor Group	Receptor Guild and Habitat	Site Use	Species
Benthic Invertebrates	Benthic, deposit/filter-feeders, marine	Resident	Infaunal inverts./ polychaete worms
	Benthic, filter-feeder, marine	Resident	Softshell clam
	Benthic omnivore, marine	Resident	Blue crab
Fish	Forage fish	Resident	Mummichog/killifish (*Fundulus* sp.)
	Forage fish	Migratory	Atlantic menhaden/silverside
	Benthic omnivore	Migratory	Summer/winter flounder
	Pelagic invertivore/piscivore	Migratory	White perch
	Pelagic piscivore	Part Resident	American eel
Birds	Benthivore/sediment-probing	Migratory	Spotted sandpiper
	Subtidal piscivore	Part Resident	Great blue heron
	Pelagic piscivore	Part Resident	Double-crested cormorant
	Omnivore	Migratory	Lesser Scaup
Mammals	Piscivore	Transient	River otter
	Omnivore	Resident	Muskrat
	Piscivore	Transient	Harbor seal

3.3 Ecological Conceptual Site Model

A preliminary ecological CSM was presented in the Phase I RIWP (Tierra 2005) and in the SLERA (Battelle 2008), and was recently updated in the draft RI Report (GSH 2020). Based on the review of additional data and reports (i.e., the data and information summarized in this document) and information from the Problem Formulation (Attachment 2; Tierra 2013a) and NBSA Reconnaissance (Tierra 2015a), the ecological/food web components of the CSM have been updated as displayed on Figure 3-2; the specific ecological exposure pathways are depicted on Figure 3-3.

3.3.1 Ecological Exposure Pathways

Following discharge to the NBSA, contaminants can partition between the dissolved- and particulate-phase in the water column. Chemicals in the particulate-phase can then be transferred to the sediment bed by settling or be resuspended from the bed to the water column. The estimated depth of the BAZ, the area where biological activity and benthic exposures to contaminants occur, is approximately 6 inches throughout the Bay (Tierra 2008b). Bioaccumulation of contaminants is dependent on a variety of factors including contaminant type and speciation, metabolism, lipid content of the organisms, and physicochemical attributes of the sediment and porewater (e.g., organic carbon and sulfide content). Contaminants can enter the food web via accumulation in tissues of biota exposed directly to contaminants in the water column, sediments/porewater, and/or in the tissues of prey items (Figure 3-2). Food web interactions are likely the most significant exposure pathways for wildlife that forage in the NBSA. Because the Bay surface water is saline, ingestion of water, other than incidental ingestion during foraging, is not an exposure pathway for wildlife.

For aquatic organisms, such as fish and invertebrates, exposure to contaminated media (i.e., sediment and surface water) occurs via direct contact (e.g., absorption) or ingestion/uptake. Although birds and mammals are in direct contact with contaminated media, exposure via direct or dermal contact is negligible due to the presence of feathers and fur. Field reconnaissance of the NBSA (Tierra 2015a) indicated little evidence of reptile use in the NBSA. Similarly, inhalation of contaminants, such as volatile compounds in sediment or surface water by wildlife, is negligible.

3.3.2 Assessment Zones

Risks in this BERA are estimated both on a NBSA-wide basis, and for a series of assessment zones to evaluate relative risks on most localized areas of potential exposure (Figure 3-4). There are three primary assessment zones for which risks are quantified in this BERA: North, Southeast, and Southwest Zones. The Southeast Zone includes the Newark Bay confined disposal facility. The regularly dredged navigation channel zone is treated qualitatively in this BERA, as only limited data were collected from this zone for risk assessment purposes due to sampling limitations because of the regular ship traffic in the channels, the more temporary nature of the sediments in these channels as a result of regular removal from dredging, and the more limited and transient exposure of fish and other vertebrate organisms in these areas. In addition, the contamination in these areas is evaluated and addressed by the USACE as part of the permitting process for the navigation dredging events. The limited intertidal mudflat habitats that are present in the NBSA are evaluated in this BERA in terms of the specific risk potential from localized sediment contamination to organisms that preferentially forage in these areas. Shoreline samples, which

are also inclusive of all mudflat samples, are evaluated for muskrat only, which preferentially forage in these locations within the NBSA.

The selection of the assessment zones for evaluation were based on geographic considerations related to Bay physiography (i.e., position relative to the navigation channels, representation of different geomorphic features and depths within each non-channel zone, etc.), habitat, and data distribution for the different BERA datasets. The purpose of the zones is to evaluate if more localized exposures, within a reasonable foraging range for the different receptors, would result in estimates of potential exposure risks that differ from those estimated on a NBSA-wide basis. A summary of the zone-specific risk evaluations conducted for each of the key receptors in Sections 6 through 9 is presented in Table 3-3. Discussion of the specific analytical data available for each zone is provided in Section 4.4.

Table 3-3. Summary of Zone-Specific Exposure Risk Analyses for the Representative Receptors

Receptor	Prey Consumption		Incidental Sediment Ingestion			
	NBSA-Wide	Assessment Zone[a]	NBSA-Wide	Assessment Zone[a]	Mudflat	Shoreline[c]
Fish[b]						
Mummichog/killifish	✓	✓			✓	
Summer/Winter Flounder	✓	✓	✓	✓		
White Perch	✓	✓	✓	✓		
American Eel	✓	✓	✓	✓		
Birds						
Spotted Sandpiper	✓	✓			✓	
Great Blue Heron	✓	✓			✓	
Double-crested Cormorant	✓	✓	✓	✓		
Lesser Scaup	✓	✓	✓	✓		
Mammals						
River Otter	✓	✓	✓	✓		
Muskrat	✓	✓				✓
Harbor Seal	✓	✓	✓	✓		

Notes:
[a] = Preliminary assessment zones (North, Southeast, Southwest); no biota data were collected in regularly dredged deep water channel zone
[b] = Atlantic menhaden/silverside (migratory forage fish) not included in this table as they are only being assessed from their tissue data
[c] = All intertidal mudflat samples are also considered and included as shoreline samples.
✓ = Risk assessment being conducted for this exposure scenario

3.4 Summary of SLERA and Selection of COPECs

The final SLERA for the NBSA (Battelle 2008) is provided as Attachment 1. The SLERA was conducted using historical datasets that were available for the NBSA prior to implementation of Phase I and II of the RI.

The results of the SLERA indicated that the average and/or upper-bound concentrations of a variety of contaminants in sediments exceeded conservative screening guidelines and/or benchmarks throughout the NBSA. In addition, preliminary screening-level food web model results for fish, birds, and mammals, indicated that the upper-bound tissue and exposure-modeled concentrations of bioaccumulative

contaminants exceeded conservative tissue benchmarks derived from the scientific literature. From the SLERA, a preliminary list of COPECs was identified for sediments and the different types of organisms. These included dioxins/furans, metals, PAHs, PCBs, pesticides, and other semivolatile organic compounds (Table 3-4). The conclusion of the SLERA was that a BERA should be performed to evaluate the potential risks from these COPECs.

As part of the Problem Formulation (Attachment 2; Tierra 2013a) development, a revised screening-level assessment was performed using the surface sediment chemistry data collected during the Phase I and II RIs. The results of the updated screen confirmed the list of primary chemical groups retained as COPECs for this BERA and helped to identify the most important individual chemicals or compounds in those groups.

For this BERA, all chemical data collected under the Phase III sampling programs (i.e., 2014 to 2016 datasets) are evaluated with respect to their potential for risk. In the SQT program, all detected analytes in surface sediments (regardless of prior COPEC status) are included in the statistical evaluations to determine if there is a relationship between the analyte and potential effects on the benthic invertebrate community. In the tissue and food web modeling analyses for shellfish, fish, birds, and mammals, a group of widely detected COPECs with known potential for toxicity are evaluated (Table 3-5). Sensitivity analyses are then presented for other analytes (e.g., metals, pesticides) that were less widely detected, and generally have less toxicological potential or information available, in order to assess the likelihood of risk relative to the more prominent COPECs. The latter results are discussed as part of the uncertainty sections for the various receptor groups in Sections 6 through 10 and summarized as part of the risk conclusions in Section 11.

Table 3-5. COPECs Evaluated for Shellfish, Fish, and Wildlife Receptors in the BERA

COPEC	COPECs for the NBSA BERA						
	Benthic Invertebrate Tissue	Fish Tissue	Fish Egg	Fish Diet	Bird Egg	Bird Diet	Mammal Diet
Dioxins/Furans							
2,3,7,8-TCDD	X	X	X		X	X	X
Total Dioxin/Furan TEQ Fish		X	X				
Total Dioxin/Furan TEQ Bird					X	X	
Total Dioxin/Furan TEQ Mammal							X
Polychlorinated Biphenyls							
Total PCBs	X	X	X		X	X	X
Total PCB TEQ Fish		X	X				
Total PCB TEQ Bird					X	X	
Total PCB TEQ Mammal							X
Total Dioxin/Furan/PCB TEQ Fish		X	X				
Total Dioxin/Furan/PCB TEQ Bird					X	X	
Total Dioxin/Furan/PCB TEQ Mammal							X
Pesticides							
Total DDx (2,4 & 4,4)	X	X			X	X	X
Dieldrin	X	X			X	X	X
Total Chlordane	X	X			X	X	X
Hexachlorobenzene	X	X			X	X	X
Polycyclic Aromatic Hydrocarbons							
Total HMW PAH	X					X	X
Total LMW PAH	X					X	X
Total PAH				X	X	X	X
Inorganics							
Arsenic	X	X		X		X	X
Cadmium	X			X	X	X	X
Chromium	X	X		X		X	X
Copper	X	X		X		X	X
Lead	X	X		X		X	X
Mercury/Methylmercury	X	X	X	X	X	X	X
Nickel	X			X		X	X
Selenium	X	X		X		X	X
Silver	X	X		X		X	X
Zinc	X	X		X		X	X

Notes:
[a] Total chlordane is the sum of heptachlor epoxide, oxychlordane, heptachlor endo-epoxide, trans-nonachlor, alpha-chlordane, cis-nonachlor, gamma-chlordane, and heptachlor.
X = Indicates the constituent is a COPEC for the species and line of evidence

3.5 Risk Analysis Framework for the BERA

Consistent with USEPA guidance (1997, 1998, 1999), risk is evaluated for populations of ecological receptors. Potential effects of COPEC exposure to populations or communities may be measured directly or evaluated using toxicity of individual members of the population based on changes in growth, reproduction, or survival, and extrapolating how these individual effects translate to populations of organisms. The risk analysis framework for this BERA was designed to determine if exposures to COPECs in the NBSA are likely to cause adverse effects to ecological populations at the site or changes in community composition or function.

The risk analysis framework is based on consideration of multiple LOEs, where available, to draw risk conclusions regarding the potential for unacceptable risk to populations of ecological receptors. The various LOE for each receptor group and overall WOE approach used in this BERA are described in more detail below.

3.5.1 Lines of Evidence

According to USEPA (1997) guidance, there are four primary types of LOEs that can be used to determine if ecological risks exist at the site:

1. Comparing estimated or measured exposure levels to levels that are known from the literature to be toxic to receptors associated with the assessment endpoint
2. Comparing the observed effects in the receptors associated with the site with observed effects in similar receptors at a reference site
3. Comparing the results of laboratory bioassays with media from the site and reference sites
4. Comparing the results of *in situ* toxicity tests conducted at the site and reference sites.

For each receptor group evaluated in this BERA, the LOEs with available data are summarized in Table 3-6. Available data are summarized in more detail in Section 4.3.

Table 3-6. Lines of Evidence for the BERA

Receptor Group	Exposure and Toxicity Comparisons (Hazard Quotients)			Site-specific Toxicity Measures	Comparison to Reference (Urban Background)
	Environmental Media[a]	Dietary	Tissue		
Benthic Invertebrates[b]	X		X	X	X
Fish	X[c]	X	X[d]	X[e]	X[f]
Birds		X	X	X[g]	X[g]
Mammals		X			
Reptiles[h]		X			

Notes:
a. Sediment, porewater, and/or surface water data.
b. Benthic invertebrates were evaluated using the SQT as the primary LOE for infaunal communities, and a tissue assessment for epibenthic shellfish (clam and crab).
c. Surface water data are mostly below available screening levels and do not indicate potential for ecological risk; surface water hazard quotients were not calculated in this BERA.
d. Whole-body and/or egg tissue.
e. Site-specific fish pathology study.
f. USACE ABS historical adult, juvenile, and ichthyoplankton community studies.
g. Parsons (2003) site-specific bird tissue/egg/reproduction study.
h. Evaluated qualitatively only.

The LOEs align with AEs, risk questions, and MEs as presented in Table 3-1. The various LOEs were used to develop overall risk conclusions based on consideration of the specific strengths and uncertainties for each LOE. For benthic invertebrates, potential for unacceptable risk to benthic invertebrate (infaunal) communities in the NBSA was evaluated using the SQT assessment (Appendix A; Section 6). This approach, which incorporates multiple LOEs (site-specific toxicity testing [including comparison to toxicity in reference locations], measurement of community structure and function, and chemical analysis of environmental media and associated dose modeling), has the most site relevance and least uncertainty in predicting potential for unacceptable risk in the NBSA. For the remaining receptors that are quantitatively evaluated in this BERA (shellfish, fish, birds, and mammals), hazard quotients (HQs) were used as the LOE to define preliminary constituents of concern (COCs); all COPECs with a lowest observed adverse effect level (LOAEL) HQ ≥ 1 in any of the available HQ LOEs (including sensitivity analyses) were identified as a preliminary COC (i.e., having potential for unacceptable risk). Each preliminary COC was then evaluated using the available LOEs (as indicated in Table 3-6) and consideration of the specific strengths and uncertainties for each LOE to draw risk conclusions for that receptor-COPEC pair based on the cumulative WOE. More detail regarding the WOE approach is provided in Section 3.5.3.

3.5.2 Consistency Between the NBSA (OU3) and Lower Passaic River (OU4) BERA

As stated in Section 1, an overarching goal of this BERA is to maintain, to the extent practicable, consistency with the technical approach and applications for estimating risks and drawing risk conclusions in the LPRSA BERA. While there are differences in the ecosystems between the two sites (i.e., settings, physicochemical characteristics, geomorphology, habitats, data collected, and representative receptor species), in general, the types of receptors and approaches to evaluating risks are similar within the context of the USEPA Superfund ERA guidelines (USEPA 1997).

The risk analysis plan for this BERA is consistent with that of the LPRSA BERA. Important process similarities include the use of an SQT assessment for assessing risk to benthic invertebrate communities, and a tissue and food web exposure modeling approach, along with the calculation of HQs, for epibenthic invertebrates, fish, birds, and mammals.

In order to keep the tissue and food web exposure-risk assessments comparable between the two OUs, GSH has adopted, to the extent feasible and appropriate, the TRVs for the different COPEC and receptor

groups from the LPRSA BERA (Windward 2019)[3]. This includes the incorporation of the TRVs developed by the USEPA for the Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River (LPR FFS; USEPA 2014) for risk bounding purposes.

In general, regarding bounding of risk estimates, the parties concur that the LPR FFS TRVs are more conservative than comparable TRVs developed by the CPG for the LPRSA BERA. The LPRSA BERA TRVs used in risk calculations were selected from a larger dataset of no observed adverse effect level (NOAEL) and LOAELs in one of two ways: 1) a TRV (representing a LOAEL TRV) was derived as the 5th percentile value of a species sensitivity distribution (SSD) curve if toxicity data were sufficient and the highest NOAEL below the 5th percentile SSD value was selected as the NOAEL, or 2) a study-specific NOAEL TRV and a LOAEL TRV were selected (if toxicity data were not sufficient to develop an SSD). When data were not sufficient to derive a TRV from an SSD, the lowest acceptable LOAEL and the highest NOAEL below the LOAEL from the same study were selected as the TRVs. The SSD and TRVs development and selection process for the TRVs used in the LPRSA BERA are described in detail in the main text and Appendix E of that document.

The intent of using both TRV sources, when available, is to understand the potential range of effects within a particular trophic category from more sensitive to less sensitive endpoint receptors. Different TRVs for this BERA were only selected for COPECs that were not assessed in the LPRSA BERA. By applying common TRVs to both BERAs, the risk estimates are analogous between the two BERAs. This document cites the CPG's LPRSA BERA (Windward 2019) for details on the process in developing the common set of TRVs for invertebrates, fish, birds, and mammals, and does not repeat this detailed information. Summary information on TRV development and selection is provided in the respective sections and appendices of this BERA. Toxicity profiles and discussions on the TRVs are presented in detail in Appendix D.

The interpretation of the risk calculations/estimates for this BERA is also consistent with the LPRSA BERA. In the risk characterization, LOAEL HQs ≥ 1 are used as the initial threshold for potential unacceptable risk and evaluation of LOEs for each receptor are considered in a WOE approach. The outcome of the WOE approach is a list of, and basis for, recommended COCs for further evaluation in the FS. The approach is described in more detail in Section 3.5.3.

3.5.3 Weight of Evidence Approach for Drawing Risk Conclusions

At the conclusion of this BERA, COPECs with uncertain or unacceptable risk to ecological receptors (i.e., risk drivers) are identified and these constituents are recommended as final COCs for further evaluation in the FS. To identify these risk drivers/final COCs, a WOE approach was used. In the WOE evaluation, the various LOE available for each receptor group and COPEC are evaluated for factors contributing to the overall confidence and conservatism inherent in the risk estimates. Through consideration of the

[3] It is the NJDEP's position that a single TRV set (NOAEL and LOAEL) that evaluates the more sensitive species and endpoints to characterize risk to invertebrates, fish, birds and wildlife should be selected in a BERA, not two sets of TRVs as presented in this document. The NJDEP's Ecological Evaluation Technical Guidance, August 2018, does not advocate the use of more than one set of TRVs for individual contaminant-receptor pairs. It is the NJDEP's position that use of one conservative TRV set derived for sensitive receptors and sensitive endpoints most clearly demonstrates the degree of risk for individual contaminant-receptor pairs and ensures protection of threatened, endangered and species of special concern.

independent strengths and weaknesses of each LOE, it is possible to draw risk conclusions supported by the cumulative WOE.

As presented by Suter (2006), factors to consider when evaluating various LOE are related to the overall relationship of the LOE to the AE, the quality of the data, and the strength of the study design to address risk questions at the site. These factors can include site relevance, existence of a dose-response relationship, spatial extent, quality and quantity of the data, which are discussed briefly below:

- Site Relevance – LOE and supporting data (such as toxicity values or exposure factors) derived from information with high site relevance was given higher weight than information with unknown or unlikely relevance to the NBSA. Representativeness of the media, species, environmental conditions, and habitat type relative to those at the site is considered. For example, toxicity data derived for species present at the site or derived using realistic exposure routes are given higher weight than for less relevant data.
- Dose-Response Relationship – The existence of a dose–response relationship and the strength of the relationship increase confidence in the LOE.
- Spatial and Temporal Extent – A LOE was given more weight if the data adequately represent the area assessed. For example, tissue data collected from resident species are given higher weight than for data collected from migratory species with other potential non-site exposures; exposure estimates representative of a receptor population are preferred over estimates based on much smaller or larger areas.
- Quality and Quantity - Various factors, including analysis procedures, sample counts, and frequency of detection (FOD), can be considered to assess the LOE. In general, data with adequate quantitation limits, high relative sample counts, and low FOD were given higher weight.

For example, when interpreting HQ results, uncertainties in the various calculation inputs are considered. These can include supporting statistical information for the exposure estimates (e.g., sample size, FOD), confidence in the toxicity values and exposure factors, the direction of uncertainty in the risk estimates, and spatial extent of elevated concentrations.

Potential for unacceptable risk to benthic invertebrate (infaunal) communities in the NBSA was evaluated using the SQT assessment (Appendix A; Section 6). This approach, which incorporates multiple LOE (site-specific toxicity testing, measurement of community structure and function, and chemical analysis of environmental media), has the most site relevance and least uncertainty in predicting potential for unacceptable risk in the NBSA. The SQT data are site-specific and designed to evaluate the various habitat types and invertebrate communities present within the NBSA. The robust statistical evaluations incorporated into the SQT integrate exposure from all routes.

For the remaining receptors that are quantitatively evaluated in this BERA (shellfish, fish, birds, and mammals), all COPECs with a LOAEL HQ ≥ 1 in any of the available HQ LOEs (including sensitivity analyses) were identified as a preliminary COC (i.e., having potentially unacceptable risk). Each preliminary COC was then evaluated using all available LOEs and consideration of the factors above to reach a risk conclusion for that receptor-COPEC pair based on the cumulative WOE. Only receptor-COPEC pairs with a LOAEL HQ ≥ 1 and factors supporting the conclusion of unacceptable risk were recommended as risk drivers/final COCs. In cases where no risk conclusion could be made, risk was

considered uncertain and these COPECs were also recommended as final COCs. This approach is consistent with that used in the LPRSA BERA (Windward 2019) and was retained for this BERA for consistency.

There are ultimately three possible risk outcomes for fish, shellfish and wildlife based on the LOAEL HQs ≥ 1 and WOE:

1. Unacceptable risk is possible (i.e., indicated by sufficient and strong supporting LOEs). These COPECs are recommended as final COCs.
2. Unacceptable risk is unlikely (i.e., indicated by sufficient and strong LOEs supporting a conclusion of no unacceptable risk). These COPECs are not recommended as final COCs.
3. Unacceptable risk is uncertain (i.e., indicated by insufficient LOEs). While sufficient data were collected to evaluate ecological receptor exposures in the NBSA, toxicity data used to evaluate the exposures were selected primarily from published literature. Toxicity data for some receptors, such as tissue copper effects levels in fish, are limited in the literature. In cases where there is low confidence in the toxicity data and the various LOEs gave conflicting results, the available information was considered too uncertain to draw risk conclusions. These COPECs are recommended as final COCs.

Selection of final COCs for evaluation in the FS will be completed in consultation with USEPA and based on the findings of this BERA.

The risk characterization results based on the WOE are presented in Section 6.5 for shellfish (i.e., clam and crab), Section 7.7 for fish, Section 8.4 for birds, and Section 9.3 for mammals. A summary of the overall risk findings for this BERA is presented in Section 11.

4 DATA RESULTS AND EVALUATION

This section describes the datasets used to conduct this BERA. A summary of the site-specific investigations performed in Phase III of the RI/FS to support this BERA is provided, along with historical datasets that are used throughout this BERA to provide perspectives on the ecosystem and risk estimates.

4.1 Data Used in the Baseline Ecological Risk Assessment

A Phase III site investigation (SI) and several additional sampling programs to collect the data necessary to conduct the BHHRA and BERA, were conducted between 2012 and 2016. Field activities for the Phase III SI were conducted in 2016 and were performed consistent with the Phase III QAPP (Tierra 2016). Under the RI, two bathymetry surveys (2005 and 2012/2013), an evaluation of the BAZ, and an evaluation of sediment data and sedimentation rates (Tierra 2008a, 2008b, 2011, 2014c) were performed.

In addition, a shoreline/habitat survey and three sampling programs were conducted as part of the Phase III field activities to support this BERA and BHHRA. A shoreline/habitat survey was conducted in 2013 in accordance with the Reconnaissance Survey Work Plan (Tierra 2013c), a crab and clam sampling program was conducted in 2014 in accordance with the Crab and Clam QAPP (Tierra 2014a), a fish sampling program was conducted from 2014 through 2016 in accordance with the Fish Sampling and Analysis QAPP (Tierra 2014b), and a SQT and porewater sampling program was conducted in 2015 in accordance with the SQT and Porewater QAPP (Tierra 2015b).

Two prior Phase I/II investigations were also considered in this BERA. First, an evaluation of the BAZ was conducted in 2005 to evaluate the level of bioturbation that plays a key role in distributing pollutants in sediments (Tierra 2008b). From this work, the depth of the BAZ was defined to be approximately 0 to 6 inches, information that was used to guide the design of the Phase III and risk assessment surface sediment investigations. Second, surface water sampling conducted by the CPG within the NBSA (2010 to 2013) as part of fate and transport modeling work being conducted for the system was evaluated to characterize the potential exposures of ecological receptors in the Bay to contaminants in surface water.

Additional information regarding these field activities are provided in the following reports:

- Estimation of the Biologically Active Zone (Tierra 2008b)
- Newark Bay Study Area Reconnaissance Survey Report (Tierra 2015a)
- Technical Memorandum: Risk Assessment Field Sampling and Analysis Program - Newark Bay Study Area (Arcadis 2015)
- SQT and Porewater Field and Data Reports (GSH 2017a,d)
- Phase III Sediment Investigation Field Report (GSH 2017c)
- Crab and Clam Field and Data Reports (Normandeau 2017; GSH 2017b)
- Fish Field and Data Reports (Normandeau 2017; Tierra 2017).

A summary of the overall components of the data collected under the NBSA Phases I through III field activities used for risk assessment is provided in Tables 4-1a and 4-1b. The list of chemical constituents analyzed for in water, sediment and tissue samples is provided in Table 4-2.

Maps of the sampling locations for the risk assessment program are provided on Figures 4-1 through 4-3 (surface water, SQT, and Phase III sediment sampling locations, respectively), Figure 2-5 (clam/crab sampling locations) and Figures 2-8 through 2-10 (2014-2016 fish sampling locations). Figure 3-4 shows the aggregate BERA sampling locations in the five BERA assessment zones.

Together, these investigations provide the necessary data to complete this BERA, as discussed in the CSM (GSH 2020). The Phase III RI/BERA investigations utilized to conduct this BERA are discussed in sequence of performance in Section 4.3, and the results for the full suite of chemical analytes are presented in that section. A more focused evaluation and summary of the data for the COPECs (identified in Section 3.4) is presented in Section 4.4. This includes the development of the sediment and tissue data inputs, both Bay-wide and for each BERA assessment zone, used in the exposure modeling and risk calculations in Sections 6 through 9.

4.2 Data Reduction Rules

This section describes data reduction and handling methods used to prepare the laboratory analytical data for detailed evaluation (e.g., field duplicates, non-detects) and various data normalization techniques. In addition, the statistical and data visualization methods used to evaluate the various datasets for this BERA are described. Sample results that were rejected in the data validation process were not included in this BERA.

4.2.1 Field Duplicates

Field duplicate sample results were combined with the parent sample (i.e., corresponding sample) results to generate a single sample result for subsequent data evaluation.

1. When both field duplicate and parent sample results were reported as detected concentrations, the sample concentrations were averaged to generate a single concentration.
2. When either the field duplicate sample or the parent sample was reported as a detected concentration, but was not detected in the other sample, only the detected concentration was used to represent the concentration of that analyte in that sample. The alternate approach of averaging the detected value with the quantitation limit from the non-detect value would introduce unnecessary uncertainty because the quantitation limit does not provide a known measure of concentration.
3. When a given analyte was not detected in either the parent or field duplicate sample the lower of the two quantitation limits was used to represent the quantitation limit for that analyte in that sample.

4.2.2 Calculated Totals

For several chemical groups, data were evaluated both as individual chemicals and as total concentrations for a particular chemical group. Total concentrations (other than those reported by the

analytical laboratory[4]) were defined as the sum of the detected concentrations of individual chemicals within that chemical group; a value of zero is used for non-detects. These total concentrations were calculated for the following groups:

1. Total Low Molecular Weight (LMW) PAHs = sum of naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene
2. Total High Molecular Weight (HMW) PAHs = sum of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene
3. Total PAHs = sum of naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene
4. Total Alkylated PAHs = sum of C1-Chrysenes, C1-Fluoranthenes/Pyrenes, C1-Fluorenes, C1-Naphthalenes, C1-Phenanthrenes/Anthracenes, C2-Chrysenes, C2-Fluoranthenes/Pyrenes, C2-Fluorenes, C2-Naphthalenes, C2-Phenanthrenes/Anthracenes, C3-Chrysenes, C3-Fluoranthenes/Pyrenes, C3-Fluorenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Chrysenes, C4-Naphthalenes, and C4-Phenanthrenes/Anthracenes
5. Total Aroclor PCBs = sum of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, and Aroclor-1268
6. Total PCBs (209 Congeners) = sum of 209 individual congener PCBs (note that co-elutions were included at the full value for this calculation)
7. Total Alpha + Gamma Chlordane = sum of alpha-Chlordane and gamma-Chlordane
8. Total Chlordane = sum of alpha-Chlordane and gamma-Chlordane, heptachlor epoxide, oxychlordane, heptachlor endo-epoxide, trans-nonachlor, and cis-nonachlor
9. Total BHC Compounds = sum of alpha-BHC, beta-BHC, delta-BHC, and gamma-BHC (lindane)
10. Total DDx (2,4') = sum of 2,4'- dichlorodiphenyldichloroethylene (DDE), 2,4'-dichlorodiphenyldichloroethane (DDD), and 2,4'- dichlorodiphenyltrichloroethane (DDT)
11. Total DDx (4,4') = sum of 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT
12. Total DDx (2,4' and 4,4') = sum of 2,4'-DDE, 2,4'-DDD, 2,4'-DDT, 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT

If all analytes that made up a given total for a specific sample were non-detect, the total for that sample was reported as a non-detect at the highest quantitation limit of the individual analytes.

For uncertainty and sensitivity analyses, totals concentrations were evaluated with either one-half the quantitation limit substituted for non-detects in the summation (denoted as ND = ½) or with the full quantitation limit substituted for non-detects in the summation (denoted as ND =1).

[4] The total concentration of each of the eight dioxin and furan homologue groups was reported by the laboratory.

4.2.3 TEQ Methodology

The toxic equivalency (TEQ) is a toxicity-weighted value based on the estimated toxicity of various dioxin-like compounds relative to 2,3,7,8-TCDD. Each compound is associated with a toxic equivalency factor (TEF) that represents its toxicity relative to 2,3,7,8-TCDD. The TEQ is calculated as the sum of the concentrations of the dioxin-like compounds multiplied by their TEFs. TEFs have been separately derived for fish, birds, and mammals (USEPA 2008). The fish and bird TEFs are tissue-based while the mammal TEFs are dietary-based (USEPA 2008). Three separate totals were calculated for each species group: total dioxin TEQ (based on 2,3,7,8-substituted dioxin and furan congeners only); total PCB TEQ (based on dioxin-like PCB congeners only); and total dioxin/PCB TEQ (based on all dioxin-like compounds). The toxicity-weighted totals for PCBs and PCDDs/PCDFs were calculated by summing each of the detected chemical constituents multiplied by its respective TEF.

There are a number of uncertainties associated with this methodology, as discussed in USEPA (2008); these uncertainties are discussed in the context of receptor group-specific risk characterization in Sections 6 through 9:

- A number of relative potencies for each dioxin-like compound, each derived from its own study, were used to derive a consensus value for the TEF. These relative potencies may vary because of uncertainties in the various steps leading to the determination of value in each study. Such uncertainties include differences in study design and calculation techniques, measurement errors, precision of dose and effects measurements, and natural variability among organisms of the same species in their responses (USEPA 2008).
- The TEFs are point estimates derived from the individual relative potency studies, and they may range over several orders of magnitude among species within each of the groups (i.e., fish, birds, and mammals). There is uncertainty associated with the method used to aggregate the data used to derive each TEF (USEPA 2008).
- The TEQ approach assumes that the toxicity of each dioxin-like compound is additive. It is possible that synergistic or antagonistic interactions could occur.
- The TEFs used in this BERA include only the PCBs, PCDDs, and PCDF congeners known to elicit responses mediated by the aryl hydrocarbon (Ah) receptor.

In addition, recent studies have found that other congeners are more toxic than 2,3,7,8-TCDD, and that the current TEF of 1.0 for two PCDFs (2,3,4,7,8-pentachlorodibenzofuran and 2,3,7,8-tetrachlorodibenzofuran) may underestimate avian toxicity TEFs (Farmahin et al. 2012; Cohen-Barnhouse et al. 2011; Yang et al. 2010). Despite some inherent uncertainties, the TEQ methodology provides a reasonable, scientifically justifiable, and widely accepted method for estimating risks to ecological receptors in CERCLA risk assessments (USEPA 2008).

For uncertainty and sensitivity analyses, total TEQ concentrations were also evaluated with either one-half the quantitation limit multiplied by the corresponding TEF substituted for non-detects in the summation (denoted as ND = ½) or with the full quantitation limit multiplied by the TEF substituted for non-detects in the summation (denoted as ND =1).

4.2.4 Normalization

4.2.4.1 Sediment Data Normalization

The spatial and temporal distribution of contaminants in sediments can be affected by interactions between contaminants and grain size, mineralogy, and organic carbon. Varying sediment sources and flow velocities can affect the size distribution and characteristics of materials deposited in specific portions of the Bay. These hydrodynamic-related variations in the sediment characteristics can in turn influence the concentrations of contaminants accumulated in the sediment. Most natural and anthropogenic substances, including metals and hydrophobic organic compounds, have a higher affinity to fine-grained particulates than to the coarse fraction. This affinity is related to the surface area of the particles because fine-grained particles have more surface area for adsorption. Often organic matter and clay minerals, associated with fine particle fractions, show the strongest sorption capacity for contaminants. Therefore, even if overlying water concentrations of the contaminants are held constant, there will be a correlation of the contaminant concentration with sediment organic carbon content, clay fraction, or other geochemical factors. The challenge is to separate the natural variability component of sediment mineralogy from the anthropogenic contribution of contaminants to sediment.

Normalization is a data analysis procedure that takes into account both background and contaminant concentrations for the influence of the natural variability in sediment size, mineralogy, and organic carbon content driven largely by differences in energy in the aquatic system (Kersten and Smedes 2002). Through normalization to a parameter that reflects naturally occurring changes in contaminant concentrations, the inherent variability relating to that parameter can be reduced, allowing more meaningful assessment of spatial and temporal patterns in contaminant concentrations.

For hydrophobic organic compounds, concentrations are usually normalized to the organic carbon content of the sediments.

For metals, there is no consensus on the most appropriate constituent to be used in the normalization. Aluminum, iron, TOC, and grain size often vary with sediment texture and show strong relations with metals and can be used as geochemical normalizers (Horowitz 1991; Naval Facilities Engineering Command 2003; San Francisco Estuary Institute 2006). In these cases, the metal of concern may vary with natural differences in sediment composition and mineralogy, but will vary in a relatively constant proportion to the parameter used for the normalization.

A detailed evaluation of normalization for NBSA sediment data is provided in Section 4 (Nature and Extent of Contamination) of the draft RI Report (GSH 2020). The results indicate there was no relationship between inorganic contaminants and normalizing factors. However, nonionic organic contaminants do tend to covary with organic carbon content in the sediments. For the purposes of this BERA, organic COPECs in surface sediments are normalized to TOC, and these results are evaluated in terms of whether they substantially explain variability in the dry weight data results. This evaluation is provided in Section 4.3.4.

4.2.4.2 Biota Tissue Normalization

Lipid levels vary seasonally in organisms (depending on reproductive state) and can also be influenced by a number of environmental factors, including quality of food and stress levels in the organism. Lipid

levels in softshell clam were relatively low (mean= 0.36%; range 0.2 -1%) compared to those reported for clams sampled in studies from other Atlantic estuarine areas (e.g., 5.3 - 9% in Boston Harbor; Lohmann et al. 2004). Biota contaminant concentration is normalized to lipid content to potentially minimize the variability associated with changes in lipid content and facilitate comparisons across locations and species. However, lipid normalization is only useful when a direct and proportional relationship exists between lipid content and contaminant concentrations. The relationship between lipid content and contaminant concentration by organisms sampled is explored in Section 4.3.7.

4.2.5 Significant Figures

Tracking of significant figures is important when calculating averages and performing other data summaries. The appropriate number of significant figures associated with specific risk estimates was applied in the last step of each calculation and reflected the least precise value in the calculation (i.e., the lowest number of significant figures).

4.2.6 Calculating Upper Confidence Limits

Exposure point concentrations (EPCs) were represented by the 95% upper confidence limit (UCL) of the mean and were calculated using the USEPA's ProUCL® statistical package (Version 5.1.00) (USEPA 2015b) and were derived following the USEPA guidance for calculating UCLs for EPCs at hazardous waste sites (USEPA 2002). The 95% UCL recommended by the USEPA's ProUCL® software was used. For some data sets, ProUCL may recommend multiple values for the 95% UCL, which are all considered valid, and in general, multiple recommended values are very similar. If multiple UCLs were recommended by ProUCL, the lowest value was selected to represent the EPC. The UCL is a statistic that estimates the mean concentration with a specified degree of confidence, and accounts for variability among the sampling data. For datasets with fewer than six detected samples, a UCL was not calculated, and instead the maximum concentration was used to represent an EPC. In cases when statistically derived UCLs were greater than the maximum detected concentration, the maximum detected concentration was used in place of the UCL concentration to represent the upper bound value. The 95% UCLs used to represent EPCs in this BERA are summarized in Appendix C.

4.2.7 Treatment of Non-Detects in Risk Calculations

Historically, it has been common practice to estimate the concentration of a chemical not detected in a sample by assuming the chemical is present at a concentration below the quantitation limit. This approach is typically referred to as a substitution method whereby the quantitation limit, one-half the quantitation limit, or a value of zero is used as an estimate of the concentration. In this BERA, for all analytical methods, non-detect values were reported to the quantitation limit.

For the purposes of calculating summary statistics (e.g., calculation of mean and standard deviation), one-half the quantitation limit was substituted for non-detects. However, when all data are reported as non-detect, the calculated mean and standard deviation are calculated using the full quantitation limit; a "less than" symbol (<) is used to indicate a calculated value below the maximum quantitation limit.

For the purposes of data presentation in scatter plots and box plots, individual non-detect sample results are shown at the quantitation limit and identified as non-detects by symbol or color-coding. Arithmetic means shown on box plots are calculated with one-half the quantitation limit substituted for non-detects.

Only detected concentrations were included in totals concentrations as described in Sections 4.2.2 and 4.2.3. However, uncertainty analyses include evaluation of substituting both one-half and the full quantitation limit for non-detects in summations.

ProUCL® uses Kaplan-Meier methods for handling non-detect data (USEPA 2015b) in the calculation of UCLs. Input data sets for ProUCL identify non-detects and include the quantitation limit.

4.2.8 Graphical and Statistical Evaluations

Boxplots are used to graphically display measurements in a sample population for the analyses included in Section 4 of this BERA. Boxplots display the main distributional characteristics (spread and skew) of the data. The "box" contains 50% of the sample values from the 1st quartile (25th percentile) to the 3rd quartile (75th percentile), also referred to as the inter-quartile range. The sample median (50th percentile) is displayed as horizontal line within the box. The whiskers represent the smallest or largest value within 1.5 times the interquartile range above or below the box. Mild outliers are shown as individual points that lie outside 1.5 times the interquartile range above or below the box. Extreme outliers are shown as individual points that lie outside 3 times the interquartile range above or below the box. Non-detect data are plotted at the quantitation limit. Percentiles are based on the full quantitation limit for non-detects. The arithmetic mean shown on box plots is calculated similarly as the summary statistics presented in tables with one-half the quantitation limit substituted for non-detects. Means and percentiles are not shown on box plot graphics when sample size is less than 8 or FOD is less than 50%.

In addition to the graphical displays, several statistical evaluations were conducted on the data as part of this BERA to glean information on the similarity or difference in contaminant concentrations between the various spatial features or areas of the NBSA. These tests included:

Analysis of variance (ANOVA): ANOVA procedures were used to evaluate whether significant differences exist in mean contaminant concentrations. ANOVA is a linear model in which the dependent variable is continuous and there is one independent fixed effect categorical variable with two or more possible values. One-half the quantitation limit was substituted for non-detects. Data were log-transformed to better satisfy the assumptions of normality of data residuals and homogeneity of variance. Residuals were checked for approximate normality and symmetry (Scheffe 1959). In addition, within group standard deviations were checked for departure from homogeneity as described by Hochberg and Tamhane (1987). When ANOVA models were statistically significant ($\alpha < 0.05$); a post-hoc Tukey-Kramer pairwise multiple comparison test (Kramer 1956) was conducted to determine which group or groups within the categorical variable set were different from each other. Log-transformation results in the comparison of geometric means; however, under the assumption of equal variance, differences in means are inferred when differences in geometric mean are statistically significant.

Spearman Rank Correlation: The strength of association between toxicity and benthic effects measures and contaminant concentrations was evaluated using Spearman's rank-order correlation. The Spearman's rank-order correlation is the nonparametric version of the Pearson product-moment

correlation. Spearman's correlation measures the strength and direction of a monotonic association between two variables. When one variable generally increases (or decreases) as the other variable increases (or decreases), the two variables are said to possess a monotonic correlation. Correlation coefficients have the characteristic of being dimensionless and scaled to lie in the range −1 to 1. When there is no correlation between two variables, the correlation coefficient is equal to zero (0). When one variable increases as the second increases, the correlation coefficient is positive. Alternatively, when one variable decreases as the second increases, the correlation coefficient is negative.

4.3 Phase III RI/BERA Data Collections and Results

The following sections discuss the results of the data collected for use in this BERA. Summary statistics are provided for the full suite of detected analytes (including, but not limited to the focused list of COPECs) in this section. More focused data summaries for the COPECs are provided in the respective risk assessment sections of this BERA. Appropriate normalizations and data reductions are also presented and discussed in this section, along with broad spatial findings from the various datasets. Detailed discussions of the data findings for the NBSA are provided in the draft RI Report (GSH 2020).

4.3.1 Shoreline/Habitat Survey

The Shoreline/Habitat Reconnaissance Survey for the NBSA was conducted in 2013 as part of the BHHRA and BERA activities for the RI/FS. The survey was completed by boat and video, and still cameras were used to record various shoreline/habitat data, including:

- Shoreline/habitat characterization information
- Characterization of human use of shoreline areas
- Identification of sampling areas and evaluation of sampling approaches.

Where feasible, the field biologists surveyed, on foot, the shoreline areas identified as habitat looking for bird nests and signs of mammal use (e.g., scat, tracks) and documented such findings. Survey findings, including a photograph log and a shoreline characterization video, are provided in the Reconnaissance Survey Report (Attachment 3; Tierra 2015a). Figure 2-11 shows the shoreline habitat characterization from Figure 2-1 overlain with evidence of bird or mammal use that were documented by the field biologists during the 2013 Reconnaissance Survey.

The findings of the reconnaissance were used to help design the various sampling programs in Phase III of the RI/FS, particularly the biota sampling locations in nearshore (intertidal and shallow subtidal) areas. The results from the survey were used to develop the shoreline, habitat, and species characterizations presented in Section 2, and are discussed in various portions of the risk analyses in Sections 6 through 10.

4.3.2 Surface Water Chemistry Data

A comprehensive surface water sampling program was conducted by the CPG within the LPR and Newark Bay (2010 to 2013) as part of the fate and transport modeling work being conducted by the CPG

for the LPRSA and NBSA (AECOM 2010, 2011). These surface water data have been deemed sufficient by the USEPA for use in conducting the RI, BHHRA, and BERA for the NBSA (Arcadis 2015).

Surface water samples were analysed for the parameter groups listed in Table 4-2. The sampling program included six stations (NNE, NBN, NNW, NBE, NBS, and ARK) within the NBSA (Figure 4-1). Other locations outside the NBSA that were also sampled under this program included stations within the Passaic River and its tributaries, the Hackensack River, and the Kill van Kull.

The physical water column monitoring program was conducted from March through November 2010.

Five routine chemical water column monitoring events were conducted in 2011 and 2012 under normal flow conditions (i.e., 400 to 3,000 cubic feet per second [cfs] at Dundee Dam):

- Event 1 was conducted from August 15 to 17, 2011, during average tide (median flow at Dundee Dam was 2,650 cfs)
- Event 2 was conducted from February 20 to 21, 2012, during spring tide (median flow at Dundee Dam was 699 cfs)
- Event 3 was conducted from March 26 to 27, 2012, during neap tide (median flow at Dundee Dam was 392 cfs)
- Event 4 was conducted from June 4 to 5, 2012, during spring tide (median flow at Dundee Dam was 1,389 cfs)
- Event 5 was conducted from December 10 to 11, 2012, during average tide (median flow at Dundee Dam was 664 cfs).

A single low-flow (i.e., less than 400 cfs at Dundee Dam) water column monitoring event was conducted in August 2012 during spring tide (median flow at Dundee Dam was 253 cfs). No samples were collected from the NBSA during this event per the Quality Assurance Project Plan/Field Sampling Plan Addendum. Remedial Investigation Water Column Monitoring/Small Volume Chemical Data Collection (AECOM 2011) because interaction between the lower Passaic River and the NBSA is diminished during low flow events.

Two high-flow events (i.e., greater than 3,000 cfs at Dundee Dam) were conducted in 2013:

- Event 1 was conducted from February to March 2013
- Event 2 was conducted in June 2013.

At each location and event, grab samples were collected from two depths in the water column: 3 feet (0.9 meter) above the bottom and 3 feet (0.9 meter) below the surface. Samples were collected at four intervals (i.e., high water slack tide, low water slack tide, maximum ebb tide, and maximum flood tide) at each location and depth.

Results of the surface water sampling program are summarized in Table 4-3. In general, the concentrations of COPECs were consistent across sampling locations, depths, tidal cycles, and season. The results of the surface water program and perspectives on the findings with respect to the exposure risks for the concentrations of COPECs detected are discussed in Section 5.

4.3.3 Sediment Quality Triad and Porewater Chemistry Data

A SQT and porewater sampling program was conducted in September 2015. The SQT and porewater program was conducted in support of the BHHRA and BERA and in accordance with the SQT and Porewater QAPP (Tierra 2015b). This program was implemented to meet the following data use objectives:

- Evaluate whether exposure to site-related COPECs in the NBSA poses unacceptable risks to benthic invertebrate communities
- Evaluate whether the consumption of benthic invertebrates (represented by a laboratory- exposed bioaccumulation test) poses unacceptable risks to fish and wildlife receptors
- Evaluate whether exposure to site-related constituents of potential concern (COPCs) in surface sediments in the shoreline intertidal Areas of the NBSA poses unacceptable risks to human receptors.

Sediment grab samples were collected from 43 locations over 13 days. The SQT analyses (i.e., sediment chemistry, toxicity testing, and benthic invertebrate community analysis) and porewater chemistry analyses were conducted at 30 of these locations. Samples from the remaining 13 locations were evaluated only for sediment chemistry for the purposes of quantifying contaminant levels in shoreline/nearshore areas where potential human exposure by direct contact may occur (Figure 2-5). Sediment samples were analyzed for the parameter groups listed in Table 4-2.

Details of the field program are provided in the Sediment Quality Triad and Porewater Field Report (GSH 2017c). Results for the sediment quality triad and porewater sampling program are provided in the Sediment Quality Triad and Porewater Data Report (GSH 2017a). Field, laboratory, data quality assurance/quality control (QA/QC) procedures, and data validation were also implemented, as specified in the SQT and Porewater QAPP (Tierra 2015b).

The respective component datasets from the SQT program are summarized in subsections below, consistent with the type of data being described (e.g., sediment, toxicity, porewater).

4.3.4 Sediment Chemistry Data

Under the SQT program, surface sediment grab samples were collected from 43 locations over 13 days. The SQT analyses (i.e., sediment chemistry, toxicity testing, and benthic invertebrate community analysis) and porewater chemistry analyses were conducted at 30 of these locations. Samples from the remaining 13 locations were evaluated only for sediment chemistry for the purposes of quantifying contaminant levels in shoreline/nearshore areas where potential human exposure may occur (Figure 2-1). Sediment samples were analyzed for the parameter groups listed in Table 4-2.

The Phase III sediment investigation program was conducted in fall 2016, pursuant to the Phase III QAPP (Tierra 2016). This program was implemented to provide a current surface sediment chemistry dataset for the entire NBSA based on a statistically developed grid design to meet the characterization needs for the RI and risk assessments, and provide a basis for future monitoring events to conduct trends analyses. Surface sediment samples were collected using vibracore and PONAR grab samplers. A total of 173 discrete vibracore surface sediment samples and 47 grab samples were collected in the NBSA under this program (Figure 4-3). The vibracore samples and 10 of the grab samples were analyzed as discrete

samples, while the remaining grab samples were combined into 10 composite samples. Sediment samples were analyzed for the parameter groups listed in Table 4-2.

Details of the field program and analytical results are provided in the Phase III Sediment Investigation Field Report (GSH 2017d) and in the Draft RI Report (GSH 2020). Field, laboratory, data QA/QC procedures, and data validation were also implemented, as specified in the Phase III QAPP (Tierra 2016).

The integrated results of the SQT and Phase III surface sediment sampling program are presented in Table 4-4. An evaluation of the effects of organic carbon normalization on organic COPEC concentrations is presented in Table 4-5.

In general, the collective SQT and Phase III surface sediment data indicate that metals concentrations tend to be highest in the southern portion of the Bay and industrial waterfront areas, while concentrations of organic compounds are more variable between geographic/geomorphic areas. The PCDDs/PCDFs and PAHs tend to be higher in the northern portion of the Bay, while PCB and DDT concentrations are higher in the southern portion of the Bay. A shown in Table 4-5, organic carbon normalization has little effect on explaining the variances in concentrations of hydrophobic organic COPECs (e.g., PCDDs/PCDFs, PCBs, pesticides, etc.) in surface sediments. The coefficients of variation between non-normalized and normalized concentrations would be expected to vary substantially if normalization was driving the spatial difference in COPEC concentrations. Given that this is not the case, no additional analyses on such normalization is utilized in the risk analyses of this BERA. Similarly, as discussed in the RI report, geochemical normalizations explain little of the variability in their concentrations in NBSA sediments.

4.3.5 Sediment Toxicity Data

Sediment samples collected from the 30 SQT locations were subject to two toxicity tests using the amphipod *Leptocheirus plumulosus*. These included a short-term 10-day exposure for survival and a longer-term 28-day exposure for survival, growth, and reproduction (GSH 2017c). The results of the toxicity program are presented and evaluated in detail in the SQT assessment (Appendix A) and Section 6.

4.3.6 Porewater Chemistry Data

An ex-situ laboratory porewater passive sampling program was conducted on field-collected sediments by researchers at the University of Maryland Baltimore County, in coordination with Arcadis and Tierra. Passive samplers for select organic compounds included polyoxymethylene for PCDDs/PCDFs and polyethylene for PCB congeners, pesticides, and semivolatile organic compounds via select ion monitoring. Strips of these samplers were deployed in sediments to extract compounds from the porewater fraction of the sediment. The organic compounds were then extracted from the samplers and the resulting data were used to estimate concentrations of these compounds in the porewater. The estimation procedures are summarized in Appendix B of the Sediment Quality Triad and Porewater Data Report (GSH 2017d). The calculations rely on the use of a poly-water partition constant (K_{PS}), which is estimated from other studies. Therefore, organic compound porewater concentrations are subject to uncertainty. Large-volume (0.5 liter) diffusion bags were used to capture porewater for direct analysis of

metals and other inorganics (i.e., mercury, methylmercury, dissolved organic carbon, ammonia, and total sulfide). A total of 30 porewater samples were analyzed using these methods.

The results of the porewater sampling program are presented in Table 4-6. In general, a majority of inorganic/metal COPECs (arsenic, cadmium, copper, lead, nickel, selenium, silver, and zinc) were characterized by either low detection frequencies or no detection at all in porewater. Pesticides and alpha-BHC and beta-BHC, also exhibited low and no detection, respectively. A detailed porewater data evaluation with respect to concentrations and risks to benthic communities is presented in the SQT assessment (Appendix A; Section 6). A discussion of the uncertainty in porewater values is found in Section 6.4.1.

4.3.7 Tissue Chemistry Data

Biota sampling was conducted as part of sampling activities for the BHHRA and BERA to support the risk assessments, and as input parameters to the food web model in this BERA. Given the general open water habitat of the system, and the fact that the biota in the Bay are primarily migratory in their life histories, discerning statistical trends on a broad geographic scale is most relevant. In addition, while it is likely that migratory fish have some background level of contamination in their tissues related to integrated exposures that occur while they are outside Newark Bay, the assumption for this characterization is that their residence time in the NBSA on an annual basis is sufficient for these organisms to achieve an equilibrium with respect to uptake of the primary COPCs in the system. This assumption is evaluated further in the uncertainties sections of this BERA.

4.3.7.1 Polychaete Bioaccumulation Tests

Bioaccumulation tests (laboratory exposures of polychaete worms using field-collected sediments) were conducted at a subset of eight locations in the sub-tidal and intertidal mudflats (Figure 4-2). Polychaete tissue samples were analyzed for the parameter groups listed in Table 4-2. The results of the polychaete tissue analyses are presented in Table 4-7a.

4.3.7.2 Crab and Clam Sampling Program

As part of the BHHRA and BERA investigations, blue crab, softshell clam, and co-located surface sediment sampling were conducted in late summer/early fall 2014. This work was performed in accordance with the Crab and Clam QAPP (Tierra 2014a).

Crab tissue samples collected as part of this program included hepatopancreas, edible muscle, and carcass samples. A total of 37 samples of each crab tissue type were collected, and 18 clam samples were collected. Tissue samples were analyzed for the parameter groups listed in Table 4-2. Additionally, 18 co-located surface sediment samples were collected from the softshell clam locations in intertidal areas by compositing the sediment associated with each clam burrow from which clams were collected at a location. Sediment samples were analyzed for the parameter groups listed in Table 4-2. Crab and clam and surface sediment sample locations are shown on Figure 2-5.

Details of the field program are provided in the Newark Bay Study Area Environmental Sample Collection Report (Normandeau 2017). Results for the crab and clam sampling program are provided in the Crab

and Clam Data Report (GSH 2017b). Field, laboratory, data QA/QC procedures, and data validation were also implemented, as specified in the Crab and Clam QAPP (Tierra 2014a).

The results of the clam and crab tissue analyses are presented in Tables 4-7b and 4-7c, respectively. The results of the co-located surface sediment analyses are presented as part of the Phase III sediment data results in Table 4-4. A focused discussion on the concentrations of COPECs in clam and crab and their relative concentrations in the BERA exposure areas is provided in Section 6.

4.3.7.3 Fish Sampling Program

A fish sampling program was conducted as part of the BHHRA and BERA activities, which included a community survey, fish tissue sampling, and a fish health study. These activities were conducted in accordance with the Fish Sampling and Analysis QAPP (Tierra 2014b). A total of 44 fish species were collected over sampling events conducted in three phases (fall 2014, spring/summer 2015, and spring 2016) (Normandeau 2017). Details on the breakdown of species captured by event are provided in Section 2.4.2.

Fish tissue samples were analyzed for the parameter groups shown in Table 4-2. Information regarding fish species collected and analytical results are reported in the Fish Data Report (Tierra 2017). Fish were collected from various locations along the subtidal flats, transitional slopes, and navigational channel throughout each of the three zones (north, south, central) to provide spatial coverage across the NBSA. Sample locations for 2014, 2015, and 2016 are shown on Figures 2-8, 2-9, and 2-10, respectively. The results of the fish tissue analyses are presented in Tables 4-7d through 4-7k. A focused discussion on the concentrations of COPECs in various fish species and their relative concentrations in the BERA exposure areas is provided in Section 7.

An evaluation of the effects of lipid normalization on organic COPEC concentrations in biota tissue is presented in Table 4-8. As shown in Table 4-8, lipid normalization has little effect on explaining the variances in concentrations of hydrophobic organic COPECs (e.g., PCDDs/PCDFs, PCBs, pesticides, etc.) in the various species or biota tissue types. The coefficients of variation between non-normalized and normalized concentrations would be expected to vary substantially if normalization was driving the spatial difference in COPEC concentrations. Given that this is not the case, no additional analyses on lipid normalization is utilized in the risk analyses of this BERA.

Additional data were also collected to provide qualitative information about the health of fish in the NBSA. During fish tissue sampling, non-forage fish were externally examined, and any gross physical abnormalities, lesions, or anomalies were documented. A subset of individual forage fish collected were externally examined. Additionally, a representative sample of individual non-forage fish were subjected to internal pathological examination in 2014 and 2015. The fish pathology evaluations included overall morphology, gonad condition, presence of lesions, gonadosomatic index, and internal physical conditions/abnormalities.

Information regarding the fish health results, as well as details of the analytical program, are reported in the Fish Data Report (Tierra 2017). Field, laboratory, data QA/QC procedures, and data validation were also implemented, as specified in the Fish Sampling and Analysis QAPP (Tierra 2014b).

4.3.8 Biological Survey Data

Biological survey data were collected in a variety of ways under the Phase III sampling program. Benthic invertebrate community surveys were conducted as part of the SQT and porewater program. The results of these surveys were presented and discussed in context of historical community data in Section 2.3. A detailed evaluation of the benthic community data with respect to potential risks from COPECs is presented in the SQT assessment (Appendix A) and Section 6.

Semi-quantitative fish and shellfish community surveys were conducted as part of the tissue collection program conducted between 2014 and 2016. The results of these surveys were presented and discussed in context of historical community data in Section 2.4. The details of the field sampling program for benthic invertebrates and fish are provided in Normandeau (2017) (Attachment 4).

4.4 Data Summary for COPECs and BERA Assessment Zones

In this section, the surface sediment and biota tissue data for the COPECs identified in Section 3 are presented for the risk assessment zones identified in Section 3.4. The UCLs of these data, which represent the input parameters for the food web modeling and risk calculations (as discussed in further in Sections 6 through 9), are also presented.

The Bay-wide versus zone-specific data are discussed for sediment, invertebrate, and forage fish; and Bay-wide versus geographic data are discussed for upper trophic level fish species. Sediment data are also discussed in comparison to urban background data compiled from Jamaica Bay under USEPA's REMAP.

Additional data groupings for estimating exposure point concentrations for the risk calculations are provided in respective sections of this document as needed.

4.4.1 Surface Sediment, Invertebrates & Fish

The number of sediment and biota samples collected in each BERA assessment zone are listed in Table 4-9. Table 4-10 and Figure 4-4 present the samples locations in each assessment zone for sediment, as well as the sample locations that are considered intertidal mudflat habitat or shoreline. Table 4-11 presents the sample locations in each assessment zone for biota. Zone-specific sediment data summaries for the COPECs are presented in Table 4-12. Boxplots by COPEC that illustrate the distribution of the data for sediments and lower trophic level invertebrate and fish receptors (i.e., clam, blue crab, and mummichog/killifish) are presented in Figure 4-5, and those for upper trophic level fish in Figure 4-6.

In general, there are apparent zone-specific differences in the mean concentrations of many COPECs, including 2,3,7,8-TCDD, total PCBs, metals, and pesticides (total DDx, total chlordane, dieldrin, hexachlorobenzene), in surface sediments and the tissues of lower trophic level organisms. Average concentrations of most metals, total PCBs, total PAHs, and pesticides are relatively higher in the Southwest Zone than they are in either the North or Southeast Zones. Mean concentrations of 2,3,7,8-TCDD and related dioxin/furan TEQs are generally higher in the North Zone.

The ten composite sediment samples collected in the regularly dredged deep water channels are included in the NBSA-wide dataset, but are not included in the BERA assessment zone datasets and the channels were not evaluated as a separate assessment zone for risk assessment purposes due to the changing conditions in these areas from regular removal of sediments during navigation dredging activities. Summary statistics for these samples are presented in Table 4-12. Mean and UCL concentrations for most of the COPECs including 2,3,7,8-TCDD, total PCBs, PAHs, some pesticides, and most metals are generally lower in the channel sediments than those in the other zones. Exceptions include total DDx, chlordane, mercury/methylmercury, silver, and zinc for which the average and UCL concentrations are within the range of the other zones.

Table 4-9. Sediment and Biota Sample Numbers by BERA Assessment Zone

Matrix/Species	Number of Samples by Assessment Zone[a]											
	NBSA-wide[b]	NBSA-wide Mudflat Only	NBSA-wide Shoreline Only	North	South-east	South-west	North Mudflat Only	South-east Mudflat Only	South-west Mudflat Only	North Shoreline Only	South-east Shoreline Only	South-west Shoreline Only
Sediment	254	21	51	104	50	90	13	3	5	21	14	16
Polychaete	8	--	--	4	2	2	--	--	--	--	--	--
Softshell Clam	18	--	--	8	4	6	--	--	--	--	--	--
Blue Crab	37	--	--	12	13	12	--	--	--	--	--	--
Mummichog/ Killifish	17	--	--	8	3	6	--	--	--	--	--	--
White Perch	27	--	--	9	9	9	--	--	--	--	--	--
Summer Flounder	8	--	--	2	2	4	--	--	--	--	--	--
Winter Flounder	10	--	--	4	4	2	--	--	--	--	--	--
American Eel	18	--	--	6	6	6	--	--	--	--	--	--
Atlantic Menhaden	2	--	--	2	--	--	--	--	--	--	--	--
Atlantic Silverside	7	--	--	1	3	3	--	--	--	--	--	--

Notes:
[a]Sample IDs and Assessment Zone assignments can be found in Tables 4-10 and 4-11.
[b]The NBSA-wide samples include the ten composite samples collected in the regularly dredged deep water channels. The 10 composite samples were not included in the BERA assessment zones (i.e., North, Southeast, Southwest Zones).

ANOVA models were used to evaluate the differences in mean concentrations in sediment (Table 4-13a) and whole body blue crab (Table 4-13b) among the BERA assessment zones (North, Southeast, Southwest Zones). Sediment concentrations of hexachlorobenzene, total DDx and most metals are significantly greater in the Southwest Zone (Table 4-13a) while 2,3,7,8-TCDD is significantly greater in the North Zone. For whole body blue crab, concentrations of total DDx and arsenic were significantly greater in in the Southwest Zone (Table 4-13b) while 2,3,7,8-TCDD, PCBs, pesticides other than DDx, PAHs, mercury and selenium were significantly greater in the North Zone. The risk implications for the zone-specific differences are examined by receptor in Sections 6 through 9.

4.4.2 Evaluation of Urban Background

A comparison of the NBSA surface sediment data from the Phase III RI/BERA sampling programs to data collected in Jamaica Bay under the REMAP program in 2008 and 2013 is presented in Table 4-14. This analysis was conducted to evaluate whether any COPECs identified for the NBSA may be considered comparable to urban background levels for the NY/NJ Harbor Estuary. Jamaica Bay is considered by USEPA to be the least impacted area in the Harbor Estuary, with very limited potential influence from legacy CERCLA sites within the embayment. This area was used as the marine/estuarine urban background location for the LPRSA RI as well.

In general, the data indicate that most of the COPECs in the NBSA are elevated relative to Jamaica Bay. The exceptions are selenium and silver, which have similar mean concentrations in the NBSA sediments to those in Jamaica Bay. The mean metals concentrations were 1.1 (silver) to 7.2 (mercury) times greater in the NBSA than in Jamaica Bay, with many exceedances of the upper 95th percentile of the Jamaica Bay concentrations noted (Table 4-14). 2,3,7,8-TCDD concentrations are substantially elevated in the NBSA compared to Jamaica Bay (mean ratio of 85). Total Aroclor PCBs were infrequently detected in Jamaica Bay; however, 90% of the NBSA concentrations exceeded the Jamaica Bay maximum. Pesticides were also infrequently detected in Jamaica Bay and quantitation limits tended to be greater than those in the Phase III data, making comparison difficult. However, the statistics suggest that hexachlorobenzene and total DDx are elevated in the NBSA compared to Jamaica Bay. Total PAHs (total HMW, total LMW, and total) are elevated in the NBSA compared to Jamaica Bay, with ratios of means ranging from 26% to 32% and 85% to 88% of Phase III concentrations exceeding the 95th percentile of the Jamaica Bay concentrations (Table 4-14).

The results of this analysis help to provide some perspective on the COPECs in Newark Bay in terms of distinguishing those that are comparable to urban background for the NY/NJ Harbor Estuary (e.g., selenium and silver), versus those that are clearly elevated in the NBSA. While somewhat limited in its overall usefulness due to analytical limitations of the REMAP Jamaica Bay dataset identified above for many COPECs, this information can be used as a line of evidence to inform decision-making regarding risk management and remediation options. There are no comparable invertebrate or fish tissue background datasets available. Some limited perspectives are provided on fish tissue background where applicable in Section 6.

4.5 Whole-Body Crab Calculation

Blue crab tissue was analysed as three separate tissue types: edible muscle, hepatopancreas and carcass. Tissue types were precisely weighed in 34 individual crabs collected September 10-11, 2014 (Normandeau 2017). After that date, for efficiency, the field processing protocol was changed such that the individual tissue types for each individual crab were no longer weighed separately. An average of the fractional weights (Table 4-15) for these 34 individually and precisely measured crabs was calculated and used to combine the tissue types for estimation of the whole-body crab concentration for all sample composites collected in the NBSA. The whole-body crab concentration was calculated as follows:

$C_{WB} = (C_{mus} \times f_{mus}) + (C_{hep} \times f_{hep}) + (C_{car} \times f_{car})$

where,

C_{WB} = estimated whole-body crab concentration

C_{mus} = muscle concentration

f_{mus} = fraction of whole-body weight that is muscle (i.e., 0.54)

C_{hep} = hepatopancreas concentration

f_{hep} = fraction of whole-body weight that is hepatopancreas (i.e., 0.19)

C_{car} = carcass concentration

f_{car} = fraction of whole-body weight that is carcass (i.e., 0.27)

When one or two of the three tissue types within a sample had non-detect concentrations, one-half the quantitation limit was substituted as the concentration for the non-detect tissue type. When all three tissue types were non-detect, the whole-body concentration was reported as a non-detect at the lowest quantitation limit of the three tissue types.

4.6 Historical Data

Historical studies have been conducted to understand the contaminant distribution in water, sediment, and biota in the Bay and surrounding areas, and their potential effects on humans and the Bay ecosystem. Throughout the RI process, searches have been performed to identify, locate, and evaluate such studies and determine their usefulness to support the RI and risk assessments. Details and data summaries for these secondary datasets are provided in the Phase I and Phase II Data Evaluation and Analysis Report (Tierra 2014c). Table 4-16 provides an overview of the available secondary data.

The uses of these secondary datasets in this BERA are generally limited to characterizing the ecology of the NBSA and providing historical perspective on potential changes in conditions and related risks in the system. However, several toxicological studies that have been conducted on invertebrates, fish, and birds in Newark Bay are used in this risk assessment to inform the development of TRVs for risk assessment, and to provide perspectives on potential COPEC-related effects that have been observed on these organisms. Concentrations in fish and crabs for selected COPECs measured in 1999 and 2000 in the NBSA as part of the Contamination Assessment and Reduction Program by NYSDEC are shown in Table 4-17.

5 SURFACE WATER ASSESSMENT

Surface water in the NBSA was monitored between 2010 and 2013, with more than 200 samples collected and analyzed for typical water quality parameters, as well as the chemical constituents listed in Table 4-2. Summary statistics for the COPEC analytical results are presented in Table 5-1. These results are compared to their respective New Jersey Surface Water Quality Criteria (SWQC) for aquatic life, as well as various conservative ecological screening values from the scientific literature. The state use designation of Newark Bay is Saline Estuarine Category 3 (SE3) waters. The primary uses of SE3 waters are for secondary contact recreation (i.e., boating, fishing), and primarily maintenance of the waters for migratory fish and wildlife use and propagation. The aquatic life criteria are a conservative means to evaluate the water quality of the Bay for ecological uses. The goal of this evaluation is to evaluate whether surface water likely represents a substantive COPEC exposure pathway or potential risk to ecological receptors.

Concentrations of metals and organic COPECs, with the exception of copper in a few samples (8 out of 274 samples) were below their respective New Jersey SWQC (Table 5-1). Boxplots (Figure 5-1) illustrate the distributions of COPC concentrations, which are characterized by tight ranges with a few outliers. Overall, the low concentrations of COPCs in surface water do not exhibit much variability and are consistent with respect to space, time, flow regime, depth, or tidal cycle. Because contaminants tend to preferentially associate with solids, the low variability in COPC concentration is indicative of low variability in suspended solids concentrations in the Bay. A more detailed discussion of the surface water data is presented in the RI Report (GSH 2020).

Given the fact that COPEC concentrations in surface water do not exceed either NJ SWQC or other conservative surface water screening guidelines/benchmarks, and the concentrations of COPECs are similar spatially throughout the Bay (vertically, tidally and seasonally) it is highly unlikely that:

- COPECs in surface water pose a risk to aquatic communities, including plankton, algae, shellfish, or fish
- Surface water represents a substantive exposure pathway for uptake of bioaccumulative COPECs (relative to those from sediments and food web exposures) for wildlife.

The conservative nature of this water screen is comparable to that of the SLERA, and therefore the conclusion of no risk has a high degree of certainty. For these reasons, surface water is not further evaluated in the SQT assessment for benthic invertebrates, or in subsequent exposure modeling of COPECs for semi-aquatic wildlife receptors. Instead, the focus of this BERA is on exposures from sediment- and food web-associated COPECs.

Uncertainty in the evaluation pertains to the toxicity of DDx isomers. While no exceedances of the chronic SWQC for 4,4'-DDT (i.e., 1 nanogram per liter [ng/L]) were observed, either for 4,4'-DDT itself or for the other 4,4' isomers individually, exceedances do occur when the sum of DDx isomers is compared to the chronic 4,4'-DDT SWQC (Table 5-1). There are 38 exceedances (24% of all observations) for total 4,4'-DDx; however, the overall NBSA-wide mean (i.e., 0.85 ng/L) is less than the chronic 4,4'-DDT SWQC. There are some spatial differences among the NBSA stations. At station ARK, located at the mouth of the Arthur Kill (Figure 4-1), mean total 4,4'-DDx was 1.6 ng/L which exceeds the chronic SWQC for 4,4'-DDT.

In addition, 50% of the 28 total 4,4'-DDx results from this station exceeded the chronic 4,4'-DDT SWQC. The highest DDx concentrations were noted during the December 2012 sampling event, which took place during average tidal and normal flow conditions (i.e., as measured at Dundee Dam in the Passaic River). At all other NBSA stations, mean total 4,4'-DDx concentrations were less than 1 ng/L.

Surface water TRVs for the evaluation of risk to fish were derived for the LPRSA BERA (Windward 2019). An estuarine chronic TRV of 300 ng/L for 4,4'-DDE was based on the lowest chronic toxicity value available in the ECOTOX database (USEPA 2016b), which was for a copepod (*N. spinipes*). Surface water concentrations of 4,4'-DDE in the NBSA are orders of magnitude lower than this TRV (Table 5-1). An estuarine chronic TRV was also derived for 4,4'-DDT/total DDx based on a SSD that included data for 14 fish and 18 invertebrate species (Windward 2019). This value, 19 ng/L, exceeds all observed surface water concentrations of total 4,4'-DDx in the NBSA (Table 5-1).

6 BENTHIC INVERTEBRATE ASSESSMENT

Benthic invertebrates in the NBSA include both infaunal communities and several epibenthic shellfish such as softshell clam, Baltic clam, eastern oyster, and blue crab. There are a variety of taxonomic feeding guilds for benthic and epibenthic invertebrates including filter-feeders, deposit-feeders, detritivores, and omnivores. These organisms live in close association with the sediments in the Bay and, therefore, represent some of the highest potential for exposure to COPECs in sediments. Invertebrates also form the base of the food web for fish and other upper-trophic level organisms such a birds and mammals. This section includes the risk assessment for invertebrates in the NBSA.

The following are the AEs and Risk Questions for invertebrates that are addressed in this section.

AE: Survival, growth, and/or reproduction of invertebrates.

Risk Question 1: *Are invertebrate communities in the NBSA different from those found in similar nearby water bodies with chemical concentrations at regional background levels?*

Risk Question 2: *Are the COPEC concentrations in sediments from the BAZ greater than benchmarks for the survival, growth, and/or reproduction of invertebrates?*

Risk Question 3: *Is the survival, growth, and/or reproduction of invertebrates exposed to sediments from the BAZ of the NBSA significantly lower than that in reference sediments?*

Risk Question 4: *Are COPEC concentrations in porewater from the NBSA greater than toxicological benchmarks for the survival, growth, and/or reproduction of invertebrates?*

Risk Question 5: *Are COPEC residues in invertebrate tissues from the NBSA greater than tissue (whole-body) toxicity benchmarks for the survival, growth, and/or reproduction of invertebrates?*

Risk Questions 1 through 4 are addressed by the SQT Assessment presented in Section 6.1. Risk Question 5 is addressed in the tissue-based assessment in Section 6.2. A detailed description of the benthic communities that inhabit the NBSA (including perspectives on historical changes in the communities) is provided in Section 2.3. The life history profiles for softshell clam and blue crab are provided in Appendix B.

6.1 Sediment Quality Triad Assessment

SQT data were collected from 30 locations in the NBSA (Figure 6-1). Sediment grab samples from each of these locations were prepared for the following analyses: sediment chemistry, toxicity testing (10 and 28-day *L. plumulosus* whole sediment bioassays), benthic invertebrate taxa enumeration, and porewater chemistry. Sediment and porewater samples were analyzed for the parameter groups listed in Table 4-2. These data were collected for the purpose of evaluating whether exposure to site-related COPECs in the NBSA poses unacceptable risks to benthic invertebrate communities (BIC).

The SQT program was designed to support an effects-based, WOE assessment to evaluate risks to benthic invertebrate communities using three primary LOEs: 1) sediment chemistry, 2) sediment toxicity, and 3) benthic invertebrate community metrics. The approach is widely utilized by regulatory agencies, including USEPA Region 2 and its Partner Agencies, as the most appropriate process currently available

for assessing potential risks to benthic invertebrates. It is the approach that is being used to assess risks to benthic invertebrates for the LPRSA. For consistency purposes and data comparability, this approach is also used for the NBSA.

The SQT method incorporates a combination of both quantitative and qualitative analyses to identify potential cause-and-effect relationships between two or more of the components (Tierra 2015b). The specific technical approach for the SQT was developed by GSH and USEPA in an iterative and collaborative manner between 2016 and 2018.

The SQT evaluation methods include comparisons of BIC and toxicity data to an appropriate reference site. The reference site chosen for this evaluation is the Jamaica Bay Estuary, New York, which is physically similar to the open water habitats of the NBSA. A total of 150 SQT samples (samples with co-located chemistry, toxicity [i.e., 10-day *A. abdita* bioassay], and BIC data) have been collected from Jamaica Bay over of period of years (1993 through 2013) by USEPA under REMAP and by other agencies. A screening process was conducted to select a subset of these 150 samples to represent reference conditions for the benthic invertebrate community (Appendix A). The Jamaica Bay sediment chemistry data were compared to effects range-low (ERL) and effects range-median (ERM) values (Long et al. 1995). Acceptable Jamaica Bay reference locations had three or fewer exceedances of ERLs and no exceedances of ERMs across all chemicals for which those sediment guidelines were available. In addition to meeting the chemical criteria, acceptable reference locations in Jamaica Bay were required to meet sediment toxicity criteria. Specifically, *A. abdita* survival results at Jamaica Bay reference locations were required to be ≥ 80% of the respective negative control response. The screening evaluation resulted in a total of 59 SQT samples from Jamaica Bay suitable for use as reference data in a reference envelope evaluation. The Jamaica Bay reference data and screening results are provided in Appendix A.

The SQT analysis methods fall into two major categories:

- The SQT evaluation (Section 6.1.1) is an objective method of comparing sediment chemistry concentrations, sediment toxicity endpoints, and BIC metrics to screening, control, or reference values with the objective of categorizing each sampling station with respect to the degree of potential impact.
- The quantitative effects assessment (Section 6.1.2) incorporates bivariate and multivariate statistical methods to evaluate the association of sediment and porewater chemistry with effects measures (i.e., toxicity endpoints and BIC metrics).

Appendix A provides the detailed results and calculations of the comprehensive analyses of the SQT data described here.

6.1.1 SQT Evaluation

This evaluation was used to classify each of the 30 SQT stations with respect to degree of potential impact. Three categories (i.e., the triad) were evaluated: BIC composition, sediment toxicity, and sediment/porewater chemistry. Each category has equal weighting in the evaluation and was assigned a score ranging from 0 (unimpacted) to 1 (most impacted). The scores for each category are summed (maximum possible score = 3) and the final score is used to categorize each station with respect to degree of impact (Table 6-1). This methodology is consistent with the SQT evaluation of the LPRSA (Windward 2019).

The following three subsections discuss how the evaluation and scoring was conducted within each of the triad categories. Section 6.1.1.4 discusses the final classification of the SQT stations.

6.1.1.1 BIC

Benthic invertebrate communities were characterized by identifying and enumerating the benthic invertebrates from sediment grab samples (three replicates per station) collected at the 30 SQT stations. Taxa in BIC samples were identified to the lowest practicable identification level, in a manner consistent with other surveys performed in the NY/NJ Harbor Estuary (Weisberg et al. 1998). The BIC taxonomic data are presented in Appendix A. The following five standardized BIC metrics were calculated for each sample as described in Appendix A:

- Abundance (i.e., density): the number of organisms per square meter
- Number of Taxa (i.e., number of discrete lowest practicable identification level taxa)
- Shannon-Weiner diversity index (Shannon 1948)
- Pielou's evenness index (Pielou 1966)
- Swartz's dominance index (Swartz et al. 1985).

In addition, a multimetric B-IBI was calculated using a method derived for the saline portions of the NY/NJ Harbor Estuary (Weisberg et al. 1998). Threshold values of the B-IBI for the classification of impacts are as follows: 1 to <2 = impacted, 2 to <3 = slightly impacted, and 3 to 5 = unimpacted (Weisberg et al. 1998). These six BIC metrics were also used in the quantitative effects assessment described in Section 6.1.2.

The BIC data from each SQT station were evaluated and scored using a reference envelope approach (Table 6-1). This approach involves the comparison of metrics measured at the potentially impacted SQT stations to lower (or upper) percentiles of the distribution of metric values measured at the reference site. Four of the five standardized BIC metrics (number of taxa, Shannon-Weiner diversity index, Pielou's evenness index, and Swartz's dominance index) are expected to decline in value as a result of physical and/or chemical degradation. Therefore, these metrics were compared to the 5th percentile of the Jamaica Bay reference distribution. BIC metrics that are equal to or greater than the 5th percentile of the reference distribution are considered comparable to reference. Abundance is a metric that can either decline or increase as a result of degradation (Weisberg et al. 1998). Therefore, abundance was compared to both the 5th and the 95th percentile of the Jamaica Bay distribution. Abundance equal to or greater than the 5th percentile and less than or equal to the 95th percentile of the Jamaica Bay reference distribution is considered comparable to reference. Metrics outside the reference envelope received a score of 1 (Table 6-1). For the B-IBI, a score of either 0, 0.5, or 1 was applied according to the impact categories described by the authors (Weisberg et al.1998) with respect to degree of impact (Table 6-1). Each metric score was weighted equally (0.167) and the weights were multiplied by the metric score and summed, such that the maximum possible score for the BIC is 1, representing the greatest impact.

Table 6-2 presents the metric values and SQT scores for each of the 30 stations. The Jamaica Bay reference envelope values are shown in the top row for each metric. (The details of the percentile calculations are provided in Appendix A.) For the five standardized metrics only one value, abundance at station 148, was outside the Jamaica Bay reference envelope. Based on the B-IBI values (Table 2-9), 21

stations were classified as non-impacted (Table 6-2) and eight stations were classified as slightly impacted (three in the north, one in the central, and four in the south). Station 148, which is located along a bulkheaded portion of the southern shoreline of the NBSA (Figure 4-2), was classified as impacted. The B-IBI scores are depicted on Figure 2-4. The combined BIC SQT scores are very low for most stations indicating non-impacted BIC. The BIC at station 148 exhibited low abundance and number of taxa along with a low B-IBI score indicating potential impact to BIC at that location.

To further support the comparison of BIC metrics to the Jamaica Bay reference data, hypothesis testing was also conducted (Table 6-3). Mean abundance in Jamaica Bay is greater than that of the NBSA. Because abundance can decrease or increase with degradation, inferences regarding comparability are uncertain for this metric and no hypothesis testing was conducted. For the other metrics, the Jamaica Bay reference means were compared to the NBSA means using the non-parametric Kruskal-Wallis test. The mean number of taxa in Jamaica Bay (19) is lower than that of the NBSA (21-26), but the difference is not significant. For other metrics, Shannon Wiener diversity, Pielou's evenness, and Swartz's dominance, the Jamaica Bay mean is significantly lower that the NBSA mean (Table 6-3). These results support the reference envelope comparison findings and indicate that the BIC in the NBSA are comparable to the BIC in the Jamaica Bay reference. Boxplots of the BIC metric data can be found in Appendix A (Figures A-3 and A-4).

6.1.1.2 Toxicity

Ten-day acute and 28-day chronic toxicity tests were conducted on sediment from each of the 30 SQT stations using the amphipod *L. plumulosus* (USEPA 2001).

The following endpoints were measured for each sample:

- 10-day survival
- 28-day survival
- Growth rate (milligrams per organism per day) at Day 28
- Reproduction (young per surviving adult) at Day 28.

Five replicates with 20 amphipods each were tested for each sample and a laboratory control sample. For each endpoint, the mean response for each sample was compared to the laboratory control response to determine if the sample response was statistically significantly different than the control response ($\alpha = 0.05$) using the methods described in the test guidance (USEPA 2001). Ten- and 28-day survival results and statistical significance are depicted in Figure 6-2.

The sediment toxicity data comprise survival and sublethal (i.e., growth and reproduction) endpoints. Criteria for assigning toxicity are well established for the survival endpoints, but not for the sublethal endpoints. Criteria used for REMAP (USEPA 2003a) defined samples as toxic if the 10-day amphipod (i.e., *A. abdita*) survival was less than 80% of the control survival and highly toxic if it was less than 60% of the control survival. The 80% decision criterion is consistent with the criterion in the testing manual for discharge to U.S. waters (USEPA and USACE 1998) and was also suggested by Kennedy et al. (2009) for 28-day *L. plumulosus* toxicity tests. Therefore, these criteria were adopted to define toxicity of sediments from the NBSA based on the survival endpoints. Where survival is $\geq$ 80% of control and/or not significantly different from control, a score of 0 was applied (Table 6-1). Survival significantly different

from control and between 60 and 80% of control received a score of 0.5. Survival significantly different from control and < 60% of control received a score of 1 (Table 6-1).

The sublethal endpoints are subject to considerable response variability compared to the survival endpoints. Eickhoff et al. (2014) subjected five control sediments to 28-day tests with *L. plumulosus* and found little variation in survival among the five control samples, which ranged from 96 to 99%. Within-batch replicate variance was also low for survival, with a mean coefficient of variation (CV) of 5.6%. However, growth and reproduction endpoints were more variable both among control samples and within batch replicates. Mean growth in control samples ranged from 0.7 to 1.8 milligrams per organism and the mean CV among replicates was 30%. Reproduction had a 10-fold range within control sediments (0.8 to 8.4 juveniles per surviving adult) and the mean CV among replicates was 79%. Kennedy et al. (2009) found significant variability in control sediment for growth (CV = 56%) and reproduction (CV = 63%), as well as significant variability in an interlaboratory comparison of the growth and reproduction endpoints. *L. plumulosus* reproduction is known to be highly dependent on grain size (McDonald et al. 2010). This fact was illustrated in Kennedy et al. (2009) where it was found that a clean reference sample, which was relatively coarse-grained, had a very low response for the reproductive endpoint compared to the control (i.e., less than 10% of the control response). Based on the typical criteria used to define toxicity for survival endpoints (i.e., less than 80% of the control response), the clean reference sample would be classified as toxic based on the reproductive endpoint.

Given the large variability that can occur among control sediments for these sublethal endpoints and because there are no established control acceptability criteria for these sublethal endpoints, a simple comparison to control sediment cannot be used to judge a sediment sample as toxic. Further, high variability makes default application of decision criteria (e.g., 20% reduction compared to control) inappropriate (McDonald et al. 2010). Given these considerations, the SQT scoring for the sublethal endpoints was adjusted as compared to the survival endpoints. Where sublethal response is $\geq$ 70% of control and/or not significantly different from control, a score of 0 was applied (Table 6-1). Sublethal response significantly different from control and between 50 and 70% of control received a score of 0.5. Sublethal response significantly different from control and < 50% of control received a score of 1 (Table 6-1).

The NBSA toxicity data for sublethal endpoints was also subject to high variability (Attachment A-2 of Appendix A). The CV for 28-day survival ranged from 4% to as high as 139% with variance generally increasing as mean survival decreases. The average minimum detectable difference (MDD) at $\alpha = 0.05$ and $\beta = 0.20$ for this endpoint is 33%. This is why some stations with survival less than 80% of control were not found to be statistically significantly different than control. The uncertainty of this with respect to SQT scoring is discussed in Section 6.4.

Each toxicity endpoint score was weighted equally (0.25) and the weights were multiplied by the score and summed, such that the maximum possible score for the toxicity category of the triad is 1, representing the greatest impact. The scoring and weighting are consistent with the SQT evaluation presented in the BERA conducted for the lower 17 miles of the LPRSA (Windward 2019); however, in that BERA the responses were compared to a reference threshold response whereas for this BERA, the response is compared to the laboratory control response.

Table 6-4 presents the measured values and scoring for the four sediment toxicity endpoints at each of the 30 SQT stations. Statistical significance is depicted by shading. Values less than the control value

minus the minimum detectable difference are shown in bold. Twenty-eight stations had 10-day survival comparable to the laboratory control survival (90%). Only two stations, 151 and 154, located near the southwestern shoreline of the NBSA (Figure 6-2) exhibited acute toxicity and received the maximum SQT score of 1. Thirteen stations received a score of 0 because all endpoints were comparable to control based on the scoring criteria. Fifteen stations had scores between 0 and 1 based on a comparison of chronic endpoints to laboratory control. However, in total, only five stations had 28-day survival less than 80% of control and significantly different than control (151, 154, 143, 158, and 160). Twenty-eight day survival at Station 141 (67%), while significantly different than control, was greater than 80% of control (i.e., 83% of control) and therefore received a score of 0 for this endpoint. Alternative scoring methods are evaluated in the uncertainty analysis.

A comparison of mean 10-day amphipod survival to reference survival was also conducted (Table 6-5) using the non-parametric Kruskal-Wallis test. While two different species were tested in the two estuaries, *A. abdita* in Jamaica Bay and *L. plumulosus* in the NBSA, these two species were found to be similar in their ability to identify toxic sediment samples in a round robin inter-laboratory study (Schlekat et al. 1995). Survival was first adjusted to control survival as follows: Control-adjusted survival = Observed survival/Control survival. The mean control adjusted survival in the NBSA was compared to the mean control adjusted survival in Jamaica Bay. The overall NBSA mean and the means for each geographic area were statistically significantly greater than the Jamaica Bay reference mean. It is important to note that the mean 10-day survival in the Jamaica Bay reference dataset is biased high due to the screening process. All samples with observed survival less than 80% of control were screened from the Jamaica Bay dataset regardless of whether the sample had inflated chemistry. Therefore, the actual mean control survival in Jamaica Bay based on all samples or even just those samples that pass a chemistry screen is lower than that based on the 59 samples that passed the chemistry and toxicity screen. Nonetheless, even when compared to this biased high mean control-adjusted reference survival, the NBSA is demonstrated to be, at the very least, comparable to Jamaica Bay. Boxplots and full details of the hypothesis testing are described in Appendix A. Details of the screening of the 2008 and 2013 REMAP data for Jamaica Bay are found in Table A-1-3 of Appendix A. Of the 37 samples that passed the toxicity screen, 17 did not pass the chemical screen.

6.1.1.3 Sediment and Porewater Chemistry

Sediment and porewater chemistry results at each of the 30 SQT stations were compared to screening values and water quality criteria to develop the score for the chemistry category of the triad (Table 6-1).

6.1.1.3.1 Sediment Scoring

Sediment screening values were preferentially based on those published either by USEPA (2005a) or Long et al. (1995). The USEPA (2005a) developed sediment screening values for a number of chemicals based on their predicted toxicity to amphipods. For each chemical, T20, T50, and T80 values were developed that correspond to probabilities of toxicity of 20%, 50%, and 80%, respectively. Long et al. (1995) developed sediment screening values, ERL and ERM, for a number of chemicals that correspond to threshold and probable effect concentrations. Long et al. (2006) also present a method for assessing sediment quality using an ERM quotient, which is the sum of the chemical concentrations in sediment divided by the ERMs for 25 chemicals. An ERM quotient was calculated for each SQT sample. For SQT

scoring, a threshold value was developed based on the T20 and/or the ERL. For chemicals that had both a T20 and an ERL, the maximum of the two values was chosen as the threshold value. Similarly, a median value was developed based on the T50 and/or the ERM. For chemicals that had both a T50 and an ERM, the maximum of the two values was chosen as the median value. For chemicals with a FOD greater than 25% in surface sediment for which T20/T50 and/or ERL/ERM values were not available, threshold and median scoring criteria were based on threshold effect level or probable effect level values for marine sediment published in the NOAA Screening Quick Reference Table (SQuiRT) (Buchman 2008). See Appendix A (Table A-8) for a list of the sediment screening values. If a sediment sample had a concentration for any chemical that exceeded the threshold value, it received a score of 0.5 (Table 6-1). If a sediment sample had a concentration for any compound that exceeded the median value and/or its ERM quotient exceeded 1, it received a score of 1 (Table 6-1). Sediment concentration made up 50% by weight of sediment chemistry score (Table 6-1).

Table 6-6 presents the number of exceedances by chemical for each of the screening values at the 30 SQT sediment samples. The threshold values for most chemicals were exceeded at most stations and therefore threshold values provide very little information in the way of discriminating among stations with respect to potential impact. Median values were also frequently exceeded, again providing little value for discriminating among stations.

The sediment data were also evaluated according to USEPA equilibrium sediment partitioning guidance for metal and PAH mixtures (USEPA 2003b, 2005b, 2017a). Under equilibrium partitioning theory, no toxicity is expected in any of the SQT sediment samples due to divalent metals concentrations. However, the potential for toxicity due to PAHs is predicted at 7 stations. Detailed results are provided in Appendix A (Table A-14).

6.1.1.3.2 Porewater Scoring

Porewater screening values used in the SQT scoring were preferentially based on the New Jersey acute and chronic SWQC for aquatic life in saline water (NJDEP 2016). Because a portion of the NBSA is in the state of New York, the NYSDEC ambient water quality standards were reviewed. NYSDEC applies only acute aquatic water quality criteria to saline waters and the New Jersey SWQC were equal or greater to the NYSDEC standards and are therefore protective based on NYSDEC standards. For detected compounds without WQC, acute and chronic screening values were selected from the NOAA SQuiRT tables for marine surface waters. If marine guidelines were not available, freshwater guidelines were selected. See Appendix A (Table A-11) for a list of screening values for porewater. In addition, a sum of toxic units (SumTU) approach was evaluated for mixtures of PAHs and metals in porewater (see Table A-14 in Appendix A) as described in guidance (USEPA 2003b, 2005b, 2017a). For metals, the SumTU is a unitless value equal to the sum of each of the divalent metals (i.e., cadmium, chromium, nickel, lead, and zinc) concentrations divided by its final chronic value. A sample with a SumTU greater than 1 has the potential to exhibit chronic toxicity (USEPA 2005b). Similarly, for PAH mixtures, the SumTU is equal to the sum of the concentrations of 34 PAHs divided by their final chronic values (USEPA 2017a). If a porewater sample had a concentration for any chemical that exceeded a chronic criteria or screening value, it received a score 0.5. If either the metal or PAH SumTU of the sample exceeded 1, it received a score of 0.5 regardless of whether any individual chronic criteria were exceeded. If a porewater sample had a concentration for any chemical that exceeded an acute criteria or screening value, it received a score of 1. Porewater concentration made up 50% by weight of the sediment chemistry score (Table 6-1).

Table 6-7 presents the number of exceedances by chemical for each of the screening values for the 30 porewater samples. Exceedances of chronic SWQC were observed for PCBs and total DDx, but all other organic compound concentrations were below chronic screening values. Arsenic, copper, and zinc were infrequently detected in porewater, but where they were detected they were often in exceedance of acute or chronic SWQC. Of the five acute exceedances observed, three were for zinc, and one each was for arsenic and copper. Metals SumTU exceeded 1 at six stations. PAH SumTU exceeded 1 at station 154 and was nearly 1 at station 151, the two stations exhibiting acute toxicity.

6.1.1.3.3 Sediment and Porewater Chemistry Summary

Table 6-8 presents the summary of exceedances and scoring for each of the SQT stations. For sediment concentrations, all stations received the maximum score of 1 due to exceedances of the median sediment screening values or ERM quotients exceeding 1. For porewater concentrations, exceedances of chronic criteria were observed at 18 stations, 5 of which also had an exceedance of acute WQC. The metals SumTU exceeded 1 at six stations. The PAH SumTU exceeded 1 at one station, 154, where acute toxicity was also observed. No porewater exceedances were observed at 12 stations, 11 of which received an SQT score of 0 because neither SumTU exceeded 1. The combined sediment and porewater SQT scores ranged from 0.5 to 1.

For some chemicals, strong relationships were apparent between sediment and porewater concentrations (e.g., 2,3,7,8-TCDD, PCBs, and DDx). For others, such as mercury, the relationship is not very strong. For PAHs, there is no apparent relationship. Bivariate plots of porewater vs. sediment concentrations at the SQT stations are given in Attachment A-4 of Appendix A.

6.1.1.4 Summary of the SQT Evaluation

Table 6-9 presents the final scores for each station based on each leg of the triad. Consistent with the LPRSA BERA (Windward 2019) and as agreed upon with USEPA, the final scores were assigned impact categories as follows: no impact = $\leq$0.75; low impact = >0.75 and $\leq$1.5; medium impact = >1.5 and $\leq$ 2.25; and high impact = >2.25. Most SQT stations had scores indicating no impact (10) or low impact (18). Two stations (151 and 154) were classified as medium impact. While the BIC metrics at these stations did not indicate impact, acute toxicity and elevated chemistry was observed. In fact, these stations had the highest concentrations observed in SQT sediment and porewater samples for many chemicals (Table 6-10). No stations were classified as high impact.

6.1.2 Quantitative Effects Assessment

6.1.2.1 Spearman Rank Correlation

Spearman rank correlation, a non-parametric measure, was used to evaluate the strength of the association between chemical concentrations and effects measures (i.e., toxicity endpoints and BIC metrics). The Spearman rank correlation coefficient is computed with ranked data and describes the strength of the monotonic association between two variables. Correlation coefficients can range in value from -1 to 1 and the absolute value describes the strength of the association with 0 indicating no association and 1 or -1 indicating the strongest association. Positive values indicate one variable

increases with the other. Negative values indicate one variable decreases with the other. Correlation coefficients, like all statistics, are subject to indicating an association by chance where none exists and the probability of this is a function of sample size. For a sample size of 30, Spearman correlation coefficients with an absolute value greater than 0.3 indicate statistically significant association ($\alpha = 0.05$).

Tables 6-11 and 6-12 give the Spearman rank correlation coefficients for effects measures and selected sediment and porewater chemical concentrations, respectively. The coefficients for all detected chemicals are found in Appendix A (Tables A-19 and A-20). Coefficients less than -0.3 are bolded to indicate that a chemical has a significant negative association with an effect measure. Many chemicals including metals, PCBs, PCDD/PCDFs, pesticides, and PAHs are significantly and negatively associated with toxicity endpoints in both sediment and porewater. While association does not indicate causation, there is evidence that chemical stressors may be responsible for the observed toxicity. The evidence is less clear for BIC metrics. For example, while several sediment chemical concentrations are negatively correlated with number of taxa, this association is not seen for porewater.

Table 6-13 summarizes the chemicals of potential concern to the BIC based on the SQT evaluation and the correlation analysis. Chemicals on this list had exceedances of sediment and/or water quality guidelines/criteria and also were correlated with toxicity and/or BIC metrics for either sediment or porewater.

6.1.2.2 Multivariate Analysis

Because many chemicals are associated with effects measures, dose response modeling of individual chemicals would not be appropriate. Therefore, multivariate analyses were conducted to further evaluate the relationships between chemicals and effects. One method of multivariate analysis is multivariate regression. In this method, multiple independent or predictor variables (e.g., chemical concentrations) can be evaluated with respect to their association with dependent or response variables (e.g., effects measures). However, when the predictor variables in a regression model are highly correlated, parameter estimates are unstable and have high standard errors, a problem referred to as collinearity or multicollinearity (Jackson 1991). A solution to this problem is to transform the predictor variables into principal components and use the principal components in subsequent modeling of the response variables (Jackson 1991). This transformation, called principal component analysis (PCA), was used to evaluate the relationships between sediment and porewater chemistry concentrations and response variables because these chemicals are in fact highly correlated in the NBSA.

In PCA, a multivariate dataset is transformed using matrix algebra (i.e., orthogonal rotation) to create a new set of uncorrelated variables known as principal components (PCs), which are linear combinations of the original variables (i.e., chemical concentrations). PCs are sorted such that each, in turn, represents a smaller percentage of the variance within the dataset. These uncorrelated PCs, or some subset of them, can be used in subsequent linear modeling of response variables while avoiding the problem of multicollinearity. Another objective of PCA is to reduce the dimensionality of the dataset. When a multivariate dataset consists of many correlated variables, the structure of the dataset can be explained with fewer transformed variables (PCs). A common rule of thumb for PCA is that the first *n* principal components with eigenvalues greater than one are the most important and explain most of the variance of a multivariate dataset with correlated variables (Jackson 1991).

In addition to PCA, factor analysis was also used to evaluate the relationships between sediment and porewater chemistry concentrations and response variables. Factor analysis is a subsequent orthogonal rotation of the axes conducted to create new variables called factors that might be more easily interpretable than PCs. Varimax rotation was used with the objective of having individual chemicals "load" (i.e., be strongly correlated with) a single factor and not load on any other factors. This is only achievable for multivariate datasets with "simple structure," which is further described below.

PCA and factor analysis are subject to the assumptions of linear modeling, specifically that residuals are approximately normally distributed. Further, when variables that are measured in different scales and/or differ greatly in variance, are combined in PCA, they are commonly rescaled by standard normalization (or other methods) so as not give any one variable undue weight (Jackson 1991). These requirements were satisfied by conducting the PCA and factor rotation on a correlation matrix of natural logarithm transformed chemical concentrations. The PRINCOMP and FACTOR procedures in SAS© 9.4 were used to conduct the PCA and factor analysis.

6.1.2.3 Sediment

6.1.2.3.1 Principal Component Analysis of Sediment Chemistry

The objective of dose response modeling of the SQT data is to be able to predict where toxicity to the BIC might be expected to occur in the NBSA. Therefore, a PCA model was developed using the entire Phase III surface sediment dataset (n=254). Prior to conducting the PCA for sediment, an exploratory analysis was conducted to determine a subset of chemicals or summed totals that could be used to represent large chemical groups and also to simplify the analysis by reducing the variance introduced by chemicals that are unlikely to be causing the observed toxicity. Chemicals with a FOD less than 80% were excluded from the exploratory analyses due to the potential for adding additional unexplained variability. The details of this exploratory analysis are described in Appendix A. The following observations resulted in the subset of 21 chemicals/totals that were carried forward in the sediment chemistry PCA model:

- All dioxin and furan congeners are highly correlated; therefore, only 2,3,7,8-TCDD concentrations were used to represent this chemical group.
- PCB congeners are highly correlated; therefore, one total (total PCB congeners) was used to represent this chemical group.
- Individual PAH concentrations are correlated overall, but greater correlation was noted within PAHs grouped by alkylation and molecular weight. Therefore, three totals, total HMW, total LMW, and total alkylated PAHs were used to represent all PAH compounds.
- Exploratory analysis of metals concentrations provided evidence to exclude some individual metals that are likely mostly present at background concentrations due to their strong correlation with aluminum (beryllium, cobalt, iron, manganese, thallium, titanium, and vanadium). Other metals that were much less correlated with aluminum were carried forward in the PCA (antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc).
- All 34 individual petroleum hydrocarbons were detected in surface sediments at frequencies ranging from 6 to 97% of samples. Although there were no sediment screening guidelines available for total

petroleum hydrocarbons, they are potentially toxic to marine invertebrates (Hobbs et al. 2018) and were therefore included in the PCA. A summation, total petroleum hydrocarbons (C9-C40) was used to represent this class of chemicals.

- Because of differences in toxicity, no attempt was made to combine pesticides of different classes. Based on the observations previously described, such as detection frequency, exceedances of screening criteria, and correlation to effects measures, a subset of pesticides were selected for the PCA model. Total (2,4' and 4,4') DDx was used to represent all DDx isomers. Among chlordane chemicals, alpha- and gamma-chlordane were detected most frequently and often at values greater than screening guidelines; therefore, total alpha + gamma chlordane was used to represent chlordane chemicals. Hexachlorobenzene and dieldrin, both of which have high rates of detection in sediment and were fully detected in porewater, were also included in the PCA.
- No semivolatile compounds were included in the final PCA model. None were significantly correlated with toxicity and the low detection frequency (which would require substitution for non-detects because no values can be missing in PCA) would add uncertainty to the model.
- Two Phase III samples (not SQT samples) from locations 349 and 354 were collected in the area of the confined disposal facility. Chemical concentrations in the uncharacteristically sandy sediment samples from these locations were very low or non-detect adding additional variance to the model. Therefore, these samples were excluded from the final PCA as outliers. In addition, another sample near the confined disposal facility, at location 339, was excluded because of missing pesticide data. Concentrations of other chemicals were low at this location. This left a total of 251 Phase III surface sediment samples included in the sediment chemistry PCA.
- Detection frequencies were high among the remaining samples and 21 chemicals (>95%). One-half the quantitation limit was substituted for any remaining non-detected results before the transformations were conducted.

The first principal component (PC1) explains 66.7% of the variance and the first three PCs explain a total of 83% of the variance of the sediment chemistry dataset (Figure 6-3). All remaining PCs have eigenvalues less than 1. All 21 chemicals are correlated to PC1. The second principal component (PC2), explaining 9.4% of the variance, is correlated with chlordane, dieldrin, 2,3,7,8-TCDD, and total PCBs. The third principal component (PC3) explaining 6.5% of the variance is correlated with PAHs. While PC1 explains most of the variance in overall chemical concentrations, PC2 and PC3 explain some relative differences in concentrations among the chemical groups. Because PCs are new variables that are linear combinations of the original variables (i.e., chemical concentrations), the concentration data can be used to find the value, usually referred to as the score, of each PC for each sediment sample. Because PC1 represents overall chemistry concentrations, it is useful to view in map form to see patterns of elevated chemistry. Figure 6-4 presents the scores on PC1 of the Phase III surface sediment samples in the NBSA. Lower (more negative) PC1 scores indicate lower concentrations, while scores near 0 indicate median concentrations. Greater (more positive) scores indicate higher chemical concentrations.

6.1.2.3.2 Dose Response Modeling: Sediment

The objective of conducting the PCA was to create a set of variables, PCs, that represent sediment chemical concentrations (but are uncorrelated and therefore not subject to the problem of

multicollinearity) to be used in the quantitative effects assessment. Linear modeling methods were used to evaluate the relationship between predictor variables (e.g., PCs, grain size, etc.) and response variables (e.g., 10-day mortality, number of taxa). Due to the nature of the response variables, two types of models were used: 1) linear/multivariate regression models—appropriate for continuous response variables (e.g., growth) and 2) binary response models—the appropriate model form for variables with only two possible outcomes (e.g., survival/mortality).

Linear regression models have the form:

$$R = \alpha + \beta_i x_i + \varepsilon \qquad \textbf{\textit{Equation 6-1}}$$

where,

R = response (e.g., growth, number of taxa)

α = intercept parameter

β_i = slope parameter of the *ith* predictor variable

x_i = *ith* predictor variable (e.g., PC1)

ε = random error

Competing linear regression models were compared using the adjusted coefficient of determination (R^2). The adjusted R^2 gives an indication of the ability of the model to explain the variance of the response data while penalizing the introduction of additional spurious predictors to the model. Models were fitted using the GLM procedure in SAS© 9.4. Parameters were added in a stepwise manner (step up and step down) and the R^2 and p-values for each parameter were compared using Type III (i.e., marginal) sums of squares. This process is detailed in tables in Appendix A.

Survival data from the 10- and 28-day *L. plumulosus* bioassays were evaluated using linear binary response models. Because of the natural or threshold mortality expected during the test as measured in the control, it is more convenient to model mortality rather than survival: (%Mortality = 100-%Survival). These models have the form:

$$\pi = C+(1-C)F(\alpha + \beta_i x_i) + \varepsilon \qquad \textbf{\textit{Equation 6-2}}$$

where,

π = probability of mortality

C = threshold mortality (i.e., mean laboratory control mortality)

F = a cumulative probability distribution function

α = intercept parameter

β_i = slope parameter of the *ith* predictor variable

x_i = *ith* predictor variable (e.g., PC1)

ε = random error

The cumulative distribution function (F) maps the range of the linear function $(-\infty,\infty)$ onto the range of probability (0,1). Three different probability distributions were tested for each subset of model predictors:

the logistic distribution, the standard normal distribution (called a probit model), and the Gompertz distribution (also called the extreme value model). Competing binary response models were compared using Akaike's Information Criteria (AIC). Given a set of candidate models, the preferred model is the one with the minimum AIC value (Akaike 1981). AIC rewards goodness of fit, but it also includes a penalty that is an increasing function of the number of predictors in the model.

For each response variable, the following predictors were tested: PC1, PC2, PC3, TOC, and percent fines. For BIC metrics, shear stress[5] was also tested. Predictor variables were added to each model in a stepwise fashion (i.e., step up and step down). In addition to the adjusted R^2 and AIC, the Type III marginal test statistic, computed for each parameter specified in the model, was examined to determine whether there is any contribution from the added predictor variable. Non-significant predictors ($\alpha = 0.05$) were removed from the final models. Models were fitted using the PROBIT procedure in SAS© 9.4. Table 6-14 summarizes the significant ($\alpha = 0.05$) and best fitting models for each toxicity endpoint and BIC metric tested. Full details of model fitting and graphs of fitted models are presented in Appendix A.

For the 10-day test, the best fitting model for amphipod mortality was a Probit model with PC1 as the sole predictor variable (Figure 6-5). Based on this model, mortality in all Phase III sediments was calculated. Mortality was transformed back to survival (%Survival = 100-%Mortality) and samples for which survival is predicted to be less than 80% and/or 60% of the control survival were identified on a map (Figure 6-6). These locations are labelled with their abbreviated location identifiers (i.e., station identifier). Based on the model, acute toxicity is expected in samples with a PC1 score of 5 or greater for which there are a total of 21 (8.2% of all Phase III samples) in the NBSA, three in the north geographic area, and 18 in the south geographic area.

For the 28-day test, the best fitting model for amphipod mortality was a Gompertz model with both PC1 and PC2 as significant predictors (Figure 6-7). It is observed that 28-day mortality is much more variable than 10-day mortality and therefore the predictability of the model is less certain. However, based on the observed results, the model correctly predicts toxicity (or lack thereof) 80% of the time (see Appendix A for the analysis of model predictability). Similarly, as was done for the 10-day model, mortality in all Phase III sediments was calculated and transformed back to survival. Samples for which 28-day survival is predicted to be less than 80% and/or 60% of the control survival were identified on a map (Figure 6-8). Chronic toxicity is predicted in 45 (17.7%) of Phase III samples: 11 are located in the north geographic area mostly in the same area where acute toxicity was predicted; 5 are spread out in the central geographic area; and the remaining 29 samples are in the southern geographic area mostly in the same areas where acute toxicity was predicted.

PC1 (and no other PCs) was a significant negative predictor for 28-day growth ($R^2 = 0.19$). Mean growth in the laboratory control sample was 0.045 milligram (mg)/organism/day. Only one SQT sample met or exceeded this value (Table 6-4). The SQT sample with the lowest chemical concentrations, from location 155, had observed growth of 0.035 mg/organism/day. As previously discussed, the sublethal endpoints are subject to considerably more variability that is unrelated to chemical stressors. Kennedy et al. (2009) found significant variability in control sediments for growth with a CV of 56% as well as significant variability in an interlaboratory comparison of growth. Eickhoff et al. (2014) found considerable variability

[5] Shear stress is defined as the daily maximum grain stress in dynes per square centimeter predicted by the hydrodynamic model (1995-2013) of the NBSA in the model grid cell in which the SQT sample was located.

in mean growth in five control sediments from the same estuary ranging from 0.025 to 0.064 mg/organism/day. The only test acceptability criterion for control growth is that it is measurable (USEPA 2001), setting a low bar for this endpoint. Growth was measurable in all but two of the SQT samples that exhibited 100% mortality at 28 days (Table 6-4). It is unknown what growth rate could be achieved in the NBSA sediments in the absence of chemical stressors. However, based on the results of sample 155, it is more likely to be in the range of 0.035 mg/organism/day or less. At the median PC1 score of 0, the regression model predicts mean growth of 0.03 mg/organism/day, a 35% reduction compared to control but within the range of growth observed in control sediments by Eickhoff et al. (2014). At a PC1 score of 5, the threshold for prediction of acute toxicity, the regression model predicts mean growth of 0.02 mg/organism/day, a reduction of 57% from control growth.

The reproductive endpoint was not significantly associated with any of the predictors tested, which is not surprising due to the variability in this endpoint. Reproduction in the laboratory control (mean = 1.97 young per surviving adult) was subject to significant replicate variability where it ranged from 0.33 to 4 young per surviving adult (CV = 73%). Among the SQT samples, reproduction ranged from 0 to 1.93 (mean = 0.68 young per surviving adult) (Table 6-4). As previously discussed, the reproductive endpoint is subject to considerable variability unrelated to chemical stressors. Eickhoff et al. (2014) observed mean reproduction in five control samples from the same estuary ranging from 0.8 to 8.4 young per surviving adult with an average replicate CV of 79%. Kennedy et al. (2009) found significant variability in control sediment for reproduction with a CV of 63%, as well as significant variability in an interlaboratory comparison of reproduction. Reproduction is also known to be highly dependent on grain size (McDonald et al. 2010).

Among benthic metrics, only density was significantly negatively correlated with PC1 (or any other PCs) (R^2 = 0.17). Inferences about density vs. chemical concentrations are subject to uncertainty because chemical stressors can result in both increases and decreases in this metric (Weisberg et al. 1998). The number of taxa was most correlated with grain size (R^2 = 0.29) with an increasing percentage of silt and clay resulting in a decline in number of taxa.

6.1.2.3.3 Factor Analysis of Sediment Chemistry

In addition to PCA, factor analysis was conducted on the sediment chemistry data to determine if individual chemicals or chemical classes could be attributed to the observed toxicity. Based on the outcome of the PCA, it was hypothesized that three factors would explain the variance of the multivariate dataset. Varimax rotation resulted in the factor loadings shown on Figure 6-9. The objective of varimax rotation is to have each chemical load on one factor and no other. This was not fully achievable for the NBSA sediment chemistry dataset; however, some chemicals loaded more strongly on individual factors. Metals were most strongly correlated to Factor 1 (Figure 6-9). Pesticides, PCBs, and 2,3,7,8-TCDD were most strongly correlated to Factor 2. However, the pesticides, total DDx and hexachlorobenzene also had significant loading on Factor 1 with metals. PAHs and total petroleum hydrocarbons were most strongly correlated to Factor 3. However, alkylated PAHs and total petroleum hydrocarbons also had significant loading on Factor 1. Dose response modeling was conducted using these factors in a similar manner as was described for the PCA (Table 6-15).

For 10-day mortality, both Factors 1 and 3 were significantly and positively correlated with mortality (Table 6-15). For 28-day mortality, both Factors 1 and 2 were significantly and positively correlated with

mortality. No factor models were significant for growth or reproduction. These findings are consistent with the findings in the PC models where PC1, representing elevated chemistry for all chemicals, was a significant predictor of both 10- and 28-day toxicity and PC2 was also significant for 28-day mortality.

6.1.2.3.4 Sediment Conclusions

The PCA, factor analysis, and dose response modeling provide evidence that chemical concentrations in sediments are associated with toxicity to benthic invertebrates. The PCA-based dose response models can be used to reasonably predict where toxicity has the potential to occur in the NBSA as shown on Figures 6-6 and 6-8. The factor-based dose response models confirm that multiple chemical mixtures are associated with the observed toxicity. Major findings include:

- The PCA of sediment chemistry concentrations indicates that most of the variance is explained by the first three PCs with PC1 explaining the most variance since it is representative of overall concentration and most of the chemicals are correlated with each other (Figure 6-3).
- The 10-day toxicity testing resulted in only two toxic stations with low survival while all other stations had very high survival, suggesting that the data are largely binary (i.e., either showing high survival or low survival) and do not provide an accurate estimation of intermediate survival conditions. Consequently, while the proposed model can represent the distribution of the survival data, it is poorly constrained and identifying a threshold level from the model is challenging. The primary utility of the model is to identify a lower bound PC score where effects of some degree can be expected. The model predicts acute toxicity at a PC1 score of 5; however, a threshold for acute toxicity could occur between a PC1 of 3.5 (i.e., the highest PC1 score for a non-toxic sample) and 5.6 (i.e., the lowest PC1 score for a toxic sample).The uncertainty with respect to estimating a threshold for acute toxicity is discussed in Section 6.4.
- The 28-day survival results were subject to considerably more variability and the relationship to chemistry, while significant, is not as strong as it is for the 10-day tests. Both PC1 and PC2 are associated with 28-day survival (Figure 6-7). Two stations, 142 and 158, that showed significant departure from the model (Figure 6-7) also had significant within replicate variability for this endpoint (Appendix A).

6.1.2.4 Porewater

PCA was conducted using the porewater chemistry data. To be consistent with the sediment chemistry PCA where possible, the same subset of chemicals was used in the porewater PCA:

- Porewater concentrations of 2,3,7,8-TCDD, detected in all porewater samples, were used to represent all dioxin and furan congeners.
- Most PCB congeners had high rates of detection in porewater with 111 congeners/co-elutions having a 100% detection rate. Total PCB congeners was used to represent all PCB congeners in the PCA.
- Individual PAH concentrations are represented by two totals, total PAHs and total alkylated PAHs, both 100% detection rates. Total LMW PAHs had a FOD rate of only 50% in porewater and were therefore not evaluated separately from HMW PAHs as was done for sediment.

- Except for mercury, only 29 samples were analyzed for metals due to a broken dialysis bag for the sample from station 155. Of the remaining samples, most metals had very low FOD: antimony (3%), arsenic (31%), cadmium (0%), copper (17%), lead (21%), nickel (0%), silver (0%), and zinc (10%). Therefore, only mercury, which was detected in 29 of 30 samples, was included in the porewater PCA model. One-half the quantitation limit was substituted for the non-detect.
- Total (2,4' and 4,4') DDx was used to represent all DDx isomers and was fully detected in porewater. Among chlordane chemicals, alpha- and gamma-chlordane were fully detected with concentrations as much as 10 times greater than other chlordane chemicals; therefore, total alpha + gamma chlordane was used to represent chlordane chemicals. Hexachlorobenzene and dieldrin, both fully detected in porewater, were also included in the PCA.
- Semivolatiles and petroleum hydrocarbons were not analyzed in porewater.

A total of nine chemicals was included in the porewater PCA (Figure 6-10). The first principal component (PC1) explains 51% of the variance and the first three PCs explain a total of 80% of the variance of the sediment chemistry dataset (Figure 6-10). All remaining PCs have eigenvalues less than 1. All but mercury and total alpha + gamma chlordane are correlated to PC1. The second principal component (PC2), explaining 19% of the variance, is correlated with mercury and total alpha + gamma chlordane. The third principal component (PC3), explaining 10% of the variance is correlated with mercury and PAHs. While PC1 explains most of the variance in overall chemical concentrations, PC2 and PC3 explain some relative differences in concentrations among the chemical groups.

Based on the PCA, three factors were evaluated for porewater (Figure 6-11) using varimax rotation with the objective of having chemicals strongly load (i.e., be correlated with) a single factor and no other factors. However, this was not achieved for the porewater chemistry dataset. Total PCB congeners, 2,3,7,8-TCDD, hexachlorobenzene and dieldrin are most strongly correlated with Factor 1 (45% of the variance). PAHs are most strongly correlated to Factor 2 (35% of the variance) and mercury is most strongly correlated with Factor 3 (20% of the variance). Total DDx and alpha + gamma chlordane are correlated with all factors; although, in opposite directions for Factors 2 and 3. Total DDx is positively correlated to Factor 2 and negatively correlated to Factor 3, while the opposite is observed for alpha + gamma chlordane.

Both PCs and factors were evaluated in dose response modeling of porewater chemistry and toxicity (Table 6-16). The modeling methods were the same as those described in Section 6.1.2.3.2 for sediment. Only PCs and factors were tested as predictors for toxicity. PC1 (and no other PCs) is significantly and positively associated with 10-day mortality (Table 6-16; Figure 6-12). Both factors 1 and 2 were significantly and positively correlated with 10-day mortality (Table 6-16); however, combining them in one model resulted in unstable parameter estimates. This indicates that both factors may be giving similar or redundant information, which makes sense given that both of the two acutely toxic stations, 151 and 154, have relatively high scores on both factors. Therefore, the chemicals (or some subset of them) associated with PC1 and both factors 1 and 2 (i.e., all except mercury and total alpha + gamma chlordane) are potentially contributing to the observed acute toxicity.

Porewater PCs were also evaluated as predictors of BIC metrics (Appendix A) and were not found to be significant predictors of any BIC metrics.

6.1.2.5 Non-metric Multidimensional Scaling

Benthic metrics are useful indicators of BIC health, but some information is lost in the analysis of metrics only. Therefore, community ordination was also evaluated with respect to sediment chemistry. Ordination refers to a variety of techniques used to arrange benthic samples in relation to one or more coordinate axes and to each other to provide information about their ecological similarities. Community abundance data collected over environmental gradients are typically non-linear and are better suited to non-linear methods of analysis such as non-metric multidimensional scaling (NMDS) of a Bray-Curtis dissimilarity matrix (Ludwig and Reynolds 1988). Like PCA, NMDS is a method used to reduce the dimensionality of the community data, the result of which is that each BIC sample can be scored in the new smaller coordinate space. These scores can be plotted on graphs where samples near each other are judged more similar than those further away on the graph. Spatial patterns may be discernible if the BIC varies based on geographic or geomorphic location. The resulting dimensions can be regressed against other variables such as individual chemicals, PCs, or factors to evaluate effects of stressors on changes in community structure.

Figure 6-14 illustrates the results of the NMDS evaluation. Goodness of fit criteria indicate that the community structure can be represented in two dimensions (see Appendix A). The space between samples can be thought of as distances that increase with dissimilarity. For example, stations 148 and 160 have no species in common and exhibit the maximum distance between any two stations on the graph Figure 6-14a). In this type of analysis, the dimensions are not always easily interpretable; however, dimension 2 is correlated with number of taxa. There are no obvious geographical trends (Figure 6-14a). Other spatial trends based on geomorphic unit or USEPA subunit were also not apparent (Appendix A). Linear egression modeling was conducted to determine if the sediment chemistry PC1 was a predictor of community structure (Figure 6-14b). There is no significant relationship between PC1 and dimension 1 ($p=0.26$) nor between PC1 and dimension 2 ($p=0.38$). It might appear from the graph (Figure 6-14b) that a relationship between PC1 and dimension 2 would be more apparent if the two toxic stations (151 and 154) were removed from the analysis; however, the p-value of this model is still not significant ($p=0.09$). Other predictors for BIC dimensions were tested: PC2, PC3, TOC, and percent fines (Appendix A). The only finding was that percent fines (Figure 6-14c) is a significant predictor for dimension 2 ($p=0.004$; $R^2 = 0.26$), which is not surprising given that percent fines was also the best predictor for number of taxa.

In summary, there is no evidence of geographic spatial patterns among the benthic community structure and no apparent relationship to sediment chemistry. Sediment grain size is the best predictor of patterns in community structure.

6.1.2.6 Summary of Quantitative Effects Assessment

The quantitative effects assessment demonstrated the following conclusions.

Acute toxicity is significantly correlated with chemical concentrations in sediment and porewater. The PCA evaluations demonstrated that measures of overall chemical concentrations as represented by the first PC in both the sediment and porewater PCA are significantly correlated with 10-day amphipod mortality and based on this relationship, areas where acute toxicity might occur can be reasonably predicted based on the Phase III sediment chemistry (Figure 6-6). The factor analyses demonstrated that toxicity is associated with a mixture of multiple chemicals: metals, pesticides, PCBs, PAHs, and dioxins/furans. No

single chemical or chemical group in the evaluation was shown to be unrelated to toxicity. It is important to note that because of the high correlation among chemical concentrations, these findings cannot prove that all individual chemicals evaluated are causing toxicity. Acute toxicity was only observed at two of the 30 SQT stations in the NBSA. Those two stations happened to have the highest concentrations in both sediment and porewater of most chemicals including those included in the multivariate analysis (Table 6-10).

Chronic toxicity is also significantly correlated with chemical concentrations in sediment and porewater as demonstrated by the PCA models. And similarly factor analysis demonstrated that toxicity is associated with a mixture of multiple chemicals: metals, pesticides, PCBs, PAHs and dioxins/furans. Based on models of 28-day mortality, areas where chronic toxicity could potentially occur can be reasonably predicted based on the Phase III sediment chemistry (Figure 6-8).

For chronic sublethal endpoints, growth but not reproduction is significantly negatively correlated with chemical concentrations; although, there is significant variability in the sublethal responses.

With the exception of density, none of the BIC metrics or community ordination measures were significantly correlated with chemical concentrations. PC1 is a significant predictor of density ($p=0.026$; $R^2 = 0.17$); however, because density can either increase or decrease as a result of degradation (Weisberg et al.1998), this somewhat weak relationship does not demonstrate chemical impact to BIC.

6.1.3 Integrated Benthic Community Risk Characterization

Table 6-17 summarizes the LOEs of the SQT Assessment based on the individual evaluations of BIC, toxicity, and sediment and porewater data as well as the quantitative effects assessment. The dose response modeling and comparisons to Jamaica Bay reference indicate no apparent impact to the BIC due to chemical stressors. Multivariate analyses indicate that acute and chronic toxicity to amphipods are associated with chemical mixtures in sediment and porewater. Toxicity occurred in samples with elevated concentrations of multiple chemicals: dioxins/furans, PCBs, pesticides (particularly total DDx, dieldrin, chlordane, and hexachlorbenzene), PAHs (both parent an alkylated), petroleum hydrocarbons, and most inorganics (e.g., arsenic, cadmium, chromium, copper, lead, mercury, and zinc). Areas where the dose response models predict potential toxicity are of limited extent in the NBSA and are primarily located in the southwestern subtidal flat and in a smaller area in the north in the vicinity of historically disturbed sediments.

6.2 Benthic Invertebrate Tissue Assessment

The tissue assessment was conducted for epibenthic shellfish including the softshell clam and blue crab. In addition, the tissue data generated from the polychaete worm bioaccumulation tests were also evaluated as another infaunal invertebrate LOE. The COPECs evaluated for the benthic invertebrate tissue assessment are listed in Table 3-5 and include: 2,3,7,8-TCDD, total PCBs (209 congeners), pesticides (total chlordane, total DDx, dieldrin, and hexachlorobenzene), PAHs, and inorganics/metals (arsenic, cadmium, chromium, copper, lead, mercury/methylmercury, nickel, selenium, silver, and zinc).

Tissue data EPCs for each species from the 2014 to 2016 BERA sampling program were compared to whole-body tissue TRVs to calculate HQs. The risk characterization presents the results of this assessment and summarizes the uncertainties associated with the tissue assessment.

6.2.1 Exposure

Tissue EPCs were calculated as UCLs using all available whole-body tissue data (i.e., individual and composite; calculated whole-body samples) for each species. The UCLs were calculated using USEPA's ProUCL® statistical package (Version 5.1) (USEPA 2015b) as described in Section 4.2.6. If a dataset contained fewer than six detected concentrations, a UCL was not calculated; instead, the maximum concentration was used as the EPC. Table 4-11 presents the sample locations in each assessment zone for benthic invertebrate (i.e., polychaete worm, blue crab, and softshell clam) tissue. The COPEC summary concentrations for invertebrates are provided in Tables 4-7a-c and the selected EPCs for invertebrate tissue samples by zone are presented in Appendix C.

6.2.2 Effects

Benthic invertebrate tissue-based TRVs for the COPECs identified in Table 3-5 are provided in Table 6-18, and discussed in detail in Appendix D. The selected TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019) and are consistent with the Final LPRSA BERA TRVs for COPECs common to both areas (NBSA and LPRSA). For the LPRSA BERA, Windward (2019) conducted a literature search for relevant toxicological studies, and derived acceptable NOAELs and LOAELs. The lowest acceptable LOAEL and highest NOAEL below the LOAEL from the same study based on marine organisms were chosen. If marine TRVs were not available, then the freshwater-based TRV selected by LPRSA BERA was used. Two COPECs being evaluated for invertebrate tissue assessment in this BERA, total chlordane and hexachlorobenzene, were not evaluated in the LPRSA BERA. The selected NBSA TRVs for these additional COPECs are further discussed in Appendix D.

In addition to the above selected TRVs for this BERA, TRVs derived by the USEPA for the LPR FFS (USEPA 2014) were also assessed and are included in the TRV summary table (Table 6-18). LPR FFS benthic invertebrate tissue TRVs are available for 2,3,7,8-TCDD, total PCBs, total DDx, dieldrin, LMW PAH, HMW PAH, copper, lead, and methylmercury. A key difference in the TRV application for invertebrates in the LPR FFS is the use of oyster (i.e., bivalve) TRVs to assess potential risks to blue crab for 2,3,7,8-TCDD (derived from Wintermyer and Cooper 2003) and PCBs (derived from Chu et al. 2000; Chu et al. 2003). This is a highly conservative and uncertain TRV application given the very different life histories and exposure potential between sessile filter-feeding oysters and mobile blue crab, but was used for risk bounding given the limited TRVs available for crustaceans for meaningful endpoints other than survival.

The NBSA total DDx TRV for benthic invertebrates was a SSD-derived 5th percentile value based on survival, growth, and reproduction studies in six species (NOAEL = 0.011 milligrams per kilogram [mg/kg] and LOAEL = 0.11 mg/kg). This SSD-derived value was based on a gamma distribution. An additional alternative total DDx TRV was also developed by Windward (2019) using the same SSD dataset, but the TRV was derived from a beta general distribution (NOAEL = 0.001 mg/kg and LOAEL = 0.01 mg.kg). Both sets of total DDx TRVs for invertebrates are assessed in this BERA.

6.2.3 Risk Characterization

This section presents the comparison of benthic invertebrate tissue EPCs to NBSA-selected and LPR FFS TRVs to calculate HQs for each COPEC and species. Benthic invertebrate tissue (i.e., worm, crab,

and clam) NOAEL and LOAEL HQs are presented in Table 6-19a (NBSA-wide), Table 6-19b (North Zone), Table 6-19c (Southeast Zone), and Table 6-19d (Southwest Zone). The HQs are based on UCLs, or maximum concentrations if there were fewer than six detected values. Polychaete worms were not evaluated by assessment zone due to low sample sizes (i.e., total of eight samples Bay-wide from the bioaccumulation tests).

A summary of COPECs that exceed their TRVs (i.e., HQs that equal or exceed 1) is provided in Table 6-20.

Table 6-20. Summary of TRV Exceedances for Benthic Invertebrate Tissue

Constituents	NBSA and FFS NOAEL and LOAEL-based HQs ≥ 1.0																	
	Polychaete Worm		Blue Crab								Softshell Clam							
	NBSA-wide		NBSA-wide		North		Southeast		Southwest		NBSA-wide		North		Southeast		Southwest	
	NBSA	FFS	NBSA	FFS	NBSA	FFS	NBSA	FFS	NBSA	FFS	NBSA	FFS	NBSA	FFS	NBSA	FFS	NBSA	FFS
Dioxins/Furans																		
2,3,7,8-TCDD		●		●		●		●		●		●		●		●		●
Polychlorinated Biphenyls																		
Total PCBs	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●
Pesticides																		
Total DDx (2,4 & 4,4)			●	○	●	○	○	○	●	●	○				○		○	
Total DDx (2,4 & 4,4) Alternative TRV	○	--	●	--	●	--	●	--	●	--	●	--	●	--	●	--	●	--
Dieldrin		○		○	○	●		○		○								
Total Chlordane		--		--		--		--		--		--		--		--		--
Hexachlorobenzene		--		--		--		--		--		--		--		--		--
Polycyclic Aromatic Hydrocarbons																		
Total HMW PAH	○	○	○	○		○		○			●	●		○		○		○
Total LMW PAH								○										○
Inorganics																		
Arsenic	●	--	●	--	●	--	●	--	●	--	●	--	●	--	●	--	●	--
Cadmium	○	--	●	--	●	--	●	--	●	--	○	--	○	--	●	--	●	--
Chromium		--		--		--		--		--	●	--	●	--	●	--	●	--
Copper	--		--	●	--	●	--	●	--	●	--	●	--	○	--	●	--	●
Lead		○		○		○		○		○	○	●	○	●	○	●	●	●
Mercury			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Methylmercury			●	●	●	●	●	●	●	●					○	○	○	○
Nickel	○	--	○	--	○	--	○	--	○	--	●	--	●	--	●	--	●	--
Selenium	○	--	●	--	●	--	●	--	●	--	●	--	●	--	●	--	●	--
Silver		--	●	--	●	--	●	--	●	--		--		--	●	--		--
Zinc	○	--	○	--	○	--	○	--	○	--	○	--	○	--	○	--	●	--

Notes: ● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1; - = not evaluated in the LPR FFS; COPECs evaluated that did not have any exceedances are not shown.

LOAEL HQs ≥ 1 were calculated NBSA-wide for softshell clam for total DDx (alternative TRV only), total HMW PAH, and several inorganics (arsenic, chromium, mercury, nickel, and selenium) using the NBSA TRVs, and 2,3,7,8-TCDD, total PCBs, total HMW PAHs, and several inorganics (copper, lead, and mercury) using LPR FFS TRVs. Similar results were found in each of the zones (see Table 6-20).

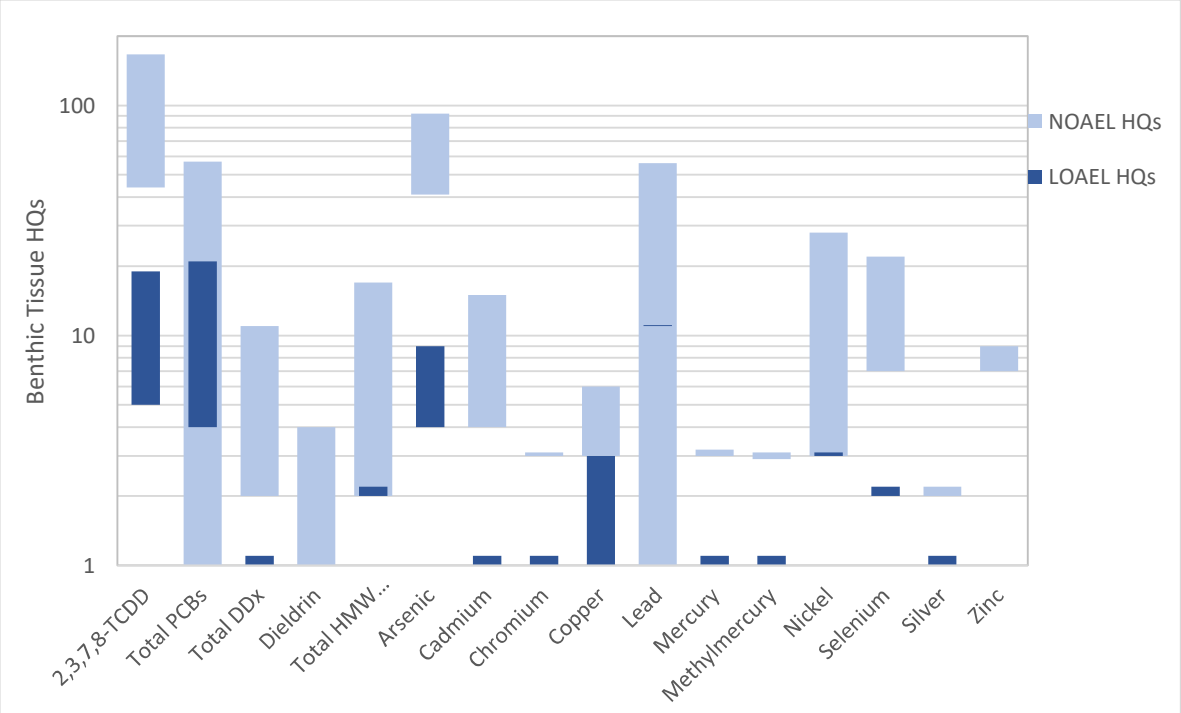
LOAEL HQs ≥ 1 were calculated NBSA-wide for blue crab for total DDx (both primary and alternative TRVs) and several inorganics (arsenic, cadmium, mercury, methylmercury, selenium, and silver) using

the NBSA TRVs, and 2,3,7,8-TCDD, total PCBs, and several inorganics (copper, mercury, and methylmercury) for LPR FFS TRVs. Similar results were found in each of the assessment zones (see Table 6-20).

The polychaete worm bioaccumulation data LOAEL HQs were ≥ 1 for 2,3,7,8-TCDD and total PCBs using LPR FFS TRVs, and only arsenic for NBSA TRVs. The limited polychaete tissue data generated from the laboratory exposures are compared to tissue TRVs in order to provide perspectives on the overall potential for invertebrate risks. They may be considered a secondary LOE for risk, but the primary risk conclusions for these organisms are made in the SQT assessment from toxicity and community-based analyses. Polychaete survival ranged from 92 to 100% during the 28-day bioaccumulation study for the NBSA indicating the insensitivity of these organisms to the NBSA COPECs. In addition, a site-specific study in the NBSA system of polychaete bioaccumulation and toxicity conducted in the LPR (i.e., Iannuzzi et al. 2008) has shown that elevated concentrations of similar COPECs as in the NBSA but at higher concentrations, do not affect the growth or survival of these organisms.

The range of HQs for the aggregate invertebrate tissue samples (i.e., all species) with HQs ≥ 1 are depicted in Figure 6-15.

Figure 6-15. Magnitude of NBSA-wide NOAEL and LOAEL HQs ≥ 1 for Invertebrate Tissue Assessment



6.3 Additional Lines of Evidence for Benthic Invertebrates

Additional LOEs for bivalves include site-specific toxicity testing conducted with transplanted oysters in the NBSA (Wintermyer and Cooper 2003). This study evaluated the bioaccumulation of dioxins/furans and PCBs and concurrent reproductive success of transplanted oysters in Newark Bay and other study

sites in the NY/NJ Harbor Estuary and was the basis of the LPR FFS tissue TRVs for those COPECs. The study found diminished reproductive success in oysters deployed in the Bay. While it was focused on dioxins/furans and PCBs, the authors of this study did not take into account the various other contaminants present in the study system.

6.4 Uncertainties Assessment

The following is an uncertainties assessment for the invertebrate risk assessment. Both quantitative and qualitative characterizations are provided for the SQT and tissue assessments presented in Sections 6.1 and 6.2, respectively. The objective of the uncertainty assessment is to provide perspective on the likely accuracy of the overall risk conclusions that are presented in Section 6.5.

One overarching uncertainty that is relevant to both the SQT and invertebrate tissue assessments is the fact that a formal risk analysis was not conducted for the regularly dredged deep water channels in the NBSA. This was a decision made during the planning of the BERA process due to the changing conditions in these areas from regular navigational dredging activities performed by the USACE, which regularly removes sediments from these channels. Ten composite sediment samples were collected in the regularly dredged deep water channels. Summary statistics for these samples are presented in Table 4-12. Mean and UCL concentrations for most of the COPECs including 2,3,7,8-TCDD, total PCBs, PAHs, some pesticides, and most metals are generally lower in the channel sediments than those in the other ecological risk assessment zones. Exceptions include total DDx, chlordane, mercury/methylmercury, silver, and zinc for which the average and UCL concentrations are within the range of the other zones. Given that the concentrations of COPECs in the channels are below or within the range of those found in the other zones, the potential for risks to invertebrate receptors that are exposed in the channels are bounded by the risk estimates for the other zones presented in this BERA.

6.4.1 SQT Uncertainties

There are several uncertainties associated with the SQT assessment related to the following issues: weighting and scoring in the SQT evaluation; estimation of porewater concentrations; prediction of acute toxicity; variability in chronic toxicity endpoints; reference comparisons and the representativeness of the 30 SQT samples. These are each discussed in the following paragraphs.

The scoring in the SQT evaluation used equal weights for each category of the triad: BIC, toxicity, and sediment chemistry. Alternative scoring methods have been proposed in the literature that give less weight to data with more uncertainty, in particular, the sediment chemistry category because it is generally based on a comparison to screening values (i.e., T20/T50 and ERL/ERM) that have not been demonstrated to accurately predict toxicity as they were derived from field sediments with chemical mixtures. In this assessment, the sediment chemistry score is based on an equal weighting of sediment and porewater chemistry. While the sediment chemistry portion of the score is based on a comparison to screening values, the porewater chemistry portion of the score is based on exceedances of promulgated water quality criteria, which may be a better indicator of exposure and potential impact for benthic communities. Therefore, to assess this uncertainty, the scoring was recalculated, to give porewater chemistry the full weight of the sediment chemistry category score (i.e., sediment chemistry is ignored in the scoring). The result of the scoring change is that seven of the low impact stations become no impact

stations for a total of 17 no impact stations. The two stations categorized as medium impact (i.e., stations 151 and 154) remain so. The remaining 11 stations keep their low impact classification. This alternative scoring is perhaps a better characterization of risk given the paucity of observed impacts to BIC and the low levels of observed acute toxicity. Another alternative scoring scenario was evaluated that assigned a score of 1 to any survival value less than 80% of control survival, regardless of statistical significance. Variability in the replicate data could result in MDD that would not identify samples as toxic when survival is less than 80% of control (see Attachment A-2 for estimates of MDDs for each endpoint). The outcome of this scoring is nine no impact stations and 19 low impact stations. The medium impact stations maintain their categorization. The details of the alternative scoring evaluations are presented in Attachment A-5 of Appendix A.

While it is expected that porewater concentrations would provide better information about exposure, it is important to note the uncertainty in the measurement of porewater chemistry. Concentrations of organic compounds in porewater were obtained by ex-situ exposure of polyethylene (PE) and polyoxymethylene (POM) passive samplers to sediments in a laboratory-controlled setting. PE passive samplers loaded with performance reference compounds (PRCs) were used to determine the freely dissolved porewater concentrations of PCBs, PAHs, and pesticides. POM passive samplers (without PRCs) were used to measure freely dissolved concentrations of dioxins and furans. Following exposure to sediment, the PE and POM samplers were transferred to the analytical laboratories where the target organic compounds were extracted in solvent (acetone/hexane (1:1 by volume)) and the concentrations in final extracts were measured. Porewater concentrations were estimated using the laboratory-reported concentrations in the PE/POM extracts as described by Ghosh (2014). A simple mass balance calculation is used to convert extract concentrations to concentrations within the PE/POM. Then the porewater concentration is estimated as the ratio of the PE/POM concentration and a literature derived polymer-water partition coefficient (K_{PS}). The PRCs were used to assess the extent of equilibrium achieved during the period that the samplers were in contact with the sediment. Some of the strongly hydrophobic compounds, in particular, the higher chlorinated PCB congeners, did not achieve equilibrium during the period of contact and a mathematical correction was performed to calculate the true equilibrium concentrations (Fernandez et al. 2009). Uncertainty in the porewater concentrations arises from the fact that the source of the K_{PS} values are regression relationships derived in other experiments with these samplers (Ghosh 2014; Choi et al. 2013; Fernandez 2012; Cornelissen et al. 2008). Another source of uncertainty for the dioxin/furan concentrations is that PRCs were not used in the POM samplers and therefore no equilibrium corrections were made. There is a possibility that the dioxin/furan concentrations are biased low; however, if non-equilibrium occurred, it is more of a concern for the higher chlorinated dioxin/furan congeners that have much lower toxicity equivalent factors compared to, for example, 2,3,7,8-TCDD. For PCBs, non-equilibrium occurred infrequently and only among the higher chlorinated congeners (i.e., hexa-, hepta-, octa-, nona-, and deca-chlorinated congeners).

The uncertainty of K_{PS} values used in this SQT assessment is further described in the USEPA's passive sampling user's manual (USEPA/SERDP/ESTCP 2017). Estimated values of K_{PS} are expected to be accurate within 0.3 log units (i.e., a factor of 2) even for highly hydrophobic compounds. The resulting error is similar to other environmental partition coefficients. Therefore, porewater concentrations could be as much as two times greater or lower than the calculated values presented here. As an uncertainty analysis, porewater concentrations for organic chemicals were doubled and then compared to the acute and chronic criteria and screening values used in this assessment (Appendix A; Table A-11). The chronic

exceedance counts increased for PCBs and DDx beyond that shown in Table 6-7. For PCBs, doubling the concentrations resulted in five additional samples exceeding the chronic criteria for a total of eight out of 30. For total DDx, doubling the concentrations resulted in 15 additional samples exceeding the chronic criteria for a total of 29 out of 30. The doubling also resulted in one sample (i.e., station 154) exceeding the chronic freshwater SQuiRT value for 2,3,7,8-TCDD (Appendix A; Table A-11) since the estimated value changed of 9.35 picograms per liter (pg/L) exceeds 10 pg/L when doubled. No additional acute exceedances resulted from the doubling. The PAH SumTU values were also be doubled to evaluate the uncertainty. Doubling results in one additional sample (i.e., station 151) with a PAH SumTU that exceeds one.

Modeling of acute toxicity indicated a strong association between sediment and porewater chemistry and 10-day survival. Because there are only two stations that exhibited acute toxicity, there is uncertainty that the relationship is real or could have happened by chance. However, a review of the historical data shows a clear relationship between 10-day *A. abdita* survival and sediment chemistry in the NBSA (Appendix A) so it is very likely that the same relationship exists with *L. plumulosus* as both organisms have demonstrated a similar ability to identify toxic sediments (Schlekat et al. 1995). There is also uncertainty in the model fitting since all but two stations had very high 10-day survival. The PC1 scores of the acutely toxic stations, 151 and 154, are 7.3 and 5.6, respectively. The next highest PC1 score for the non-acutely toxic samples is 3.52. There are four non-acutely toxic stations with PC1 scores that exceed 3 so it is clear that the threshold for acute toxicity is somewhere between 3.5 and 5.6. The sediment model predicts toxicity at PC1 scores exceeding 5 and identified 21 Phase III locations as potentially acutely toxic. If the true PC1 score threshold for toxicity were lower, for example, 4, then an additional 13 Phase III locations would also be classified as potentially acutely toxic for a total of 34, 13.4% of all samples. If the true PC1 score threshold for toxicity was 3.6, then an additional 16 Phase III locations would also be classified as potentially acutely toxic for a total of 37, 14.6% of Phase III samples.

There is uncertainty associated with the results of toxicity tests. Endpoint response to sediments is not necessarily indicative of contaminant effects (Kennedy et al. 2009). A reduction in endpoint values (i.e., survival, growth, number of young) compared to control could be caused by other factors including inherent random variability that could affect both the tested samples and/or the control samples. The 10-day acute toxicity tests have control acceptability criteria that require $\geq$ 90 % survival; therefore, control variability is tightly controlled in these tests. Nonetheless, clean reference samples have been shown to exhibit 10-day amphipod survival less than control (Kennedy et al. 2009).

The 28-day tests are subject to more variability. In an interlaboratory comparison, Kennedy et al. (2009) found greater inconsistency among chronic endpoints as compared to acute testing results. For 28-day survival, Kennedy et al. (2009) and Eickhoff et al. (2014) found fairly low variability among laboratory control samples; within replicate CVs ranged from 2 to 11%. However, among test sediments, toxicity classifications differed among duplicate testing results (Kennedy et al. 2009). For example, a sediment sample from Newark Bay tested three different times exhibited 28-day survival significantly less than control (i.e., toxic) in the first test and comparable to control in subsequent tests (i.e., non-toxic). A clean reference sample exhibited 28-day survival of 60%, which would result in classification as toxic.

The sublethal endpoints are subject to considerably more variability in both control and test sediments. There are no control acceptability requirements that control variability in these endpoints. Eickhoff et al. (2014) subjected five control sediments to 28-day tests with *L. plumulosus* and found growth and

reproduction endpoints were more variable both among control samples and within batch replicates. Mean growth in control samples ranged from 0.7 to 1.8 milligrams per organism and the mean CV among replicates was 30%. Reproduction had a 10-fold range within control sediments (0.8 to 8.4 juveniles per surviving adult) and the mean CV among replicates was 79%. Kennedy et al. (2009) found significant variability in control sediment for growth (CV = 56%) and reproduction (CV = 63%), as well as significant variability in an interlaboratory comparison of the growth and reproduction endpoints. *L. plumulosus* reproduction is known to be highly dependent on grain size (McDonald et al. 2010). This variability leads to uncertainty in the interpretation of these chronic tests.

Variability in the sublethal endpoints was also demonstrated in split sample testing conducted by the USEPA on a subset of three SQT samples (USEPA 2017b). Growth was found to be significantly different than control in samples from stations 144, 156, and 157 (Table 6-4). However, the split results indicated growth greater than control for these same sediments. This inconsistency is not unlike what has been documented in the literature and confirms the inherent uncertainty in the interpretation of sublethal endpoints.

For the BIC comparisons to reference, there is uncertainty due to the difference in sampling depths, 2 cm for Jamaica Bay and 6 inches in the NBSA, which may cause differences in abundance and richness in the samples. Both programs incorporated three grab samples per location for taxa enumeration. In both programs, BIC samples were sieved with a 0.5 mm sieve.

There is uncertainty regarding the incorporation of the 2013 REMAP data from Jamaica Bay into the reference dataset. As noted in Section 2.3.1, there was a significant decline in the BIC metrics when 2013 REMAP data are compared to 2008 REMAP data (and prior) in the NBSA. This same pattern was also observed in Jamaica Bay. This decline affected only BIC measures as there was no change in the incidence of toxicity. The mean chemical concentrations presented in Appendix A are similar between the two programs. It is not known why this apparent decline in BIC occurred, but given it was observed in both estuaries it is due to either of two possibilities: 1) a change in sampling methodology (unlikely, due to REMAP using similar methods since 1993); or 2) changes caused by a regional event. In fact, the 2013 samples were collected after a significant meteorological event had occurred in October 2012, Hurricane Sandy. It is possible the storm affected the BIC. In the NBSA, these effects, if real, were short-lived because the 2015 dataset indicated a full recovery. There are currently no available data to infer whether the BIC has rebounded in Jamaica Bay since 2013. To evaluate this uncertainty, the 2013 REMAP data were removed from the Jamaica Bay reference dataset, and the comparisons to the NBSA were reanalyzed (see Appendix A). It was found that removal of the 2013 data had no impact on the evaluation. There were no additional exceedances of the reference envelope nor changes in SQT scoring, and the hypothesis testing results were similar in that there was no indication the NBSA had lower mean BIC values than Jamaica Bay.

There is uncertainty regarding whether the 30 SQT stations are representative of the larger Phase III surface sediment data sets. This was evaluated in two ways, first, by comparing summary statistics of selected chemicals for the 30 SQT stations and the remaining Phase III samples. Mean concentrations were found to be similar for the SQT samples and the remaining samples. For example, the mean 2,3,7,8-TCDD concentration in SQT samples is 91.3 nanograms per kilogram (ng/kg) while for the remaining Phase III samples, it is 86.6 ng/kg. Other chemical concentrations compare similarly. The mean SQT versus remaining samples are as follows respectively, total PCB congeners (588 micrograms per

kilogram [µg/kg], 465 µg/kg), total 2,4' and 4,4' DDx (98.7 µg/kg, 135 µg/kg), total PAHs (13,000 µg/kg, 12,000 µg/kg), mercury (1.92 mg/kg, 2.4 mg/kg). The mean and median concentrations for other chemicals are also similar as well. The mean percent fines for the SQT samples (60.3%) is higher than for the remaining Phase III samples (55.5%) and mean TOC for the SQT samples (40,100 mg/kg) is also higher than for the remaining Phase III samples (21,400 mg/kg). This could be due in part to the finer grained samples in the SQT data set. In addition, an extreme outlier for TOC (151,000 mg/kg from station 154) occurs in the SQT data. With the outlier excluded, the mean TOC of the SQT samples is 36,300 mg/kg. Higher TOC may decrease the bioavailability of organic compounds. The data sets were also evaluated in the PCA and were found to have a similar range and chemical composition as the remaining sediment samples. These evaluations indicate that the SQT samples are representative of the full Phase III data set and the NBSA surface sediments. The details of these evaluations are found in Appendix A. Because the SQT locations are representative of the overall Phase III dataset, conclusions based on the integrated SQT LOEs (sediment chemistry, toxicity and benthic community assemblage) can be applied within the NBSA for remedial decision-making at spatial scales smaller than the assessment zones evaluated in this BERA.

6.4.2 Invertebrate Tissue Risk Uncertainties

Sources of uncertainty that influenced invertebrate tissue risk characterization included uncertainties in the analytical results, data evaluation, effects assessment, and interpretation of the risk estimates. Many of these sources of uncertainty are generic in nature and inherent in the risk assessment process, particularly with relying on the use of literature-based TRVs and the computation of HQs to make conclusions on population-level risks.

Inherent practices in risk assessment that will bias high the estimates of exposure to be reasonably conservative include:

- The use of a maximum values in the place of a UCL when limited data are available
- The assumption that blue crab populations feed exclusively or get all of their seasonal and lifetime exposure to COPECs from the NBSA.

Uncertainties associated with the invertebrate tissue TRVs are discussed in Appendix D. In general, there are limited whole-body tissue TRVs available for invertebrate organisms, making it difficult to derive TRVs that are specific and relevant for particular groups such as bivalves and crustaceans. This renders most invertebrate TRVs uncertain. The goal of using different sets of TRVs is to try and bound those uncertainties. However, application of a TRV for one group to another with very different life histories, exposure scenarios, and potential toxicological/adaptive sensitivities to COPECs can make the resulting risk estimates highly uncertain.

For 2,3,7,8-TCDD, the main uncertainties with the crayfish TRVs from Ashley et al. (1996) and used in the LPRSA BERA (Windward 2019) are: mortality is generally not the most sensitive endpoint based on chemical exposure; tissue concentrations were not reported; the test individuals were wild-caught; only three or four individuals were exposed per treatment; and application of the TRVs to non-crustaceans is highly uncertain. The TRVs for 2,3,7,8-TCDD used in the LPR FFS and derived from a NBSA site-specific study of Eastern oyster reproduction (Wintermyer and Cooper 2003) also have uncertainties that include: reported tissue concentrations were based on one composite of seven oysters from each site; the

endpoint; fertilized egg development was based on one sample; the presence of other contaminants were not considered or evaluated; a true control group was not used for comparison; and application of the TRVs to non-bivalves is highly uncertain. The species evaluated for PCB invertebrate toxicity were more diverse given that an SSD based on 10 species was used to derive the TRVs in the LPRSA BERA (Windward 2019) and this reduces inter-species toxicity uncertainty. However, as with 2,3,7,8-TCDD, Eastern oyster reproductive toxicity was the basis of the alternate PCB TRVs (Chu et al. [2000, 2003] as cited in the LPR FFS). This is a highly conservative and uncertain TRV application, given the very different life histories and exposure potential between sessile filter-feeding oysters and mobile blue crab. The use of both the 2,3,7,8-TCDD and the total PCB TRVs derived from studies on Eastern oysters produces substantially different risk estimates (i.e., HQs) for blue crab than does the application of the crustacean survival TRV for 2,3,7,8-TCDD, and the 10 species SSD for survival, growth, and reproduction for PCBs. However, given that TRVs do not exist specifically for blue crab and are limited for ecologically relevant endpoints other than survival in crustaceans in general, the use of this range of TRVs was used for risk bounding.

Whole-body tissue concentrations of total metals (other than organometals, including methylmercury, organo-selenium, and butyltins) are poorly predictive of adverse effects for several reasons: toxicity is caused by specific metal species, invertebrates store excess metals in non-toxic compartments, and toxicity is strongly dependent on the exposure rate and pathway. The use of a tissue residue approach for metals (except for methylmercury and selenium) is highly uncertain because of the wide range of strategies used by organisms to store, detoxify, and excrete bioaccumulated metals (e.g., fish and invertebrates may regulate their body burdens of some metals; although, metals regulation, and the strategy thereof, is species and metal specific) (Adams et al. 2011; USEPA 2007b). For these reasons, USEPA risk assessment guidance for metals and recent expert guidance conclude that comparison of whole-body metals tissue concentrations to literature-reported whole-body effects thresholds is not sufficiently robust for drawing risk conclusions (Adams et al. 2011; USEPA 2007b). Further details on key uncertainties for individual metals are presented in Appendix D.

With respect to the treatment of non-detects for invertebrate EPCs, the concentrations of sum components (e.g., PCB congeners) that were not detected were assumed to be zero when calculating totals. The effect on HQs of using one-half the quantitation limit or the full quantitation limit (ND=1) was evaluated and there were no changes to NBSA-wide or zone LOAEL tissue HQs based on either NBSA or LPR FFS-based TRVs for softshell clam or blue crab. Summary tables of HQ results from this sensitivity analysis on the treatment of non-detects are presented in Appendix F.

6.5 Weight of Evidence Risk Findings for Benthic Invertebrates

For benthic invertebrate infaunal communities, the risk characterization outcome is based on integrating the WOE from the SQT assessment for infaunal communities. Additional LOE for benthic (infaunal) communities include only tissue HQs for polychaete worms, which were considered a secondary LOE as discussed in Section 6.2.3. For epibenthic clams (bivalves) and blue crab, tissue-based HQs were the primary LOE available and were used to evaluate COPECs with LOAEL HQs ≥ 1 (preliminary COCs; Table 6-21) and potential for unacceptable risk to these receptors (i.e., shellfish).

Table 6-21. Summary of Preliminary COCs for Benthic Invertebrate Tissue Assessment

Preliminary COCs	Exposure Area	Range of LOAEL HQs					
		Invertebrate Tissue LOE					
		NBSA TRVs			LPR FFS TRVs		
		Polychaete Worm	Blue Crab	Softshell Clam	Polychaete Worm	Blue Crab	Softshell Clam
2,3,7,8-TCDD	NBSA-wide	<1	<1	<1	9	19	5
	Zones	--	<1	<1	NC	13 - 27	4 - 7
Total PCBs	NBSA-wide	<1	<1	<1	4	21	8
	Zones	--	<1	<1	NC	17 - 28	5 - 17
Total DDx (2,4 & 4,4)	NBSA-wide	<1	1	<1	<1	<1	<1
	Zones	--	<1- 1	<1	NC	<1 - 1	<1
Total DDx (2,4 & 4,4) Alternative TRV	NBSA-wide	<1	12	3	NC	NC	NC
	Zones	--	10 - 16	1 - 5	NC	NC	NC
Dieldrin	NBSA-wide	<1	<1	<1	<1	<1	<1
	Zones	--	<1	<1	NC	<1 - 1	<1
Total HMW PAH	NBSA-wide	<1	<1	2	<1	<1	2
	Zones	--	<1	<1	NC	<1	<1
Arsenic	NBSA-wide	4	4	9	NC	NC	NC
	Zones	--	3 - 5	4 - 14	NC	NC	NC
Cadmium	NBSA-wide	<1	1	<1	NC	NC	NC
	Zones	--	1 - 2	<1 - 1	NC	NC	NC
Chromium	NBSA-wide	<1	<1	1	NC	NC	NC
	Zones	--	<1	1 - 2	NC	NC	NC
Copper	NBSA-wide	NC	NC	NC	<1	3	1
	Zones	NC	NC	NC	NC	3	<1 - 2
Lead	NBSA-wide	<1	<1	<1	<1	<1	11
	Zones	--	<1	<1 - 2	NC	<1	4 - 36
Mercury	NBSA-wide	<1	1	2	<1	1	2
	Zones	--	1 - 2	1 - 3	NC	1 - 2	1 - 3
Methylmercury	NBSA-wide	<1	1	<1	<1	1	<1
	Zones	--	1 - 2	<1	NC	1 - 2	<1
Nickel	NBSA-wide	<1	<1	3	NC	NC	NC
	Zones	--	<1	2 - 5	NC	NC	NC
Selenium	NBSA-wide	<1	2	2	NC	NC	NC
	Zones	--	2	2	NC	NC	NC
Silver	NBSA-wide	<1	1	<1	NC	NC	NC
	Zones	--	1 - 2	<1 - 1	NC	NC	NC
Zinc	NBSA-wide	<1	<1	<1	NC	NC	NC
	Zones	--	<1	<1 - 3	NC	NC	NC

Notes:
NC = not calculated; TRV not available; -- = COC not evaluated

Additional LOE include site-specific measurements of reduced reproductive success in oysters in Newark Bay (Wintermyer and Cooper 2003), and consideration of background sediment concentrations (see Section 4.4.2). A summary of the risk characterization and LOE for benthic invertebrates is presented in Table 6-22. For benthic invertebrate (infaunal) communities, the results of the SQT integrate all available LOEs and were used to make risk conclusions. The overall SQT scores (described in Section 6.1.1) and summary of SQT findings (presented in Table 6-17) indicate impairment in localized areas of the NBSA. The individual LOEs contributing to the increased SQT scores and conclusion of localized risk are

primarily sediment toxicity test results and exposure-response models from the SQT, which appear to be a function of localized elevated concentrations of multiple co-occurring COPECs. These include dioxins/furans, PCBs, pesticides (particularly total DDx), PAHs, and many inorganics/metals (particularly, but not limited to, arsenic, cadmium, chromium, and mercury). The areas of localized risk (see Figures 6-6 and 6-8) represent a small proportion of the NBSA. Exposure of individual organisms to these areas is considered unlikely to substantially impact the overall benthic invertebrate communities and populations within the NBSA.

For shellfish (softshell clam and blue crab), the risk conclusions are based on the tissue HQ LOE (Table 6-22). Additional LOEs for clams include site-specific toxicity testing as reported in Wintermyer and Cooper (2003). LOAEL HQs were >1 for 2,3,7,8-TCDD, total PCBs, total DDx, dieldrin, and various metals for blue crab, and for 2,3,7,8-TCDD, total PCBs, total DDx, total HMW PAHs, and various metals for softshell clam. The tissue-based risks, based on the relative magnitude of the LOAEL HQs, are likely limited to 2,3,7,8-TCDD and PCBs in bivalves (represented by softshell clam), and 2,3,7,8-TCDD, total PCBs, and total DDx in blue crab, and possibly a few metals in localized areas, particularly arsenic, mercury/methylmercury, and lead.

For bivalves, the unacceptable risks are likely for 2,3,7,8-TCDD and total PCBs due to tissue HQs greater than 10 calculated using LPR FFS TRVs and site-specific evidence of potential reproductive impairment in oysters (Wintermyer and Cooper 2003). For 2,3,7,8-TCDD, the LPR FFS TRVs are based the Wintermyer and Cooper (2003) study that evaluated the bioaccumulation of dioxins/furans and PCBs and concurrent reproductive success of transplanted oysters in Newark Bay and other study sites in the NY/NJ Harbor Estuary. The study found diminished reproductive success in oysters deployed in the Bay. While it was focused on dioxins/furans and PCBs, the authors of this study did not take into account the various other contaminants present in the study system. A follow-up laboratory study—Cooper and Wintermyer (2009)—was used to associate similar reproductive effects observed in the prior field study with tissue data for dioxin/furan/PCB TEQ in oysters. This study reported effect levels similar to, but about two times greater, than the LOAELs from Wintermyer and Cooper (2003). It is unclear whether the reported effects translate to impairments to the maintenance of bivalve populations in the NBSA, but there is some potential for increased risk of adverse effects to individual bivalve reproduction. The NBSA TRVs for 2,3,7,8-TCDD are based on crayfish data (Ashley et al. 1996), which is more relevant to blue crab (crustaceans) than bivalves.

For several metals, LOAEL HQ > 1 were also predicted for bivalves. However, the magnitude of the HQs was generally low except for arsenic and lead, and there is significant uncertainty in the tissue HQ approach for metals. Unacceptable risk was considered possible for mercury, given that LOAEL HQs > 1 were predicted for all scenarios using both NBSA and FFS TRVs, and there is a lower degree of uncertainty in the tissue TRVs for mercury and methylmercury. Some of these metals (i.e., selenium and silver) are present at concentrations near or below background levels in sediment. Unacceptable risk is considered possible in some cases, consistent with the SQT evaluation.

For blue crabs, unacceptable risk is considered likely for 2,3,7,8-TCDD and PCBs, based on substantial exceedance of the LPR FFS TRVs. For total DDx, LOAEL HQs close to or greater than 10 were predicted using the alternate NBSA TRV; however, LOAEL HQs were never greater than 1 using NBSA or LPR FFS TRVs. Therefore, total DDx risks to blue crab are considered unlikely. LOAEL HQs > 1 were also predicted for several metals as well. Similar to the evaluation for softshell clam, the magnitude of the

metals HQs was generally low and there is significant uncertainty in the tissue HQ approach for metals. Unacceptable risk was considered possible for blue crab exposed to mercury and methylmercury, based on the same rationale as for softshell clam.

7 FISH ASSESSMENT

The fish community of the NBSA includes species at various trophic levels of the food web. They consume invertebrates and other lower-trophic level organisms but, in turn, are fed upon by upper-trophic level birds and mammals. Similar to invertebrates, there are various taxonomic feeding guilds for fish including benthic-feeding (i.e., benthivores), omnivorous forage fish, and pelagic predatory fish. Fish also form part of the food web for other fish and upper-trophic level organisms such a birds and mammals. This section includes the risk assessment for fish in the NBSA.

The following are the AEs and Risk Questions for fish that are addressed in this section.

AE: Survival, growth, and/or reproduction of fish.

Risk Question 1: *Are fish communities in the NBSA different from those found in similar nearby water bodies and comparable to what's expected in mid-Atlantic estuaries?*

Risk Question 2: *Are COPEC concentrations in fish tissues from the NBSA greater than toxicity benchmarks for the survival, growth, and/or reproduction of fish?*

Risk Question 3: *Are COPEC concentrations in porewater, surface water, and sediment from the NBSA greater than benchmarks for the survival, growth, and/or reproduction of fish?*

Risk Question 4: *Does the daily dose of COPECs received by fish (including forage fish, benthic omnivore, pelagic invertivore, and pelagic piscivore) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of fish? If yes, what are the probabilities of effects of differing magnitude for survival, growth, and/or reproduction of fish?*

Risk Question 1 is addressed by a qualitative analysis of available adult and juvenile fish and ichthyoplankton community data from a study conducted in the NY/NJ Harbor Estuary including site-specific data collected from the NBSA as presented in Section 7.1. Risk Question 2 is addressed by the fish tissue-based assessment presented in Section 7.2 and the fish egg tissue assessment presented in Section 7.4. Risk Question 3 is addressed in the surface water assessment in Section 5. Risk Question 4 is addressed in the fish dietary risk assessment in Section 7.3. The life history profiles for the fish receptors identified for the tissue and dietary risk assessments are provided in Appendix B.

A summary of the fish pathology investigation that was conducted as part of the BERA fish sampling program is provided in Section 7.5 as a LOE for the fish assessment, particularly to help assess the overall condition of fish populations in the NBSA. The full fish pathology reports are provided as Attachment 5. An uncertainties assessment is provided for the overall fish assessment in Section 7.6, and the WOE summary of findings for fish is provided in Section 7.7. Additionally, a field investigation on potential contaminant effects on mummichog reproduction (Bugel et al. 2010) is included for perspective for the WOE in Section 7.7.

The species for which data were collected under the RI/BERA and evaluated in this assessment were identified as predominant resident and migratory fish that inhabit or utilize the NBSA, and as important representatives of Bay fishery. They were selected based on the substantial historical data and information available on the Bay fishery (Section 2.8), including the various life histories of fish from

ichthyoplankton to adult stages, and consideration of the EFH designations by the NMFS for the NBSA. These fish include species from different feeding guilds, and with different levels of potential exposure to COPECs in sediments and the food web of the system. For these reasons, the assessment provided in this section is fully representative of the potential risks to NBSA fish populations.

7.1 Fish Community Assessment

7.1.1 Available Data

The USACE-New York District conducted an extensive Aquatic Biological Survey (ABS) of the NY/NJ Harbor Estuary to assess the seasonal distribution and abundance of the fish community as well as habitat information (salinity, water temperature, oxygen levels) as a basis for informed dredging management practices and to promote the protection of fish assemblages utilizing existing habitats of the Harbor and near shore habitats of the New York Bight.

The ABS was a long-term, diverse, and spatially robust sampling program that included bottom trawl surveys of demersal or near bottom occurring finfish (2001 to 2010 dataset) and ichthyoplankton tows using a benthic sled equipped with a plankton net to collect fish eggs and larvae near the bottom (2001 to 2011 dataset; USACE 2015b). Sampling locations were divided into three subregions: 1) Newark Bay and Arthur Kill; 2) the Upper New York Bay (South Brooklyn, Port Jersey, Kill Van Kull); and 3) the Lower New York Bay (Ambrose Channel, Chapel Hill South Channel, Raritan Bay East Reach, East Bank, Swash Channel Range, Old Orchard Shoals).

The data from these surveys were used to compare and contrast the fish assemblages at different life stages (i.e., adult/juvenile and ichthyoplankton), including seasonal occurrence, diversity, and abundance of species between the survey locations. In addition, the USACE evaluated the fish community found in their studies relative to those typical of mid-Atlantic estuaries. This dataset provides a unique opportunity to assess the relative occurrence, diversity, and abundance of fish species in the NBSA region, relative to other regions in the NY/NJ Harbor Estuary and in general for fisheries in mid-Atlantic estuaries.

7.1.2 Qualitative Evaluation of Fish Community Data

7.1.2.1 Water Quality and Habitat Information

Water quality data from the ABS show that salinities were consistently lowest in the Arthur Kill/Newark Bay and highest in the Lower Bay throughout the seasons. Dissolved oxygen trends were similar across the three Harbor regions; gradually decreasing from January through April, and then rapidly decreasing from April through June as water temperatures increased.

The bottom water temperature was slightly lower in the Arthur Kill/Newark Bay from December through February and slightly higher from March through June than in the other regions of the Harbor. The warmest water temperatures occur in the Arthur Kill/Newark Bay region during the spring and into early summer (April to July). The Arthur Kill/Newark Bay region also had some of the coolest bottom temperatures in January. The Arthur Kill/Newark Bay and, to a lesser extent, the Upper Bay salinities and temperatures are influenced by freshwater runoff from the Raritan, Passaic, Hackensack, and Hudson Rivers.

The bottom substrate in the Arthur Kill/Newark Bay region comprises fine grain silt and clay, while the Lower Bay is primarily composed of sand and coarse-grained sands. The Upper Bay consists of a mixture of finer clay and silt, and sand sediments. The Arthur Kill/Newark Bay and Upper Bay regions have a larger percentage of maintained deep channels and berthing areas compared to the Lower Bay, which is dominated by shallows/shoals with a smaller percentage of maintained channel areas.

7.1.2.2 Adult and Juvenile Fish Community

7.1.2.2.1 Abundance

The ABS dataset shows that many of the numerically dominant fish species collected during the winter, such as white perch, striped bass, and winter flounder, were concentrated in Arthur Kill/Newark Bay (Table 7-1; USACE 2015b). Therefore, overall abundances of fish of all species in the winter in Arthur Kill/Newark Bay are nearly twice as high as that collected in Lower Bay and nearly four times as high as winter fish abundances in Upper Bay. Total winter fish catch per unit effort over the nine years of sampling averaged 96 fish/10 minute trawl in Arthur Kill/Newark Bay, 58 fish/10 minute trawl in Lower Bay, and 28 fish/10 minute trawl in Upper Bay.

Table 7-1. Relative Abundance of Adult and Juvenile Fish in the NY/NJ Harbor Estuary Subregions: December-March (Winter) 2001-2011

Species*	Average Catch-Per-Unit-Effort (No. Fish/10 Minute Trawl)		
	Arthur Kill/Newark Bay	Lower Bay	Upper Bay
	Adult/juveniles	Adult/juveniles	Adult/juveniles
White perch	80	0.01	0.8
Striped bass	19	0.1	5.1
Winter flounder	4.1	1.6	3.0
Red hake	2.1	1.2	2.9
Alewife	1.5	16.2	3.7
Spotted hake	1.5	5.2	3.6
Blueback herring	1.5	7.2	4.2
Atlantic silverside	0.7	6.5	0.6
Bay anchovy	0.4	0.8	0.5
Windowpane	0.3	0.5	1.0
American shad	0.3	0.5	1.2
Silver hake	0.1	1.6	0.2
Atlantic menhaden	0.1	1.5	0.2
Smallmouth flounder	0.1	1.2	0.3
American sandlance	0	11	0.1
Grubby	0	0	0.2
Atlantic croaker	0	0	0.6
Atlantic herring	0	0.8	0.4
Spotted hake	0	0	0.5

Notes: *Species that collectively comprised 95% of all fish collected in a subarea; From USACE (2015)

In spring, fish densities were highest in Upper Bay, with a mean total of 115 fish/10 minute trawl compared to 92 fish/10 minute trawl in Arthur Kill/Newark Bay and 64 fish/10 minute trawl in Lower Bay.

Bay anchovy was dominant in all three NY Harbor locations in spring, and spotted hake as well as Atlantic herring were also common (Table 7-2; USACE 2015b).

Table 7-2. Relative Abundance of Adult and Juvenile Fish in the NY/NJ Harbor Estuary Subregions: April-July (Spring) 2001-2011

Species*	Average Catch-Per-Unit-Effort (No. Fish/10 Minute Trawl)		
	Arthur Kill/Newark Bay	Lower Bay	Upper Bay
	Adult/juveniles	Adult/juveniles	Adult/juveniles
Bay anchovy	29	44	80
Spotted hake	23	6.8	18
Atlantic herring	23	2.7	14
Striped bass	4.3	0.1	2.8
Alewife	3.8	2.6	1.7
Winter flounder	2.5	2.0	3.1
White perch	2.3	0	0.3
Blueback herring	2.3	0.9	2.7
Red hake	2.1	0.5	2.8
Atlantic tomcod	1.1	0.02	5.5
Windowpane	0.6	0.6	1.4
Scup	0.01	1.2	1.2
Atlantic butterfish	0	0.9	0
Striped searobin	0	0.7	0.0
American sandlance	0	0.1	1.5

Notes: *Species that collectively comprised 95% of all fish collected in a subarea; From USACE (2015)

7.1.2.2.2 Diversity

Generally, alewife, blueback herring, spotted hake, winter flounder, and red hake occur in all Harbor areas during the winter (Table 7-1; USACE 2015b). Winter species communities were similar in the Arthur Kill/Newark Bay regions due to large abundances of white perch and striped bass, species that were much less common in the Upper Bay and Lower Bay (Table 7-1; USACE 2015b). White perch are uncommon in the Upper and Lower Bay, which have more saline waters compared to Arthur Kill/Newark Bay. Although the Upper and Lower Bay fish densities were lower than that of Arthur Kill and Newark Bay, the communities were more diverse.

In spring, Harbor fish communities were composed of bay anchovy, spotted hake, Atlantic herring, alewife, blueback herring, and winter flounder (Table 7-2; USACE 2015b). Spotted hake accounted for more than half the fish in Arthur Kill are bay anchovy and Atlantic herring comprising more than half the fish in Newark Bay. The spring demersal fish communities in Upper Bay and Lower Bay were dominated by bay anchovies, spotted hake and Atlantic herring. Spring species diversity was similar across the three Harbor regions.

7.1.2.3 Ichthyoplankton (Egg/Larvae) Community

The ABS found that the numerically dominant egg and larvae species collected included gobies, wrasses, Atlantic menhaden, searobins, weakfish, and windowpane (Tables 7-3 and 7-4; USACE 2015b).

Table 7-3. Relative Abundance of Eggs and Larval Fish in the NY/NJ Harbor Estuary Subregions: December-March (Winter) 2001-2011

Species*	Average Catch-Per-Unit-Effort (No. Eggs/Larvae Per 1,000m^3)		
	Arthur Kill/Newark Bay	Lower Bay	Upper Bay
	Egg/larvae	Egg/larvae	Egg/larvae
Grubby	34	48	41
Winter flounder	17	75	61
Atlantic tomcod	13	1.9	4.9
American sandlance	10	86	32
Atlantic croaker	8.9	2.2	13
Fourbeard rockling	6.3	4.1	12
Rock gunnel	6.2	11	9.1
Atlantic herring	4.8	2.7	3.7
Summer flounder	4.5	4.2	5.6
Atlantic menhaden	3.3	5.2	5.5
Gadidae (cod)	2.9	4.1	10
Gobiidae (goby)	0	36	3.4

Notes:
*Species that collectively comprised 95% of all fish collected in a subarea
Eggs/larvae category includes eggs, yolk sac, post-yolk sac
From USACE (2015)

Table 7-4. Relative Abundance of Eggs and Larval Fish in the NY/NJ Harbor Estuary Subregions: April-July (Spring) 2001-2011

Species*	Average Catch-Per-Unit-Effort (No. Eggs/Larvae Per 1,000m^3)		
	Arthur Kill/Newark Bay	Lower Bay	Upper Bay
	Egg/larvae	Egg/larvae	Egg/larvae
Gobiidae (goby)	659	451	393
Labridae (wrasse)	566	1,146	1,053
Atlantic menhaden	238	1,135	592
Weakfish	171	514	124
Windowpane	143	471	266
Searobin species	118	1,022	291
Winter flounder	69	376	120
Tautog	35	245	85
Hogchoker	25	436	51
Clupeidae (shad/herring)	14	69	244
Gadidae (cod)	10	91	87

Notes:
*Species that collectively comprised 95% of all fish collected in a subarea
Eggs/larvae category includes eggs, yolk sac, post-yolk sac
From USACE (2015)

There were high larval abundances in Arthur Kill/Newark Bay non-channel locations of bay anchovy, gobies, and northern pipefish and lower larval abundances of winter flounder, windowpane, and grubby (USACE 2015b). The abundance and distribution of Atlantic menhaden, bay anchovy, windowpane, and wrasse eggs suggest spawning throughout the Harbor; while the abundance and distribution of fourbeard rockling, hogchoker, and weakfish eggs suggests those species spawn primarily in the Upper Bay and Newark Bay. Bay anchovy, goby, and northern pipefish larvae were relatively more abundant in Arthur Kill/Newark Bay than in Lower Bay and Upper Bay channel locations, whereas winter flounder, windowpane, and grubby larvae were not as abundant in Arthur Kill/Newark Bay (USACE 2015b). These spatial distribution patterns are potentially explained by physical tolerances to different salinity and water temperatures, and larval periods.

Winter flounder egg densities were lowest in the Arthur Kill/Newark Bay region and egg densities of fish species like searobins, cods, weakfish, Atlantic menhaden, and fourbeard rockling were lower at Arthur Kill/Newark Bay than other Harbor areas (USACE 2015b). Benthic habitats, sediment types, and disturbance histories differ among Harbor areas. Salinities also are lower in Arthur Kill/Newark Bay; therefore, site selection for spawning may include an aversion to disturbed benthic habitat and preference for higher salinities for egg and larval development (USACE 2015b)

A study of ichthyoplankton community in 1993 and 1994 in the lower Hudson River estuary, south of the George Washington Bridge and Battery Park, found that Atlantic tomcod and winter flounder young of the year dominated the fish community in early summer (May to July) while large numbers of young of the year striped bass were collected as part of a late summer assemblage (August-September; Able et al 1998). Black sea bass, American eel, cunner, and northern pipefish were also common.

Juvenile fish assemblages from a study in 1995 and 1996 in the Kill van Kull, Arthur Kill, and lower Hudson River found that juvenile silver perch, naked goby, mummichog, bay anchovy, Atlantic silverside, and winter flounder were commonly collected in benthic traps at Arthur Kill. Naked goby, Atlantic silverside, and winter flounder were also common in benthic traps at Kill van Kull and the lower Hudson River. The number of fish trapped was greatest at Arthur Kill compared to Kill van Kull and the lower Hudson River (Duffy-Anderson et al. 2003).

The USACE (2015a, 2015b, 2011) compared the fish assemblages found in their study to expected assemblages in terms of species occurrence and distributions of ichthyoplankton, juveniles, and adults, and concluded that they were comparable to those from other mid-Atlantic estuaries. These comparisons were made based on multiple surveys and studies conducted by Dr. Ken Able of Rutgers University and his associates (i.e., Able et al. 2011; Able and Fahey 2010; Able et al. 1998).

7.1.3 Risk Characterization

The ABS dataset includes a wide variety of species representative of fish communities in the NBSA, including fish receptors evaluated in this BERA (winter and summer flounder, American eel, and white perch). Adult fish abundance and diversity in the Arthur Kill/Newark Bay were similar or greater than other locations in the NY/NJ Harbor Estuary. Juveniles, larvae, and eggs were commonly collected in the NBSA, indicative of ongoing reproduction within fish communities. Differences in species communities among the regions may be in part explained by physical differences such as bottom substrate, water temperature, salinities, and effects of freshwater inputs that can influence the presence of certain species.

7.2 Fish Tissue Assessment

The fish tissue assessment was conducted for the following fish species: combined mummichog/striped killifish (i.e., *Fundulus* sp.), summer and winter flounder, American eel, and white perch. A limited number of Atlantic Menhaden and silverside samples were also collected in the fish sampling efforts for this BERA. However, these are seasonal forage fish that move throughout the Bay and were not target species for the fish risk assessment. They were primarily collected to support the bird and mammal food web model (i.e., dietary) assessments.

The COPECs evaluated for the fish tissue assessment are listed in Table 3-5 and include: 2,3,7,8-TCDD, total dioxin/furan TEQ, total PCBs (209 congeners), total PCB TEQ, total dioxin/furan/PCB TEQ, pesticides (total chlordane, total DDx, dieldrin, and hexachlorobenzene), and inorganics (arsenic, chromium, copper, lead, mercury/methylmercury, selenium, silver, and zinc). Cadmium, nickel, and PAHs, which are COPECs for fish and other receptors in this BERA, were only evaluated in the dietary assessment for fish (Section 7.3), as they were not detected substantially in fish tissue samples. As such, a tissue assessment was not appropriate.

Tissue chemistry EPCs for the fish species were compared to whole-body tissue TRVs to calculate HQs. A separate focused assessment was conducted to evaluate the results of white perch liver samples, and to contrast the assessment of those findings with those from the whole-body HQ assessment. This section summarizes the COPECs, describes the derivation of tissue exposure and effects concentrations, and presents the HQs for fish tissue.

7.2.1 Exposure

EPCs were calculated for COPECs identified for each fish species evaluated. EPCs were calculated as UCLs using all available whole-body tissue data (i.e., individual and composite; calculated whole-body samples) for each fish species. UCLs were calculated using USEPA's ProUCL® statistical package (Version 5.1) (USEPA 2015b) as described in Section 4.2. If a dataset contained fewer than six detected concentrations, a UCL was not calculated; instead, the maximum concentration was used as the EPC. Table 4-11 presents the sample locations in each assessment zone for fish tissue. The summary statistics for fish tissue by species are presented in Tables 4-7d-k The EPCs for fish tissue COPECs are presented in Appendix C.

7.2.2 Effects

Fish tissue TRVs for the COPECs identified in Table 3-5 are provided in Table 7-5 and discussed in detail in Appendix D. Fish tissue TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019; Appendix E) and are consistent with the Final LPRSA BERA TRVs for COPECs common to both areas (NBSA and LPRSA). For the LPRSA BERA, Windward (2019) conducted a literature search for relevant toxicological studies, and derived acceptable NOAELs and LOAELs. Total chlordane and hexachlorobenzene were not identified as COPECs for the LPRSA BERA and, as such, TRVs were not developed by the CPG. For this BERA, a total chlordane TRV based on Parrish et al. (1976) and a hexachlorobenzene TRV based on Schuytema et al. (1990) were identified, as described in Appendix D.

In addition, the CPG did not assess fish tissue risks for some metals that are considered essential to fish metabolism and are physiologically regulated in terms of concentrations in the body of fish. They also did not assess fish tissue risks from PAHs due to the rapid metabolism of these compounds and excretion of their breakdown products by fish following uptake. For these metals and PAHs, the CPG relied primarily on a fish dietary assessment, similar to that presented in Section 7.3.

In addition to the above selected TRVs, TRVs derived by the USEPA for the LPR FFS (USEPA 2014) were also assessed. The LPR FFS did not evaluate fish tissue-based risks for arsenic, chromium, selenium, silver, zinc, total chlordane, or hexachlorobenzene.

The primary NBSA 2,3,7,8-TCDD/TEQ TRV for fish tissue was a SSD-derived 5th percentile value based on survival, growth, and reproduction studies in seven species (NOAEL = 0.000012 mg/kg and LOAEL = 0.00012 mg/kg). This SSD-derived value as based on the geomean 5th percentile value for several different distributions (Windward 2019). An additional alternative fish tissue 2,3,7,8-TCDD/TEQ TRV was also developed by Windward (2019) in the LPRSA BERA using the same SSD dataset, but the TRV was derived from a beta general distribution (NOAEL = 0.0000023 mg/kg and LOAEL = 0.000023 mg/kg). Both sets of TRVs are evaluated in the NBSA fish tissue assessment.

A focused effort was also conducted as part of this BERA to identify and summarize available fish liver TRVs. This included extracting fish liver studies cited in the USACE's Environmental Residue Effects Database (ERED; USACE 2019). Studies reporting liver tissue concentrations and lowest observed adverse effect concentration (LOAEC) (and effects endpoints ranging from the LC10 to LC20) for growth, reproduction, and survival/mortality were included in the datasets used to calculate TRVs. The available fish liver TRV ranges are provided in Table 7-6. Liver-based LOAEC TRVs were available for arsenic, chromium, copper, mercury, selenium, 2,3,7,8-TCDD (used to evaluate 2,3,7,8-TCDD, total dioxin/furan TEQ fish, total PCB TEQ fish, and total dioxin/furan/PCB TEQ fish), and Aroclor 1254 (used to evaluate total PCBs). For COPECs without available LOAEC liver TRVs from USACE (2019), the no observed adverse effects concentration (NOAEC) liver TRVs available in USACE (2019) were included in the evaluation. These included lead, silver, and zinc. The mean NOAEC was selected for the HQ assessment for these metals.

Table 7-6. TRVs for White Perch Liver Assessment

Constituent	Range of Fish Liver TRVs				Selected Liver-based TRV[a]			
	No. Studies	Minimum	Maximum	Mean	NOAEL	LOAEL	Notes (endpoint/ species)	Source
Dioxins/Furans								
2,3,7,8-TCDD	3	0.00371	0.00371	0.00371	--	0.00371	Growth/mortality; rainbow trout	Branson et al. 1985
Total Dioxin/Furan TEQ Fish [b]	3	0.00371	0.00371	0.00371	--	0.00371	Growth/mortality; rainbow trout	Branson et al. 1985
PCBs								
Total PCBs [c]	1	7.88	7.88	7.88	--	7.88	Reproduction; Atlantic cod	Sangalang et al. 1981
Total PCB TEQ Fish [c]	3	0.00371	0.00371	0.00371	--	0.00371	Growth/mortality; rainbow trout	Branson et al. 1985
Total Dioxin/Furan /PCB TEQ Fish [b]	3	0.00371	0.00371	0.00371	--	0.00371	Growth/mortality; rainbow trout	Branson et al. 1985
Pesticides								
Total DDx (2,4 & 4,4)	--	--	--	--	--	--	--	--
Dieldrin	--	--	--	--	--	--	--	--
Total Chlordane	--	--	--	--	--	--	--	--
Inorganics								
Arsenic	2	9.6	18	13.8	--	9.6	Mortality; Mozambique tilapia	Liao et al. 2004
Cadmium	9	1.3	252	29.9	--	1.3	Mortality; dab	von Westernhagen et al. 1980
Chromium	1	0.42	0.42	0.42	--	0.42	Mortality; chinook salmon	Farag et al. 2006
Copper	9	0.84	288	137	--	0.84	Growth; channel catfish	Murai et al. 1981
Lead[a]	15	1.0	20	11.1	11.1	--	Mortality; goldfish	Zhang et al. 2005
Mercury	1	3.0	3.0	3.0	--	3.0	Growth; climbing perch	Panigrahi and Misra 1978
Methylmercury [d]	1	3.0	3.0	3.0	--	3.0	Growth; climbing perch	Panigrahi and Misra 1978
Selenium	8	5.2	20	11.5	--	5.2	Growth; white sturgeon	Tashjian et al. 2006
Silver[a]	2	19	19	19	19	--	Growth/mortality; rainbow trout	Galvez et al. 2001
Zinc[a]	13	3.4	68	35	35	--	Mortality; goldfish	Zhang et al. 2005

Notes:
Units are milligrams per kilogram, wet weight
[a] Liver TRVs based on the LOAEC were not available for lead, silver, and zinc; therefore, liver TRVs based on the NOAEC are provided and used for the evaluation.
[b] Liver TRV based on 2,3,7,8-TCDD.
[c] Liver TRV based on Aroclor 1254.
[d] Liver TRV based on mercury.

7.2.3 Risk Characterization

7.2.3.1 Whole-Body Tissue

This section presents the comparison of fish tissue EPCs to NBSA-selected and LPR FFS TRVs to calculate HQs for each COPEC and species. Fish tissue NOAEL and LOAEL HQs are presented in Table 7-7a (NBSA-wide), Table 7-7b (North Zone), Table 7-7c (Southeast Zone), and Table 7-7d (Southwest Zone). The HQs are based on UCLs, or maximum concentrations if there were fewer than six detected values. A summary of COPECs that exceed their TRVs (i.e., HQs that equal or exceed 1) is provided in Table 7-8.

Table 7-8. Summary of TRV Exceedances for Fish Tissue Assessment

Preliminary COCs	NBSA and LPR FFS NOAEL and LOAEL-based HQs ≥ 1.0															
	Mummichog/ Killifish								American Eel							
	NBSA-wide		North		SE		SW		NBSA-wide		North		SE		SW	
	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans																
2,3,7,8-TCDD	○	●	○	●	○	●	○	●		●	○	●		●		●
Total Dioxin/Furan TEQ Fish	○	●	○	●	○	●	○	●		●	○	●		●		●
Polychlorinated Biphenyls																
Total PCBs	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●
Total PCB TEQ Fish		●		○		○		●		○		●				○
Total Dioxin/Furan/PCB TEQ Fish	○	●	○	●	○	●	○	●		●	○	●		●	○	●
Pesticides																
Total DDx (2,4 & 4,4)	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	●
Dieldrin		○		○		○				○		○		○		○
Total Chlordane		--		--		--		--		--		--		--		--
Hexachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics																
Arsenic		--	○	--		--		--		--		--		--		--
Chromium		--		--		--		--		--		--		--		--
Copper	●	●	●	●		●	○	●		○		○		○		●
Lead		○		○		○		○				○				○
Mercury	○		○	○			○		○	○	○	●	○	○	○	○
Methylmercury	○	○	○	○	○		○	○	○	○	●	●	○	○	○	●
Selenium	○	--	○	--	○	--	○	--	○	--	○	--	●	--	○	--
Silver	○	--	●	--		--		--		--		--		--		--
Zinc		--		--		--		--		--		--		--		--

Notes:
● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1
- = not evaluated in the LPR FFS; COPECs evaluated that did not have any exceedances are not shown.
*Sediment COPEC concentrations are within background levels and tissue residues are assumed to be related to background conditions as well.
** Tissue residues in mummichog were within the range of Jamaica Bay background residues; all fish tissue copper residues also assumed to be background-related.

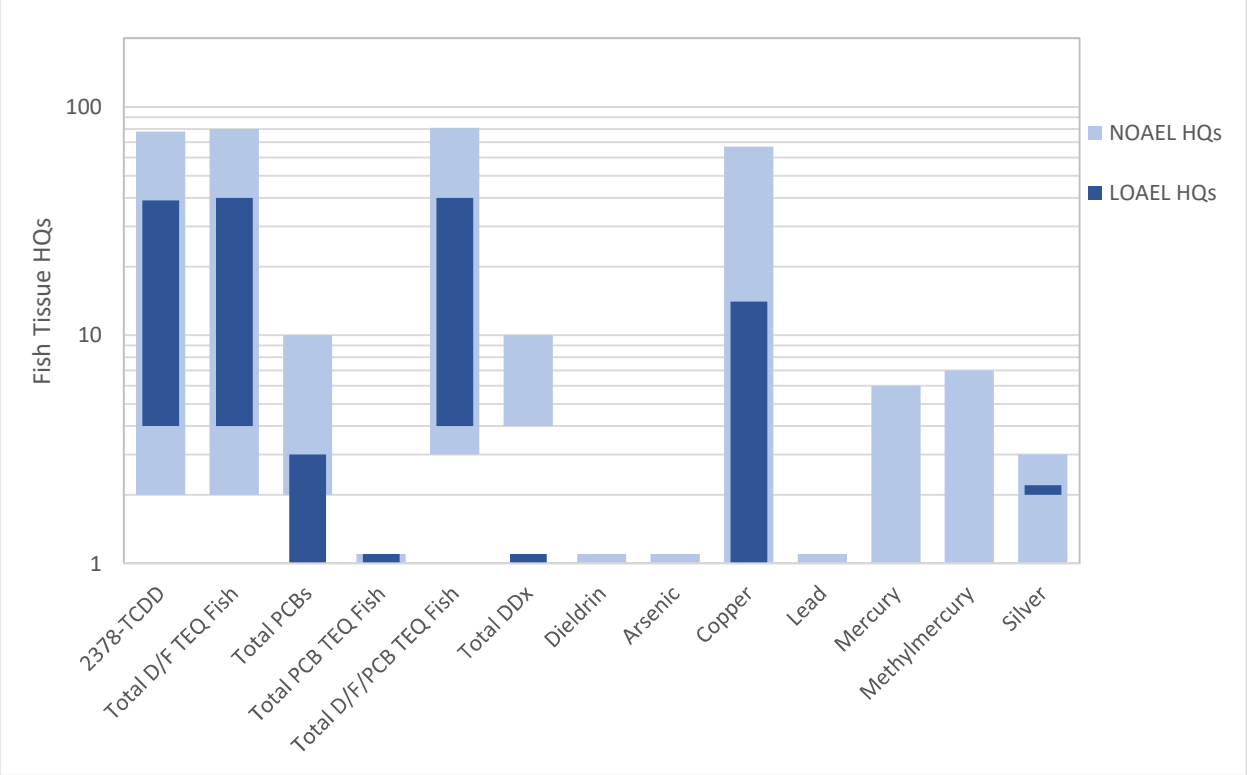
Table 7-8. Summary of TRV Exceedances for Fish Tissue Assessment (cont.)

Preliminary COCs	NBSA and LPR FFS NOAEL and LOAEL-based HQs ≥ 1.0															
	Summer/Winter Flounder								White Perch							
	NBSA-wide		North		SE		SW		NBSA-wide		North		SE		SW	
	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans																
2,3,7,8-TCDD		●	○	●		●		●	○	●	●	●	○	●	○	●
Total Dioxin/Furan TEQ Fish		●	○	●		●		●	○	●	●	●	○	●	○	●
Polychlorinated Biphenyls																
Total PCBs		○	○	●		○		○	○	●	○	●	○	●	○	●
Total PCB TEQ Fish										○		●		○		○
Total Dioxin/Furan/PCB TEQ Fish		●	○	●		●		●	○	●	●	●	○	●	○	●
Pesticides																
Total DDx (2,4 & 4,4)									●	●	○	●	○	●	●	●
Dieldrin										○		○		○		○
Total Chlordane		--		--		--		--		--		--		--		--
Hexachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics																
Arsenic	○	--	○	--	○	--	○	--		--		--		--		--
Chromium		--		--		--		--		--	●	--		--		--
Copper		○		●		○		○	●	●	●	●	●	●	●	●
Lead		○		○		○										
Mercury	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Methylmercury	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Selenium	○	--	○	--	○	--	○	--	○	--	○	--	○	--	●	--
Silver		--		--		--		--	●	--	●	--	●	--	●	--
Zinc		--		--		--		--		--		--		--		--

Notes:
● = indicates LOAEL HQ ≥ 1
○ = indicates NOAEL HQ ≥ 1
- = not evaluated in the LPR FFS; COPECs evaluated that did not have any exceedances are not shown.
*Sediment COPEC concentrations are within background levels and tissue residues are assumed to be related to background conditions as well.
** Tissue residues in mummichog were within the range of Jamaica Bay background residues; all fish tissue copper residues also assumed to be background-related.

The range of HQs for the aggregate whole-body fish tissue samples (i.e., all species) with HQs ≥ 1 are depicted in Figure 7-1. NBSA-wide LOAEL HQs were ≥ 1 for 2,3,7,8-TCDD, total dioxin/furan TEQ, total PCBs, total PCB TEQ, total dioxin/furan/PCB TEQ, total DDx, and some inorganics (primarily copper) for most receptors using the LPR FFS TRVs. NBSA-wide LOAEL HQs were ≥ 1 for total DDx, copper, and silver using the NBSA TRVs for some receptors.

Figure 7-1. Magnitude of NBSA-wide NOAEL and LOAEL HQs ≥ 1 for Fish Tissue Assessment



7.2.3.2 White Perch Liver Tissue

In addition to whole-body tissue, several white perch liver tissue samples were collected to provide additional perspective on the uptake and processing of COPECs. In fish and other vertebrates, the liver functions to filter waste from the blood and serves as the primary site for *in vivo* metabolism and/or excretion of exogenous and endogenous chemicals. The liver is centrally located in the fish circulatory system and lacks a basement membrane, which increases exchange between the blood and hepatic tissue for chemicals present in fish via both dietary and brachial (i.e., via the gills) exposure routes (Di Giulio and Hinton 2008). As a result, concentrations of COPECs are typically higher in liver than in other tissues.

White perch was selected for this evaluation because it is: 1) a species that is known to accumulate higher levels of contaminants than other fish (based on findings from the LPR [see Windward 2019]), and 2) a species for which enough individuals could be collected in the NBSA during a focused sampling period to composite the requisite liver mass to analyze for the full suite of constituents identified in Table 4-2.

Liver tissue EPCs were compared to the range of available TRVs to calculate liver tissue HQs. Consistent with the approach for TRV derivation used in this BERA, lowest available liver tissue LOAEL was compared to the results of the white perch liver samples, and the resulting HQs are presented in Table 7-9. Liver tissue EPCs are based on UCLs, or maximum concentrations if there were fewer than six

detected values. For liver, the North, Southeast, and Southwest Zones EPCs are based on maximum detected concentrations due to the low sample sizes in each zone.

Table 7-9. Calculated White Perch Liver Tissue HQs

Constituent	White Perch Liver (Liver-based TRVs) HQs based on the Minimum Liver TRV			
	NBSA-wide	North	Southeast	Southwest
Dioxins/Furans				
2,3,7,8-TCDD	0.02	0.03	0.02	0.02
Total Dioxin/Furan TEQ Fish	0.02	0.03	0.02	0.02
PCBs				
Total PCBs	0.3	0.4	0.2	0.3
Total PCB TEQ Fish	0.001	0.002	0.0006	0.001
Total Dioxin/Furan/ PCB TEQ Fish	0.02	0.03	0.02	0.02
Pesticides				
Total DDx (2,4 & 4,4)	-	-	-	-
Dieldrin	-	-	-	-
Total Chlordane	-	-	-	-
Inorganics				
Arsenic	**1**	0.1	0.1	**2**
Chromium	**12**	0.4	0.3	**12**
Copper**	**4,312**	**1,175**	**1,190**	**9,286**
Lead	0.1	0.1	0.1	0.2
Mercury	0.08	0.09	0.07	0.08
Methylmercury	0.03	0.04	0.04	0.03
Selenium*	**18**	**6**	**5**	**39**
Silver*	**4**	**1**	**1**	**8**
Zinc	**52**	**23**	**20**	**121**

Notes:
"-" = Not evaluated in the LPR FFS (whole-body TRVs), or not available in the Environmental Residue Effects Database (liver TRVs).
*Sediment COPEC concentrations are within background levels and tissue residues are assumed to be related to background conditions as well.
**Tissue residues in mummichog were within the range of Jamaica Bay background residues; white perch residues are also assumed to be background-related.

When comparing the liver EPC to liver TRVs, HQs for dioxins/furans, total PCBs, lead, mercury, and methylmercury are less than 1. For arsenic, chromium, copper, and selenium, HQs are greater than 1 in the NBSA-wide area and one or more individual assessment zones. The HQs for copper are particularly elevated, but this is due to the wide range (i.e., three orders of magnitude) of reported liver TRVs, and the use of the lowest of the TRVs in this assessment. If the mean of the reported TRVs were applied, the resulting HQs would be above 1, but in the same range as those for whole body tissues.

Liver TRVs were not available from the Environmental Residue Effects Database for any pesticides (total DDx, dieldrin, total chlordane), and only NOAEC liver TRVs are available for lead, silver, and zinc. The HQs were greater than 1 for silver and zinc, but not for lead.

For selenium and silver, sediment concentrations in the NBSA are at or below background concentrations in Jamaica Bay sediments (Table 4-14). Although these metals were measured in white perch liver and other fish tissues, they likely reflect background exposures. In particular, selenium is a critical nutrient in fish. The HQs greater than 1 estimated for selenium and silver for fish are likely a result of uncertainties in the toxicity values for these metals. The selenium and silver NOAEC HQs ≥ 1 are not considered to indicate that adverse effects to fish are occurring. Similarly, while the zinc NOAEC liver HQs are > 1, there is uncertainty associated with both the exposure and effects assumptions. The liver datasets are smaller than for whole body tissue; only the NBSA-wide liver EPC is based on a 95UCL, as the assessment zones had too few samples to calculate this statistic. Additionally, there is a high degree of uncertainty in the interpretation of liver HQs to effects in whole fish and fish populations. Specifically, for zinc, fish actively regulate the uptake and distribution of this essential metal (Bury et al. 2003) and tissue burdens vary widely between species (USEPA 2007b). Although there is uncertainty in the use of tissue HQs for metals, the whole-body TRVs are considered to be less uncertain for estimating risk to individuals and fish populations than liver TRVs. The fact that zinc did not exceed any of its NOAEL or LOAEL HQs in whole-body sample of any fish species evaluated indicates that it does not pose a risk. It is interesting to note that the highest liver HQs calculated for metals consistently occurs in the Southwest Zone. This is consistent with the findings of elevated metals concentrations in sediments and whole-body tissues of invertebrates and some fish from this zone.

7.3 Fish Dietary Assessment

The dietary assessment was conducted for the following species: mummichog/killifish (forage fish), summer/winter flounder (benthic omnivore), white perch (pelagic invertivore), and American eel (pelagic piscivore). The reason for conducting the dietary assessment was to evaluate potential risks from COPECs that may be taken up by fish through their diet, but are physiologically regulated, and do not necessarily bioaccumulate in tissues. This includes PAHs (which are readily metabolized by fish and excreted as metabolites of the parent compounds), and inorganic chemicals. For these COPECs, the bioaccumulation-based tissue assessment (Section 7.2) may not adequately represent exposure-risks. Therefore, a focused dietary assessment was conducted as a secondary LOE for these COPECs to evaluate whether daily doses ingested by fish may pose risk.

This section describes how exposure and effects concentrations were derived, and presents the HQs for the fish dietary assessment. The COPECs evaluated for the fish dietary assessment are limited to PAHs and inorganics (arsenic, cadmium, chromium, copper, lead, mercury/methylmercury, selenium, silver, and zinc).

7.3.1 Exposure

This section presents the methods for calculating exposure doses, including descriptions of the selection of parameters for the dose equation, composition of prey in diet, exposure areas, and EPCs in prey.

7.3.1.1 Methods

Dietary doses for fish were estimated based on ingestion of biota (i.e., prey) and the incidental ingestion of sediment. Dietary doses were estimated as milligrams of each COPEC ingested per kilogram of body weight per day using the following equation:

$$ADD_{total} = [(EPC_s * SIR/BW * DF_s) + \Sigma(EPC_k * FIR_k/BW * DF_k)] * SUF \quad \textbf{\textit{Equation 7-1}}$$

where,

ADD_{total} = average daily dose in milligrams per kilogram body weight per day (mg/kg bw/day)

EPC_s = exposure point concentration in sediment (milligrams per kilogram [mg/kg], dry weight [dw])

SIR = ingestion rate for sediment (kg/day, dw)

BW = body weight of organism (kg)

DF_s = dietary fraction of sediment ingested (range 0 to 1)

EPC_k = EPC for the kth food type (mg/kg/ day, wet weight [ww])

FIR_k = ingestion rate for the kth food type ((kg/day, ww)

DF_k = dietary fraction of intake of the kth food type (range 0 to 1)

SUF = site use factor (unitless); proportion of time the selected species spends foraging in the NBSA

7.3.1.2 Body Weights, Ingestion Rates, Prey Composition, Site Use Factors, Exposure Areas

The description of the exposure factors for the various fish receptors is provided in Appendix B. Body weights for each species were based on the average of all body weights for individuals of that particular species collected during the 2014, 2015, and 2016 NBSA fish sampling events. Ingestion rates were obtained from the literature for each representative species being modelled. Body weights and ingestion rates for each receptor are presented in Table 7-10.

The dietary fraction of each component in each species' diet is based on information obtained from the literature (reviewed in Appendix B) and are presented in Table 7-10. Prey ingested by fish species were limited to whole-body samples only from prey types for which empirical tissue chemistry data from the NBSA were available. Fish were separated by length into two groups: fish ≤ 15 cm and fish ≤ 30 cm.

Several studies conducted in varied habitats have found that the mummichog diet consists of detritus, algae, small crustaceans (i.e., amphipods, tanaids, copepods, and ostracods), insects (adult and larvae), and polychaetes (Abraham 1985). Polychaete worm tissue data from the bioaccumulation study were used to represent the benthic prey portion in the mummichog diet (i.e., 100% of the mummichog diet was based on worm tissue).

Adult summer and winter flounder feed mostly on fish and crustaceans as well as squid, polychaetes, and shrimp (Packer et al. 1999). Their diet is related to size: the larger the individual, the greater the size of

the food item to be consumed. A diet of 25% polychaete worms, 25% blue crabs, 25% softshell clam, and 25% fish (≤ 30 cm) was used to represent the prey consumed by flounder evaluated in the NBSA.

White perch are invertivorous benthic-feeding fish; common dietary components include amphipods, shrimp, copepods, and fish, based on regional studies for the Hudson and Hackensack Rivers (Bath and O'Connor 1985; Weis 2005). Blue crab (a surrogate for shrimp) and small fish (< 15 cm) were assumed to each make up 20% of the diet. Softshell clam (a surrogate for copepods and amphipods) were assumed to make up 20% of the diet. NBSA polychaete worms were used to represent the remaining portion (40%) of the white perch diet (a surrogate for amphipods and unidentified material).

American eel are opportunistic carnivores and have a diverse diet that includes benthic invertebrates (e.g., insects, crayfish, snails, worms), gastropods, and fish (Atlantic States Marine Fisheries Commission [ASMFC] 2000). As eel grow, a clear shift occurs in the percent composition of prey in their diet; larger eel have a diet of mainly fish and crustaceans, while smaller eel mainly prey on insects (ASMFC 2000). Small eel (< 50 cm) were assumed to consume approximately 40% worms (surrogate for insect species), 20% blue crabs (surrogate for crustaceans), 20% softshell clams (surrogate for gastropods), and 20% fish (≤ 15 cm). Larger eel (≥ 50 cm) were assumed to consume approximately 20% worms (surrogate for insect species), 20% blue crab (surrogate for crustaceans), 20% softshell clam (surrogate for gastropods), and 40% fish (≤ 30 cm).

While fish, blue crab, and softshell clam data were field collected, the worm tissue data were based on the laboratory bioaccumulation study in which worms were exposed to homogenized sediment collected from the 0 to 15-cm depth horizon.

The SUFs for the representative fish receptors are provided in Table 7-10. Mummichog are considered resident in Newark Bay. American eel spawning occurs in the Sargasso Sea and then juvenile eels migrate into coastal waters with some moving into freshwater streams, but some remaining in coastal estuaries and bays until maturity (ASMFC 2000, 2009). Sampling data indicate American eel are present in the NBSA year-round. Other species are migratory and only use the site for a portion of each year. Summer flounder are found in bays and estuaries from late spring to early autumn, when they migrate offshore to the outer continental shelf; winter flounder undertake small-scale migrations into estuaries and embayments in winter to spawn, then move to deeper water during summer (Grimes et al. 1989). White perch are primarily found in low salinity waters upstream of Newark Bay, but are common in Newark Bay in winter and when freshwater runoff produces low salinity conditions (USACE 1997).

The exposure areas assessed for the receptor fish species are provided in Table 3-3. Mummichog risk from prey consumption was evaluated NBSA-wide and by assessment zone (North, Southeast, Southwest Zones) and risk from incidental sediment ingestion was evaluated using sediment samples from NBSA-wide mudflats and mudflats within assessment zones. Risk (from prey and incidental sediment ingestion) to summer/winter flounder, white perch, and American eel were evaluated NBSA-wide and by assessment zone. All of the fish receptor species included polychaete worm as a portion of their diet; however, polychaete worm sample size was not large enough to be evaluated by assessment zone. Therefore, risk from ingestion of polychaete worms were assessed NBSA-wide in the risk calculations for fish. See Table 4-10 and Figure 4-4 for sediment samples assigned to each assessment zone and mudflats, and Table 4-11 for tissue samples assigned to each assessment zone.

7.3.1.3 Exposure Point Concentrations

EPCs were calculated for each of the two modeled media types (prey and sediment) to calculate dietary doses using Equation 7-1. For prey concentrations, EPCs were calculated separately for each of the prey types for each species (worms, blue crab, softshell clam, fish ≤ 15 cm, and fish ≤ 30 cm) as the UCL for each prey group. The EPCs for prey were calculated NBSA-wide and by assessment zone (except polychaete worm, where EPCs were calculated NBSA-wide only due to limited sample size). For sediment, the EPCs were equal to the UCLs using data from the relevant exposure areas for each fish species. UCL concentrations were calculated using USEPA's ProUCL® statistical package (Version 5.1) (USEPA 2015b).[6] For each dataset with fewer than six detected samples or fewer than six total samples, a UCL was not calculated; instead, the maximum detected concentration was used as the EPC. If no samples were detected, then the maximum non-detect value was used as the EPC. The tissue data used in the fish dietary assessment are summarized in Tables 4-7d through 4-7k The EPCs for the fish dietary assessment are presented in Appendix C.

7.3.1.4 Estimated Doses

Dietary doses were calculated based on Equation 7-1 using the prey and sediment ingestion rates and species body weights and prey composition from Table 7-10. The EPCs are presented in Appendix C.

7.3.2 Effects

Dietary fish TRVs for the COPECs identified in Table 3-5 are provided in Table 7-11, and discussed in detail in Appendix D. The selected TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019) and are consistent with the Final LPRSA BERA TRVs for COPECs common to both areas (NBSA and LPRSA). For the LPRSA BERA Windward (2019) conducted a literature search for relevant toxicological studies, and derived acceptable NOAELs and LOAELs. The lowest acceptable LOAEL and highest NOAEL below the LOAEL from the same study was chosen. Several COPECs were not evaluated in the LPRSA BERA fish dietary risk assessment including arsenic, lead, and silver. TRVs for arsenic and silver were available in the LPRSA BERA TRV database (Windward 2019). A lead TRV based on Mount et al. (1994) was selected. No fish dietary TRVs were derived for the USEPA LPR FFS. The selected NBSA TRVs for these additional COPECs are further discussed in Appendix D.

7.3.3 Risk Characterization

This section presents the comparison of fish dietary doses to NBSA-selected TRVs to calculate HQs for each COPEC and species. Fish NOAEL and LOAEL HQs based on dietary doses for mummichog/killifish, American eel, summer/winter flounder, and white perch are presented in Table 7-12a (NBSA-wide), Table 7-12b (North Zone), Table 7-12c (Southeast Zone), and Table 7-12d (Southwest Zone). The HQs are based on UCLs, or maximum concentrations if there were fewer than six detected values. Appendix E provides dietary doses, TRVs, and calculated HQs for the fish dietary COPECs. A summary of COPECs that exceed their dietary TRVs (i.e., HQs that equal or exceed 1) in fish is provided in Table 7-13.

[6] The UCL recommended by USEPA's ProUCL® software (typically the 95% UCL, but in some cases the 97.5% or even the 99% UCL) was used. The selected UCL statistic is presented in Appendix C-1.

Table 7-13. Summary of TRV Exceedances for Fish Dietary Assessment

Preliminary COCs	NBSA NOAEL and LOAEL-based HQs ≥ 1.0											
	Mummichog				American Eel <50 cm				American Eel ≥50 cm			
	NBSA-wide	North	SE	SW	NBSA-wide	North	SE	SW	NBSA-wide	North	SE	SW
	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA
Inorganics												
Cadmium	●	●	●	●	●	●	●	●	●	●	●	●
Copper								○				○
Mercury	○	○	○	●	●	●	●	●	●	●	●	●
Methylmercury	○	○	○	○	○	○	●	○	●	●	●	●
Selenium	○	○	○	○	○	○	○	○	○	○	○	○

Preliminary COCs	NBSA NOAEL and LOAEL-based HQs ≥ 1.0							
	Summer/Winter Flounder				White Perch			
	NBSA-wide	North	SE	SW	NBSA-wide	North	SE	SW
	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA	NBSA
Inorganics								
Cadmium	●	○	●	●	●	●	●	●
Copper				○				
Mercury	●	●	○	●	○	●	○	○
Methylmercury	○	○	○	○	○	○	○	○
Selenium	○	○	○	○	○	○	○	○

Notes:
● = indicates LOAEL HQ ≥ 1
○ = indicates NOAEL HQ ≥ 1
Fish dietary HQs not evaluated in the LPR FFS. LOAEL is not available for chromium, lead, and silver; therefore, results are presented based on the NOAEL. COPECs evaluated that did not have any exceedances are not shown.

Dietary LOAELs ≥ 1 for cadmium were found NBSA-wide and in various zones for all fish species and for mercury and methylmercury for some of the species (primarily American eel < 50 cm and ≥ 50 cm) NBSA-wide and in several of the assessment zones. The remaining metals (i.e., arsenic, chromium, copper, lead, nickel, selenium, silver, zinc) and total PAHs all have LOAEL HQs less than 1 for all receptors evaluated.

7.4 Fish Egg Tissue Assessment

Potential risks to fish eggs from maternal dietary exposure were evaluated for mummichog and killifish (i.e., combined *Fundulus* sp.), the only resident fish species in the Bay. In this assessment, fish egg tissue chemical concentrations were estimated using chemical-specific egg-to-adult conversion factors (CFs) from the literature. Consistent with the evaluation conducted in the LPRSA BERA, the NBSA fish egg risk assessment was limited to the resident *Fundulus* sp. for a select group of bioaccumulative

compounds that are known to pose potential reproductive risks in fish, including dioxins/furans, PCBs, associated TEQs, and mercury/methylmercury.

7.4.1 Exposure

Fish egg tissue chemical concentrations for *Fundulus* sp. were estimated using egg to adult CFs. The following sections describe CFs for total PCBs, TEQs, and methylmercury/mercury, and present the modeled concentrations based on the CFs.

7.4.1.1 CFs for Total PCBs, Dioxin/Furan TEQ, and Dioxin/Furan/PCB TEQs

For organic fish egg COPECs (i.e., total PCBs, dioxin/furan TEQ, PCB dioxin/furan TEQ), CFs were calculated using lipid-normalized concentrations based on data reported by Niimi (1983) and Russell et al. (1999) using the following equation:

$$CF = (C_{egg,lipid})/(C_{adult,lipid})$$ ***Equation 7-2***

where:

CF = adult-to-egg conversion factor

$C_{egg,lipid}$ = lipid-normalized chemical concentration in egg tissue

$C_{adult,lipid}$ = lipid-normalized chemical concentration in adult whole-body tissue

Based on the data reported in Niimi (1983), the following equation was derived to predict egg tissue concentrations from adult concentrations on a lipid-normalized basis for total PCBs, dioxin/furan TEQ, and PCB dioxin/furan TEQ:

$$EPC_{egg,lipid} = 0.6213 \times EPC_{adult,lipid}$$ ***Equation 7-3***

where,

$EPC_{egg,lipid}$ = exposure point concentration in egg tissue (mg/kg-lipid dw)

$EPC_{adult,lipid}$ = exposure point concentration in adult whole-body tissue (mg/kg-lipid dw)

Based on the data reported in Russell et al. (1999), a CF of 1 was also evaluated. The following equation was derived to predict egg tissue concentrations from adult concentrations on a lipid-normalized basis for total PCBs, dioxin/furan TEQ, and PCB dioxin/furan TEQ:

$$EPC_{egg,lipid} = EPC_{adult,lipid}$$ ***Equation 7-4***

where,

$EPC_{egg,lipid}$ = exposure point concentration in egg tissue (mg/kg-lipid dw)

$EPC_{adult,lipid}$ = exposure point concentration in adult whole-body tissue (mg/kg-lipid dw)

The UCL lipid value in LPRSA mummichog eggs (3.3%; Windward 2019) was used to convert lipid-normalized egg concentrations to wet weight egg concentrations for comparison to fish egg TRVs.

7.4.1.2 CFs for Methylmercury

For methylmercury/mercury, a robust regression model could not be developed based on the data presented in Niimi (1983). Thus, there is high uncertainty in predicting egg tissue concentrations from whole-body tissue concentrations. Mercury wet weight egg to adult CFs from Niimi (1983) ranged from 0.039 to 0.101. The maximum CF of 0.101 was used in the following equation to predict egg tissue concentrations from adult concentrations for methylmercury:

$$C_{egg,ww} = 0.101 \times C_{adult,ww}$$ ***Equation 7-5***

where,

$C_{egg,ww}$ = chemical concentration in egg tissue (mg/kg-lipid dw)

$C_{adult,ww}$ = chemical concentration in adult whole-body tissue (mg/kg-lipid dw)

A CF of 1 was also evaluated for methylmercury, similar to the evaluation for total PCBs, Dioxin/Furan TEQ, and Dioxin/Furan/PCB TEQs.

7.4.1.3 Modeled Egg Concentration

The modeled concentrations in mummichog eggs were estimated using *Fundulus* sp. (combined adult mummichog and striped killifish) whole-body tissue UCL concentrations[7] and are presented in Appendix C. UCLs for *Fundulus* sp. tissue EPCs were calculated using USEPA's ProUCL® statistical package (Version 5.1) (USEPA 2015b).[8] Fish egg EPC calculations are detailed in Appendix C.

7.4.2 Effects

Fish egg TRVs for the COPECs identified in Table 3-5 are provided in Table 7-14 and discussed in detail in Appendix D. Fish egg TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019). In addition, fish egg TRVs from the LPR FFS (USEPA 2014) were also included for comparison with the NBSA-selected TRVs.

7.4.3 Risk Characterization

This section presents the comparison of fish egg EPCs to TRVs to calculate HQs for all COPECs. HQs based on modeled fish egg concentrations and fish egg TRVs presented in Table 7-14 were calculated for the fish egg COPECs and are presented in Table 7-15. Appendix C provides EPCs for the fish egg tissue COPECs. A summary of COPECs that exceed their TRVs (i.e., HQs that equal or exceed 1) is provided in Table 7-16. Fish egg concentration estimates exceeded LOAEL TRVs for Total PCBs using both conversion factors (CF = 0.6213 and CF=1) and methylmercury using CF=1 for both NBSA and LPR FFS TRVs.

[7] Fillet and organ-specific samples were not available and not included in UCL calculations.
[8] The UCL recommended by USEPA's ProUCL® software (typically the 95% UCL, but in some cases the 97.5% or even the 99% UCL) was used. The selected UCL statistic is presented in Appendix C-15.

Table 7-16. Summary of TRV Exceedances for Fish Egg Assessment

Constituent	Fish Egg Tissue - HQs (NBSA-Wide)			
	Combined Mummichog Killifish			
	CF = 0.6213 (PCBs/Dioxins); CF = 0.101 (Methylmercury)		CF = 1 (all constituents)	
	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans				
2,3,7,8-TCDD	○	○	○	○
Total Dioxin/Furan TEQ Fish	○	○	○	○
Polychlorinated Biphenyls				
Total PCBs	●	●	●	●
Total PCB TEQ Fish				
Total Dioxin/Furan/PCB TEQ Fish	○	○	○	○
Inorganics				
Mercury			○	○
Methylmercury	○	○	●	●

Notes: ● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1. **-** = Not calculated

7.5 Fish Pathology Findings/Observations

Fish pathology evaluations were conducted on fish collected in the 2014 and 2015 fish sampling program. Fish were collected from various locations along the intertidal mudflats, subtidal flats, transitional slopes, and navigational channel throughout each of the three geographic areas (north, central, south) in the NBSA. Fish were collected from each of the different geographic areas to provide spatial coverage across the entire NBSA.

The pathology examinations were conducted in accordance with standard operating protocols developed by Dr. Jeffrey Wolf, DVM, ACVP, a board-certified veterinary senior pathologist with Experimental Pathology Laboratories, Inc. (EPL) in Sterling, VA. In accordance with the Fish QAPP (Tierra 2014b), the first five fish obtained for each species (unless they were kept for chemical analysis) and 20 fish of two species (scup and summer flounder) were examined. In some cases, five fish of one species were not collected while the pathologist was on site, so a lower number were examined. For the forage fish, a subset of individual fish was externally examined. In addition, a representative sample of individual non-forage fish (up to at least 20 individuals for each of two different species) were subjected to internal pathological examination. Examinations took place within hours of capture.

External examinations included the general body condition (body form), body surfaces, lips and jaws, snout, barbels (where present), operculum (opercle), isthmus, eyes, fins, gills, pseudobranch, branchial cavity, and urogenital opening. Any gross physical abnormalities, lesions, or anomalies were documented. The internal examination included overall morphology, gonad condition, presence of lesions, gonadosomatic index, and internal physical conditions/abnormalities. The fish pathology reports are provided as Attachment 5 to this BERA, and a summary of the pathology findings from this investigation are presented in Table 7-17.

In a 5-day consecutive period (October 6 through 10, 2014) during the fall 2014 fish sampling event, a total of 122 fish representing 26 distinct species were necropsied. Gross external and internal examinations revealed abnormal findings in 11 of 122 (9%) fish. Most findings were of mild severity and likely of minimal pathological significance. In five of 11 cases, findings consisted of external or internal parasite infections. Other findings included fin or skin erosions (N=3), pale nodular areas in the heart (N=2), and an enlarged and discolored ovary (N=1).

On July 27, 2015, an additional 23 fish representing five distinct species were necropsied. Gross external and internal examinations revealed abnormal findings in 1 of 23 fish. One dermal ulcer was found on an Atlantic tomcod. The results from this effort show that there was a very low incidence of minor pathological significance.

Overall, abnormal findings were observed in 12 of the 145 fish (8%) collected and necropsied during the two sampling events. According to Dr. Wolf, the fish pathology investigation showed “only low percentage [of] incidences of relatively minor pathologies across this spectrum of [representative] species” that occur in the NBSA (forage, predatory, benthic, demersal, and pelagic species; resident and migratory species; and adult and juvenile fish) (EPL 2016a).

The fish pathology results do not suggest any health impairments in the fish populations utilizing the NBSA. Although gross health examinations have limited ability to assess potential sublethal (i.e., growth and reproductive) effects, and cannot identify potential risk associated with specific COPECs in environmental media, the external and internal examinations provide an important line of evidence that speaks to the overall general good health of the fish.

7.6 Uncertainties Assessment

The following is an uncertainties assessment for the fish risk assessment. Both quantitative and qualitative characterizations are provided for the tissue, dietary, and egg assessments presented in Sections 7.2, 7.3, and 7.4, respectively. The objective of the uncertainty assessment is to provide perspective on the likely accuracy of the overall risk conclusions that are presented in Section 7.7.

For the fish risk assessment, sources of uncertainty that influenced fish risk characterization included uncertainties in the analytical results, data evaluation, CSM, exposure assessment, effects assessment, and interpretation of the risk estimates. Many of these sources of uncertainty are generic in nature and inherent in the risk assessment process, and particularly with reliance on literature-based TRVs and the computation of HQs to make conclusions on population-level risks.

Inherent practices in risk assessment result in exposure estimates that are biased high in order to be reasonably conservative include:

- The use of an upper exposure value (i.e., 95% UCL) to calculate dietary exposure concentrations
- The use of a maximum values in the place of a UCL when limited data are available
- The assumption that a fish species feeds exclusively or is getting all of its seasonal and lifetime exposure to COPECs, from the NBSA (i.e., SUF = 1).

For dietary models and HQs, the assumption that COPECs measured in sediment and/or biota using strong chemical extractants are 100% bioaccessible via dietary uptake (dermal absorption via the gut).

This uncertainty is due to the relative bioaccessibility of laboratory feed versus natural diets. When compared to TRVs based on laboratory toxicity tests conducted with recently spiked sediment, exposure doses estimated assuming 100% bioaccessibility are likely to overestimate potential for risk.

As a result, risk estimates are expected to be overestimated rather than underestimated in this BERA, especially with respect to the dietary HQs. Many of these conservative assumptions (e.g., SUF =1, 100% bioaccessibility) are not necessary when HQs are based on directly measured tissue concentrations. While the use of tissue HQs reduces uncertainty in the exposure estimates, there is typically a limited toxicity dataset available with which to derive TRVs. Therefore, uncertainty in the HQs can be biased in either direction (high or low), based on the strength of the dataset used to derive the TRVs.

For risk estimates based on tissue, dietary, and egg HQs, TRVs are a key source of uncertainty in the risk estimates and are discussed below or in Appendix D, as relevant. Additional sources of uncertainty were identified and evaluated either quantitatively or qualitatively. Table 7-18 summarizes the quantitative uncertainty evaluations conducted for fish for the tissue, dietary, and egg assessments and their associated effect on risk estimates. Risk calculations and HQs based on the quantitative uncertainty evaluations are presented in Appendix F and discussed in the following sections. Qualitative evaluations were also conducted and are presented below in their respective sections.

Table 7-18. Summary of Quantitative Fish Uncertainty Evaluations

Species	General Uncertainty Evaluated	Specific Evaluation Conducted	Difference in HQ Values	Effect on Risk Conclusions[a]
Fish Tissue Assessment				
All	Treatment of NDs as zero for EPC calculation	EPCs recalculated using half or full DL	HQs[b] increase (<0.2)	No change
Fish Dietary Assessment				
Summer/winter flounder; White perch	SUF of 0.67	HQs recalculated using SUF of 1	HQs increase (33%)	Flounder: LOAEL HQs based on NBSA TRVs increased to ≥ 1 for methylmercury in North and Southeast Zones, cadmium in North Zone, mercury in Southeast Zone; Perch: LOAEL HQs based on NBSA TRVs increased to ≥ 1 for mercury in NBSA-wide, Southeast, Southwest Zones.
All	Treatment of NDs as zero for EPC calculation	EPCs recalculated using half or full DL	HQs[b] increase (<0.01)	No change
American eel (≥ 50 cm); Summer/winter flounder	Fish prey size of < 30 cm assumed	EPCs recalculated using all prey fish	No change	No change
Fish Egg Assessment				
All	Treatment of NDs as zero for EPC calculation	EPCs recalculated using half or full DL	No change (100% FOD)	No change

Notes:
a. Based on LOAEL HQs ≥ 1.
b. NBSA-wide only results presented in this table. Differences for assessment zones are discussed in the text. All results of the sensitivity analyses are provided in Appendix F.

Additionally, relatively large exposure areas were evaluated in this BERA, including the NBSA-wide area and individual assessment zones. While these areas are appropriate for risk assessment, especially for population-level assessment of mobile fish communities, evaluation of smaller features, such as individual wetlands or mudflats, may be required in the FS. The uncertainty associated with applying the results of the NBSA-wide and assessment zone conclusions to localized areas within the NBSA is considered to be low for highly mobile receptors, and somewhat higher for species with a small relative foraging area, such as mummichog and killifish. For mummichog and killifish, this uncertainty was reduced by evaluating mudflat areas instead of the larger assessment zones in the mummichog dietary assessment, which assumed incidental ingestion of mudflat sediment and ingestion of worm tissue estimated using bioaccumulation testing data collected from mudflat locations.

Another overarching uncertainty for the fish risk assessment is the fact that a formal risk analysis was not conducted for the regularly dredged deep water channels in the NBSA. This was a decision made during the planning of the BERA process due to the changing conditions in these areas from regular navigational dredging activities performed by the USACE, which regularly removes sediments from these channels. Ten composite sediment samples were collected in the regularly dredged deep water channels. Summary statistics for these samples are presented in Table 4-12. Mean and UCL concentrations for most of the COPECs including 2,3,7,8-TCDD, total PCBs, PAHs, some pesticides, and most metals are generally lower in the channel sediments than those in the other ecological risk assessment zones. Exceptions include total DDx, chlordane, mercury/methylmercury, silver, and zinc for which the average and UCL concentrations are within the range of the other zones. Given that the concentrations of COPECs in the channels are below or within the range of those found in the other zones, the potential for risks to fish receptors that may be exposed in the channels are bounded by the risk estimates for the other zones presented in this BERA.

7.6.1 Fish Community Risk Characterization Uncertainties

As described in Section 7.1.1, the ABS conducted by USACE (2015) generated a robust fish dataset, including survey data collected over eight years for demersal finfish and icthyoplankton (juveniles, larvae, and fish eggs), to evaluate the seasonal distribution and abundance of the fish community in the NY/NJ Harbor Estuary, including the NBSA.

The ABS studies were not designed to evaluate the potential effects of contamination in the NBSA on fish communities. Without comparative long-term data for an appropriate reference estuary or defined statistical power, it is not possible to determine from these historical datasets whether or not COPECs in the Bay are impacting the NBSA fish community.

These fish community surveys found that fish communities in the NBSA are typical of other mid-Atlantic estuaries, and that generally adult abundance and diversity in the NBSA appear to be similar to or greater than other locations in the NY/NJ Harbor Estuary. The ABS did not focus on intertidal areas, where some fish such as mummichog and killifish are prevalent. Therefore, there is greater uncertainty in applying the conclusion of the ABS to these species that prefer shallow and muddy intertidal habitats.

Differences in icthyoplankton communities among the regions were attributed by USACE (2015) to physical differences such as bottom substrate, water temperature, salinities, and effects of freshwater inputs that can influence the presence of certain species. Uncertainty associated with the ABS

icthyoplankton dataset is greatly reduced relative to the icthyoplankton dataset collected as part of the NBSA investigation, which did not use sampling gear specifically targeted for larvae and eggs. The ABS icthyoplankton dataset provides an independent LOE to help support the conclusions of the fish egg assessment (which has its own associated uncertainties; Section 7.6.3), that adverse effects to early life stages are unlikely in the NBSA. As with any biological community investigation, there is uncertainty in the ability of the population data collected to detect potential effects of stressors to specific species or in localized areas. However, this uncertainty is diminished by the collection of multiple years of data in the same areas, as was the case with the USACE ABS study.

7.6.2 Fish Tissue Risk Characterization Uncertainties

Direct measures of COPECs in samples of fish tissue inherently integrate many factors related to fish COPEC exposure, such as site use and dietary composition, typically resulting in a low degree of uncertainty in the tissue EPCs. By comparison, there is generally greater uncertainty in the tissue effects assumptions and TRVs used to calculated tissue HQs. Toxicity inputs to the tissue HQs, including the use of a dioxin/furan/PCB TEQ methodology and constituent-specific TRV uncertainties, are discussed in Appendix D.

7.6.2.1 Toxicology/TRVs

The most important uncertainty associated with the TRVs for the fish tissue assessment is the large difference between the NBSA and LPR FFS TRVs for dioxins/furans and PCBs. The NBSA TRVs for both COPECs were derived by Windward (2019) as 5th percentiles of the SSDs for multiple (mostly freshwater) species, whereas the LPR FFS TRVs were based on single species studies (mummichog and Atlantic salmon for 2,3,7,8-TCDD and PCBs, respectively). The NBSA LOAEL TRVs for these COPECs are higher than the LOAEL TRVs developed for the LPR FFS (USEPA 2014) by approximately two orders of magnitude for 2,3,7,8-TCDD/TEQ and one order of magnitude for total PCBs. Given the inherent uncertainties in the use of reported critical body residues from the literature as TRVs for population-level risk assessments (i.e., due to their limited availability and the unknown applicability in extrapolating from single studies/limited endpoints to population-level risks), it is appropriate to consider a range of TRVs in risk characterization. This bounding approach was taken in the fish risk assessment (and elsewhere in this BERA) to provide perspectives on potential risks, and to maintain consistency with the LPR FFS and LPRSA BERAs. Discussions regarding the specific derivation of these TRVs are provided in Appendix D.

The use of single study TRVs from the LPR FFS as bounding estimates for fish risk are more uncertain than the LPRSA BERA SSDs not only because they are single studies, but also because the endpoint of behavior (prey capture) alterations was considered relevant in both 2,3,7,8-TCDD/TEQ and PCB TRVs. The extrapolation of behavioral endpoints to potential population effects are highly uncertain. Further, the total PCB TRVs are based on Atlantic salmon, which does not occur in the NBSA. The LPR FFS TRV for 2,3,7,8-TCDD/TEQ is based on a study of mummichog (Couillard et al. 2011), which is a resident species in the NBSA, but is an broad extrapolation of apparent behavioral effects in larvae from a single PCB congener (PCB 126), and estimates of larval doses without any measured tissue concentrations to confirm the larval exposure levels. More importantly, no delayed hatching, growth, malformation, or mortality was found in mummichog in the Couillard et al. (2011) study, even at the highest dose level (50 pg PCB 126 per egg). This study has not been used to derive a 2,3,7,8-TCDD or TEQ TRV for risk

assessment in the past. While these studies have a higher degree of uncertainty than the multispecies SSD-derived TRVs, they are utilized for bounding purposes in the fish tissue assessment.

For metals, whole-body tissue concentrations of total metals (other than organometals [i.e., methylmercury, organo-selenium]) are poor predictors of adverse effects for the following reasons: 1) toxicity varies based on the specific metal species present, 2) fish can store excess metals in non-toxic compartments, and 3) toxicity is strongly dependent on the uptake and physiological processing rate and exposure pathway. The use of a tissue residue approach for most metals (except for methylmercury and selenium) is highly uncertain because of the wide range of strategies used by organisms to store, detoxify, and excrete bioaccumulated metals (e.g., fish and invertebrates may regulate their body burdens of some metals, although metals regulation, and the strategy thereof, is species and metal specific) (Adams et al. 2011; USEPA 2007b). For these reasons, USEPA risk assessment guidance for regulated metals and recent expert guidance conclude that comparison of whole-body metals tissue concentrations to literature-reported whole-body effects thresholds is not sufficiently robust for drawing risk conclusions (Adams et al. 2011; USEPA 2007b). For all inorganic COPECs, fish dietary TRVs were used to provide another perspective on the potential for fish toxicity. TRVs for seven of the ten inorganic COPECs were sourced from the LPRSA BERA (Windward 2019), and for the other three (arsenic, lead, and silver) they were developed specifically for the NBSA and based on single studies. However, they still relate back to the LPRSA BERA, as they were studies that were reviewed/evaluated in that report (Windward 2019, Appendix A3-1). Further details on key uncertainties for individual metals are presented in Appendix D.

7.6.2.2 Treatment of Non-Detects

The concentrations of summed components (e.g., PCB congeners) that were not detected were assumed to be zero when calculating totals. This assumption may underestimate summed component concentrations if the individual constituents are actually present at concentrations close to the quantitation limit. Therefore, the effect on HQs of using one-half the quantitation limit or the full quantitation limit was evaluated quantitatively. As noted in Table 7-18, there were no changes from LOAEL HQ < 1 to HQ ≥ 1 in the fish tissue HQs, regardless of how non-detected values in sums were treated (either as zero, one-half the quantitation limit, or the full quantitation limit). Summary tables of HQ results from this sensitivity analysis on the treatment of non-detects, both NBSA-wide and by assessment zones, are presented in Appendix F. The overall effect of using a zero concentration for non-detected constituents when calculating a summed total (e.g., total PCBs, dioxin/furan TEQ, PCB TEQ, PCB/dioxin/furan TEQ) on the HQs is minimal and does not impact risk conclusions for fish.

7.6.3 Fish Dietary Risk Characterization Uncertainties

While dietary exposure modeling has been a well-established practice for wildlife (avian and mammalian) risk assessments (USEPA 1993; Sample et al. 1997) and oral doses are the principal means of contaminant exposure, dietary exposure modeling has not been widely used for evaluating fish risk (USEPA 2007b; Luoma and Rainbow 2005). It is only included in this BERA to evaluate the potential for risks from metals and PAHs that may not have been adequately captured in the fish tissue assessment. There is substantial uncertainty in both the exposure and effects assumptions used to estimate fish dietary HQs. These uncertainties are discussed below.

7.6.3.1 Toxicology/TRVs

Fish dietary TRVs are a fundamental source of uncertainty because most toxicity studies do not report daily doses. Instead, they report adverse effects based on the concentrations in food which then need to be converted to a daily dose with the use of additional variables: body weight (kilograms), ingestion rate (kilograms per day), and food moisture content (percent). Studies typically do not report these variables. In those studies that did report ingestion rate, 2% of the body weight was the most common ingestion rate and this value was used to estimate a daily dose when not reported in laboratory toxicity studies. Moisture content in food was estimated to be 80%, where not reported. Another uncertainty is that food provided in laboratory studies typically contains highly bioavailable forms of the contaminant being tested, which then may partition to the water column. In natural environments, contaminants are in equilibrium and total concentrations in prey, water, and sediment contain both bioavailable and inert fractions of contaminants. Not understanding the degree of contaminant partitioning, bioavailability, and ingestion rates makes this modeling highly uncertain, and it is unclear whether the overall effect is to over- or underestimate fish daily intakes of COPECs.

Metals dietary toxicology is uncertain and has been questioned as a means to quantify dietary risk, specifically with regard to the high variability in uptake and toxicity of inorganic metals in fish. The USEPA has recommended that this dietary approach for fish be used “only for conservatively screening for exposure and potential risks to consumers (i.e., in cases where whole-body residues in prey are below dietary toxic thresholds)” (USEPA 2007b). For more definitive assessments, USEPA suggests that further research is needed to quantify the bioavailability and effects of inorganic dietary metals (USEPA 2007b). A key uncertainty regarding dietary metals is that fish actively regulate the uptake and distribution of essential metals (e.g., copper and zinc) necessary for normal metabolic function and non-essential metals may also be regulated by these systems because they mimic essential elements (Bury et al. 2003). More recent interest and advances in quantifying dietary trophic transfer of metals in marine systems has been developed by Wang (2002), with a kinetic model, and Luoma and Rainbow (2005) with a biodynamic model. Both models require understanding of variables that may not easily be known (e.g., assimilation efficiency, metal efflux rate). Both Wang (2002) and USEPA (2007b) note a challenge with metals bioaccumulation/bioconcentration estimation because there are orders of magnitude variation within and between species. Metal concentrations in animals are probably not related to the trophic level in the food web (Wang 2002).

Unlike metals where uptake and toxicity occur through specific mechanisms, PAH uptake in fish occurs through non-specific means with general narcosis, a reversible nervous system impairment, being a noted toxicological effect (Di Toro et al. 2000). Other studies point to more specific mechanistic activity, such as binding to the aryl hydrocarbon receptor (AhR) and CYP1A induction, that can be associated with sublethal effects in early life stages. CYP1A induction is the activation of a detoxification system in fish that allows them to metabolize and eliminate PAHs (Eisler 1987), thus, tissue PAH concentrations may be less correlated to adverse effects. Additionally, recent studies have indicated that mechanisms other than narcosis and AhR-mediated toxicity are potentially responsible for PAH toxicity in early life stages of fish. Barron et al. (2004) found that an alkyl phenanthrene toxicity model, rather than narcosis or AhR agonism, best predicted toxicity in early life stages of Pacific herring and pink salmon. Some evidence suggests that alkyl-phenanthrene metabolites are more toxic than the parent compound due to the presence of benzylic alcohols. Incardona et al. (2005) found that toxicity of LMW tricyclic PAHs on cardiovascular function and morphogenesis in zebra fish embryos was independent of AhR. As alkylated

PAHs are the predominant form of PAHs in oil, evaluation of only non-alkylated PAHs, as was done in this BERA, may underestimate exposure and risk associated with PAHs in the NBSA. The magnitude of this uncertainty is unknown. However, the calculated HQs for total PAHs are orders of magnitude below 1 and additional LOEs evaluated in this BERA, including fish pathology and community surveys, are consistent with the HQs. Although potential for toxicity associated with akylated PAHs was not included in this BERA, based on consideration of other factors discussed above, risk conclusions for fish and PAHs in the NBSA are not expected to change.

7.6.3.2 Quantitative Exposure Uncertainty Assessment

Several uncertainties were quantitatively evaluated to assess potential impact on the risk characterization. These uncertainties are presented below and summarized in Table 7-18.

7.6.3.2.1 Site Use Factor

Based on data from fish surveys in the NBSA and the literature, summer/winter flounder and white perch receptors SUF were assumed to be 0.67 in this BERA (all other fish diet receptors species had SUFs = 1). A SUF of 1 was conservatively evaluated in this sensitivity analysis. Summary tables of HQ results from this sensitivity analysis on the effect of SUF values are presented in Appendix F. When the dietary food web models were analyzed using a SUF = 1, rather than 0.67 for summer/winter flounder, the cadmium and methylmercury North and Southeast Zones LOAEL HQs based on NBSA TRVs changed from < 1 to ≥ 1.When the dietary food web models were analyzed using a SUF = 1 rather than 0.67 for white perch, the NBSA-wide, Southeast, and Southwest Zones mercury LOAEL HQs based on NBSA TRVs changed from < 1 to ≥ 1.

7.6.3.2.2 Treatment of Non-Detects

For calculation of EPCs, the concentrations of summed components (e.g., total PAH) that were not detected were assumed to be zero when calculating totals. The effect on HQs of using one-half the quantitation limit or the full quantitation limit was evaluated. There were no changes from LOAEL HQ < 1 to HQ ≥ 1 for NBSA-wide or assessment zone HQs regardless of how non-detected values in sums were treated (either as zero, one-half the quantitation limit, or the full quantitation limit). Summary tables of HQ results from this sensitivity analysis on the treatment of non-detects are presented in Appendix F. The overall effect of using a zero concentration for non-detected constituents when calculating a summed total on the HQs is minimal and does not impact risk conclusions for fish.

7.6.3.2.3 *Fish Prey Sizes*

Based on data from the literature, only prey fish < 30 cm were included in the fish dietary components for summer/winter flounder (30% of diet included prey fish < 30 cm) and American eel ≥ 50 cm (40% of diet included prey fish < 30 cm). This diet excluded several larger fish samples, which may contain higher concentrations of some bioaccumulative COPECs. Summer/winter flounder and American eel ≥ 50 cm dietary food web models were analyzed using all fish samples to assess this uncertainty. There were no changes to fish dietary LOAEL HQs when all fish samples were incorporated into the dietary assessment. The calculated EPCs for fish of all lengths used and the summary tables of HQ results from this sensitivity analysis on the effect of including fish of all lengths in the fish dietary risk evaluation are found in

Appendix F. The overall effect of using only prey fish < 30 cm on the HQs is minimal and does not impact risk conclusions for fish.

7.6.3.3 Other Uncertainties

The following additional uncertainties associated with the dietary assessment were identified but not quantitatively evaluated:

- Modeled diet – Dietary items were limited to prey species with tissue chemistry data available from the NBSA, including bioaccumulation worm, blue crab, softshell clam, and fish tissue, and did not include other prey items that may be important components of fish diets, such as amphipods, copepods, algae, zooplankton, squid, shrimp, or detritus. These unsampled prey types often have lower tissue concentrations of many COPECs in relation to sampled prey types (crabs, bivalves, and fish) that feed higher on the food change and/or effectively sequester some COPECs (i.e., some metals). The exclusion of these various unsampled prey types likely results in overestimation of exposure and risk for predator fish in this BERA. In addition to the limited types of prey used in the fish dietary model, the selection of explicit prey portions did not reflect the largely opportunistic feeding behavior of most fish species. Therefore, the representativeness of the estimated dietary compositions (based on available prey tissue data) for actual NBSA fish diets is uncertain.
- Food ingestion rate – Food ingestion rates for all fish were estimated as a function of body weight and water temperature using an equation from Arnot and Gobas (2004). It is unknown whether the modeled food ingestion rates reflect actual ingestion rates of NBSA fish or whether higher or lower ingestion rates could substantially impact risk estimates.
- Sediment ingestion rate - Measured incidental sediment ingestion rates for all fish species other than American eel were not available. Sediment ingestion rates for these species were based on what is known about each species' feeding habitats and best professional judgment. It is unknown whether the estimated sediment ingestion rates reflect actual ingestion rates of NBSA fish or whether higher or lower ingestion rates could substantially impact risk estimates.
- Representativeness of worm dietary fraction – Dietary compositions evaluated for all fish receptors contained some fraction of worm tissue, which was estimated in this BERA based on concentrations measured in polychaete bioaccumulation tests. The bioaccumulation tests were conducted with field sediments collected from eight locations in subtidal and intertidal mudflats along the shoreline of the NBSA (Figure 4-2). These 8 locations represent a variety of conditions, including near-shore historically disturbed areas, industrial waterfront areas, areas designated as shoreline habitat, and open subtidal mudflats further offshore. Although a relatively small number of locations were tested, the variety of conditions makes it more likely to represent the range of worm concentrations that fish and wildlife might consume as they forage throughout the NBSA. With respect to the variety of species consumed by fish and wildlife, the use of worm tissue EPCs generated from laboratory bioaccumulation tests likely overestimates invertebrate dietary exposure due to the high uptake rates for worms relative to other invertebrate prey species, as well as the potential for increased bioavailability of contaminants in sediments that occurs during sample processing for bioaccumulation testing in the laboratory.

7.6.4 Fish Egg Tissue Risk Characterization Uncertainties

This section discusses the uncertainties associated with exposure assumptions, EPCs, and selected TRVs that could affect HQ calculations for fish eggs. Uncertainties associated with the TEQ methodology and general TRV uncertainties are discussed in Appendix D.

Fish egg TRVs were used in the assessment of 2,3,7,8-TCDD/TEQ risk. These TRVs were the same for the LPRSA BERA (Windward 2019) and LPR FFS (USEPA 2014) and were based on the SSD of 10 species derived by Steevens et al. (2005). This consensus suggests more certainty in this endpoint TRV. A potential alternative fish egg LOAEL 2,3,7,8-TCDD and TEQ TRV from Couillard et al. (2011) based on a behavioral endpoint for larval mummichog derived from eggs topically applied with PCBs was several orders of magnitude lower than the LPR BERA and FFS TRV (Steevens et al. 2005) selected for use in this BERA. This Couillard et al. (2011) TRV was derived in the LPR FFS (USEPA 2014) but for use as a fish whole-body tissue TRV not an egg tissue TRV. 2,3,7,8-TCDD and TEQ are considered preliminary COCs based on the Steevens et al. (2005) TRV and the use of this alternative (Couillard et al. 2011) TRV would simply increase the magnitude of HQs for fish egg. For total PCBs, there were TRVs for fish egg tissue, but only from the LPRSA BERA (Windward 2019) and the basis of these TRVs was a single study making them less certain than TRVs based on an SSD.

Consistent with the LPRSA BERA, the fish egg assessment was only conducted for resident *Fundulus* sp. that are known to spawn in the NBSA, and for a limited group of bioaccumulative COPECs. The egg assessment was conducted to provide additional risk perspective to the adult fish tissue assessment. One key uncertainty is that adults of other species, particularly the white perch, had higher concentrations of these COPECs in their tissues. For this reason, it is possible that such species may have higher concentrations of COPECs in their eggs as well. However, these fish are migratory and are exposed to COPECs throughout their range, and do not spawn in the Bay. The risk to these fish is assessed from the adult tissue and dietary exposures; however, there is a possibility that their exposure times and COPEC accumulation from the NBSA may cause adult:egg transfers of COPECs that are a risk.

The greatest uncertainty in this assessment is the use of an adult-to-egg uptake factors from the literature to estimate mummichog egg concentrations.

- For organics (i.e., PCBs and TEQs), a predictive relationship exists between adult whole-body tissue and egg tissue, and the resulting regression equation was used to estimate egg concentrations. Although the regression is based on empirical data, it is unknown whether the literature-based data over- or under-predicts NBSA mummichog egg concentrations (and risks) due to differences in exposure conditions, bioavailability of PCBs, and different uptake characteristics of the specific PCB mixtures tested. The uncertainty associated with modeled egg concentrations can be evaluated by considering the range of CFs evaluated (0.62 – 1). The use of CFs based on Niimi (1983) vs. Russell et al. (1999) slightly changes the HQs for PCBs and TEQ - fish COPECs; although, it does not change whether or not a HQ is above or below 1. While theoretically possible for maternal transfer to result in a CF greater than 1, the approach and range of CFs used in this BERA is consistent with that approved for the LPRSA BERA (Windward 2019), and therefore the magnitude of these uncertainties are considered acceptable. Additionally, the CF assumes a lipid content of 3.3% in mummichog eggs. This value is based on the 95UCL measured in mummichog eggs in the LPRSA (Windward 2019). While appropriate for evaluation of mummichog, it may result in over- or underestimation of egg concentration in different species, depending on their egg lipid content. The relevance of the egg HQs

for other species is tied to the similarity in egg lipid contents to mummichog. The assumed lipid content of 3.3% for the fish egg analysis is within the range of the lipid content 95UCLs of other fish species sampled in Newark Bay BERA sampling program, including American eel (7.1%), Atlantic silverside (1.6%), Atlantic menhaden (5.1%), summer flounder (1.2%), white perch (3.1%), and winter flounder (1.3%).

- For methylmercury, there was no relationship between adult and egg tissue concentrations in the literature data, and therefore a simple bioconcentration factor was selected based on the available information. The use of a bioconcentration factor to estimate methylmercury concentrations in eggs is uncertain; however, the use of the maximum CF of 0.101 likely over-predicts egg tissue concentrations (and HQs) for NBSA fish. The range of available fish CFs for methylmercury is 0.039 to 0.101 (Niimi 1983), based on data for five species (rainbow trout, smallmouth bass, white bass, white sucker, and yellow perch). Based on these data, the maximum CF and CF of 1 evaluated in this BERA may also over-predict potential risks to mummichog.

As summarized in Table 7-18, the following additional uncertainties were quantitatively evaluated:

- Treatment of non-detects for EPCs - The concentrations of summed components (e.g., PCB congeners) that were not detected were assumed to be zero when calculating totals. The effect on HQs of using one-half the quantitation limit or the full quantitation limit was evaluated. There were no changes from LOAEL HQ < 1 to HQ ≥ 1 for any COPEC regardless of how non-detected values in sums were treated (either as zero, one-half the quantitation limit, or the full quantitation limit).

7.7 Weight of Evidence Risk Findings for Fish

As summarized in Section 3.5, a WOE approach was used to evaluate COPECs with LOAEL HQs ≥ 1 (preliminary COCs; Table 7-19) and potential for unacceptable risk to fish populations in the NBSA.

Table 7-19. Summary of Preliminary COCs for Fish Tissue, Dietary, and Egg Assessments

Preliminary COCs	Exposure Area	Range of LOAEL HQs														
		Fish Tissue LOE								Fish Egg LOE[1]		Fish Diet LOE				
		NBSA TRVs				LPR FFS TRVs				NBSA TRVs	LPR FFS TRVs	NBSA TRVs				
		Mummichog	American Eel	Flounder	White Perch	Mummichog	American Eel	Flounder	White Perch	Mummichog		Mummichog	Flounder	White Perch	American Eel < 50 cm	American Eel ≥ 50 cm
2,3,7,8-TCDD	NBSA-wide	<1	<1	<1	<1	14	4	4	39	<1	<1	--	--	--	--	--
	Zones	<1	<1	<1	<1 - 1	9 - 21	4 - 8	2 - 7	16 - 69	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ Fish	NBSA-wide	<1	<1	<1	<1	16	6	4	40	<1	<1	--	--	--	--	--
	Zones	<1	<1	<1	<1 - 1	10 - 23	6 - 8	2 - 7	20 - 73	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ Fish Alternative TRV	NBSA-wide	1	<1	<1	3	NC	NC	NC	NC	--	--	--	--	--	--	--
	Zones	<1 - 2	<1	<1	2 - 6	NC	NC	NC	NC	--	--	--	--	--	--	--
Total PCBs	NBSA-wide	<1	<1	<1	<1	3	1	<1	3	3 - 5	NC	--	--	--	--	--
	Zones	<1	<1	<1	<1	2 - 6	1 - 2	<1 - 1	3 - 4	--	--	--	--	--	--	--
Total PCB TEQ Fish	NBSA-wide	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	--	--	--	--	--
	Zones	<1	<1	<1	<1 - 3	<1 - 1	<1	<1 - 1	--	--	--	--	--	--	--	--
Total Dioxin/Furan/PCB TEQ Fish	NBSA-wide	<1	<1	<1	<1	17	6	4	40	<1	<1	--	--	--	--	--
	Zones	<1	<1	<1	<1 - 1	11 - 24	6 - 9	2 - 8	21 - 90	--	--	--	--	--	--	--
Total Dioxin/Furan/PCB Fish Alternative TRV	NBSA-wide	1	<1	<1	3	NC	NC	NC	NC	--	--	--	--	--	--	--
	Zones	<1 - 2	<1	<1	2 - 7	NC	NC	NC	NC	--	--	--	--	--	--	--
Total DDx (2,4 & 4,4)	NBSA-wide	<1	<1	<1	1	<1	<1	<1	1	<1	<1	--	--	--	--	--
	Zones	<1	<1	<1	<1 - 2	<1 - 1	<1 - 1	<1	1 - 2	--	--	--	--	--	--	--
Arsenic[2]	NBSA-wide	<1	<1	<1	<1	NC	NC	NC	NC	--	--	<1	<1	<1	<1	<1
	Zones	<1	<1	<1	<1	NC	NC	NC	NC	--	--	<1	<1	<1	<1	<1
Cadmium	NBSA-wide	--	--	--	--	--	--	--	--	--	--	1	1	1	1	1
	Zones	--	--	--	--	--	--	--	--	--	--	1 - 2	<1 - 1	1 - 1	1 - 2	1 - 1
Chromium[2]	NBSA-wide	<1	<1	<1	<1	NC	NC	NC	NC	--	--	NC	NC	NC	NC	NC
	Zones	<1	<1	<1	<1 - 1	NC	NC	NC	NC	--	--	NC	NC	NC	NC	NC
Copper[2]	NBSA-wide	1	<1	<1	5	3	<1	<1	14	--	--	<1	<1	<1	<1	<1
	Zones	<1 - 2	<1	<1	3 - 8	2 - 6	<1 - 2	<1 - 1	8 - 23	--	--	<1	<1	<1	<1	<1
Mercury	NBSA-wide	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	1	1
	Zones	<1	<1	<1	<1	<1	<1 - 1	<1	<1	--	--	<1 - 1	<1 - 1	<1 - 1	1 - 2	1 - 2
Methylmercury	NBSA-wide	<1	<1	<1	<1	<1	<1	<1	<1	<1 - 1	<1 - 1	<1	<1	<1	<1	1
	Zones	<1	<1 - 1	<1	<1	<1	<1 - 1	<1	<1	--	--	<1	<1	<1	<1 - 1	1
Selenium[2]	NBSA-wide	<1	<1	<1	<1	NC	NC	NC	NC	--	--	<1	<1	<1	<1	<1
	Zones	<1	<1 - 1	<1	<1 - 1	NC	NC	NC	NC	--	--	<1	<1	<1	<1	<1
Silver[2]	NBSA-wide	<1	<1	<1	2	NC	NC	NC	NC	--	--	NC	NC	NC	NC	NC
	Zones	<1 - 1	<1	<1	1 - 3	NC	NC	NC	NC	--	--	NC	NC	NC	NC	NC
Zinc[2]	NBSA-wide	<1	<1	<1	<1	NC	NC	NC	NC	--	--	<1	<1	<1	<1	<1
	Zones	<1	<1	<1	<1	NC	NC	NC	NC	--	--	<1	<1	<1	<1	<1

Notes:
[1] HQ range includes two different conversion factors (see Table 7-15 for more details)
[2] White perch liver LOAEL HQs ≥ 1 for the following inorganics and assessment zones (see Table 7-9 and Section 7.1.3.2 for more details): Arsenic in NBSA-wide and Southwest Zone; Chromium in NBSA-wide and Southwest Zone; Copper in NBSA-wide, North, Southeast, Southwest Zones; Selenium in NBSA-wide, North, Southeast, Southwest Zones; Silver in NBSA-wide, North, Southeast, Southwest Zones; Zinc in NBSA-wide, North, Southeast, Southwest Zones
NC = not calculated; TRV not available
-- = not evaluated

For fish, long-term community monitoring data collected under the ABS (USACE 2015a, 2015b), a range of dietary and tissue HQs (including sensitivity analyses), a semi-quantitative evaluation of fish pathology, site-specific studies on reproductive/endocrine effects on killifish (Bugel et al. 2010, 2011, 2014), and consideration of background sediment concentrations (Section 4.4.2) provide LOEs used in this BERA. The range of HQs includes:

1. Tissue HQs based on whole-body or liver tissue (white perch only) concentrations measured in fish compared to tissue TRVs derived for the NBSA.
2. Tissue HQs based on whole-body and liver tissue concentrations (white perch only) measured in fish collected in the NBSA compared to tissue TRVs derived for the LPR FFS (USEPA 2014).
3. Dietary HQs based on dietary doses in food web models estimated using measured prey tissue concentrations compared to literature-derived dietary TRVs specific to the NBSA.
4. Egg tissue HQs based on modeled egg concentrations in mummichog/killifish compared to egg TRVs derived for the LPR FFS (USEPA 2014).

Tissue HQs were calculated for the NBSA-wide area and also independently for the North, Southeast, and Southwest Zones where sufficient tissue data were available. Dietary HQs were calculated for mummichog/killifish, American eel, flounder (winter and summer combined), and white perch for the NBSA (mudflats only for mummichog) and individual assessment zones. Egg tissue HQs were estimated for bioaccumulative compounds for the NBSA-wide area.

For fish community data, the ABS (USACE 2015a, 2015b) was a long-term, diverse and spatially robust sampling program that included bottom trawl surveys of demersal or near bottom occurring finfish (2002 – 2010 dataset) and ichthyoplankton tows using a benthic sled equipped with a plankton net to collect fish eggs and larvae near the bottom (2002 – 2011 dataset). Sampling locations included Newark Bay and Arthur Kill, and other Upper and Lower New York Bay locations. Observations of gross physical abnormalities were used as an indicator of site-specific toxicity as well.

Uncertainties (Section 7.6) were evaluated in this WOE assessment according to the factors presented in Section 3.5 to arrive at an overall risk conclusion for each preliminary COC. As discussed in Sections 7.6.2.1 and 7.6.3.1, fish TRVs are a key uncertainty in the risk estimates and apply to all fish receptors evaluated in this BERA. For most dietary and tissue TRVs, two sets of TRVs (i.e., NBSA and LPR FFS TRVs) were included for bounding purposes. For risk findings, the two sets of TRVs were given equal weight in this WOE evaluation. Additional LOE are discussed below for each receptor and preliminary COC. The risk conclusions based on the WOE are discussed below and summarized by species in Tables 7-20 through 7-23, and the overall summary of fish risks is presented in Table 7-24.

7.7.1 Localized Resident Forage Fish (Combined Mummichog and Killifish)

For mummichog and killifish, whole-body tissue HQs, dietary HQs, and egg tissue HQs were the available HQ LOEs. Fish community surveys (USACE 2015a, 2015b), fish pathology, a site-specific field investigation of killifish reproductive health in Newark Bay (Bugel et al. 2010, 2011, 2014), and background sediment concentrations (Section 4.4.2) were also considered in the WOE. LOAEL HQs ≥ 1 are summarized for mummichog/killifish in Table 7-20. Sensitivity analyses included evaluation of NDs for tissue HQs.

Table 7-20. Summary of LOAEL HQs ≥ 1 for Mummichog/Killifish

Preliminary COCs	Tissue LOAEL HQs ≥ 1		Dietary LOAEL HQs ≥ 1		Egg LOAEL HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs	NBSA TRVs	LPR FFS TRVs	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Tables 7-8, 7-13, and 7-16)						
Dioxins/Furans & TEQ (2,3,7,8-TCDD, Total Dioxin TEQ Fish, Total Dioxin/Furan/PCB Dioxin TEQ Fish)	NBSA-wide, North Zone	NBSA-wide, North, Southeast, Southwest Zones	-	-	None	None
Total PCBs	None	NBSA-wide, North, Southeast, Southwest Zones	-	-	NBSA-wide	None
Total PCB TEQ	None	NBSA-wide, Southwest Zone	-	-	None	None
Total DDx	None	Southwest Zone	-	-	-	-
Cadmium	ND	ND	NBSA-wide, North, Southeast, Southwest Zones	-	-	-
Copper	NBSA-wide, North Zone	NBSA-wide, North, Southeast, Southwest Zones	None	-	-	-
Mercury	None	None	Southwest Zone	-	None	None
Methylmercury	None	None	None	-	NBSA-wide	NBSA-wide
Silver*	North Zone	-	None[a]	-	-	-
Sensitivity Analyses (Table 7-18)						
No additional COCs were identified from sensitivity analyses for this receptor						

Notes:
- = not calculated; ND – not detected
a. The NOAEL HQ was < 1; a LOAEL HQ was not available.
NBSA-wide includes exceedances in each of the three zones unless otherwise noted.
*Sediment COPEC concentrations are within background levels and tissue residues are assumed to be related to background conditions as well.

Tissue (whole-body) HQs were estimated for COPECs with sufficient toxicity data to derive TRVs. Dietary models were used to evaluate COPECs for which tissue concentrations may not be useful for evaluation of toxicity, such as some actively-regulated metals and organics subject to metabolism. Egg tissue HQs were estimated for bioaccumulative COPECs (methylmercury, PCBs, dioxins/furans, and TEQ).

The long-term fish community surveys (USEPA 2015) found that the fish community in the NBSA is comparable to that of other areas in the NY/NJ Harbor Estuary in terms of the species assemblage, life stages, diversity, and seasonal abundance. In addition, it is comparable to what is expected for fish communities in mid-Atlantic estuaries.

The forage fish pathology evaluation found a low percentage of minor pathologies, and does not indicate unhealthy forage fish populations.

A literature search revealed a site-specific study on killifish reproductive health in the NBSA. Published in a series of papers, Bugel et al. (2010, 2011, 2014) conducted a field study comparing the reproductive capacity of mummichog in Newark Bay to those from a reference location in the Great Bay, Tuckerton, New Jersey. Several reproductive metrics were evaluated, including male and female gonad histology; vitellogenin production; and bile chemistry for specific low-, medium-, and HMW PAHs. Examinations of male and female gonad histology show decreased gonadal weight, altered testis morphology in males, and altered gonad development in females. Altered female gonad development was indicated in female Newark Bay mummichog by somewhat higher pre-vitellogenic follicles observed in Newark Bay as compared to Great Bay (64% versus 43%, respectively), lower mid-vitellogenic follicles (17% versus 22%, respectively), and lower mature stage follicles (3% versus 25%, respectively). Overall, Bugel et al. (2010, 2011, 2014) demonstrated that Newark Bay killifish reproductive health (including the following endpoints: eggs/female, embryotoxicity, and hatchability as well as embryo mass and yolk volume) was impaired relative to a control population. Moreover, both field caged and laboratory dose-response studies demonstrated an endocrine disruptive basis for the observed impairment of oocyte development and established a putative link to exposure to AhR agonists such as dioxins, furans, and coplanar PCBs (i.e., TEQ); although, effects of co-occurring contaminants, which is typical in urban estuaries, were not investigated. The demonstration of these responses in the pollution-tolerant killifish, a condition that is common in urban estuaries including throughout the NY/NJ Harbor Estuary, raises concerns about potential impacts to other more sensitive species.

Tissue HQs inherently integrate many factors related to fish COPEC exposure, such as site use and dietary composition, typically resulting in a low degree of uncertainty in the tissue EPCs. Toxicity inputs to the tissue HQs, such as the constituent-specific TRVs are discussed above as part of the WOE evaluation for fish. For dietary HQs, additional inputs to the HQs, including SUFs and EPCs, are also discussed as part of the WOE.

SUF: Mummichog and killifish are common within the NBSA and were evaluated for exposure to the mudflat areas in the dietary models. The selected SUF of 1 is appropriate based on the small home range (on the order of hundreds of meters or less; Appendix B) for these fish and is not likely to overestimate exposure in either the NBSA-wide area or individual assessment zones.

Diet: In this BERA, mummichog were assumed to have a diet of 100% polychaete worm, but this opportunistic feeder will consume a wide variety of small aquatic invertebrates, algae, and detritus. The assumed diet likely overestimates exposure to this receptor in the dietary food web models.

EPCs: In general, EPCs were based on 95% UCL concentrations which are appropriate exposure estimates for a BERA. Exceptions include:

- Dioxin/furan TEQ and total PCBs in egg tissue: Egg-tissue EPCs were calculated using adult-to-egg CFs based on a significant relationship between lipid-normalized adult and egg organic COPEC concentrations. A CF of 1.0 was also evaluated as part of a sensitivity analysis, but is not supported by available data for these COPECs.

- Methylmercury in worm prey tissue: Methylmercury was detected in only one of eight polychaete worm samples measured as part of the bioaccumulation investigation. The methylmercury EPC for this prey tissue is based on the maximum detected concentration.
- Mercury and methylmercury in egg tissue: For mercury and methylmercury, egg tissue EPCs were calculated using adult-to-egg CFs. Because a significant relationship was not found between adult whole-body and egg concentrations, a CF of 0.1 was evaluated based on the maximum CF measured in fish.

Conclusions: For most preliminary COCs identified for this receptor, whole-body tissue HQs were considered to have the least uncertainty for drawing risk conclusions. The dietary models have additional uncertainties related to the use of exposure assumptions (SUFs, diet, bioaccumulation factors [BAFs]) and the egg HQs were considered less certain due to the use of a CF to estimate egg concentrations. For copper and silver, dietary HQs were considered to be the least uncertain, due to the high degree of uncertainty in the tissue TRVs. Based on the various factors considered in the available LOEs, the resulting risk conclusions for preliminary COCs are as follows:

- Dioxins/furans and TEQs: Unacceptable risk is considered possible. These conclusions are based on the occurrence of tissue LOAEL HQs greater than 10 based on the LPR FFS TRVs and tissue LOAEL HQs greater than 1 based on the alternative NBSA TRV. In addition, the findings of Bugel et al. (2010, 2011, 2014) indicate that there may be reproductive impairment occurring in the pollution-tolerant killifish populations of Newark Bay. Other available LOEs indicate that unacceptable risk is unlikely for forage fish populations. These include: 1) tissue LOAEL HQs < 1 based on NBSA TRVs; 2) egg LOAEL HQs < 1 even using a conservative CF =1; and 3) fish pathology does not indicate unhealthy forage fish populations.
- Total PCB TEQ: Unacceptable risk is considered possible. This finding is primarily based on the contribution of these PCBs to the overall TEQ, as related to the findings of Bugel et al. (2010, 2011, 2014) that indicate there may be reproductive impairment occurring in the pollution-tolerant killifish populations of Newark Bay. Other available LOEs suggest limited potential for risk, which include: 1) tissue LOAEL HQs < 1 using NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1; 3) egg LOAEL HQs < 1 even using a conservative CF =1; and 4) fish pathology does not indicates unhealthy forage fish populations.
- Total PCBs: Unacceptable risk is considered possible in the Southwest Zone. These conclusions are based on: 1) tissue LOAEL HQs < 1 based on NBSA TRVs; 2) low magnitude of the tissue LOAEL HQs ≥ 1 using LPR FFS TRVs, except in the Southwest Zone where the HQ = 6; 3) egg LOAEL HQs < 1 even using a conservative CF =1; and 4) fish pathology does not indicate unhealthy forage fish populations.
- Total DDx: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 using NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1; 3) limited spatial extent (LOAEL HQs ≥ 1 for Southwest Zone only); and 4) fish pathology does not indicate unhealthy forage fish populations.
- Cadmium: Unacceptable risk is considered unlikely. These conclusions are based on: 1) cadmium was never detected in whole-body tissue; 2) low magnitude of the LOAEL HQs ≥ 1 based on dietary

models; 3) conservative exposure assumptions in the dietary models (100% worm diet); and 4) fish pathology does not indicate unhealthy forage fish populations.

- Copper: Unacceptable risk is considered unlikely. These conclusions are based on conflicting conclusions based on two uncertain HQs methods (dietary and tissue HQs). It should be noted that the dietary HQs incorporate conservative assumptions (100% worm diet), and fish pathology does not indicate unhealthy forage fish populations. In addition, as reported in the LPRSA BERA (Windward 2019), the background concentration of copper in mummichog collected from Jamaica Bay by NOAA (2013) was 4,200 µg/kg. The NBSA forage fish concentrations are at or below this concentration. As such, risks to forage fish from copper are unlikely.
- Mercury: Unacceptable risk is considered unlikely. These conclusions are based on: 1) whole-body tissue LOAEL HQs < 1 using both NBSA and LPR FFS TRVs; 2) dietary LOAEL HQs < 1 for most scenarios; 3) low magnitude of the dietary LOAEL HQs, equal to 1 in Southwest Zone only; 4) egg LOAEL HQs < 1 even using a conservative CF =1; and 5) fish pathology does not indicate unhealthy forage fish populations.
- Methylmercury: Unacceptable risk is considered unlikely. These conclusions are based on: 1) whole-body tissue LOAEL HQs < 1 using both NBSA and LPR FFS TRVs; 2) dietary LOAEL HQs < 1 for all scenarios; 4) egg LOAEL HQs = 1 using a conservative CF =1; and 5) fish pathology does not indicate unhealthy forage fish populations.
- Silver: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue and dietary LOAEL HQs < 1 in most scenarios, except for tissue HQs in the North Zone; 2) low magnitude of the tissue LOAEL HQ ≥ 1 (North Zone only); and 3) fish pathology does not indicate unhealthy forage fish populations. Although the whole-body tissue and dietary silver TRVs are uncertain, the risk conclusions are supported by an additional LOE, in that sediment concentrations in the NBSA are at or below background concentrations.

7.7.2 American Eel

For American eel, whole-body tissue HQs and dietary HQs (evaluated for eels <50 cm and ≥ 50 cm) were the available HQ LOEs. Fish community surveys (USACE 2015a, 2015b) and fish pathology were considered as indicators of overall fish population health. Background sediment concentrations (Section 4.4.2) were also considered as a LOE. LOAEL HQs ≥ 1 were predicted for the COPECs listed in Table 7-21. Sensitivity analyses included evaluation of NDs for tissue and dietary HQs, and modified prey size assumptions for the dietary HQs.

Table 7-21. Summary of LOAEL HQs ≥ 1 for American Eel

Preliminary COCs	Tissue LOAEL HQs ≥ 1		Dietary LOAEL HQs ≥ 1 <50 cm		Dietary LOAEL HQs ≥ 1 ≥50 cm	
	NBSA TRVs	LPR FFS TRVs	NBSA TRVs	LPR FFS TRVs	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Tables 7-8 and 7-13)						
Dioxins/Furans (2,3,7,8-TCDD, Total Dioxin TEQ Fish, Total Dioxin/ PCB TEQ Fish)	None	NBSA-wide, North, Southeast, Southwest Zones	-	-	-	-
Total PCBs	None	NBSA-wide, North, Southeast, Southwest Zones	-	-	-	-
Total PCB TEQ	None	North Zone	-	-	-	-
Total DDx	None	Southwest Zone	-	-	-	-
Cadmium	ND	ND	NBSA-wide, North, Southeast, Southwest Zones	-	NBSA-wide, North, Southeast, Southwest Zones	-
Copper	None	Southwest Zone	None	-	None	-
Mercury	None	North Zone	NBSA-wide, North, Southeast, Southwest Zones		NBSA-wide, North, Southeast, Southwest Zones	
Methylmercury	North Zone	North, Southwest Zones	Southeast Zone	-	NBSA-wide, North, Southeast, Southwest Zones	-
Selenium*	Southeast Zone	-	None	-	None	-
Sensitivity Analyses (Table 7-18)						
No additional COCs were identified from sensitivity analyses for this receptor						

Notes:
- = not calculated; ND – not detected
NBSA-wide includes exceedances in each of the three zones (North, Southeast, Southwest) unless otherwise noted.
*Sediment COPEC concentrations are within background levels and tissue residues are assumed to be related to background conditions as well.

Tissue HQs were estimated for COPECs with sufficient toxicity data to derive TRVs. The dietary model was used to evaluate COPECs for which tissue concentrations may not be useful for evaluation of toxicity, such as some actively-regulated metals and organics subject to metabolism.

The long-term fish community surveys (USEPA 2015) found that indicators of fish community health in Newark Bay provide evidence for a normally functioning fish community. Adult fish abundance and diversity in the Arthur Kill/Newark Bay were similar or greater than other locations in the NY/NJ Harbor

Estuary. Juveniles, larvae and eggs, including American eel, were commonly collected in the NBSA and are indicative of ongoing reproduction within fish communities.

The fish pathology evaluation of American eel found only a low percentage of minor pathologies, and does not indicate impairment of fish populations.

Tissue HQs inherently integrate many factors related to fish COPEC exposure, such as site use and dietary composition, typically resulting in a low degree of uncertainty in the tissue EPCs. Toxicity inputs to the tissue HQs, such as the constituent-specific TRVs, are discussed below as part of the WOE evaluation for these receptors. For dietary HQs, additional inputs to the HQs, including SUFs, EPCs, and TRVs, are also discussed as part of the WOE.

SUF: American eel are found within the NBSA during most sampled months and were evaluated for exposure to the NBSA-wide area as well as the individual assessment zones in the dietary models. Although this species spawns in the open ocean, eels have been reported nearly year-round in the NBSA. The selected SUF of 1 is also appropriate for the NBSA-wide area based on the reported home range of about 3 to 65 hectares (Appendix B) for these fish. The SUF of 1 likely overestimates eel exposure in the individual assessment zones.

Diet: In this BERA, eels were assumed to have a mixed diet consisting of invertebrates and fish. These opportunistic carnivores have a diverse diet, which changes from primarily insects to fish and crustaceans as eels grow. The assumed diet for small eels (<50 cm) may overestimate exposure because it does not include a high proportion of insects, and instead includes infaunal invertebrates (i.e., polychaete worm) with high potential for COPEC uptake. The assumed diet for larger eels (≥50 cm) is not expected to over- or underestimate exposure for this receptor in the dietary food web models.

EPCs: In general, EPCs were based on 95% UCL concentrations, which are appropriate exposure estimates for a BERA. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95% UCL. In cases where a COPEC is infrequently detected, use of the maximum EPC potentially overestimates exposure. EPC factors considered in the WOE include:

- Methylmercury in worm prey tissue: Methylmercury was detected in only one of eight polychaete worm samples measured as part of the bioaccumulation investigation. The methylmercury EPC for this prey tissue is based on the maximum detected concentration.

Conclusions: For most preliminary COCs identified for this receptor, whole-body tissue HQs were considered to have the least uncertainty for drawing risk conclusions. The dietary models have additional uncertainties related to the use of exposure assumptions (SUFs, diet, BAFs) and the egg HQs were considered less certain due to the use of a CF to estimate egg concentrations. For copper, dietary HQs were considered to be the least uncertain, due to the high degree of uncertainty in the tissue TRVs. Based on the various factors considered in the available dietary and tissue LOEs, the resulting risk conclusions for American eel (<50 cm and ≥50 cm) preliminary COCs are as follows:

- Dioxins/furans and TEQs: Unacceptable risk is considered possible. These conclusions are based on tissue LOAEL HQs approaching 10 based on the LPR FFS TRVs. Other available LOEs indicate that unacceptable risk is unlikely for American eel populations. These include: 1) tissue LOAEL HQs < 1 based on NBSA TRVs; 2) fish community surveys do not indicate unhealthy fish populations; and 3)

fish pathology does not indicate unhealthy fish populations. Tissue HQs were the only HQ LOE evaluated for this COPEC.

- Total PCB TEQ: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL < 1 for most scenarios; 2) low magnitude of the tissue LOAEL HQs ≥ 1 (HQ = 1 for North Zone only using LPR FFS TRVs); 3) fish community surveys do not indicate unhealthy fish populations; and 4) fish pathology does not indicate unhealthy fish populations. Tissue HQs were the only HQ LOE evaluated for this COPEC.
- Total PCBs: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 based on NBSA TRVs; 2) low magnitude of the tissue LOAEL HQs ≥1 based on LPR FFS HQs; 3) fish community surveys do not indicate unhealthy fish populations; and 4) fish pathology does not indicate unhealthy fish populations. Tissue HQs were the only HQ LOE evaluated for this COPEC.
- Total DDx: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 for most scenarios; 2) low magnitude of the LOAEL HQs ≥1 (HQ = 1 in Southwest Zone using LPR FFS TRVs only); 3) fish community surveys do not indicate unhealthy fish populations; and 4) fish pathology does not indicate unhealthy fish populations.
- Cadmium: Unacceptable risk is considered unlikely. These conclusions are based on: 1) cadmium was never detected in whole-body tissue; 2) low magnitude of the dietary LOAEL HQs ≥ 1; 3) conservative exposure assumptions in the dietary models (assumed diet and dietary EPCs likely overestimate exposure; SUF in assessment zones overestimates exposure); 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations.
- Copper: Unacceptable risk is considered unlikely. Although there is low confidence in both the tissue and dietary TRVs, the selected TRVs likely overestimate toxicity of copper. These conclusions are based on: 1) all tissue LOAEL HQs < 1 using NBSA TRVs; 2) dietary and tissue LOAEL HQs < 1 in the NBSA-wide exposure area using both sets of TRVs; 3) low magnitude of the tissue LOAEL HQs ≥ 1 using LPR FFS TRVs; 4) conservative exposure assumption in the dietary models assumptions (assumed diet likely overestimate exposures for eels < 50 cm; SUF in assessment zones overestimates exposure); 5) fish community surveys do not indicate unhealthy fish populations; and 6) fish pathology does not indicate unhealthy fish populations.
- Mercury and methylmercury: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 for most scenarios; 2) dietary and tissue LOAEL HQs < 1 in the NBSA-wide exposure area using both sets of TRVs; 3) low magnitude of the tissue LOAEL HQs ≥ 1 in the North and Southwest Zones; 3) use of conservative exposure assumptions in the dietary models (assumed diet likely overestimates exposures for eels < 50 cm; SUF in assessment zones overestimates exposure); 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations.
- Selenium: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 for most scenarios; 2) low magnitude of the tissue LOAEL HQs ≥ 1(in the Southeast Zone only); 3) dietary LOAEL HQs < 1; 4) use of conservative exposure assumptions in the dietary models (assumed diet likely overestimates exposures for eels < 50 cm; SUF in assessment zones

overestimates exposure); 5) fish community surveys do not indicate unhealthy fish populations; and 6) fish pathology does not indicate unhealthy fish populations. Additionally, selenium concentrations in NBSA sediment are at or below background concentrations.

7.7.3 Summer and Winter Flounder

For summer and winter flounder, whole-body tissue HQs and dietary HQs (evaluated combined summer/winter flounder) were the available HQ LOEs. Fish community surveys (USACE 2015a, 2015b) and fish pathology were considered as indicators of overall fish population health. Background sediment concentrations (Section 4.4.2) were also considered as a LOE. LOAEL HQs ≥ 1 were predicted for the COPECs in Table 7-22. Sensitivity analyses included evaluation of NDs for tissue and dietary HQs, modified prey size assumptions for the dietary HQs, and evaluation of an SUF of 1 for the dietary HQs.

Table 7-22. Summary of LOAEL HQs ≥ 1 for Flounder

Preliminary COCs	Tissue LOAEL HQs ≥ 1		Dietary LOAEL HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Tables 7-8 and 7-13)				
Dioxins/Furans (2,3,7,8-TCDD, Total Dioxin TEQ Fish, Total Dioxin/PCB TEQ Fish)	None	NBSA-wide, North, Southeast, Southwest Zones	-	-
Total PCBs	None	North Zone	-	-
Cadmium	ND	ND	NBSA-wide, Southeast, Southwest Zones	-
Copper	None	North Zone	None	-
Mercury	None	None	NBSA-wide, North, Southwest Zones	
Sensitivity Analyses (Table 7-18)				
Cadmium	-	-	NBSA-wide, North, Southeast, Southwest Zones (SUF=1)	None
Mercury	-	-	NBSA-wide, North, Southeast, Southwest Zones (SUF=1)	None
Methylmercury	-	-	North, Southeast Zones (SUF=1)	None

Notes:
- = not calculated; ND – not detected
NBSA-wide includes exceedances in each of the three zones (North, Southeast, Southwest Zones) unless otherwise noted.

Tissue HQs were estimated for COPECs with sufficient toxicity data to derive TRVs. The dietary model was used to evaluate COPECs for which tissue concentrations may not be useful for evaluation of toxicity, such as some actively-regulated metals and organics subject to metabolism.

The long-term fish community surveys (USEPA 2015) found that indicators of fish community health in Newark Bay provide evidence for a normally functioning estuarine fish community. Specifically, for winter flounder, adult fish abundance in the Arthur Kill/Newark Bay, were similar or greater than other locations in the NY/NJ Harbor Estuary. Although winter flounder juveniles, larvae and eggs were not as commonly

collected in the NBSA relative to other Upper and Lower Bay locations, these differences may be in part explained by physical differences such as bottom substrate, water temperature, salinities, and effects of freshwater inputs that can influence the presence of certain species. Summer flounder adults and larvae/eggs were much less common than winter flounder in NY Harbor but were captured in similar numbers across sampling locations. Overall, the data suggest healthy adult populations and ongoing reproduction of winter flounder in the NBSA.

The fish pathology evaluation included examination of 25 flounder (20 summer and five winter flounder). No pathologies/abnormalities were found in any of these fish.

Tissue HQs inherently integrate many factors related to fish COPEC exposure, such as site use and dietary composition, typically resulting in a low degree of uncertainty in the tissue EPCs. Toxicity inputs to the tissue HQs, such as the constituent-specific TRVs, are discussed above as part of the WOE evaluation for these receptors. For dietary HQs, additional inputs to the HQs, including SUFs, EPCs, and TRVs, are also discussed as part of the WOE.

SUF: Summer and winter flounder are found within the NBSA seasonally. Flounder exhibit strong seasonal inshore-offshore movements, and are found in the Bay generally between March and October, and April and October, respectively (see Section 2.4). The selected SUF of 67% is not expected to significantly over- or underestimate exposure for summer and winter flounder based on seasonal use of Newark Bay for the NBSA-wide area. Because foraging range with flounder when present within the NBSA is unknown, it is uncertain whether the selected SUF overestimates exposure for flounder in the individual assessment zones.

Diet: Flounder are omnivorous or opportunistic feeders, and consume a wide variety of prey found in or near bottom sediments. Diet composition is related to size: the larger the individual, the greater the size of the food item to be consumed. The assumed diet of 35% polychaete worms, 35% blue crabs, and 30% fish (≤ 30 cm) used to represent the prey consumed by flounder is not expected to significantly over- or underestimate exposure for summer and winter flounder, though proportions of these items in their diet may change from juvenile to adult.

EPCs: In general, EPCs were based on 95% UCL concentrations, which are appropriate exposure estimates for a BERA. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95% UCL. In cases where a COPEC is infrequently detected, use of the maximum EPC potentially overestimates exposure. EPC factors considered in the WOE include:

- Tissue EPCs: for all preliminary COCs in the individual assessment zones, tissue EPCs were based on the maximum detected concentration due to small sample size (N=2 to 4).
- Cadmium in prey fish tissue: Cadmium was not detected in forage fish tissue; the quantitation limit was selected as the EPC and likely overestimates exposure to dietary cadmium via consumption of fish.

Conclusions: For most preliminary COCs identified for this receptor, whole-body tissue HQs were considered to have the least uncertainty for drawing risk conclusions. The dietary models have additional uncertainties related to the use of exposure assumptions (SUFs, diet, BAFs) and the egg HQs were considered less certain due to the use of a CF to estimate egg concentrations. For copper, dietary HQs were considered to be the least uncertain, due to the high degree of uncertainty in the tissue TRVs.

Based on the various factors considered in the available dietary and tissue LOEs, the resulting risk conclusions for summer/winter flounder preliminary COCs are as follows:

- Dioxin/furans and TEQs: Unacceptable risk is considered possible. These conclusions are based on tissue LOAEL HQs approaching 10 based on the LPR FFS TRVs, particularly in the North Zone. Other available LOEs indicate that unacceptable risk is unlikely for flounder fish populations. These include: 1) all tissue LOAEL HQs < 1 based on NBSA TRVs; 2) fish community surveys do not indicate unhealthy fish populations; and 3) fish pathology does not indicate unhealthy fish populations. Tissue HQs were the only HQ LOE evaluated for this COPEC.
- Total PCBs: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 based on NBSA TRVs; 2) low magnitude of the LOAEL HQ ≥ 1 using LPR FFS TRVs (HQ = 1 in the North Zone only); 3) EPCs in the individual assessment zones based on maximum detected concentrations; 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations. Tissue HQs were the only HQ LOE evaluated for this COPEC.
- Cadmium: Unacceptable risk is considered unlikely in the Southeast and Southwest Zones and NBSA-wide. These conclusions are based on: 1) low magnitude of the dietary LOAEL HQs ≥ 1; 2) cadmium was never detected in flounder or prey fish tissue; 3) fish community surveys do not indicate unhealthy fish populations; and 4) the fish pathology does not indicate unhealthy fish populations.
- Copper: Unacceptable risk is considered unlikely in the North Zone and NBSA-wide. Although there is low confidence in both the tissue and dietary TRVs, the selected TRVs likely overestimate toxicity of copper. These conclusions are based on: 1) all tissue LOAEL HQs < 1 using NBSA TRVs; 2) all dietary and tissue LOAEL HQs < 1 in the NBSA-wide exposure area using both sets of TRVs; 3) low magnitude of the tissue LOAEL HQs ≥ 1 using LPR FFS TRVs; 4) maximum tissue EPCs in the assessment zones; 5) fish community surveys do not indicate unhealthy fish populations; and 6) fish pathology does not indicate unhealthy fish populations.

7.7.4 White Perch

For white perch, whole-body tissue HQs, liver HQs, and dietary HQs were the available HQ LOEs. LOAEL HQs ≥ 1 were predicted as shown in Table 7-23. Fish community surveys (USACE 2015a, 2015b) and fish pathology were considered as indicators of overall fish population health. Background sediment concentrations (Section 4.4.2) were also considered as a LOE. LOAEL HQs ≥ 1 were predicted for the COPECs listed in Table 7-23. Sensitivity analyses included evaluation of NDs for tissue and dietary HQs, evaluation of an SUF of 1 for the dietary HQs, and the evaluation of an alternative TRV for fish tissue dioxin/furan TEQ.

Table 7-23. Summary of LOAEL HQs ≥ 1 for White Perch

Preliminary COCs	Whole-body LOAEL Tissue HQs ≥ 1		Liver LOAEL HQs ≥ 1	Dietary LOAEL HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs	NBSA Liver TRVs	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Tables 7-8 and 7-13)					
Dioxins/Furans (2,3,7,8-TCDD, Total Dioxin Furan TEQ)	NBSA-wide, North, Southeast, Southwest Zones ***	NBSA-wide, North, Southeast, Southwest Zones	None	-	-
Total PCBs	None	NBSA-wide, North, Southeast, Southwest Zones	None	-	-
Total PCB TEQ	None	North Zone	None	-	-
Total DDx	NBSA-wide, Southwest Zone	NBSA-wide, North, Southeast, Southwest Zones	-	-	-
Arsenic	None	-	NBSA-wide, Southwest Zone	None	-
Cadmium	ND	ND	-	NBSA-wide, North, Southeast, Southwest Zones	-
Chromium	North Zone	-	NBSA-wide, Southwest Zone	None	-
Copper**	NBSA-wide, North, Southeast, Southwest Zones	NBSA-wide, North, Southeast, Southwest Zones	NBSA-wide, North, Southeast, Southwest Zones	None	-
Selenium*	Southwest Zone	-	NBSA-wide, North, Southeast, Southwest Zones	None	-
Silver*	NBSA-wide, North, Southeast, Southwest Zones	-	NBSA-wide, North, Southeast, Southwest Zones	None	-
Zinc	None	-	NBSA-wide, North, Southeast, Southwest Zones	None	-
Sensitivity Analyses (Table 7-18)					
Dioxins/Furans (2,3,7,8-TCDD, Total Dioxin/Furan TEQ)	NBSA-wide, North, Southeast, Southwest Zones (alternative TRV)	-	-	-	-
Mercury	-	-	-	NBSA-wide, Southeast, Southwest Zones (SUF=1)	None

Notes:
- not calculated; ND – not detected
*Sediment COPEC concentrations are within background levels and tissue residues are assumed to be related to background conditions as well.
**Tissue residues in mummichog were within the range of Jamaica Bay background residues; white perch residues also assumed to be background-related.
*** Based on alternate TRV for TEQ.

Tissue HQs were estimated for COPECs with sufficient toxicity data to derive TRVs. The dietary model was used to evaluate COPECs for which tissue concentrations may not be useful for evaluation of toxicity, such as some actively-regulated metals and organics subject to metabolism.

The long-term fish community surveys (USEPA 2015) found that indicators of fish community health in Newark Bay provide evidence for a normally functioning fish community. Adult white perch abundance in the Arthur Kill/Newark Bay, was greater than other locations in the NY/NJ Harbor Estuary during both winter and spring surveys. White perch eggs and larvae were rarely captured during ichthyoplankton surveys primarily because this species spawns upstream from Newark Bay.

Although white perch were not specifically examined in the fish pathology evaluation, only a low percentage of minor pathologies were found across all species. These results do not indicate impairment of fish populations. The conclusions likely also apply to white perch.

Tissue HQs inherently integrate many factors related to fish COPEC exposure, such as site use and dietary composition, typically resulting in a low degree of uncertainty in the tissue EPCs. Toxicity inputs to the tissue HQs, such as the constituent-specific TRVs, are discussed below as part of the WOE evaluation for these receptors. For dietary HQs, additional inputs to the HQs, including SUFs, EPCs, and TRVs, are also discussed as part of the WOE.

SUF: Multi-year fish sampling data indicate that white perch are seasonally abundant in Newark Bay in late fall and winter (October through May; Appendix B) only. White perch are not present in late spring, summer, and early fall due to spawning migration into streams feeding Newark Bay. The selected SUF of 67% is not expected to significantly over- or underestimate exposure for white perch based on seasonal use of Newark Bay for the NBSA-wide area. Because foraging range of white perch when present within the NBSA is unknown, it is uncertain whether the selected SUF overestimates exposure for fish in the individual assessment zones.

Diet: White perch are invertivorous benthic-feeding fish; common dietary components include amphipods, shrimp, and copepods. Fish are also a dietary component, with a greater proportion of fish consumed in late summer and fall. The assumed diet of 70% polychaete worms (a surrogate for amphipods and other invertebrates), 15% blue crabs, and 15% fish (≤ 30 cm) used to represent the prey consumed by white perch potentially overestimates exposure because polychaete worms likely have higher potential for COPEC uptake than small, epibenthic crustaceans.

EPCs: In general, EPCs were based on 95% UCL concentrations which are appropriate exposure estimates for a BERA. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95% UCL. In cases where a COPEC is infrequently detected, use of the maximum EPC potentially overestimates exposure. EPC factors considered in the WOE include:

- Liver EPCs: for all preliminary COCs in the individual assessment zones, liver tissue EPCs were based on the maximum detected concentration due to small sample size. Liver EPCs for chromium in the NBSA-wide area were also based on the maximum detected concentration due to low FOD.

- Polychaete worm prey tissue EPCs: The worm tissue EPCs evaluated in the assessment zones are based on NBSA-wide EPCs derived from the worm bioaccumulation investigation data.

Conclusions: For most preliminary COCs identified for this receptor, whole-body tissue HQs were considered to have the least uncertainty for drawing risk conclusions. The dietary models have additional uncertainties related to the use of exposure assumptions (SUFs, diet, BAFs) and the egg HQs were considered less certain due to the use of a CF to estimate egg concentrations. For copper, dietary HQs were considered to be the least uncertain, due to the high degree of uncertainty in the tissue TRVs. For white perch, the liver HQs were not used to draw risk conclusions in the WOE because whole-body HQs were also available for the same COPECs, and are a more relevant indicator of overall exposure. The liver assessment was used to provide perspectives on the whole-body risk findings. Based on the various factors considered in the available dietary and whole-body tissue LOEs, the resulting risk conclusions for white perch preliminary COCs are as follows:

- Dioxin/furans and TEQs: Unacceptable risk is considered possible. These conclusions are based on: 1) tissue LOAEL HQs >1 for all scenarios; and 2) tissue HQs > 10 based on LPR FFS TRVs. Other available LOEs (fish community surveys and fish pathology) do not indicate the potential for unacceptable risk.
- Total PCB TEQ: Unacceptable risk is considered unlikely. These conclusions are based on: 1) tissue LOAEL HQs < 1 for most scenarios; 2) low magnitude of the tissue LOAEL HQs ≥ 1 (HQ =1 in the North Zone using LPR FFS TRVs only); 3) fish community surveys do not indicate unhealthy fish populations; and 4) fish pathology does not indicate unhealthy fish populations.
- Total PCBs: Unacceptable risk is considered unlikely in the NBSA or individual assessment zones. These conclusions are based on: 1) all tissue LOAEL HQs < 1 based on NBSA TRVs; 2) low magnitude of the tissue LOAEL HQ ≥ 1 using LPR FFS TRVs; 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations.
- Total DDx: Unacceptable risk is considered possible. These conclusions are based on tissue LOAEL HQs ≥ 1 for most scenarios using NBSA and LPR FFS TRVs. The HQs do not exceed 2 in any case, and other available LOEs (fish community surveys and fish pathology) do not indicate the potential for unacceptable risk.
- Cadmium: Unacceptable risk is considered unlikely in all assessment zones and NBSA-wide. These conclusions are based on: 1) cadmium was never detected in perch or prey fish tissue; 2) low magnitude of the dietary LOAEL HQs ≥ 1; 3) dietary assumptions likely overestimate exposure (e.g., use of polychaete worm to represent unidentified dietary material); 4) fish community surveys do not indicate unhealthy fish populations; and 5) the fish pathology does not indicate unhealthy fish populations.
- Chromium: Unacceptable risk is considered unlikely. There is low confidence in both the tissue and dietary TRVs. The dietary LOAEL TRV is based on an unbounded NOAEL and the tissue LOAEL TRV is based on tissue data unrelated to the observed toxicity; both TRVs likely overpredict risk. LPR FFS TRVs were not available for chromium. The risk conclusion is based on: 1) all dietary LOAEL HQs < 1; 2) tissue LOAEL HQs < 1 except in the North Zone (HQ = 1); 3) low magnitude of the tissue

LOAEL HQs ≥ 1; 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations.

- Copper: Unacceptable risk is considered uncertain in the NBSA and individual assessment zones. There is low confidence in both the tissue and dietary TRVs, and the selected TRVs likely overestimate toxicity of copper. Because the tissue TRVs are well below nutritional thresholds for copper, the dietary NBSA HQs are considered to have lower uncertainty for predicting risk than the tissue HQs. However, there is also only moderate confidence in the dietary HQs to predict risk to fish due the compounded uncertainty in various exposure and toxicity assumptions included in the dietary models. Risk is considered uncertain for copper are based on: 1) all dietary LOAEL HQs < 1; 2) all tissue LOAEL HQs ≥ 1 using NBSA and LPR FFS TRVs and tissue LOAEL HQs approaching or exceeding 10 in many cases, 3) maximum tissue EPCs are used to assess risk in the assessment zones; 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations. In addition, the copper concentrations in NBSA forage fish were at or below background concentrations for mummichog collected from Jamaica Bay (by NOAA in 1999), and, therefore, it is reasonable to assume that white perch concentrations are also likely within background. However, given that background data do not exist for white perch, the risks, while unlikely, are considered uncertain.
- Mercury: Unacceptable risk is considered unlikely in the NBSA or individual assessment zones. These conclusions are based on: 1) tissue LOAEL HQs < 1 all scenarios; 2) low magnitude of the dietary LOAEL HQs ≥ 1 (maximum HQ =2 in the sensitivity analyses); 3) use of conservative exposure assumptions in the dietary models (assumed diet likely overestimates exposures); 4) fish community surveys do not indicate unhealthy fish populations; and 5) fish pathology does not indicate unhealthy fish populations.
- Silver: Unacceptable risk is considered unlikely in the NBSA or individual assessment zones. These conclusions are based on: 1) dietary LOAEL HQs < 1 in the NBSA-wide area; 2) low magnitude of the tissue LOAEL HQs ≥ 1; 3) fish community surveys do not indicate unhealthy fish populations; and 4) fish pathology does not indicate unhealthy fish populations. Although the whole-body tissue and dietary silver TRVs are uncertain, the risk conclusions are supported by additional LOE, including sediment concentrations in the NBSA are at or below background concentrations and liver HQs based on a NOAEL TRV are low in magnitude (liver LOAEL TRV unavailable for silver).
- Other metals (arsenic, selenium, and zinc): Unacceptable risk is not predicted in the NBSA or individual assessment zones for most metals because whole-body tissue and dietary LOAEL HQs <1 were predicted. As noted above, although liver LOAEL HQs ≥ 1 were estimated for some metals, these HQs were based on NOAELs, and are superseded by whole-body tissue HQs, which do not confirm the liver TRV findings.

7.7.5 Summary of WOE Risk Findings for Fish

Overall, unacceptable risk is predicted for fish potentially exposed to a limited number of COPECs in the NBSA. Based on the WOE, potential for unacceptable risk was identified for dioxins/furans and TEQ (2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish) and all fish receptors, total PCBs for forage fish in the Southwest Zone only, and total DDx for white perch. Potential risk from copper is

considered uncertain for white perch, and this COPEC was recommended as a final COC due to the substantial uncertainty associated with the risk estimates for copper. The LOE for the various fish receptors and COPECs, and overall risk conclusions based on the WOE are summarized in Table 7-24 and discussed below. Fish community monitoring data from the ABS (USACE 2015a, 2015b) found that fish abundance and diversity in the Arthur Kill/Newark Bay were similar or greater than other locations in the NY/NJ Harbor Estuary, and are comparable. Additionally, for all fish evaluated in this BERA, the pathology investigation indicates healthy fish populations within the NBSA. The fish community surveys and pathology investigations support the conclusion of no unacceptable risk presented below for most COPECs and receptors. Conclusions for the fish evaluations are based on the WOE evaluation and are summarized below:

- For localized forage fish (mummichog/killifish):
    - Preliminary COCs included dioxins/furans and TEQ (2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish), total PCB TEQ, total PCBs, total DDx, cadmium, copper, mercury, methylmercury, and silver (based on sensitivity analyses only) based on tissue, dietary, and/or egg LOAEL HQs ≥ 1 estimated for at least one scenario evaluated in this BERA.
    - Unacceptable risk is considered possible for dioxins/furans and TEQ, and for total PCBs in the Southwest Zone only.
        - For dioxins/furans and dioxin/furan and PCB TEQ, the conclusion of unacceptable risk is based primarily on tissue LOAEL HQs greater than 10 based on the LPR FFS TRVs and tissue LOAEL HQs greater than 1 based on the alternative NBSA TRV, and the findings of killifish reproductive impairment in the Bugel et al. (2010, 2011, 2014) study. Other available LOEs (tissue HQs based on NBSA TRVs, egg HQs, and fish pathology) indicate that unacceptable risk is unlikely for forage fish populations.
        - For total PCBs, unacceptable risk is considered unlikely except possibly in the Southwest Zone. These conclusions are based on LOAEL tissue HQs below or near 1 for most scenarios, except in the Southwest Zone where the HQ = 6 using LPR FFS TRVs. Egg LOAEL HQs are below 1 even using a conservative CF =1; and fish pathology does not indicate unhealthy forage fish populations.
    - Unacceptable risk is considered unlikely for the remaining preliminary COCs (total DDx, and some metals [cadmium, copper, mercury, methymercury, and silver]):
        - For total DDx, these conclusions are based primarily on whole-body tissue LOAEL HQs < 1 for most scenarios and low magnitude of the tissue LOAEL HQs ≥ 1 using LPR FFS TRVs. Egg tissue LOAEL HQs < 1 were also predicted for total PCB TEQ using conservative adult-to-egg transfer assumptions, including with the LPR FFS TRVs, which were derived from an egg-based assessment.
        - For cadmium, these conclusions are based on higher confidence in the tissue LOE in which cadmium was not detected in whole-body fish tissue and liver NBSA LOAEL HQs were < 1. The dietary LOAEL HQs ≥ 1 are low in magnitude.
        - For copper, these conclusions are based on conflicting conclusions from two uncertain HQs methods (dietary and tissue HQs). There is substantial uncertainty related to both the tissue

and dietary TRVs; although, both sets of HQs likely overestimate risk. Although tissue LOAEL HQs ≥ 1 were predicted, dietary HQs were < 1, incorporate conservative assumptions (100% worm diet) and were consistent with other LOE, including that fish pathology does not indicate unhealthy forage fish populations. In addition, as reported in the LPRSA BERA (Windward 2019), the background concentration of copper in mummichog collected from Jamaica Bay (by NOAA in 1999) was 4,200 µg/kg. The NBSA forage fish concentrations are at or below this concentration.

- Mercury and methylmercury: Unacceptable risk is considered unlikely. These conclusions are based on whole-body tissue and dietary LOAEL HQs < 1 for most scenarios, low magnitude of the dietary LOAEL HQs, equal to 1 in the Southwest Zone for mercury only, and egg LOAEL HQs < 1 even using a conservative CF =1.
- For silver, these conclusions are based on sediment silver concentrations at or below background. Additionally, tissue and dietary LOAEL HQs < 1 were predicted for most scenarios except a tissue LOAEL HQ equal to 1 in the North Zone. Fish pathology does not indicate unhealthy fish populations.

- For predatory fish (American eel, flounder, and white perch):
  - Fish community monitoring data for these three species (USACE 2015a, 2015b) found no impairment relative to other locations in the NY/NJ Harbor Estuary.
  - Fish pathology data do not indicate unhealthy fish populations in the NBSA.
  - Preliminary COCs, identified based on tissue or dietary LOAEL HQs ≥ 1 for any scenarios evaluated in this BERA, include:
    - For American eel: dioxins/furans and TEQ (2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish), total PCB TEQ, total PCBs, total DDx, cadmium, copper, mercury, methylmercury, and selenium.
    - For summer and winter flounder: dioxins/furans and TEQ (2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish), total PCBs, cadmium, copper, mercury, and methylmercury (based on sensitivity analyses only).
    - For white perch: dioxins/furans and TEQ (2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish), total PCB TEQ, total PCBs, total DDx, cadmium, chromium, copper, mercury (based on sensitivity analyses only), selenium, and silver. Additionally, arsenic and zinc were identified as preliminary COCs based only on liver LOAEL HQs ≥ 1; whole body tissue and dietary LOAEL HQs <1 were predicted for arsenic and zinc in all scenarios.
  - Unacceptable risk is considered possible for dioxin/furans and TEQ (all predatory receptors) and for total DDx (white perch only).
    - For dioxins/furans and TEQ, the conclusion of unacceptable risk is based primarily on whole-body tissue LOAEL HQs near or greater than 10 for all scenarios based on the LPR FFS TRVs. For white perch, whole body tissue LOAEL HQs ≥ 1 were also predicted in some cases using NBSA TRVs; however, tissue LOAEL HQs < 1 were predicted for eel and

flounder. Other available LOEs (tissue HQs based on NBSA TRVs, white perch liver HQs, fish community data, and fish pathology) indicate that unacceptable risk is unlikely for fish populations.

- For total DDx, unacceptable risk was considered unlikely for American eel, but possible for white perch. Total DDx was not identified as a preliminary COC for summer/winter flounder. For eel, tissue LOAEL HQs < 1 were predicted in most cases except in the Southwest Zone using LPR FFS TRVs (HQ =1). For white perch, tissue HQs ≥ 1 were predicted in most cases; however, the magnitude of the HQs is low (HQ ≤ 2). Other available LOEs (fish community data and fish pathology) indicate that unacceptable risk is unlikely for fish populations.

o Unacceptable risk is considered unlikely for the remaining preliminary COCs (total PCB TEQ, total PCBs and some metals [arsenic, cadmium, chromium, mercury/methylmercury, selenium, silver, and zinc]):

- For organics (total PCB TEQ and total PCBs), these conclusions are based primarily on whole-body tissue LOAEL HQs < 1 in most cases and low magnitude of the tissue LOAEL HQs ≥ 1 (calculated using LPR FFS TRVs only).

- For arsenic, these conclusions are based on whole body tissue and dietary LOAEL HQs < 1 in all scenarios. Although liver LOAEL HQs ≥ 1 were estimated, these HQs are superseded by whole-body tissue HQs, which do not confirm the liver TRV findings.

- For cadmium, these conclusions are based on higher confidence in the tissue LOE in which cadmium was rarely detected in whole-body fish tissue. The dietary LOAEL HQs ≥ 1 are low in magnitude. Cadmium was not detected in most whole body fish tissue (only in a single flounder sample) and therefore the tissue EPCs used to calculated both tissue HQs and prey tissue EPCs in the dietary HQs likely overestimate exposure.

- For chromium, there is low confidence in both the tissue and dietary TRVs, which both likely overpredict risk. The risk conclusion is based on 1) all dietary LOAEL HQs < 1; 2) tissue LOAEL HQs < 1 for most scenarios (except white perch in the North Zone); 3) low magnitude of the LOAEL tissue HQs ≥ 1.

- For mercury/methylmercury, these conclusions are based on tissue LOAEL HQs < 1 in most scenarios, dietary LOAEL HQs < 1 in most scenarios, and low magnitude of the LOAEL HQs ≥ 1.

- For selenium, these conclusions are based on tissue LOAELs < 1 in most scenarios, dietary LOAEL HQs < 1 in all scenarios, and low magnitude of the tissue LOAEL HQs ≥ 1 (HQ = 1 for eel in the Southeast Zone and white perch in the Southeast Zone). In addition, selenium concentrations in NBSA sediment are likely related to background.

- For silver, these conclusions are based on dietary LOAEL HQs <1 and the low magnitude of the tissue LOAEL HQs, which are greater than 1 only for white perch (whole-body). There is low confidence in the available silver TRVs. Liver HQs for silver based on an unbounded NOAEL are low in magnitude and sediment silver concentrations are less than background.

The HQs greater than 1 likely reflect uncertainty in the TRVs and silver exposures in the NBSA are considered to be related to background conditions.

- For zinc, these conclusions are based on whole body tissue and dietary LOAEL HQs <1 in all scenarios. Although liver LOAEL HQs ≥ 1 were estimated, these HQs are based on NOAEL TRVs and are superseded by whole-body tissue HQs, which do not confirm the liver TRV findings.

o For copper, unacceptable risk is considered uncertain for white perch and unlikely for American eel and summer/winter flounder. For white perch, tissue LOAEL HQs ≥ 1 are predicted in all scenarios and the tissue LOAEL HQs approach or exceed 10 in many cases; however, dietary LOAEL HQs <1 were estimated using conservative dietary assumptions. There is substantial uncertainty related to both the tissue and dietary TRVs; although, both sets of HQs likely overestimate risk. For American eel and summer/winter flounder, NBSA tissue and dietary LOAEL HQs < 1 were estimated and LPR FFS tissue LOAEL HQs ≥ 1 were low in magnitude and were estimated only in the North Zone (flounder) or Southwest Zone (eel).

Based on the results of this BERA, potential exposures to most COPECs in the NBSA are not expected to pose unacceptable risk to fish. As summarized in Table 7-24, the potential for unacceptable risk (identified based on LOAEL HQs ≥1 and WOE supporting the conclusion of unacceptable risk) was identified for dioxin/furans and related TEQ compounds (2,3,7,8-TCDD, total dioxin/furan and PCB TEQ fish) for all fish receptors, total PCBs for forage fish in the Southwest Zone, and possibly for total DDx for white perch in the NBSA. Unacceptable risk is uncertain for white perch exposed to copper.

8 BIRD ASSESSMENT

This section includes the risk assessment for birds in the NBSA. Birds are part of the upper trophic levels of the food web in the Bay. There are three feeding guilds of birds evaluated in this BERA: benthivores (consume benthic invertebrates), piscivores (consume fish), and omnivores (consume plant and animal matter). The representative bird receptors for each of these feeding guilds are listed in Table 3-2 and include spotted sandpiper, great blue heron, double-crested cormorant, and lesser scaup.

The following are the AE and Risk Question for birds that are addressed in this section.

AE: Survival, growth, and/or reproduction of birds.

Risk Question 1: *Does the daily dose of COPECs received by birds (including piscivorous, benthivorous/sediment-probing, omnivorous, invertivorous birds) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of birds?*

Risk Question 1 is addressed by the bird dietary risk assessment and bird egg tissue assessment presented in Section 8.1 and 8.2, respectively. The life history profiles for the bird receptors identified for the tissue and dietary risk assessments are provided in Appendix B. An uncertainties assessment is provided for the overall bird assessment in Section 8.3, and the WOE summary of findings for birds is provided in Section 8.4.

The species selected for assessment in this BERA were identified from historical surveys (Section 2.9) as predominant birds that forage in the NBSA, and some of which may breed in wetlands within the NY/NJ Harbor Estuary, as well as elsewhere within their home range. These birds include species from different feeding guilds, and with different levels of potential exposure to COPECs in sediments and the food web of the system. For these reasons, the assessment provided in this section is fully representative of the potential risks to populations of birds that utilize the NBSA at variable times in their life histories.

8.1 Dietary Assessment

A dietary assessment was conducted for each of the four selected bird species (spotted sandpiper, great blue heron, double-crested cormorant, and lesser scaup). This section describes how exposure and effects concentrations were derived and presents the HQs for the dietary assessment. Section 8.3 presents the uncertainties associated with the dietary assessment for birds. The COPECs evaluated for the bird dietary assessment are listed in Table 3-5 and include: 2,3,7,8-TCDD, total dioxin/furan TEQ, total PCBs (209 congeners), total PCB TEQ, total dioxin/furan/PCB TEQ, pesticides (total chlordane, total DDx, dieldrin, and hexachlorobenzene), total HMW/LMW PAHs and total PAHs, and inorganics (arsenic, cadmium, chromium, copper, lead, mercury/methylmercury, nickel, selenium, silver, and zinc).

8.1.1 Exposure

This section presents the methods for calculating exposure doses, including descriptions of the selection of parameters for the dose equation, composition of prey in diet, exposure areas, and EPCs in prey. The exposure factors used for the bird dietary assessment are presented in Table 8-1.

8.1.1.1 Dietary Dose Model

Dietary doses for birds were estimated based on ingestion of biota (i.e., prey) and the incidental ingestion of sediment. Surface water ingestions was not included in bird dietary assessment because birds were not expected to drink the saltwater of the NBSA. Dietary doses were estimated as milligrams of each COPEC ingested per kilogram of body weight per day using the following equation:

$$ADD_{total} = [(EPC_s * SIR/BW * DF_s) + \Sigma(EPC_k * FIR_k/BW * DF_k)] * SUF \quad \textbf{\textit{Equation 8-1}}$$

where,

ADD_{total} = average daily dose (mg/kg bw/day)

EPC_s = exposure point concentration in sediment (mg/kg, dw)

SIR = ingestion rate for sediment (kg/day, dw)

BW = body weight of organism (kg)

DF_s = dietary fraction of sediment ingested (range 0 to 1)

EPC_k = EPC for the kth food type (mg/kg day, ww)

FIR_k = ingestion rate for the kth food type (kg/day, ww)

DF_k = dietary fraction of intake of the kth food type (range 0 to 1)

SUF = site use factor (unitless); proportion of time the selected species spends foraging in the NBSA

8.1.1.2 Body Weights, Ingestion Rates, Prey Composition, Site Use Factors, Exposure Areas

Body weights and ingestion rates were obtained from the literature for each representative species being modelled. Body weights and ingestion rates for each receptor are presented in Table 8-1. The dietary fraction of each component in each species' diet is based on information obtained from the literature (Appendix B) and are presented in Table 8-1. Prey ingested by bird species were limited to whole-body samples only from prey types for which empirical tissue chemistry data from the NBSA were available (polychaete worm, blue cram, softshell clam, and fish). Great blue heron, double-crested cormorant, and lesser scaup were assumed to consume fish ≤ 15 cm as part of their diet. A sensitivity analysis was also performed to evaluate consumption of larger fish up to 30 cm in length, as described in Section 8.3.

The diet of the spotted sandpiper consists primarily of terrestrial and aquatic invertebrates. Examples of prey consumed includes flies, grasshoppers, crickets, beetles, caterpillars, worms, spiders, fish, crustaceans, and mollusks (Reed et al. 2013). Spotted sandpipers foraging in the NBSA were assumed to have a diet of 100% polychaete worm to represent their invertebrate prey items.

Great blue heron diet is primarily fish, but they may also consume amphibians, reptiles, crustaceans, insects, birds, and mammals (USEPA 1993). Based on an average beak length of 13.5 cm (Vennesland and Butler 2011), Krebs (1974) determined that more than 92% of great blue heron fish prey are small or medium sized (up to about 6.8 cm in length), and the remaining fish prey are greater than or equal to the length of the beak (13.5 cm). Fish up to about 20 cm in length were dominant in the diet of herons

foraging in southwestern Lake Erie and 95 percent of fish consumed by in a Wisconsin population were less than 25 cm in length (USEPA 1993). Based on the information from Krebs (1974), fish ≤ 15 cm were included as 80% of the diet for the NBSA. Because great blue heron are opportunistic foragers and will feed on prey other than fish, the remaining 20% of the diet was assumed to be 10% crab and 10% clam.

Double-crested cormorants eat almost entirely fish, usually slow-moving or schooling species (Dorr et al. 2014). Prey size ranges from 3 to 40 cm, but most commonly less than 15 cm. Therefore, for the NBSA, a diet of 100% fish (≤ 15 cm) was assumed.

Specific components of the lesser scaup diet in winter vary geographically and often reflect local abundance (Anteau et al. 2014). In the winter in the Gulf of Mexico, scaup feed nearly exclusively on surf clams (*Mulinia lateralis*) and other mollusks (Harmon 1962); when wintering in coastal bays and marshes, they feed mainly on midges (46% of total dry weight) and bulrush seeds (36%) (Afton et al. 1991); along the Columbia River in the Pacific Northwest, most of the diet is vegetation (Thompson et al. 1988); and in the Midwest, Jones and Drobney (1986) have reported that scaup consume oligochaete worms in the Detroit River. During the winter, there are no significant differences in diet between juveniles and adults or between males and females (Anteau et al. 2014). Based on a diet of primarily aquatic invertebrates, the diet evaluated in the NBSA included 25% blue crab, 25% softshell clam, 25% polychaete worms, and 25% fish (≤ 15 cm).

While fish, blue crab, and softshell clam data were field collected, the worm tissue data were based on the laboratory bioaccumulation study in which worms were exposed to homogenized sediment collected from the 0 to 15-cm depth horizon.

The SUFs for the representative bird receptors are provided in Table 8-1. Spotted sandpiper is migratory and is expected in Newark Bay only during the breeding season (Reed et al. 2013) and was given an SUF of 0.5. Both great blue heron and double-crested cormorant are expected in Newark Bay year-round (Vennesland and Butler 2011; Dorr et al. 2014) and were given SUFs of 1.0. Lesser scaup breeds in the boreal forests of northern North America and is expected in Newark Bay only during the winter or non-breeding season (Anteau et al. 2014) and was therefore given an SUF of 0.5.

The exposure areas for the receptor bird species are provided in Table 3-3. Spotted sandpiper and great blue heron risk from prey consumption was evaluated NBSA-wide and by assessment zone (North, Southeast, and Southwest Zones) and risk from incidental sediment ingestion was evaluated using sediment samples from NBSA-wide mudflats and mudflats within the individual assessment zones. Risk (from prey and incidental sediment ingestion) to double-crested cormorant and lesser scaup were evaluated NBSA-wide and by assessment zone. Spotted sandpiper and lesser scaup included polychaete worm as a portion of their diet; however, polychaete worm sample size was not large enough to be evaluated by assessment zone. Therefore, NBSA-wide UCL EPCs were used to represent polychaete worm inputs to the food web models. See Tables 4-10 and Figure 4-4 for sediment samples assigned to each assessment zone and mudflats, and Table 4-11 for tissue samples assigned to each assessment zone.

8.1.1.3 Exposure Point Concentrations

EPCs were calculated for each of the two modeled media types (prey and sediment) to calculate dietary doses using Equation 8-1. For prey concentrations, EPCs were calculated separately for each of the prey

types for each species (worms, blue crab, softshell clam, fish ≤ 15 cm) as the UCL for each prey group. EPCs for prey were calculated NBSA-wide and by assessment zone (except polychaete worm, where EPCs were calculated NBSA-wide only due to limited sample size). For sediment, the EPCs were equal to the UCLs using data from the relevant exposure areas for each bird species. UCL concentrations were calculated using USEPA's ProUCL® statistical package (Version 5.1) (USEPA 2015b).[9] For each dataset with fewer than six detected samples or fewer than six total samples, a UCL was not calculated; instead, the maximum detected concentration was used as the EPC. If no samples were detected, then the maximum non-detect value was used as the EPC. The sediment and biota tissue data used in the bird dietary assessment are summarized in Section 4.4. The EPCs calculated for the bird dietary assessment are presented in Appendix C (Table C-1 for sediment, C-2 for fish ≤ 15 cm, C-3 for fish ≤ 30 cm, C-4 for polychaetes, C-5 for softshell clam, and C-6 for blue crab).

8.1.1.4 Estimated Doses

Dietary doses were calculated based on Equation 8-1 using the prey and sediment ingestion rates, species body weights, and the prey composition from Table 8-1 and the EPCs from Appendix C. These doses are presented in Appendix E.

8.1.2 Effects

Dietary bird TRVs for the COPECs identified in Table 3-5 are provided in Table 8-2, and discussed in detail in Appendix D. The selected TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019) and are consistent with the Final LPRSA BERA TRVs for COPECs common to both areas (NBSA and LPRSA). For the LPRSA BERA, Windward (2019) conducted a literature search for relevant toxicological studies, and derived acceptable NOAELs and LOAELs. The lowest acceptable LOAEL and highest NOAEL below the LOAEL from the same study were selected. Several NBSA COPECs were not evaluated in the LPRSA BERA bird dietary risk assessment including arsenic, silver, dieldrin, total chlordane, and hexachlorobenzene. TRVs for arsenic, dieldrin, total chlordane, and hexachlorobenzene were included in the LPRSA BERA and SLERA TRV databases (Windward 2019) and were evaluated in the TRV selection process for this BERA. A silver TRV based on USEPA (1997) was selected. The selected NBSA TRVs for these additional COPECs are further discussed in Appendix D.

In addition, bird dietary TRVs from the LPR FFS (USEPA 2014) were also evaluated and are included in Table 8-2. The LPR FFS bird dietary TRVs are available for 2,3,7,8-TCDD, total PCBs, total DDx, dieldrin, LMW PAH, HMW PAH, copper, lead, and mercury/methylmercury. They were not available for total chlordane, hexachlorobenzene, arsenic, cadmium, chromium, nickel, selenium, silver, zinc, or total PAH.

8.1.3 Risk Characterization

This section presents the comparison of bird dietary doses to NBSA BERA and LPR FFS TRVs to calculate HQs for spotted sandpiper, great blue heron, double-crested cormorant, and lesser scaup. NBSA-wide NOAEL and LOAEL HQs for the bird dietary assessment based on NBSA BERA TRVs are

[9] The UCL recommended by USEPA's ProUCL® software (typically the 95% UCL, but in some cases the 97.5% or even the 99% UCL) was used. The selected UCL statistic is presented in Appendix C-1.

presented in Table 8-3a. Assessment zone (i.e., North, Southeast, and Southwest Zones) NOAEL and LOAEL HQs based on NBSA BERA TRVs are presented in Tables 8-3b through 8-3d. LPR FFS HQs are also presented in Tables 8-3a through 8-3d; Appendix E provides calculated HQs for the each COPEC and bird species. A summary of COPECs that exceed their TRVs (i.e., HQs that equal or exceed 1) is provided in Table 8-4.

LOAEL HQs ≥ 1 were estimated for one or more avian receptors for total PCB TEQ bird, total dioxin/furan/PCB TEQ bird, total DDx, lead, and mercury/methylmercury. For 2,3,7,8-TCDD, total dioxin/furan TEQ bird, total PCBs, total HMW PAH, and copper NOAEL HQs ≥ 1 and LOAEL HQs < 1 were estimated. The remaining COPECs (i.e., most inorganics/metals [arsenic, cadmium, chromium, nickel, selenium, silver, and zinc], LMW PAHs, total PAHs, dieldrin, total chlordane, and hexachlorobenzene) resulted in NOAEL HQs < 1 for all bird receptors evaluated.

Table 8-4. Summary of TRV Exceedances for Bird Dietary Assessment

Constituents	NBSA HQs ≥ 1															
	Spotted Sandpiper								Great Blue Heron							
	NBSA-wide		North		SE		SW		NBSA-wide		North		SE		SW	
	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans																
2,3,7,8-TCDD		○		○		○		○		○		○		○		
Total Dioxin/Furan TEQ Bird		○		○		○		○		○		○		○		○
Polychlorinated Biphenyls																
Total PCBs									○		○				○	
Total PCB TEQ Bird		○		○		○		○	○	○	○	○	○	○	○	○
Total Dioxin/Furan/PCB TEQ Bird		○		○		○	○	○	○	○	○	○	○	○	○	○
Pesticides																
Total DDx (2,4 & 4,4)									○	●	○	●	○	●	○	●
Dieldrin																
Total Chlordane		--		--		--		--		--		--		--		--
Hexachlorobenzene		--		--		--		--		--		--		--		--
Polycyclic Aromatic Hydrocarbons																
Total HMW PAH	--	○	--		--	○	--	○	--		--		--		--	
Total LMW PAH	--		--		--		--		--		--		--		--	
Total PAH		--		--		--		--		--		--		--		--
Inorganics																
Arsenic		--		--		--		--		--		--		--		--
Cadmium		--		--		--		--		--		--		--		--
Chromium		--		--		--		--		--		--		--		--
Copper							○									
Lead		●		○		○	○	●		○		○		○		○
Mercury	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	
Methylmercury									○	○	○	○	○	○	○	○
Nickel		--		--		--		--		--		--		--		--
Selenium		--		--		--		--		--		--		--		--
Silver		--		--		--		--		--		--		--		--
Zinc		--		--		--		--		--		--		--		--

Notes: ● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1; -- = not calculated; COPECs evaluated that did not have any exceedances are not shown.

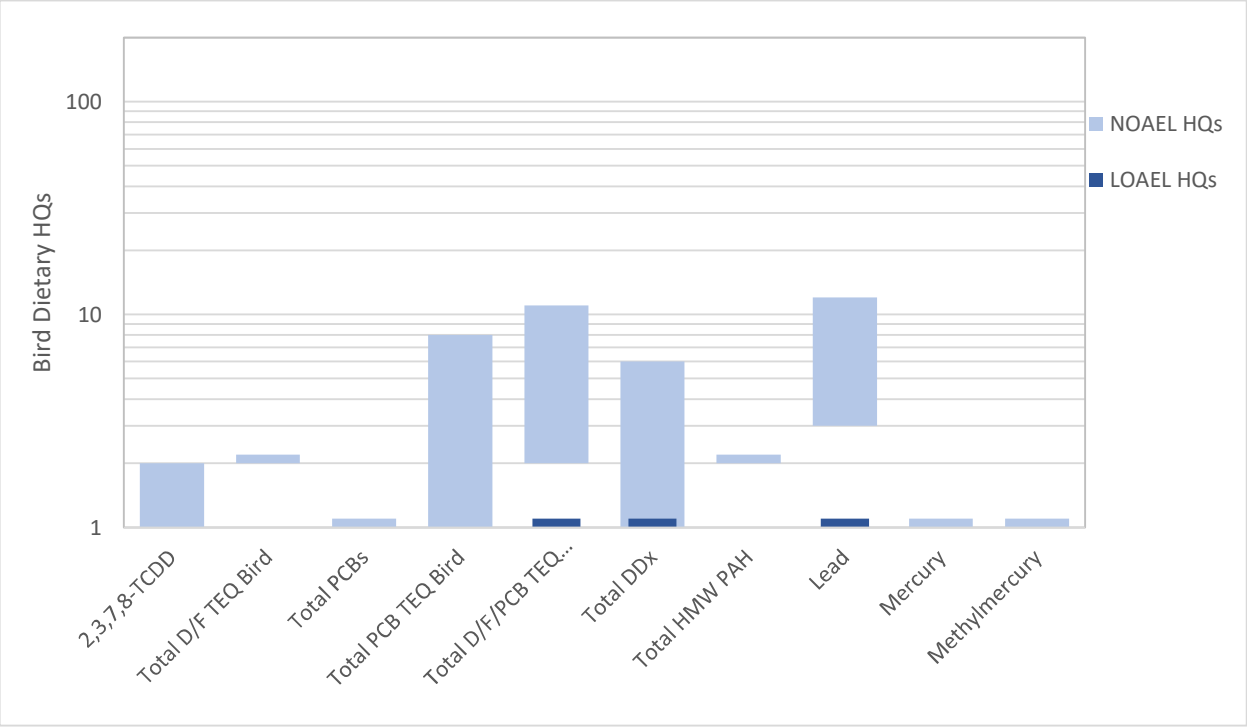
Table 8-4. Summary of TRV Exceedances for Bird Dietary Assessment (cont.)

Constituents	NBSA HQs ≥ 1															
	Double-Crested Cormorant								Lesser Scaup							
	NBSA-wide		North		SE		SW		NBSA-wide		North		SE		SW	
	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans																
2,3,7,8-TCDD		○		○		○		○								
Total Dioxin/Furan TEQ Bird		○		○		○		○				○				
Polychlorinated Biphenyls																
Total PCBs	○		○		○		○	○								
Total PCB TEQ Bird	○	○	○	○	○	○	○	●		○		○		○		○
Total Dioxin/Furan/PCB TEQ Bird	○	●	○	●	○	●	○	●		○		○		○		○
Pesticides																
Total DDx (2,4 & 4,4)	○	●	○	●	○	●	○	●				○				○
Dieldrin																
Total Chlordane		--		--		--		--		--		--		--		--
Hexachlorobenzene		--		--		--		--		--		--		--		--
Polycyclic Aromatic Hydrocarbons																
Total HMW PAH	--		--		--		--		--		--		--		--	
Total LMW PAH	--		--		--		--		--		--		--		--	
Total PAH		--		--		--		--		--		--		--		--
Inorganics																
Arsenic		--		--		--		--		--		--		--		--
Cadmium		--		--		--		--		--		--		--		--
Chromium		--		--		--		--		--		--		--		--
Copper																
Lead				○						○		○		○		●
Mercury	○	○	○	○	○	○	○				○					
Methylmercury	○	○	○	○	○	●	○	○								
Nickel		--		--		--		--		--		--		--		--
Selenium		--		--		--		--		--		--		--		--
Silver		--		--		--		--		--		--		--		--
Zinc		--		--		--		--		--		--		--		--

Notes: ● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1; -- = not calculated; COPECs evaluated that did not have any exceedances are not shown.

The range of HQs for the aggregate bird dietary exposure estimates (i.e., all species) with HQs ≥ 1 are depicted in Figure 8-1.

Figure 8-1. NBSA-wide Magnitude of NOAEL and LOAEL HQs ≥ 1 for Bird Dietary Assessment



8.2 Egg Tissue Assessment

The potential risks to bird eggs from maternal dietary exposure were evaluated for piscivorous birds, represented by the double-crested cormorant, in the NBSA. A NBSA-specific study was conducted by the Manomet Center for Conservation Science in 1999 (Parsons 2003) on contaminants in bird eggs and measures of related reproductive success on Shooters Island, the only known bird breeding site in the Bay. This study is provided as Attachment 6.

Parsons (2003) analyzed samples of double-crested cormorant eggs, blood, and feathers for various chemical parameters (e.g., dioxins/furans, PCBs, pesticides, PAHs, and metals) from three islands throughout the NY/NJ Harbor Estuary, including Shooters Island in the Bay. The objectives of the study were to determine if concentrations of chemicals were present in the birds at levels of concern, and to determine if there was any correlation between the concentrations of the chemicals and reproductive success in the population.

For the BERA bird egg tissue assessment, double-crested cormorant egg tissue data collected by Parsons (2003) were compared to available bird-egg based tissue TRVs from the literature. In addition, the COPECs analyzed in the study for which egg TRVs are not available were assessed in the context of the study findings with respect to the measured reproductive endpoints, most notably hatching and fledgling success of the eggs/fledglings. COPECs for piscivorous bird egg tissue are listed in Table 3-5 and include: 2,3,7,8-TCDD, total dioxin/furan TEQ, total PCBs, total PCB TEQ, total dioxin/furan/PCB TEQ, pesticides (total chlordane, total DDx, dieldrin, and hexachlorobenzene), and mercury/methylmercury.

8.2.1 Exposure

COPEC concentrations in bird eggs were taken from the Parsons (2003) study of double-crested cormorants in Newark Bay. In 1999, egg samples were collected from a double-crested cormorant colony located on Shooters Island in Newark Bay. Reproductive endpoints were assessed in a total of 61 nests in that colony and 20 of those nests were chosen for egg sample collection. One intact, newly laid egg was collected from the selected study nests in each colony and were analyzed for dioxins/furans, PCBs, chlorinated pesticides, PAHs, cadmium, and mercury/methylmercury. Eggs were also collected from two other islands, Gardiner's Island, located in Long Island Sound and considered a control, and Swinburne Island, located in lower New York Harbor for comparison.

Double-crested cormorant egg tissue data used in this evaluation were taken from the data tables in Parsons (2003). Total dioxin/furan TEQ and total dioxin/furan/PCB TEQ were calculated using the methods described in Section 4.2.3 and the data provided in Parsons (2003). Summary COPEC concentrations and selected EPCs for the bird egg assessment are presented in Appendix C.

8.2.2 Effects

Bird egg TRVs for dioxins/furans, PCBs, total DDx, and mercury/methylmercury are provided in Table 8-5 and discussed in detail in Appendix D. These TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019) and are consistent with the Final LPRSA BERA TRVs. In addition, bird egg TRVs from the LPR FFS (USEPA 2014) were also included for comparison with the NBSA-selected TRVs. LPR FFS bird egg TRVs were not available for mercury/methylmercury or total PCBs. Bird egg TRVs were not found for other pesticides such as chlordane, dieldrin, or hexachlorobenzene. Further discussion of the bird egg TRVs is in Appendix D.

In addition to the TRV-based assessment, the field-based study results presented in Parsons (2003) are included to assess the potential risks from the various COPECs measured in the study. This is an important LOE for this BERA, as the study evaluated the nesting and reproductive success of the birds investigated and measured their actual exposure (i.e., egg concentrations) to the COPECs in the system.

8.2.3 Risk Characterization

Bird egg HQs were calculated from data in Parsons (2003) and the NBSA TRVs identified in Table 8-5. Bird egg HQs are presented in Table 8-6, and the full HQ calculations are presented in Appendix E. LOAEL bird egg HQs were ≥ 1 using both the NBSA and LPR FFS TRVs for the following COPECs: total PCBs, total PCB TEQ, total dioxin/furan/PCB TEQ, and total DDx. Mercury and methylmercury LOAEL HQs were ≥1 for the LPR FFS TRV only. For 2,3,7,8-TCDD and total dioxin/furan TEQ, NOAEL HQs ≥ 1 and LOAEL HQs < 1 were estimated.

Tissue samples collected from birds on Shooters Island generally contained higher concentrations of COPECs than tissues collected from birds on the other two islands (Swinburne and Gardiner's Islands). However, no correlation was found between double-crested cormorant reproductive success (e.g., egg production, hatching success, and chick survival) and COPEC concentrations among the three islands (Table 8-7; Parsons 2003). Eggs from many of the study nests on both Gardiner's and Shooters Islands failed to hatch as a result of being lost from the nest—suggesting predation was a major cause of nest failure. No differences were detected among islands in the proportion of young that died in or near the

nest (typically considered to be inviable nestlings) and the proportion of young missing from the nest (considered to have been predated). The authors themselves noted that there were no associations between the COPECs measured in bird eggs (or blood and feathers) and reproductive success. Given that chemical contamination levels in the NBSA (as measured in sediments by the USEPA's REMAP between 1993 and 2013; Appendix A) have declined in the past two decades, it is likely that COPEC exposures of birds foraging in the Bay have also declined. The Parsons (2003) study, as such, likely represents a conservative estimate of potential present-day risks.

Table 8-7. Reproductive Endpoints for Double-Crested Cormorant Examined in Parsons (2003)

Reproductive Endpoint	Location	Number of Nests	Significance (Chi-square test)	Conclusion
Hatching Success	Gardiners Island (Control)	14	P=0.001	No impacts to Shooters Island hatching success relative to control
	Shooters Island	38		
	Swinburne island	3		
Hatching Failure	Gardiners Island (Control)	16		
	Shooters Island	3		
	Swinburne island	0		
Fledging Success	Gardiners Island (Control)	5	P=0.0007	No impacts to Shooters Island fledge success relative to control
	Shooters Island	30		
	Swinburne island	24		
Fledging Failure	Gardiners Island (Control)	9		
	Shooters Island	8		
	Swinburne island	3		

8.3 Uncertainties Assessment

This section contains the uncertainties assessment for the bird risk assessment. Both quantitative and qualitative characterizations are provided for the dietary and egg assessments presented in Sections 8.1 and 8.2, respectively. The objective of the uncertainty assessment is to provide perspective on the likely accuracy of the overall risk conclusions that are presented in Section 8.4.

Sources of uncertainty that influenced bird risk characterization included uncertainties in the analytical results, data evaluation, CSM, exposure assessment, effects assessment, and interpretation of the risk estimates to make conclusions regarding potential for unacceptable population-level risk. Many of these sources of uncertainty are generic in nature and inherent in the risk assessment process.

Inherent practices in risk assessment result in exposure estimates that are biased high in order to be reasonably conservative include:

- The use of an upper exposure value (i.e., 95% UCL) to calculate dietary exposure concentrations
- The use of a maximum values in the place of a UCL when limited data are available
- The assumption that a bird species feeds exclusively or is getting all of its seasonal and lifetime exposure to COPECs, from the NBSA (i.e., SUF = 1)

- The assumption that COPECs are 100% bioaccessible via dietary uptake (dermal absorption via the gut).

As a result, risk estimates are expected to be overestimated rather than underestimated in this BERA.

For risk estimates based on dietary and egg tissue HQs, TRVs are a key source of uncertainty in the risk estimates and are discussed below or in Appendix D, as relevant. Additional sources of uncertainty were identified and evaluated either quantitatively or qualitatively. Table 8-8 presents a summary of the quantitative uncertainty evaluations conducted for birds for the dietary and egg assessments and their associated effect on risk estimates. Risk calculations and HQs based on the quantitative uncertainty evaluations are presented in Appendix F and discussed in the following sections. Qualitative evaluations were also conducted and are presented below in their respective sections.

Table 8-8. Summary of Quantitative Bird Uncertainty Evaluations

Species	General Uncertainty Evaluated	Specific Evaluation Conducted	Difference in HQ Values	Effect on Risk Conclusions[a,d]
Bird Dietary Assessment				
Spotted sandpiper	SUF of 0.5	HQs recalculated using SUF of 1	HQs increase (100%)	Total Dioxin/Furan/PCB TEQ Bird LOAEL HQ based on LPR FFS TRVs changed from < 1 to ≥ 1 for Southwest Zone only; mercury LOAEL HQ based on LPR FFS TRVs changed from < 1 to ≥ 1 for NBSA-wide, North, Southeast Zones
Spotted sandpiper; Lesser scaup	NBSA-wide Polychaete worm EPCs used	Representative COPEC re-evaluated using sediment-to-worm regression and zone sediment EPCs	HQs decrease (≤ 0.1)	No change
All	Treatment of NDs as zero for EPC calculation	EPCs recalculated using half or full DL	HQs increase (< 0.2)	Increase in HQs to ≥ 1 for Total Dioxin/Furan/PCB TEQ using ND=1 in NBSA-wide, North, Southeast Zones for sandpiper. Increase in HQs to ≥ 1 for Total HMW PAHs using ND=1/2 and ND=1 in North Zone for sandpiper.
Great blue heron	Fish prey size of <15 cm assumed	EPCs recalculated using all prey fish	HQs increase (<1)	North Zone: Increase HQs to ≥ 1 for mercury, methylmercury, Total PCB TEQ, and Total Dioxin/Furan/PCB TEQ using LPR FFS TRVs

Species	General Uncertainty Evaluated	Specific Evaluation Conducted	Difference in HQ Values	Effect on Risk Conclusions[a,d]
Double-crested cormorant	Fish prey size of <15 cm assumed	EPCs recalculated using all prey fish	HQs increase (<1)	NBSA-wide: Increase HQs to ≥ 1 for mercury, methylmercury using LPR FFS TRVs North Zone: Increase HQs to ≥ 1 for Total PCB TEQ, mercury, methylmercury using LPR FFS TRVs Southeast Zone: Increase HQs to ≥ 1 for mercury using LPR FFS TRVs Southwest Zone: Increase HQs to ≥ 1 for Total PCB TEQ, copper, mercury, methylmercury
Great blue heron diet	Effect of including fish > 30 cm in dietary risk assessment	Following alternative diets evaluated: A: 100% fish > 30 cm B: 10% clam; 10% crab; 75% fish ≤ 15 cm; 5% fish > 30 cm C: 10% clam; 10% clam; 70% fish ≤ 15 cm; 10% fish > 30 cm	No change	Diet A: NBSA-wide and all zones increase HQs to ≥ 1 for mercury, methylmercury using LPR FFS TRVs. No change for Diets B or C
Lesser scaup	Effect of including fish in dietary risk assessment	Following alternative diets evaluated: A: 25% crab; 25% clam; 50% worm B: 25% crab; 50% clam; 25% worm C: 75% clam; 25% worm	HQs increase (< 0.2)	No change for Diets A or B Diet C; NBSA-wide lead LOAEL HQs based on LPR FFS TRVs increased to HQ ≥ 1
Bird Egg Assessment				
Double-crested Cormorant	TEQ TRV Based on 5th Percentile SSD	HQs re-calculated using species-specific TRV	HQs decrease 20-40x	LOAEL HQs all < 1

Notes:
a. Based on LOAEL HQs ≥ 1.
b. Double-crested cormorant only.
c. Great blue heron only
d. All results of the sensitivity analyses are provided in Appendix F.

Additionally, relatively large exposure areas were evaluated in this BERA, including the NBSA-wide area and individual assessment zones. While these areas are appropriate for risk assessment, especially for population-level assessment of bird communities, evaluation of smaller features, such as individual wetlands or mudflats, may be required in the FS. The uncertainty associated with applying the results of the NBSA-wide and assessment zone conclusions to localized areas within the NBSA is considered to be low for populations of mobile receptors such as most birds. For species with higher site fidelity (e.g., spotted sandpiper and great blue heron), this uncertainty was reduced by evaluating mudflat areas instead of the larger assessment zones in the mummichog dietary assessment, which assumed incidental

ingestion of mudflat sediment and ingestion of the dietary fraction of worm tissue estimated using bioaccumulation testing data collected from mudflat locations.

8.3.1 Bird Dietary Risk Characterization Uncertainties

Dietary exposure modeling has been a well-established practice for wildlife (avian and mammalian) risk assessments (USEPA 1993; Sample et al. 1997) and oral doses are a common method of evaluating contaminant exposure. However, there are specific uncertainties related to the dietary risk estimates for birds in this BERA, including factors related to both exposure and effects assumptions as discussed below. Uncertainties that were evaluated quantitatively are summarized above in Table 8-8.

8.3.1.1 Avian Toxicology/TRVs

A key uncertainty associated with the avian dietary risk characterization is the selection of TRVs used in the risk calculations. As noted in Section 3.5 and at the request of USEPA, two sets of TRVs were evaluated to maintain consistency and allow comparison between regional BERAs.

In general, dietary TRVs were selected to be protective of either the 5th percentile of a SSD or the lowest acceptable LOAEL based on single studies reviewed. Thus, they tend to err on the side of over predicting risk. As a result, this section focuses on the TRV uncertainty for those COPECs where LOAEL HQs ≥ 1, which was the case only for lead, mercury, methylmercury, total DDx, total PCB TEQ bird, and total PCB dioxin TEQ bird using LPR FFS dietary TRVs. For all COPECs and receptors, dietary LOAEL HQs were less than 1 when NBSA TRVs were used. Each of the NBSA TRVs was the same as was used in the LPRSA BERA (Windward 2019). General uncertainties associated with TRVs for all COPECs are discussed in Appendix D.

The NBSA TRVs for methylmercury and total DDx are considered to be more robust and less uncertain than the LPR FFS TRVs because the NBSA TRVs were based on SSD and those SSDs include species known or potentially resident in the NBSA (mallard, kestrel, great egret, double-crested cormorant). Six species were used in the development of the methylmercury SSD and 10 species were used in the development of the total DDx SSD, whereas the LPR FFS TRVs are based on data for a single species. For methylmercury, the LPR FFS TRVs include an uncertainty factor to account for interspecies sensitivity and are based on a form of mercury unlikely to be present in the NBSA. For total DDx, the LPR FFS TRVs are based on data from a field study with pelicans that does not provide a clear dose-response relationship. For mercury, the NBSA and LPR FFS TRVs evaluated in this BERA are based on the methylmercury TRVs. There is uncertainty in this approach, which is assumed to overestimate toxicity of mercury to birds.

For lead, four studies were found sufficient in the LPRSA for determining a lead dietary TRV for birds, but this was an insufficient number to develop a TRV. The lowest LOAEL (28 mg/kg bw-day) was selected as the LOAEL TRV and represented a 10% decrease in body weight compared to the control where the test species was Japanese quail (Morgan et al. 1975). Because is it not known whether a reduction in body weight is sufficient to alter reproduction or survival, this TRV likely overestimates risk. The TRV used in the LPR FFS was also based on Japanese quail as the test species, but the endpoint evaluated was egg production. Domesticated species such as quail are bred to have very high egg-laying rates, and it is not evident that the same concentration would reflect adverse effects on reproduction in wild birds. Both sets

of TRVs are based on Japanese quail exposed to lead acetate, a soluble form of lead that potentially overestimates bioavailability and toxicity of lead in the NBSA.

There are very limited avian toxicity data available for dioxin/furans. A study by Nosek et al. (1992) was selected as the basis for both the LPRSA /NBSA and LPR FFS TRVs. Nosek et al. (1992) measured adverse effects (mortality, growth, and reproduction) in ring-necked pheasants exposed to 2,3,7,8-TCDD via intra-peritoneal injection. The LPRSA/NBSA BERA selected the LOAEL (nanograms per kilogram per day [ng/kg-day]) as the LOAEL TRV, whereas the LPR FFS applied an uncertainty factor of 5 to the LOAEL to account for interspecies sensitivity resulting in a LOAEL TRV of 28 ng/kg-day. The domestic chicken, which has the Type I AhR receptor (high sensitivity), is the most sensitive species known to TEQ-mediated toxicity. Ring-necked pheasants have moderate sensitivity (Type II AhR receptor) to dioxin-like compounds. Most wildlife species have not been shown to be as sensitive to dioxins/furans as chickens. Specifically, more than 85 wild species have been genetically sequenced to date. Gray catbird is the only wild species tested by Farmahin et al. (2012) and subsequently by Eng et al. (2014) that is identified as high sensitivity and has been observed in the NBSA. Other wild birds known to be present in the NBSA are known (or assumed based on phylogenetic relationships) to have moderate to low sensitivity to the dioxin-like compounds. Thus, application of an uncertainty factor to account for interspecies sensitivity likely overestimates risk to most resident bird species in the NBSA. In cases where wild birds have low sensitivity, the selected NBSA LOAEL TRV is expected to overestimate toxicity as well. Both the LPRSA and LPR FFS used an uncertainty factor of 10 to estimate NOAEL TRVs from the LOAEL TRVs.

The lack of available TRVs for some pesticides such as chlordane, dieldrin, and hexachlorobenzene is an uncertainty in the egg assessment, as a HQ analysis cannot be performed. However, pesticide analyses were included in the Parsons (2003) study in the NBSA, and the potential integrated effects of these compounds is assessed as part of that study. As such, an adult bird HQ assessment using literature TRVs would not likely change the outcome of this assessment.

8.3.1.2 Exposure Assumptions

In this section, uncertainties specific to the NBSA dietary exposure assessment were identified and were evaluated quantitatively or qualitatively to assess potential impact on the risk estimates presented above.

Uncertainties related to the selected SUFs, polychaete worm EPCs, treatment of non-detects in calculated mixture totals (e.g., total PCBs), and prey fish size were quantitatively evaluated. These uncertainties are discussed below and summarized in Table 8-8. Other uncertainties, discussed below, were qualitatively assessed.

8.3.1.2.1 Site Use Factors

A SUF of 0.5 was applied to exposure estimates for the spotted sandpiper and lesser scaup to account for seasonal breeding migration for these species. The SUFs were selected based on data from the literature and bird species observed during surveys of the NBSA. The SUF does not account for the species foraging range when present in the NBSA, and therefore potentially overestimates exposure. Use of the SUF is reasonable and appropriate based on the known migration patterns of these species and limited habitat found within the NBSA.

An alternate SUF of 1 was evaluated for spotted sandpiper, which results in additional COPECs with LOAEL HQs ≥ 1. When spotted sandpiper dietary food web models were analyzed using a SUF = 1 rather than 0.5, the Southwest Zone Total Dioxin/Furan/PCB TEQ bird LOAEL HQ based on LPR FFS TRVs changed from < 1 to ≥ 1. The mercury LOAEL HQs based on LPR FFS TRVs changed from < 1 to ≥ 1 for NBSA-wide, North Zone, and Southeast Zone. The results of this sensitivity analysis are summarized in Table 8-8. Detailed HQ tables from this sensitivity analysis on the effect of the SUF on dietary risk are presented in Appendix F.

8.3.1.2.2 Polychaete Worm EPCs

The polychaete worm tissue EPCs used in the food web models were based on the laboratory bioaccumulation study in which worms were exposed to homogenized sediment collected from the 0 to 15-cm depth horizon. Uncertainties related the representativeness of these bioaccumulation tests for estimating dietary exposures are discussed in Section 7.6.3.3. Spotted sandpiper and lesser scaup included polychaete worm as a portion of their diets; however, polychaete worm tissue sample size was not large enough to be evaluated by assessment zone. Therefore, risk from ingestion of polychaete worms were assessed using the NBSA-wide EPCs in the assessment zone risk calculations for these species.

A regression analysis was performed to assess the relationship between sediment concentrations and polychaete worm tissue concentrations, using 2,3,7,8-TCDD as an example COPEC. There was a strongly significant relationship between sediment and polychaete worm tissue 2,3,7,8-TCDD concentrations ((r^2 = 0.91, p=0.0002; Figure 8-2). The regression equation from this analysis was used to predict polychaete worm 2,3,7,8-TCDD concentrations from sediment concentrations. The predicted polychaete worm tissue concentrations were then used in the food web models used to calculate NBSA-wide and assessment zone risk HQs.

There was no change in 2,3,7,8-TCDD HQs for spotted sandpiper or lesser scaup when using the actual polychaete worm tissue data or the predicted worm tissue data derived from the relationship between sediment and worm tissue concentrations. The results of this sensitivity analysis are summarized in Table 8-8. Detailed HQ tables from this sensitivity analysis on the effects on dietary risk of using a sediment to tissue regression to predict worm tissue concentrations are presented in Appendix F.

8.3.1.2.3 Treatment of Non-Detects

The concentrations of summed components (e.g., PCB congeners) that were not detected were assumed to be zero when calculating mixture totals. The effect of using one-half the quantitation limit or the full quantitation limit was evaluated. There were no changes from LOAEL HQ < 1 to HQ ≥ 1 for NBSA-wide and zone HQs regardless of how non-detected values in sums were treated (either as zero, one-half the quantitation limit, or the full quantitation limit). The results of this sensitivity analysis are summarized in Table 8-8. Detailed HQ tables from this sensitivity analysis on the treatment of non-detects are presented in Appendix F.

8.3.1.2.4 Lesser Scaup Diet

Although consistent with the USEPA-approved NBSA BERA-recommended exposure factors memorandum (Arcadis 2016), the lesser scaup do not typically include fish in their diet due to beak morphological constraints. The original diet examined in this BERA was 25% blue crab, 25% softshell clam, 25% polychaete worms, and 25% fish (≤ 15 cm). The impact of including fish in the diet of the lesser scaup was evaluated with the following alternative lesser scaup diets in the sensitivity analysis;

- A: 25% crab; 25% clam; 50% worm
- B: 25% crab; 50% clam; 25% worm
- C: 75% clam; 25% worm.

The only effect was that the NBSA-wide Lead LOAEL HQs based on LPR FFS TRVs changed from HQ < 1 to HQ ≥ 1 when lesser scaup diet was assumed to be 75% clam and 25% worm. No other changes to HQs occurred as a result of different lesser scaup diets. The results of this sensitivity analysis are summarized in Table 8-8. Detailed HQ tables from this sensitivity analysis on the lesser scaup diet are presented in Appendix F.

8.3.1.2.5 Fish Prey Size

Fish lengths included in diet composition were based on data from the literature. Only fish < 15 cm were included in the fish dietary components for great blue heron (80% of diet included fish < 15 cm) and double-crested cormorant (100% of diet included fish < 15 cm). These diet assumptions exclude several larger fish samples.

(i) Fish Prey Size – fish < 15 cm and all fish

Heron and double-crested cormorant dietary food web models were evaluated using all fish samples to assess this uncertainty and the following changes occurred:

- For great blue heron:
  - NBSA-wide – no changes.
  - The North Zone LPR FFS LOAEL HQs for total PCB TEQ bird, total dioxin/furan/PCB TEQ bird, mercury, and methylmercury changed from < 1 to ≥ 1 after including all fish in the diet
  - The North Zone LPR FFS LOAEL HQs for mercury changed from < 1 to ≥ 1 after including all fish in the diet
  - Southwest Zone - no changes.
- For double-crested cormorant:
  - NBSA-wide LPR FFS LOAEL HQ for mercury and methylmercury changed from < 1 to ≥ 1 after including all fish in the diet
  - North Zone LPR FFS LOAEL HQ for methylmercury and Total PCB TEQ Bird changed from < 1 to ≥ 1 after including all fish in the diet
  - Southeast Zone – no changes

- Southwest Zone LPR FFS LOAEL HQs for copper, mercury, and methylmercury changed from < 1 to ≥ 1 after including all fish in the diet. LPR FFS LOAEL HQs for total PCB TEQ -and total dioxin/furan/PCB TEQ changed from ≥ 1 to < 1 after including all fish in the diet.

The calculated EPCs for fish of all lengths used and the summary tables of HQ results from this sensitivity analysis on the effect of including fish of all lengths in the bird dietary risk evaluation are presented in Appendix F.

(i) Fish Prey Size – fish < 15 cm and fish > 30 cm

Heron dietary food web models were evaluated using fish > 30 cm to assess the effects of larger fish on dietary risk. The original diet examined in this BERA was 10% blue crab, 10% softshell clam, and 80% fish (≤ 15 cm). The impact of including fish in the diet of the great blue heron was evaluated with the following alternative great blue heron diets in the sensitivity analysis;

- A: 100% fish > 30 cm
- B: 10% clam; 10% crab; 75% fish ≤ 15 cm; 5% fish > 30 cm
- C: 10% clam; 10% clam; 70% fish ≤ 15 cm; 10% fish > 30 cm.

When the great blue heron diet was assumed to consist of 100% fish > 30 cm, mercury and methylmercury LPR FFS LOAEL HQs increased from < 1 to ≥ 1. There were no changes from LOAEL HQ < 1 to HQ ≥ 1 for NBSA-wide and zone HQs for diets B or C.

The results of this sensitivity analysis are summarized in Table 8-8.

8.3.1.2.6 Other Uncertainties

Additional uncertainties were identified that are not expected to substantially impact the risk estimates. These uncertainties were identified but not quantitatively evaluated:

- Use of TEFs for calculation of TEQ concentrations in dietary models – Avian TEFs are calculated based on egg injection studies or *in vitro* exposures where the exposure conditions are not likely to be representative (in terms of the suite of congeners and their relative concentrations) of the *in vivo* exposures that result from dietary uptake of dioxins and furans (Van den berg et al. 1998). Therefore, dioxin TEQs calculated using bird TEFs are relevant only to tissue data in which dioxin/furan congeners were measured. There is significant uncertainty in the application of bird TEFs to soil data in the dietary models and dioxin TEQ HQs for these receptors may not be predictive of actual risk.
- Modeled diet – Dietary items were limited to prey species with tissue chemistry data available from the NBSA, including bioaccumulation worm, blue crab, softshell clam, and fish tissue, and did not include other prey items that may be additional components of bird diets, such as zooplankton, squid, shrimp, mammals, amphibians, or aquatic and terrestrial plants. In addition to the limited types of prey used in the bird dietary model, the selection of explicit prey portions may not reflect the feeding behavior of some bird species. Therefore, the representativeness of the dietary estimates (based on available prey tissue data) for actual NBSA bird diets is uncertain.
- Food ingestion rate – food ingestion rates for three of the bird receptors were estimated as a function of body weight using equations from Nagy (2001). The food ingestion rate for great blue heron was

based on a model developed by Kushlan (1978) that was also a function of body weight. It is unknown whether the modeled food ingestion rates reflect actual ingestion rates of NBSA birds. The studies used to select ingestion rates have derived these rates using empirical data on birds. The use of these ingestion rate equations for birds is standard practice in Superfund risk assessments, and it is not likely that ingestion rates vary substantially in a manner that would affect risk outcomes.

- Sediment ingestion rate - Measured incidental sediment ingestion rates used for the spotted sandpiper were based on several other sandpiper species. Measured sediment ingestion rates were available for lesser scaup. Sediment ingestion rates for the other species were based on what is known about each species' feeding habitats and best professional judgment. It is unknown whether the estimated sediment ingestion rates reflect actual ingestion rates of NBSA bird receptors.

8.3.2 Bird Egg Tissue Risk Characterization Uncertainties

This section discusses uncertainties associated with EPCs and selected TRVs that could affect HQ calculations for bird eggs. The uncertainty analysis presented in this section includes qualitative discussions and, in some cases, quantitative evaluations intended to convey the magnitude and direction of uncertainty in the risk estimates. Although many of the generic sources of uncertainty discussed above in the dietary assessment for birds also apply to the bird egg assessment, there are some important differences, including:

- Tissue EPCs – The use of egg tissue eliminates many uncertainties associated with estimating exposure doses, such as uncertainties in the diet composition, SUF, and food and sediment ingestion rates because COPEC concentrations are measured directly in egg tissue.
- Dioxin/furan TEFs – Bird TEFs are calculated based on egg injection studies where the exposure conditions are not likely to be representative (in terms of the suite of congeners and their relative concentrations) of the *in vivo* exposures that result from dietary uptake of dioxins and furans (Van den berg et al. 1998). Therefore, dioxin TEQs calculated using bird TEFs are relevant only to tissue data in which dioxin/furan congeners were measured. Thus, the egg TEQ concentrations have lower uncertainty than the TEQ exposure doses predicted in the dietary assessment for birds.
- Use of egg COPEC and reproductive success data from Parsons (2003) for assessment – While there is uncertainty in relying on a single field study for risk assessment due to the potential for multiple contaminant exposure and the effects of site foraging fidelity behavior by cormorants on exposure, this particular study is important because it: 1) focused on an upper trophic level bird that is likely most exposed to COPECs in the NBSA; 2) was robust in terms of the data collected, inclusions of multiple study sites and reference conditions, number of nest monitored; and 3) was definitive in terms of its findings with respect to reproductive success of the monitored nests. Given that the endpoints measured are of direct important to the AE for birds for this BERA, the uncertainties associated with its use for risk characterization are considered low.

Uncertainties specific to the egg tissue risk estimates for birds in this BERA are discussed below.

8.3.2.1 Egg Tissue TRVs

Similar to the dietary assessment, a key uncertainty associated with the avian egg risk characterization is the selection of TRVs used in the risk calculations.

Consistent with the approach used to select dietary TRVs discussed in Section 8.3.1.1, the egg tissue TRVs derived for this BERA were selected to overestimate rather than underestimate risk. As a result, this section focuses on the TRV uncertainty for those COPECs where egg LOAEL HQs ≥ 1, which was the case only for mercury and methylmercury (LPR FFS TRVs only), total DDx, total PCBs, total PCB TEQ bird, and total PCB/dioxin TEQ bird using both sets of TRVs. Each of the NBSA TRVs was the same as was used in the LPRSA BERA (Windward 2019). General uncertainties associated with TRVs are discussed in Appendix D.

For TEQ, the NBSA egg LOAEL TRV is based on the 5th percentile from an SSD containing egg-injection studies with five bird species, some of which have been observed in the NBSA (double-crested cormorant, great blue heron). Double-crested cormorant and great blue heron are among the least sensitive birds in the dataset. Due to the limited dataset size, the 5th percentile value is below any empirically measured LOAELs and is a conservative estimate of avian toxicity for TEQ. The LPR FFS LOAEL TRV is also based on the 5th percentile SSD value for a dataset containing chicken toxicity data, which has uncertain relevance for wild species in the NBSA. Both the NBSA and LPR FFS TRVs are similar in magnitude and are based on either limited or conservative datasets, and therefore are assumed to have a similar degree of uncertainty. Importantly, both sets of TRVs likely overestimate risk to double-crested cormorants, as the species-specific LOAEL (4000 ng/kg ww; Powell et al. (1997); Figure 8-6 of LPRSA BERA) is more than an order of magnitude greater than the selected TRVs. Using the double-crested cormorant LOAEL TRV, egg HQs are all well below 1.

Table 8-9. Comparison of NBSA-wide Cormorant Egg Tissue HQs Using Species-Specific TRVs

Constituent	Units	NBSA TRV HQ (0.00025 mg/kg) Windward (2019) SSD 5 species	LPR FFS TRV HQ (0.00015 mg/kg) USEPA (2003) Various species	Species-specific TRV HQ (0.004 mg/kg) Powell et al (1997) Cormorant
Dioxins/Furans				
2,3,7,8-TCDD	unitless	0.4	0.6	0.02
Total Dioxin/Furan TEQ Bird	unitless	0.5	0.9	0.03
PCBs				
Total PCB TEQ Bird	unitless	**2**	**3**	0.1
Total Dioxin/Furan/ PCB TEQ Bird	unitless	**2**	**4**	0.1

For total PCBs, the NBSA egg LOAEL TRV is based on the lowest available LOAEL. Although only two studies were available, the selected LOAEL is based on a wild species (ringed turtle dove) and based on reduced hatchability in a two-generation study. Multiple NOAELs above the selected TRVs are available. The LPR FFS LOAEL TRV is based on an interpolated 25% effect level for reduced hatchability in domestic chicken, which has uncertainty for wild populations. Due to the chronic study duration and use of reproductive data for wild species, the NBSA TRV is considered to be somewhat more predictive of toxicity to wild birds in the NBSA.

For total DDx, the NBSA egg LOAEL TRV is based on the 5th percentile from an SSD containing data for seven bird species, some of which have been observed in the NBSA (kestrel, black duck, and mallard). The LPR FFS egg LOAEL TRV is similar in magnitude but is based on field residue data for brown pelican that were not dose-responsive for the selected endpoint (nesting success). As noted in Appendix D, the use of field-collected egg data created uncertainty in establishing a LOAEL, given the other factors in the field that could potentially influence to reproductive success (e.g., other contaminants and non-chemical stressors).

8.3.2.2 Exposure Assumptions

As noted above, the use of measured egg tissue COPEC concentrations eliminates many uncertainties associated with exposure in the bird egg risk assessment. Remaining uncertainties for the bird egg risk assessment were identified and discussed below, but were not quantitatively evaluated:

- Treatment of non-detects for EPCs – All egg tissue concentration data were derived from Parsons (2003), which treated non-detects as zero. Therefore, it was not possible to assess the effects of treating non-detects as half or the full quantitation limit on bird egg HQs. Based on the results of the non-detect evaluation for the bird dietary assessment, treatment of non-detects as half or full quantitation limits is unlikely to substantially change risk estimates for bird eggs.
- Sample size – For most COPECs measured by Parsons (2003) in cormorant eggs, sample size was adequate for calculation of tissue EPCs based on 95% UCLs. For methylmercury however, data were available for only three eggs and therefore the maximum detected concentration was selected as the EPC. Because methylmercury concentrations in the three eggs were similar (range 175-320 nanograms per gram [ng/g] ww) and because total mercury concentrations were also not highly variable (range 85 -1130 ng/g ww) in a larger number of samples (N=14), the risk estimates are not expected to be substantially over- or underestimated for methylmercury.

8.4 Weight of Evidence Risk Findings for Birds

As summarized in Section 3.5, a WOE approach was used to evaluate COPECs with LOAEL HQs ≥ 1 (preliminary COCs; Table 8-10) and potential for unacceptable risk to bird populations in the NBSA.

Table 8-10. Summary of Preliminary COCs for Bird Dietary Assessment

Preliminary COCs	Exposure Area	Range of LOAEL HQs									
		Bird Diet LOE								Bird Egg LOE	
		NBSA-wide TRVs				LPR FFS TRVs				NBSA TRVs	LPR FFS TRVs
		Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	Double-crested Cormorant	Double-crested Cormorant
Total PCBs	NBSA-wide	<1	<1	<1	<1	<1	<1	<1	<1	1	15
	Zones	<1	<1	<1	<1	<1	<1	<1	<1	--	--
Total PCB TEQ Bird	NBSA-wide	<1	<1	<1	<1	<1	<1	<1	<1	2	3
	Zones	<1	<1	<1	<1	<1	<1	<1 - 1	<1	--	--
Total Dioxin/Furan/PCB TEQ Bird	NBSA-wide	<1	<1	<1	<1	<1	<1	1	<1	2	4
	Zones	<1	<1	<1	<1	<1	<1	1	<1	--	--
Total DDx (2,4 & 4,4)	NBSA-wide	<1	<1	<1	<1	<1	1	2	<1	2	2
	Zones	<1	<1	<1	<1	<1	1 - 2	1 - 3	<1	--	--
Lead	NBSA-wide	<1	<1	<1	<1	1	<1	<1	<1	--	--
	Zones	<1	<1	<1	<1	<1 - 3	<1	<1	<1 - 1	--	--
Mercury	NBSA-wide	<1	<1	<1	<1	<1	<1	<1	<1	<1	5
	Zones	<1	<1	<1	<1	<1 - 1	<1	<1	<1	--	--
Methylmercury	NBSA-wide	<1	<1	<1	<1	<1	<1	<1	<1	<1	3
	Zones	<1	<1	<1	<1	<1	<1	<1 - 1	<1	--	--

Notes:
-- = not evaluated

For birds, a range of dietary and tissue HQs (including HQs based on sensitivity analyses), as well as a detailed field study of reproductive success of birds that nested and hatched on Shooters Island, provides the available LOEs used in this BERA. These include:

1. HQs based on dietary doses in wildlife food web models estimated using measured prey tissue concentrations compared to literature-derived dietary TRVs specific to the NBSA
2. HQs based on dietary doses in wildlife food web models estimated using measured prey tissue concentrations compared to literature-derived dietary TRVs derived for the LPR FFS (USEPA 2014)
3. HQs based on tissue concentrations measured in double-crested cormorant eggs collected in the NBSA compared to bird-egg based tissue TRVs from the literature
4. Direct measures of reproductive success of double-crested cormorant eggs, hatchlings, and fledglings on Shooters Island.

Dietary HQs were calculated for the NBSA (in the mudflats for spotted sandpiper and great blue heron; NBSA-wide for double-crested cormorant and lesser scaup), and also independently for the North, Southeast, and Southwest Zones. A variety of sensitivity analyses were conducted for the dietary HQs. Egg tissue HQs were estimated for bioaccumulative compounds for the NBSA-wide area.

The HQ assessment is contrasted with the actual measures of reproductive effects from Parsons (2003). This study provides actual data demonstrating a lack of reproductive effects in double-crested cormorants, one of the most exposed upper trophic level birds to COPECs in the NBSA; although, egg predation levels were high at two of the three islands examined. As such, it is given high weight in the risk findings.

Uncertainties in the dietary HQs (Section 8.3.1) and egg-tissue HQs (Section 8.3.2) were evaluated in this WOE assessment according to the factors presented in Section 3.5 to arrive at an overall risk conclusion for each preliminary COC.

As discussed above in Sections 8.3.1 and 8.3.2, avian TRVs are a key uncertainty in the risk estimates and apply to all avian receptors evaluated in this BERA. For both dietary and egg tissue TRVs, two sets of TRVs (i.e., NBSA and LPR FFS TRVs) were included for bounding purposes and given equal weight in this WOE evaluation. Additional LOE are discussed below for each receptor and preliminary COC.

8.4.1 Spotted Sandpiper

For spotted sandpiper, dietary LOAEL HQs ≥ 1 were predicted for the COPECs identified in Table 8-11. Sensitivity analyses conducted for this receptor included evaluation of NDs, dietary HQs, use of an uptake model for polychaete worm dietary fraction, and evaluation of an SUF of 1.

Table 8-11. Exceedances of TRVs for Spotted Sandpiper Dietary Assessment

Preliminary COCs	Dietary HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 8-4)		
Lead	None	NBSA-wide; Southwest Zone
Mercury	None	Southwest Zone
Sensitivity Analyses (Table 8-8)		
Total Dioxin/Furan/PCB TEQ Bird	None	Southwest Zone (SUF = 1); NBSA-wide; North and Southeast Zones (ND=QL)
Total HMW PAH	None	North Zone (ND=QL)
Lead	None	NBSA-wide; Southwest Zone (SUF =1)
Mercury	None	NBSA-wide; North, Southeast, and Southwest Zones (SUF =1)

Notes:
ND = not detected; QL = quantitation limit; SUF = site use factor
Sensitivity analysis resulting in LOAEL HQs ≥ 1 is indicated in parentheses; see Section 8.3 for more detail.

No dietary LOAEL HQs ≥ 1 were predicted for any COPECs using the NBSA-selected TRVs in the NBSA-wide area or individual assessment zones in any of the scenarios evaluated in this BERA. Using the primary exposure and toxicity assumptions, dietary LOAEL HQs ≥ 1 were predicted only for lead and mercury using the LPR FFS TRVs in the NBSA-wide (lead only) and Southwest Zone. Sensitivity analyses, including evaluation of a SUF of 1 and calculation of total concentrations using the full quantitation limit for non-detects, resulted in identification of total dioxin/furan/PCB TEQ and total HMW PAH as additional preliminary COCs based on LOAEL HQs equal to 1 for the NBSA-wide area and/or one or more individual assessment zones.

Inputs to the HQs, including exposure assumptions (SUFs and dietary composition), EPCs, and TRVs, are discussed below as part of the WOE evaluation for this receptor.

SUF: Evidence of spotted sandpipers has been noted in some of the NBSA mudflats during the breeding season. However, spotted sandpiper is migratory and is potentially present in Newark Bay only during this

time. Therefore, the SUF of 0.5 is not likely to underestimate exposure and an SUF of 1 is likely to overestimate exposure. Additionally, limited spotted sandpiper habitat is available along the margins of the NBSA due to the highly urbanized shorelines. The mudflat area evaluated in the NBSA is comprised of unvegetated expanses of mud, fine sand, or clay and encompassing roughly 29 acres. Mudflats in the individual assessment zones range from about 6.5 acres in the Southwest Zone to 19 acres in the North Zone. By comparison, the breeding territory of spotted sandpipers is small (< 2 acres; Hays 1972). Due to the scarcity of adequate breeding habitat within the NBSA, the NBSA-wide area is considered most relevant for evaluation of spotted sandpiper populations.

Diet: In this BERA, spotted sandpipers were assumed to have a diet of 100% polychaete worm, but their actual diet consists of both terrestrial and aquatic invertebrates. As discussed in Section 8.3.1, the assumed diet likely overestimates exposure to this receptor in the dietary food web models.

EPCs: The Southwest Zone sediment EPCs for all preliminary COCs are based on the maximum detected concentration due to the small dataset size for intertidal mudflats in this zone. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95% UCL.

Based on the various factors considered in the dietary HQ LOE, the resulting risk conclusions for preliminary COCs are as follows:

- Lead: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 based on NBSA TRV; 2) low magnitude of the LOAEL HQs ≥ 1 based on the LPR FFS TRV; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPC, exposure assumptions, and TRVs).
- Mercury: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 based on NBSA TRV; 2) low magnitude of the LOAEL HQs ≥ 1 based on the LPR FFS TRV; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPC, exposure assumptions, and TRVs).
- Total Dioxin/Furan/PCB TEQ: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 based on NBSA TRV; 2) low magnitude of the LOAEL HQs =(but not greater than) 1 based on the LPR FFS TRV; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPC, exposure assumptions, and TRVs).
- Total HMW PAH: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 based on NBSA TRV; 2) low magnitude of the LOAEL HQs = (but not greater than) 1 based on the LPR FFS TRV; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPC, exposure assumptions, and TRVs).

8.4.2 Great Blue Heron

For great blue heron, dietary LOAEL HQs ≥ 1 were predicted for the COPECs identified in Table 8-12. Sensitivity analyses conducted for this receptor included evaluation of NDs, dietary HQs, and modified prey size and composition assumptions for the dietary HQs.

Table 8-12. Exceedances of TRVs for Great Blue Heron Dietary Assessment

Preliminary COCs	Dietary HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 8-4)		
Total DDx	None	NBSA-wide; North, Southeast, & Southwest Zones
Sensitivity Analyses (Table 8-8)		
Total PCB TEQ	None	North Zone (Diet = fish all sizes)
Total Dioxin/Furan/PCB TEQ	None	North Zone (Diet = fish all sizes)
Total DDx	None	NBSA-wide; North, Southeast, & Southwest Zones (Diet = fish all sizes)
Mercury	None	North Zone (Diet = fish all sizes) NBSA-wide; North, Southeast, & Southwest Zones (Diet A [100% fish > 30 centimeters])
Methylmercury	None	NBSA-wide; North, Southeast, & Southwest Zones (Diet A [100% fish > 30 centimeters])

No dietary LOAEL HQs ≥ 1 were predicted for any COPECs using the NBSA TRVs in the NBSA-wide area or individual assessment zones in any of the scenarios evaluated in this BERA. Using the primary exposure and toxicity assumptions, dietary LOAEL HQs ≥ 1 were predicted only for total DDx using the LPR FFS TRVs in the NBSA-wide area and all assessment zones. Sensitivity analyses related to evaluation of alternate diets resulted in identification of total PCB TEQ, total dioxin/furan/PCB TEQ, mercury, and methylmercury as additional preliminary COCs based on LOAEL HQs ≥ 1 for the NBSA-wide area and/or one or more individual assessment zones.

Inputs to the HQs, including SUFs, EPCs, and TRVs, are discussed below as part of the WOE evaluation for this receptor.

SUF: Great blue heron are expected in Newark Bay year-round and this receptor has been observed within the NBSA. Kearny marsh (North Zone) seasonally becomes a roost for large numbers of herons and egrets, including great blue heron. This receptor was evaluated using a SUF of 1.0. The SUF likely overestimates great blue heron exposure to the NBSA based on their large foraging range (forage 3 to 7 kilometers from breeding colony; Vennesland and Butler 2011) relative to the area of mudflat habitat within the NBSA (29 acres). Due to the limited areas of mudflats and adequate breeding habitat within the NBSA, the NBSA-wide mudflat area (29 acres) is considered most relevant for evaluation of great blue heron populations.

Diet: Great blue heron were assumed to eat a mixed diet containing primarily fish and also aquatic invertebrates. The primary assumed diet consists of fish in the size range of <15 cm as part of the diet and is not assumed to significantly over- or underestimate exposure for this receptor. The sensitivity evaluations assume that heron eat fish of all sizes as part of a mixed diet or only eat fish less than 30 cm, neither of which are less realistic for this species.

EPCs: In general, EPCs were based on 95% UCL concentrations which are appropriate exposure estimates for a BERA. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95% UCL. In cases where a COPEC is infrequently detected, use of the maximum EPC potentially overestimates exposure. These cases include:

- Sediment EPCs: Sediment Southwest and Southeast Zone sediment EPCs are based on maximum detected concentrations for all preliminary COCs due to the small dataset size.
- Clam EPCs: The clam dietary fraction is also based on the maximum EPC for most preliminary COCs in the Southeast and Southwest Zones due to small sample size (N < 6) in the Southeast Zone and low FOD in the Southwest Zone.

Based on the various factors considered in the dietary HQ LOE, the resulting risk conclusions for preliminary COCs are as follows:

- Total DDx: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPCs in some assessment zones, conservative TRVs, SUFs).
- Total PCB TEQ and total dioxin/furan/PCB TEQ: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPCs in some assessment zones, conservative TRVs, SUFs).
- Mercury and methylmercury: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPCs in some assessment zones, conservative TRVs, SUFs).

8.4.3 Double-crested cormorant

For double-crested cormorant, LOAEL HQs ≥ 1 were predicted for the COPECs identified in Table 8-13. Sensitivity analyses conducted for this receptor included evaluation of NDs for dietary HQs, modified prey size and composition assumptions for the dietary HQs, and use of a species-specific TRV for the egg tissue HQs.

Table 8-13. Exceedances of TRVs for Double-Crested Cormorant Dietary Assessment

Preliminary COCs	Dietary LOAEL HQs ≥ 1		Egg Tissue LOAEL HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 8-4)				
Total Dioxin/Furan/PCB TEQ Bird	None	NBSA-wide; North, Southeast, & Southwest Zones	NBSA-wide	NBSA-wide
Total PCB TEQ Bird	None	Southwest Zone	NBSA-wide	NBSA-wide
Total PCBs	None	None	NBSA-wide	NBSA-wide
Total DDx	None	NBSA-wide; North, Southeast, & Southwest Zones	NBSA-wide	NBSA-wide
Mercury	None	None	None	NBSA-wide
Methylmercury	None	Southeast Zone	None	NBSA-wide
Sensitivity Analyses (Table 8-8)				
Total PCB TEQ Bird	None	North Zone (Diet = fish all sizes)	None	None
Total Dioxin/Furan/PCB TEQ Bird	None	NBSA-wide; North, Southeast, & Southwest Zones (Diet = fish all sizes)	None	None
Total DDx	None	NBSA-wide; North, Southeast, & Southwest Zones (Diet = fish all sizes)	NA	NA
Copper	None	Southwest Zone (Diet = fish all sizes)	NA	NA
Mercury	None	NBSA-wide, North, Southeast, & Southwest Zones (Diet = fish all sizes)	NA	NA
Methylmercury	None	NBSA-wide, North, Southeast, & Southwest Zones (Diet = fish all sizes)	NA	NA

No dietary LOAEL HQs ≥ 1 were predicted for any COPECs using the NBSA TRVs in the NBSA-wide area or individual assessment zones in any of the scenarios evaluated in this BERA. Using the primary exposure and toxicity assumptions, dietary LOAEL HQs ≥ 1 were predicted for total dioxin/furan/PCB TEQ and total DDx using the LPR FFS TRVs in the NBSA-wide area and all assessment zones, total

PCB TEQ in the Southwest Zone, and methylmercury in the Southeast Zone. Sensitivity analyses related to evaluation of alternate diets resulted in identification of copper as additional preliminary COCs based on dietary LOAEL HQs ≥ 1 for the NBSA-wide area and/or one or more individual assessment zones.

Egg tissue LOAEL HQs ≥ 1 were predicted for total dioxin/furan/PCB TEQ, total PCB TEQ, Total PCBs, and total DDx in the NBSA-wide area using both sets of TRVs, and mercury and methylmercury in the NBSA-wide area using LPR FFS TRVs only. Quantitative sensitivity analyses were not conducted for egg tissue HQs.

Inputs to the dietary and tissue HQs, including exposure assumptions (SUFs and dietary composition), EPCs, and TRVs where appropriate, are discussed below as part of the WOE evaluation for this receptor.

SUF: Double-crested cormorant are expected in Newark Bay year-round and this receptor has been observed within the NBSA. Nests are seasonally present on Shooters Island (Southwest Zone) and have been observed on in water features like buoys, markers, and other structures (see Appendix B). This receptor was evaluated using a SUF of 1.0. Based on a foraging range of roughly 5 to 10 miles from the nest colony (Palmer 1962), the selected SUF is not anticipated to over- or underestimate exposure for this receptor. Based on foraging range, the NBSA-wide area is considered most reliable for evaluating exposure estimates for double-crested cormorants.

Diet: Double-crested cormorant were assumed to eat a diet consisting exclusively of fish less than 15 cm in the primary exposure assumptions. The primary assumed diet is not expected to significantly over- or underestimate exposure for this receptor. The sensitivity evaluation assumes that cormorant eat fish of all sizes, which is less realistic for this species.

EPCs: In general, EPCs were based on 95% UCL concentrations which are appropriate exposure estimates for a BERA. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95% UCL. In cases where a COPEC is infrequently detected, use of the maximum EPC potentially overestimates exposure. EPC factors considered in the WOE include:

- Total dioxin/furan/PCB TEQ bird: In egg tissue, PCBs account for about 90% of the total Dioxin/Furan/PCB TEQ concentration.
- Methylmercury in bird eggs: Bird egg EPCs are based on maximum detected concentrations in the NBSA-wide area calculated from eggs analyzed for methylmercury (N=3). Bird eggs, collected on Shooters Island, are considered representative of the NBSA-wide area and not evaluated by individual assessment zones.

TEFs: As discussed in Section 8.3.1, avian TEFs are calculated based on egg injection studies. Dioxin TEQs calculated using bird TEFs are relevant only to tissue data in which dioxin/furan congeners were measured. There is significant uncertainty in the application of bird TEFs to soil data in the dietary models. Use of egg tissue data eliminates this uncertainty.

Based on the various factors considered in the dietary and egg tissue HQ LOEs, the resulting risk conclusions for preliminary COCs are as follows:

- Total dioxin/furan/PCB TEQ bird and total PCB TEQ: Unacceptable risk is considered unlikely. Although LOAEL HQs ≥ 1 were predicted using both sets of tissue TRVs and tissue HQs were considered to have the least uncertainty for the HQ LOE, the HQs likely overestimate toxicity to this species based on the use of LOAEL TRVs based on 5th percentile values from SSDs. The species-

specific egg LOAEL is more than 10-fold greater than the selected LOAEL TRVs, which is consistent with genetic sequencing data indicating a low sensitivity AhR receptor (Type III; Farmahin et al. 2012) for this species. Additionally, Parsons (2003) found no relationship between reproductive success (e.g., egg production, hatching success, and chick survival) and COPEC concentrations in eggs and other bird tissues from Shooters Island, located within the NBSA, and two other islands in New York Harbor and Long Island. This site-specific measure of toxicity provides an important LOE indicating that COPEC concentrations in the NBSA are not adversely impacting reproductive success in cormorant populations.

- Total PCBs: Unacceptable risk is considered unlikely based on the same LOE as described above for TEQ.
- Total DDx: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using both tissue and dietary NBSA TRVs; 2) EPCs and SUF unlikely to over- or underestimate exposure; 3) low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs; and 4) no effect on reproductive success found by Parsons (2003).
- Mercury and methylmercury: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using dietary NBSA TRVs; 2) an SUF unlikely to over- or underestimate exposure; 3) dietary sediment and prey tissue EPCs indicate low variability of mercury and methylmercury concentrations within the NBSA; 4) egg LOAEL HQs < 1 using NBSA TRVs; and 5) low magnitude of the dietary LOAEL HQs ≥ 1 using LPR FFS TRVs. For the HQ LOEs, dietary HQs were considered to have least uncertainty for predicting risk based on the small dataset available for egg tissue EPCs. Site-specific toxicity data from Parsons (2003) support these conclusions.
- Copper: Unacceptable risk is considered unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using dietary NBSA TRVs; 2) an SUF unlikely to over- or underestimate exposure; and 5) low magnitude of the dietary LOAEL HQs ≥ 1 in the Southwest Zone sensitivity analysis using LPR FFS TRVs. Site-specific toxicity data from Parsons (2003) support these conclusions.

8.4.4 Lesser Scaup

For lesser scaup, there were no LOAEL HQs ≥ 1 for the NBSA TRVs, and only lead in the Southwest Zone for the LPR FFS TRVs (Table 8-14) using the primary exposure and toxicity assumptions. Sensitivity analyses conducted for this receptor included evaluation of ND dietary HQs, modified prey composition for the dietary HQs, and use of an uptake model for polychaete worm dietary fraction. Sensitivity analyses related to evaluation of alternate diets did not result in identification of additional preliminary COCs.

Table 8-14. Exceedances of TRVs for Lesser Scaup Dietary Assessment

Preliminary COCs	Dietary HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 8-4)		
Lead	None	Southwest Zone
Sensitivity Analyses (Table 8-8)		
Lead	None	NBSA-wide and Southwest Zone (Diet C [75% clam; 25% worm])

Inputs to the dietary and tissue HQs, including exposure assumptions (SUFs and dietary composition), EPCs, and TRVs where appropriate, are discussed below as part of the WOE evaluation for this receptor.

SUF: Lesser scaup breeds in the boreal forests of northern North America and is expected in Newark Bay only during the winter or non-breeding season (Anteau et al. 2014) and was therefore given an SUF of 0.5. Home range information was not located for lesser scaup, but observations indicate a relatively large foraging area (see Appendix B). For evaluation of lesser scaup populations, the NBSA-wide area was considered to be most appropriate for developing exposure estimates. Based on the available information, the selected SUF is considered more likely to overestimate rather than underestimate exposure to this receptor.

Diet: The prey diet evaluated in this BERA consists of species with high potential for uptake and is likely representative of the scaup diet, foraged from bottom sediments in shallow water. Sensitivity analyses conducted for varying diets had little effect on the estimated HQs.

EPCs: The Southwest Zone lead EPC is based on the maximum detected concentration due to the small dataset. A maximum EPC is a less robust exposure estimate for this BERA than EPCs based on a 95%UCL.

Based on the various factors considered in the dietary HQ LOE, the resulting risk conclusions for preliminary COCs are as follows:

- Lead: Unacceptable risk is considered unlikely. This conclusion is based on 1) LOAEL HQs < 1 using the NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs; and 3) conservative assumptions used in the risk estimates (e.g., maximum EPCs, conservative TRVs).

8.4.5 Summary of Risk Findings for Birds

Spotted sandpiper, great blue heron, double-crested cormorant, and lesser scaup were evaluated using dietary HQs calculated for the NBSA-wide and individual assessment zones using two sets of TRVs (NBSA and LPR FFS) and including a variety of quantitative sensitivity analyses. For double-crested cormorant, egg tissue HQs were also evaluated for the NBSA-wide exposure area using two sets of tissue TRVs when available.

Overall, no unacceptable risk to birds potentially exposed to COPECs in the NBSA is expected. Conclusions for the bird evaluations are based on the WOE evaluation presented above in Section 8.4 and are summarized below:

- For spotted sandpiper (benthivorous bird):
  - Using primary exposure and toxicity assumptions, dietary LOAEL HQs < 1 were estimated for all COPECs using all exposure area and TRVs assumptions, except for lead and mercury using LPR FFS TRVs.
  - Sensitivity analyses, including evaluation of a SUF of 1 and calculation of total concentrations using the full quantitation limit for NDs, resulted in identification of total dioxin/furan/PCB TEQ and total HMW PAH as additional preliminary COCs based on LOAEL HQs equal to 1 for the NBSA-wide area and/or one or more individual assessment zones.
  - Unacceptable risk is considered unlikely for lead, mercury, total dioxin/furan/PCB TEQ, and total HMW PAH based primarily on LOAEL HQs < 1 using NBSA TRVs, the low magnitude of the LPR FFS LOAEL HQs ≥ 1, and the use of exposure assumptions that likely overestimate risk to spotted sandpiper populations.
- For great blue heron (piscivorous bird):
  - Using primary exposure and toxicity assumptions, dietary LOAEL HQs < 1 were estimated for all COPECs using all exposure area and TRVs assumptions, except for total DDx and using LPR FFS TRVs.
  - Sensitivity analyses related to evaluation of alternate diets resulted in identification of total PCB TEQ, total dioxin/furan/PCB TEQ, mercury, and methylmercury as additional preliminary COCs based on LOAEL HQs ≥ 1 for the NBSA-wide area and/or one or more individual assessment zones.
  - Unacceptable risk is considered unlikely for total DDx, total PCB TEQ, total dioxin/furan/PCB TEQ, mercury, and methylmercury based primarily on LOAEL HQs < 1 using NBSA TRVs, the low magnitude of the LPR FFS LOAEL HQs ≥ 1, and the use of exposure assumptions that likely overestimate risk to great blue heron populations.
- For double-crested cormorant (piscivorous bird):
  - Using primary exposure and toxicity assumptions, dietary LOAEL HQs < 1 were estimated for all COPECs using all exposure area and TRVs assumptions, except for total dioxin/furan/PCB dioxin TEQ, total PCB TEQ, total PCBs, total DDx, and methylmercury using LPR FFS TRVs only.
  - Sensitivity analyses related to evaluation of alternate diets resulted in identification of copper and mercury as additional preliminary COCs based on dietary LOAEL HQs ≥ 1 for the NBSA-wide area and/or one or more individual assessment zones.
  - Egg tissue LOAEL HQs ≥ 1 were predicted for total dioxin/furan/PCB TEQ, total PCB TEQ, total PCBs, and total DDx in the NBSA-wide area using both sets of TRVs, and mercury and methylmercury in the NBSA-wide area using LPR FFS TRVs only. Quantitative sensitivity analyses were not conducted for egg tissue HQs.
  - Unacceptable risk is considered unlikely for total dioxin/furan/PCB TEQ, total PCB TEQ, total PCBs, total DDx, copper, mercury, and methylmercury.

  - Unacceptable risk is considered unlikely for total dioxin/furan/PCB TEQ, total PCB TEQ, and total PCBs. These conclusions are based on HQs calculated using a species-specific LOAEL TRV and a site-specific reproductive success study (Parsons 2003) that found no effect of COPECs on hatchability, fledging success, and other reproductive parameters in double-crested cormorant. Although LOAEL HQs ≥ 1 were predicted for these preliminary COCs in some scenarios evaluated in this BERA using NBSA and/or FFS dietary and tissue TRVs, these HQs are likely overestimated.
  - For total DDx, these conclusions are based on LOAEL HQs < 1 using both tissue and dietary NBSA TRVs; EPCs and SUF unlikely to over- or underestimate exposure; and low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs.
  - For mercury and methylmercury, these conclusions are based on LOAEL HQs < 1 using dietary and egg tissue NBSA TRVs; an SUF unlikely to over- or underestimate exposure; dietary EPCs indicate low variability of mercury and methylmercury concentrations within the NBSA; and low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs.
  - For copper, these conclusions are based on LOAEL HQs < 1 using NBSA and FFS TRVs and primary exposure assumptions, LOAELs ≥ 1 were identified in the Southwest Zone only in sensitivity analyses with diet and were low in magnitude.
  - For all preliminary COCs, site-specific toxicity data from Parsons (2003) support the conclusion that unacceptable risk is unlikely.

- For lesser scaup (omnivorous bird):
  - Using primary exposure and toxicity assumptions, dietary LOAEL HQs < 1 were estimated for all COPECs using all exposure area and TRVs assumptions, except for lead using LPR FFS TRVs.
  - Sensitivity analyses related to evaluation of alternate diets did not result in identification of additional preliminary COCs.
  - Unacceptable risk is considered unlikely for lead based primarily on LOAEL HQs < 1 using the NBSA TRVs; low magnitude of the LOAEL HQs ≥ 1; and conservative assumptions used in the risk estimates (e.g., maximum EPCs, conservative TRVs).

Based on the results of this BERA, potential exposures to most COPECs in the NBSA are not expected to pose unacceptable risk to birds. For birds, exceedances of dietary LOAEL TRVs were found for TEQs and total DDx in double-crested cormorants using only the LPR FFS TRVs, and the HQs for these were at or near 1. For cormorants, egg tissue LOAEL HQs ≥ 1 were also predicted using both sets of tissue TRVs; however, given the low HQs, conservative TRVs relative to cormorant-specific toxicity data for eggs, and lack of evidence on reproductive success from the Parsons (2003) study, risks to cormorants are unlikely. As presented in Table 8-15, the potential for unacceptable risk to bird populations (identified based on LOAEL HQs ≥1 and WOE supporting the conclusion of unacceptable risk) was not identified.

9 MAMMAL ASSESSMENT

Mammals are part of the upper trophic levels of the food web in the NBSA. There are two feeding guilds of mammals evaluated in this BERA: omnivores (consume plant and animal matter), and piscivores (consume fish).

The following are the AE and Risk Question for mammals that are addressed in this section.

AE: Survival, growth, and/or reproduction of mammals.

Risk Question 1: *Does the daily dose of COPECs received by mammals (including piscivorous, omnivorous, and invertivorous) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of mammals?*

Risk Question 1 is addressed by the mammal dietary risk assessment presented in Section 9.1. The life history profiles for the mammal receptors identified for the tissue and dietary risk assessments are provided in Appendix B.

9.1 Dietary Assessment

A dietary assessment was conducted for each of the three selected mammal species (river otter, muskrat, and harbor seal). This section describes how exposure and effects concentrations were derived and presents the HQs for the dietary assessment. Section 9.2 presents the uncertainties associated with the dietary assessment for mammals. The COPECs evaluated for the bird dietary assessment are listed in Table 3-5 and include: 2,3,7,8-TCDD, total dioxin/furan TEQ, total PCBs (209 congeners), total PCB TEQ, total dioxin/furan/PCB TEQ, pesticides (total chlordane, total DDx, dieldrin, and hexachlorobenzene), total PAHs, and inorganics/metals (arsenic, cadmium, chromium, copper, lead, mercury/methylmercury, nickel, selenium, silver, and zinc).

9.1.1 Exposure

This section presents the methods for calculating exposure doses, including descriptions of the selection of parameters for the dose equation, composition of prey in diet, exposure areas, and EPCs in prey.

9.1.1.1 Dietary Dose Model

Dietary doses for mammals were estimated based on ingestion of biota (i.e., prey) and incidental ingestion of sediment. Surface water ingestion was not included in mammal dietary assessment because mammals were not expected to drink the saltwater of the NBSA. Dietary doses were estimated as milligrams of each COPEC ingested per kilogram of body weight (mg/kg bw-day) per day using the following equation:

$$ADD_{total} = = [(EPC_s * SIR/BW * DF_s) + \Sigma(EPC_k * FIR_k/BW * DF_k)] * SUF \quad \textbf{\textit{Equation 9-1}}$$

where,

ADD_{total} = average daily dose (mg/kg bw/day)

EPC_s = exposure point concentration in sediment (mg/kg, dw)

SIR = ingestion rate for sediment (kg/day, dw)

BW = body weight of organism (kg)

DF_s = dietary fraction of sediment ingested (range 0 to 1)

EPC_k = EPC for the kth food type (mg/kg day, ww)

FIR_k = ingestion rate for the kth food type (kg/day, ww)

DF_k = dietary fraction of intake of the kth food type (range 0 to 1)

SUF = site use factor (unitless); proportion of time the selected species spends foraging in the NBSA

The body weights, ingestion rates, diet composition, and SUFs for river otter, muskrat, and harbor seal are described in Section 9.1.1.2.

9.1.1.2 Body Weights, Ingestion Rates, Prey Composition, Site Use Factors, Exposure Areas

Body weights, ingestion rates for sediment and food, SUFs, and diet composition for use in the dietary dose calculations were obtained from the literature as summarized in Table 9-1.

The dietary fraction of each component in each species' diet is based on information obtained from the literature (reviewed in Appendix B) and is presented in Table 9-1. Prey ingested by mammal species were limited to whole-body samples only from prey types for which empirical tissue chemistry data from the NBSA were available (polychaete worm, blue crab, softshell clam, and fish). Fish were separated by length into two groups: fish ≤ 15 cm and fish ≤ 30 cm (Appendix C; Tables C-2 and C-3, respectively)

River otters generally prey on fish that are 2 to 50 cm in length, with an average prey length of approximately 30 cm (Melquist et al. 1981). For the NBSA, river otter diet was limited to fish ≤ 30 cm (comprising 80% of the diet evaluated). However, river otter from some locations have been observed to consume fish up to 50 cm in length (Tumlison et al. 1986; Wise et al. 1981; Melquist et al. 1981) and may infrequently consume fish up to 70 cm in length. Based on the variety of prey river otters may consume, the remaining diet evaluated in the NBSA was made up of 5% polychaete worms, 5% blue crabs, and 10% softshell clams.

Muskrats are herbivorous and eat the basal parts, rhizomes, and leaves of aquatic emergent vegetation (Dozier 1953; Errington 1939). Although they consume mostly plant material, they will also eat some fish, crustaceans, dead birds, and frogs (Errington 1939; Johnson 1925; Willner et al. 1980; cited in USEPA 1993). A diet of 85% vegetation (estimated from sediment using an uptake factor), 5% softshell clams, and 10% fish (≤ 15 cm) was evaluated in the NBSA. The muskrat diet was assumed to consist of 85% aquatic/emergent plants. However, plants were not collected in the NBSA. Instead, soil to plant BAFs derived from USEPA (2007b) were applied to sediment data to estimate concentrations in aquatic/ emergent plant diet (Table 9-2). Soil to plant BAFs were not available for methylmercury and a BAF equal to 1.0 was assumed for this COPEC.

The diet of harbor seals varies seasonally and includes bottom-dwelling fishes (e.g., flounder), invertebrates (e.g., octopus), and species that can be caught in periodic spawning aggregations (e.g., herring) (Everitt et al. 1981; Lowry and Frost 1981; Pitcher and Calkins 1979; Roffe and Mate 1984; cited in USEPA 1993). Fish species between 4 and 28 cm are consumed, with an average of 6 to 18 cm (Brown and Mate 1983; cited in USEPA 1993). Therefore, fish ≤ 30 cm were included as 90% of the harbor seal diet evaluated in the NBSA. The remaining prey items evaluated as part of the harbor seal diet included 5% blue crab and 5% softshell clam.

While fish, blue crab, and softshell clam data were field collected, the worm tissue data were based on the laboratory bioaccumulation study in which worms were exposed to homogenized sediment collected from the 0 to 15-cm depth horizon.

The SUFs for the representative mammal receptors are provided in Table 9-1. The muskrat is assumed to use the NBSA for the entire year; however, the river otter and harbor seal are transient in the NBSA and assumed to be present for only 50% of the time. According to the USEPA's Wildlife Exposure Handbook (USEPA 1993), river otters inhabit "some" marine environments and are found in "non-polluted waterways" and areas showing "little human impact." Harbor seals are found as far south as eastern Long Island but generally winter offshore. In addition, harbor seals require adequate places to haul out, which are not found in the NBSA. The assumption of a 50% SUF is reasonable based on this information, and professional judgement regarding the life history and available habitat in the NBSA for these species.

Potential risk from prey and sediment ingestion for river otter and harbor seal was evaluated NBSA-wide and by assessment zone (North, Southeast, and Southwest Zones). Muskrat were expected to forage only along shoreline areas with adequate habitat coverage (USEPA 1993); therefore, risk from the aquatic plant portion of their diet (derived from sediment to plant BAFs, discussed above) and incidental sediment ingestion was assessed only from sediment samples collected along the shoreline. The softshell clam and fish portion of the muskrat diet was evaluated NBSA-wide and by assessment zone. River otter included polychaete worm as a portion of their diet; however, polychaete worm sample size was not large enough to be evaluated by assessment zone. Therefore, risk from ingestion of polychaete worms were assessed NBSA-wide in the zone risk calculations for this species. See Tables 4-10 and Figure 4-4 for sediment samples assigned to each assessment zone, mudflats, and shoreline areas, and Table 4-11 for tissue samples assigned to each assessment zone.

9.1.1.3 Exposure Point Concentrations

EPCs were calculated for each of the media types (i.e., prey and sediment) to calculate dietary doses using Equation 9-1. For prey concentrations, EPCs were calculated separately for each of the prey types (worms, blue crab, softshell clam, fish ≤ 15 cm, fish ≤ 30 cm) as the UCL for each prey group. EPCs for prey were calculated NBSA-wide and by assessment zone (except polychaete worm, where EPCs were calculated NBSA-wide only due to limited sample size). Plants were not collected in the NBSA; therefore, soil to plant BAFs derived from USEPA (2007c) were applied to sediment data to estimate concentrations in aquatic/emergent plant diet (Table 9-2). Soil-to-plant BAFs were not available for methylmercury; BAFs were assumed to be 1.0 for this COPEC. For sediment, the EPCs were equal to the UCLs using data from the relevant exposure areas for each mammal species. UCL concentrations were calculated using

USEPA's ProUCL® statistical package (Version 5.1) (USEPA 2015b).[10] For each dataset with fewer than six detected samples or fewer than six total samples, a UCL was not calculated; instead, the maximum detected concentration was used as the EPC. If no samples were detected, then the maximum non-detect value was used as the EPC. The UCLs used to calculate mammals dietary EPCs are presented in Appendix C.

9.1.1.4 Estimated Doses

Dietary doses were calculated based on Equation 9-1 using the prey and sediment ingestion rates, species body weights, and the prey composition from Table 9-1; and the EPCs from Appendix C. These doses are presented in Appendix E.

9.1.2 Effects

Dietary mammal TRVs for the COPECs identified in Table 3-5 are provided in Table 9-3, and discussed in detail in Appendix D. The selected TRVs were primarily derived from the LPRSA BERA TRV database (Windward 2019) and are consistent with the Final LPRSA BERA TRVs for COPECs common to both areas (NBSA and LPRSA). For the LPRSA BERA, Windward (2019) conducted a literature search for relevant toxicological studies, and derived acceptable NOAELs and LOAELs. The lowest acceptable LOAEL and highest NOAEL below the LOAEL from the same study was selected. Several NBSA BERA COPECs were not evaluated in the LPRSA BERA mammal dietary risk assessment (i.e., chromium, silver, total PAHs, total DDx, total chlordane, and hexachlorobenzene). TRVs for these COPECs were available in the LPRSA BERA TRV database (Windward 2019). The selected mammal dietary TRVs for COPECs are further discussed in Appendix D.

In addition, mammal dietary TRVs from the LPR FFS (USEPA 2014) were also assessed and are included in the TRV summary table (Table 9-3). LPR FFS mammal dietary TRVs are available for 2,3,7,8-TCDD, total PCBs, total DDX, dieldrin, HMW PAHs, LMW PAHs, copper, lead, and mercury/methylmercury.

9.1.3 Risk Characterization

This section presents the comparison of mammal dietary doses to NBSA BERA and LPR FFS TRVs to calculate HQs for river otter, muskrat, and harbor seal. NBSA-wide NOAEL and LOAEL HQs for the mammal dietary assessment based on NBSA BERA TRVs are presented in Table 9-4a. Assessment zone (i.e., North, Southeast, and Southwest Zones) NOAEL and LOAEL HQs based on NBSA BERA TRVs are presented in Tables 9-4b through 9-4d. The HQ calculations for each COPEC and mammal species are provided in Appendix E. A summary of COPECs that exceed their TRVs (i.e., HQs that equal or exceed 1) is provided in Table 9-5.

[10] The UCL recommended by USEPA's ProUCL® software (typically the 95% UCL, but in some cases the 97.5% or even the 99% UCL) was used. The selected UCL statistic is presented in Appendix C-1.

Table 9-5. Summary of TRV Exceedances for Mammal Dietary Assessment

Preliminary COCs	NBSA and FFS LOAEL-based HQs ≥ 1.0								NBSA and FFS LOAEL-based HQs ≥ 1.0							
	River Otter								Muskrat							
	NBSA-wide		North		SE		SW		NBSA-wide		North		SE		SW	
	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans																
2,3,7,8-TCDD		○	○	●		○		○		○		○		○		○
Total Dioxin/Furan TEQ Mammal		○	○	●		○		○		○		○		○		○
Polychlorinated Biphenyls																
Total PCBs																
Total PCB TEQ Mammal		○		○		○		○		○		○		○		○
Total Dioxin/Furan/PCB TEQ Mammal		○	○	●		○		○		○		○		○		○
Pesticides																
Total DDx (2,4 & 4,4)																
Dieldrin																
Total Chlordane		--		--		--		--		--		--		--		--
Hexachlorobenzene		--		--		--		--		--		--		--		--
Polycyclic Aromatic Hydrocarbons																
Total HMW PAH	--		--		--		--		--		--		--		--	
Total LMW PAH	--		--		--		--		--		--		--		--	
Total PAH		--		--		--		--		--		--		--		--
Inorganics																
Arsenic		--		--		--		--		--		--		--		--
Cadmium		--		--		--		--		--		--		--		--
Chromium		--		--		--		--		--		--		--		--
Copper																
Lead																○
Mercury										○		○		○		●
Methylmercury																
Nickel		--		--		--		--		--		--		--		--
Selenium	○	--	○	--	○	--	○	--	○	--	○	--	○	--	○	--
Silver		--		--		--		--		--		--		--		--
Zinc		--		--		--		--		--		--		--		--

Notes: ● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1; **-** = not evaluated in the LPR FFS; COPECs evaluated that did not have any exceedances are not shown.

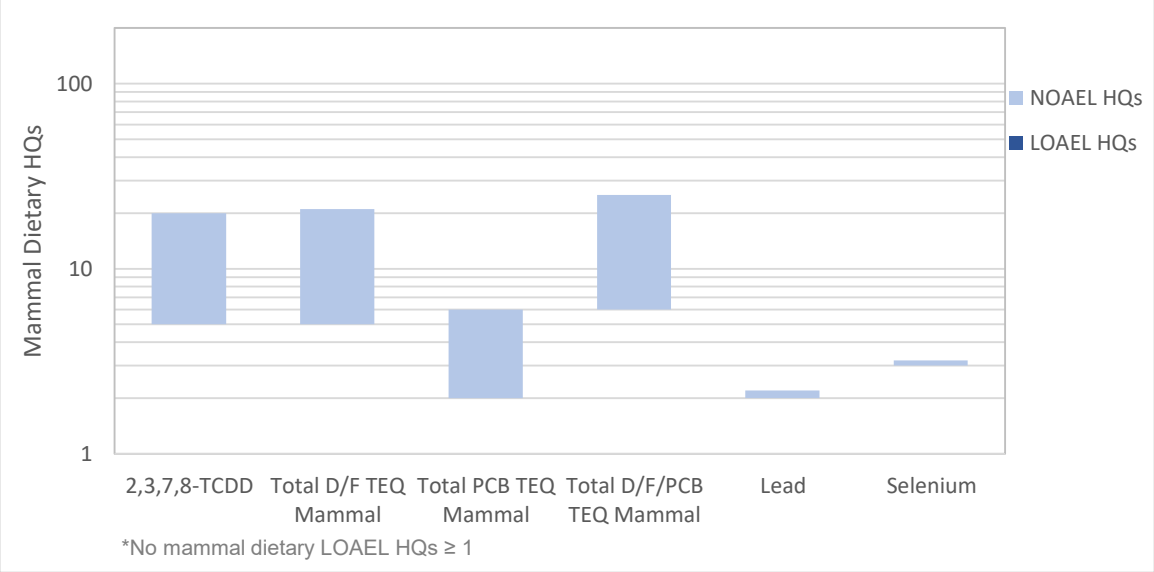
Table 9-5. Summary of TRV Exceedances for Mammal Dietary Assessment (cont.)

Preliminary COCs	NBSA and FFS LOAEL-based HQs ≥ 1.0							
	Harbor Seal							
	NBSA-wide		North		SE		SW	
	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS	NBSA	LPR FFS
Dioxins/Furans								
2,3,7,8-TCDD		○		○		○		○
Total Dioxin/Furan TEQ Mammal		○		○		○		○
Polychlorinated Biphenyls								
Total PCBs								
Total PCB TEQ Mammal		○		○		○		○
Total Dioxin/Furan/PCB TEQ Mammal		○		○		○		○
Pesticides								
Total DDx (2,4 & 4,4)								
Dieldrin								
Total Chlordane		--		--		--		--
Hexachlorobenzene		--		--		--		--
Polycyclic Aromatic Hydrocarbons								
Total HMW PAH	--		--		--		--	
Total LMW PAH	--		--		--		--	
Total PAH		--		--		--		--
Inorganics								
Arsenic		--		--		--		--
Cadmium		--		--		--		--
Chromium		--		--		--		--
Copper								
Lead								
Mercury								
Methylmercury								
Nickel		--		--		--		--
Selenium		--		--		--		--
Silver		--		--		--		--
Zinc		--		--		--		--

Notes: ● = indicates LOAEL HQ ≥ 1; ○ = indicates NOAEL HQ ≥ 1; **-** = not evaluated in the LPR FFS; COPECs evaluated that did not have any exceedances are not shown.

The range of HQs for the aggregate mammal dietary exposure estimates (i.e., all species) with HQs ≥ 1 are depicted in Figure 9-1 for the NBSA-wide exposure area. Harbor seal LOAEL HQs were less than 1 for all COPECs and exposure areas using NBSA- and LPR FFS-selected TRVs. Muskrat LOAEL HQs were less than 1 for all COPECS and exposure areas except for mercury in the Southwest Zone, where HQ=1 using the LPR FFS TRV. River otter LOAEL HQs are ≥ 1 in the North Zone using the LPR FFS TRVs for 2,3,7,8-TCDD, total dioxin/furan TEQ, and total dioxin/furan/PCB TEQ. River otter LOAEL HQs using NBSA-selected TRVs are all less than 1.

Figure 9-1. NBSA-wide Magnitude of NOAEL and LOAEL HQs ≥ 1 for Mammal Dietary Assessment



9.2 Uncertainties Assessment

This section contains the uncertainties assessment for the mammal risk assessment. Both quantitative and qualitative characterizations are provided for the dietary assessment presented in Section 9.1. The objective of the uncertainty assessment is to provide perspective on the likely accuracy of the overall risk conclusions that are presented in Section 9.3.

Sources of uncertainty that influenced risk characterization for mammals included uncertainties in the analytical results, data evaluation, CSM, exposure assessment, effects assessment, and interpretation of the risk estimates, especially with respect to drawing conclusions regarding potential for unacceptable population-level risk. Many of these sources of uncertainty are generic in nature and inherent in the risk assessment process.

Dietary exposure modeling has been a well-established practice for wildlife (avian and mammalian) risk assessments (USEPA 1993; Sample et al. 1997) and oral doses are a common method of evaluating contaminant exposure. However, there are uncertainties specific to the dietary risk estimates for mammals, as discussed in this section. Inherent practices in risk assessment result in exposure estimates that are biased high in order to be reasonably conservative include:

- The use of an upper exposure value (i.e., 95% UCL) to calculate dietary exposure concentrations
- The use of a maximum values in the place of a UCL when limited data are available
- The assumption that a mammal species feeds exclusively or is getting all of its seasonal and lifetime exposure to COPECs, from the NBSA (i.e., SUF = 1)
- The assumption that COPECs are 100% bioaccessible via dietary uptake (dermal absorption via the gut).

As a result, risk estimates are expected to be overestimated rather than underestimated in this BERA. For risk estimates based on dietary HQs, TRVs are a key source of uncertainty in the risk estimates and are discussed below or in Appendix D, as relevant. Additional sources of uncertainty were identified and evaluated either quantitatively or qualitatively. Table 9-6 summarizes the quantitative uncertainty evaluations conducted for mammals for the dietary assessments and their associated effect on risk estimates. Risk calculations and HQs based on the quantitative uncertainty evaluations are presented in Appendix F and discussed in the following sections. Qualitative evaluations were also conducted and are presented below in their respective sections.

Table 9-6. Summary of Quantitative Mammal Uncertainty Evaluations

Species	General Uncertainty Evaluated	Specific Evaluation Conducted	Difference in HQ Values	Effect on Risk Conclusions[a]
Mammal Dietary Assessment				
River otter	SUF of 0.5	HQs recalculated using SUF of 1	HQs increase (100%)	NBSA-wide: Increase HQ to ≥ 1 for 2,3,7,8-TCDD, Total Dioxin/Furan TEQ, Total PCBs, Total Dioxin/Furan/PCB TEQ based on LPR FFS TRVs and for Total PCBs based on NBSA TRVs. North Zone: Increase HQ to ≥ 1 for based on NBSA and LPR FFS TRVs for Total PCBs. Southeast Zone: Increase HQ to ≥ 1 for 2,3,7,8-TCDD, Total PCBs, Total Dioxin/Furan/PCB TEQ based on LPR FFS TRVs and for Total PCBs based on NBSA TRVs. Southwest Zone: Increase HQ to ≥ 1 for Total PCBs, Total Dioxin/Furan/PCB TEQ based on LPR FFS TRVs and for Total PCBs based on NBSA TRVs.
Harbor seal	SUF of 0.5	HQs recalculated using SUF of 1	HQs increase (50%)	No change
River otter	NBSA-wide Polychaete worm EPCs used	Representative COPEC re-evaluated using sediment-to-worm regression and zone sediment EPCs	HQs decrease (<5%)	No change
All	Treatment of NDs as zero for EPC calculation	EPCs recalculated using half or full QL	HQs increase (<0.1)	River otter NBSA-wide increase HQ to ≥ 1 when using LPR FFS TRVs and ND=1/2QL or 1QL for Total Dioxin/Furan TEQ and Total Dioxin/Furan/PCB TEQ
River otter; Harbor seal	Fish prey size of <30 centimeters assumed	EPCs recalculated using all prey fish	HQs mostly decrease (13-92%), some increase (10-100%)	No change

Additionally, relatively large exposure areas were evaluated in this BERA, including the NBSA-wide area and individual assessment zones. While these areas are appropriate for risk assessment, especially for

population-level assessment of mammal communities, evaluation of smaller features, such as individual wetlands or mudflats, may be required in the FS. The uncertainty associated with applying the results of the NBSA-wide and assessment zone conclusions to localized areas within the NBSA is considered to be low for highly mobile receptors, such as most mammals, and somewhat higher for species restricted to specific habitat types, such as muskrat. For muskrat, this uncertainty was reduced by evaluating shoreline areas instead of the larger assessment zones.

9.2.1 Mammalian TRVs

A key uncertainty associated with the mammalian dietary risk characterization is the selection of TRVs used in the risk calculations. As noted in Section 3.5 and at the request of USEPA, two sets of TRVs were evaluated to maintain consistency and allow comparison between the LPRSA, LPR FFS, and NBSA BERAs.

In general, TRVs are selected to be protective of either the 5th percentile of an SSD or the lowest acceptable LOAEL based on single studies reviewed. Thus, they tend to err on the side of over predicting risk. The TRVs for dioxins/furans (2,3,7,8-TCDD and TEQ), were further evaluated as a key uncertainty in the mammal assessment because they were the COPECs for which LOAEL HQs ≥ 1 were most frequently predicted. General uncertainties associated with TRVs are discussed in Appendix D.

The NBSA TRVs for 2,3,7,8-TCDD and TEQs are based on reproductive effects in mink (Hochstein et al. 2001) and are the same as was used in the LPRSA BERA (Windward 2019). The LPR FFS TRVs are also based on reproductive effects in mink (Tillitt et al. 1996); however, the LPR FFS LOAEL (2.2 ng/kg-day) is approximately the same as the NBSA NOAEL (2.6 ng/kg-day). The two studies identified very different toxicity curves with a factor of 28 separating the NOAEL and LOAEL in the study used as the basis for the LPR FFS TRV (Tillitt et al. 1996), and a factor of 3 separating the NOAEL and LOAEL in the study used as the TRV basis in the LPRSA BERA (Hochstein et al. 2001). Beyond this single species, the sensitivity of mammals in general to TCDD toxicity is highly variable with acute toxicity ranging among species up to a factor of 8,400 between the single oral lethal dose, 50% (LD50) dose for the guinea pig (the most sensitive mammal) and the hamster (Eisler 1985).

The primary reason why TRVs were developed in the LPRSA BERA for mink based on the Hochstein et al. (2001) study was that this was a laboratory study with 2,3,7,8-TCDD incorporated into the diet while the Tillitt et al. (1996) study fed mink field contaminated fish with variable levels of multiple COPECs in the diet including PCBs, dioxins/furans, and multiple other contaminants. The use of a food source containing multiple contaminants introduces significant uncertainty for evaluating effects associated with only 2,3,7,8-TCDD, as the effects seen in the mink in the Tillitt et al. (1996) study could have been caused by synergistic effects of contaminant mixtures. The toxicity study by Tillitt et al. (1996) is preferred for evaluating ecological risks specific to the region where the study was conducted because it captures unique aspects of the ecosystem that can affect toxicity: multiple contaminants, heterogeneous genetic composition, contaminant bioavailability, and non-contaminant potential stressors such as disease, weather, and food availability. For the NBSA area, site-specific field toxicity studies are not available, and the extent to which the contaminant mixture evaluated by Tillitt et al. (1996) is representative of the contaminant mixture in the NBSA area is uncertain. Exposure to dioxins, furans, dioxin-like PCBs in this BERA was evaluated using the 2,3,7,8-TCDD TEQ approach, in which concentrations of individual constituents are adjusted based on relative toxicity to a 2,3,7,8-TCDD. Therefore, use of the TRVs based

on only 2,3,7,8-TCDD (Hochstein et al. 2001) is considered appropriate for use with the TEQ approach used in this BERA. While site-specific field studies such as Tillitt et al. (1996) are preferred over laboratory studies for evaluating toxicity of a particular site, and can provide information useful for bounding risk estimates, they are not generally preferred over laboratory studies at different sites because of the great inherent number of variables that can influence the toxicity between sites.

Regarding the applicability of TRVs from a mink study to be applicable to the mammalian receptors in this assessment (river otter, muskrat, and harbor seal), based on taxonomic relatedness, the sensitivity of river otters is expected to be similar since river otter and mink are both in the family Mustelidae. Muskrats are in the same taxonomic order (Rodentia) as guinea pigs (the most sensitive species found to 2,3,7,8-TCDD with a LOAEL of 4.9 ng/kg-day as compared to the mink LOAEL of 8.8 ng/kg-day as reported in the LPRSA BERA) and rats (which were found to be less sensitive than mink to 2,3,7,8-TCDD as reported in the LPRSA BERA). The degree to which a mink TRV is protective of harbor seals is not known.

9.2.2 Exposure Assumptions

In this section, uncertainties specific to the NBSA dietary exposure assessment were identified and were evaluated quantitatively or qualitatively to assess potential impact on the risk estimates presented above.

Uncertainties related to the selected SUFs, polychaete worm EPCs, treatment of non-detects in calculated mixture totals (e.g., total PCBs), and prey fish size were quantitatively evaluated. Other uncertainties, discussed below, were qualitatively assessed.

9.2.2.1 Site Use Factors

The selection of SUFs for mammals and the related question of whether there is habitat for mammals are important factors in understanding risk estimates for mammals in the NBSA. A SUF of 0.5 was applied to exposure estimates for the river otter and harbor seal. The SUF was selected based on data from the literature indicating that these species have large home ranges compared to the size of the NBSA and prefer habitats for foraging (tidal mud flats, sand bars, shoals, river deltas, estuaries, bays, coastal rocks, and offshore islets; USEPA 1993) and loafing (cobble and sand beaches, tidal mud flats, offshore rocks and reefs, glacial and sea ice, and man-made objects such as piers and log booms; USEPA 1993) that are not found in the NBSA or make up a very small proportion of the NBSA. Use of the SUF is reasonable and appropriate based on the habitat preferences of these species. The use of an alternate SUF of 1 was examined for the uncertainty assessment and results in additional COPECs with LOAEL HQs ≥ 1. These include:

- For river otter, when dietary food web models assumed a SUF =1 rather than 0.5, the following changes to HQs occurred:
  - NBSA-wide HQs:
    - NBSA TRVs: total PCB LOAEL HQ changed from < 1 to ≥ 1.
    - LPR FFS TRVs: total PCBs, 2,3,7,8-TCDD, total dioxin/furan TEQ – mammal, and total dioxin/furan/PCB TEQ – mammal LOAEL HQs changed from < 1 to ≥ 1.
  - North Zone HQs:

  - NBSA TRVs: total PCBs LOAEL HQs changed from < 1 to ≥ 1.
  - LPR FFS TRVs: The total PCBs LOAEL HQs changed from < 1 to ≥ 1.
- Southeast Zone HQs:
  - LPR FFS TRVs: 2,3,7,8-TCDD, total dioxin/furan TEQ – mammal, and total dioxin/furan/PCB TEQ – mammal LOAEL HQs changed from < 1 to ≥ 1.
- Southwest Zone HQs:
  - NBSA TRVs: total PCBs LOAEL HQs changed from < 1 to ≥ 1
  - LPR FFS TRVs: total PCBs and total dioxin/furan/PCB TEQ - mammal LOAEL HQs changed from < 1 to ≥ 1.

- Harbor seal food web models also assumed that SUF = 0.5, given the lack of haul-out sites for this receptor in the NBSA. When harbor seal food web models were analyzed with SUF = 1, there were no changes from HQ < 1 to HQ ≥ 1 for NBSA-wide or zone LOAEL HQs based on NBSA or LPR FFS TRVs.

As noted above, the SUFs evaluated in this BERA are appropriate based on the available information for the NBSA. HQs estimated using SUF of 1 for river otter and harbor seal are provided only to demonstrate the effect of application of an SUF on the HQs; use of a SUF of 1 is not warranted in this BERA. Summary tables of HQ results from this sensitivity analysis on the effect of SUF on mammal dietary risk are found in Appendix F.

9.2.2.2 Polychaete Worm EPCs

The polychaete worm tissue data used in the food web models were based on the laboratory bioaccumulation study in which worms were exposed to homogenized sediment collected from the 0 to 15-cm depth horizon. Uncertainties related the representativeness of these bioaccumulation tests for estimating dietary exposures are discussed in Section 7.6.3.3. River otter included polychaete worm as a portion of its diet; however, polychaete worm tissue sample size was not large enough to be evaluated by assessment zone. Therefore, risk from ingestion of polychaete worms were assessed NBSA-wide in the zone risk calculations for this species. A regression analysis was performed to assess the relationship between sediment concentrations and polychaete worm tissue concentrations, using 2,3,7,8-TCDD as an example COPEC. There was a strongly significant relationship between sediment and polychaete worm tissue 2,3,7,8-TCDD concentrations (r^2 = 0.91, p=0.0002; Figure 8-2). The regression equation from this analysis was used to predict polychaete worm 2,3,7,8-TCDD concentration from sediment concentrations. The predicted polychaete worm tissue concentrations were then used in the food web models used to calculate NBSA-wide and assessment zone risk HQs. There was no change in 2,3,7,8-TCDD HQs for river otter when using the actual polychaete worm tissue data or the predicted worm tissue data derived from the relationship between sediment and worm tissue concentrations. This is not unexpected given the relatively small dietary exposure attributable to invertebrates in the mink diet. The regression analysis assumed that the sediments used in the laboratory bioaccumulation study are representative of conditions throughout the NBSA. Summary tables of HQ results from this sensitivity analysis on the effect of using sediment to worm tissue regressions on risk from dietary exposure in mammals are presented in Appendix F.

9.2.2.3 Treatment of Non-Detects

The concentrations of sum components (e.g., PCB congeners) that were not detected were assumed to be zero when calculating totals. The effect on HQs of using one-half the quantitation limit or the full quantitation limit was evaluated.

NBSA-wide LOAEL HQs based on LPR FFS TRVs changed from < 1 to ≥ 1 when using ND = ½ and 1 for total dioxin/furan TEQ – Mammal and total dioxin/furan/PCB TEQ - Mammal for river otter.

There were no other changes from HQ < 1 to HQ ≥ 1 for NBSA-wide and zone HQs based on NBSA or LPR FFS TRVs regardless of how non-detected values in sums were treated (either as zero, one-half the quantitation limit, or the full quantitation limit). Summary tables of HQ results from this sensitivity analysis on the treatment of non-detects are presented in Appendix F.

9.2.2.4 Fish Prey Size

Based on data from the literature, only fish < 30 cm were included in the fish dietary components for river otter (80% of diet included fish < 30 cm) and harbor seal (90% of diet included fish < 30 cm). This diet excluded several larger fish samples.

(i) Fish Prey Size – fish < 30 cm and all fish

River otter and harbor seal dietary food web models were analyzed using all fish samples to assess this uncertainty. There were no changes from LOAEL HQ < 1 to HQ ≥ 1 for NBSA and LPR FFS TRVs, either NBSA-wide or by zone, for either species. The calculated EPCs for fish of all lengths used and the summary tables of HQ results from this sensitivity analysis on the effect of including fish of all lengths in the mammal dietary risk evaluation are presented in Appendix F.

(i) Fish Prey Size – fish < 30 cm and fish > 30 cm

River otter dietary food web models were analyzed using fish > 30 cm to assess this uncertainty. LOAEL HQs based on LPR FFS TRVs for 2,3,7,8-TCDD, total dioxin/furan TEQ - mammal, and total dioxin/furan/PCB TEQ – Mammal decreased from ≥ 1 to < 1 in the North Zone when 100% of the otter diet was assumed to include only fish > 30 cm. No changes in HQs were found when the river otter diet was 5% polychaete worm, 10% softshell clam, 5% blue crab, 70% fish < 30cm, and 10% fish > 30cm or when the river otter diet was 5% polychaete worm, 10% softshell clam, 5% blue crab, 75% fish < 30cm, and 5% fish > 30cm.

The calculated EPCs for fish > 30 cm in length used are presented in Appendix C and the summary tables of HQ results from this sensitivity analysis on the effect of including fish > 30 cm in the river otter dietary risk evaluation are presented in Appendix F.

9.2.2.5 Other Uncertainties

Additional uncertainties were identified that are not expected to substantially impact the risk estimates. These uncertainties were identified but not quantitatively evaluated:

- Modeled diet – Dietary items were limited to prey species with tissue chemistry data available from the NBSA, including worm, blue crab, softshell clam, and fish tissue, and did not include other prey items that may be additional components of mammal diets, such as zooplankton, squid, shrimp,

mammals, amphibians, or aquatic and terrestrial plants. In addition to the limited types of prey used in the mammal dietary model, the selection of explicit prey portions may not reflect the feeding behavior of some mammal species. Therefore, the representativeness of the dietary estimates (based on available prey tissue data) for actual NBSA mammal diets is uncertain. However, as prey tissue concentrations were measured in species with relatively high bioaccumulation potential (e.g., infaunal life history, higher trophic level consumers) compared with many of the unmeasured dietary components, it is likely that COPEC exposure via the diet is overestimated rather than underestimated in this BERA.

- Use of soil to plant BAFs to estimate concentrations of COPECs in aquatic plant tissue for muskrat – Aquatic plants make up a significant portion (85%) of the muskrat diet; however, aquatic plant tissue data are not available from the NBSA. Additionally, sediment to aquatic plant BAFs are generally unavailable. Therefore, soil to plant BAFs from the literature were used to estimate the concentration of COCs in plant tissue. For many of the key COPECs in the NBSA (PCBs, dioxins/furans, many metals), plant uptake from soil is lower than for invertebrates and/or vertebrates exposed to the same media. However, it is unknown whether the BAFs accurately reflect the uptake of COPECs in aquatic plants or whether the resulting values represent actual COPEC aquatic plant tissue concentrations available to muskrats in the NBSA.
- Food ingestion rate – Food ingestion rates for river otter and muskrat were estimated as a function of body weight using equations from Nagy (2001). The food ingestion rate for harbor seal was based on a model developed by Ashwell-Erickson and Elsner (1981) that was also a function of body weight (cited in USEPA 1993). It is unknown how closely the modeled food ingestion rates reflect actual ingestion rates of NBSA mammals, but these studies have derived these rates from empirical studies on these mammals. The use of these ingestion rate equations for mammals is standard practice in Superfund risk assessments, and it is not likely that ingestion rates vary substantially in a manner that would affect risk outcomes. The CPG conducted a probabilistic sensitivity analysis of various exposure factors for mink and otter in the LPRSA BERA. In general, they found that the deterministic risk calculations were generally more conservative, and produced higher HQs. These results suggest an added level of conservatism and certainty in the NBSA risk estimates from the deterministic food web model.
- Sediment ingestion rate – Measured incidental sediment ingestion rates were not available for any of the mammal receptors. Muskrat was assumed to have the same sediment ingestion rate as hispid cotton rat (Garten 1980). Sediment ingestion rates for the other species were based on what is known about each species' feeding habitats and best professional judgment. It is unknown whether the estimated sediment ingestion rates reflect actual ingestion rates of NBSA mammals. For bioaccumulative COPECs, prey uptake is assumed to account for the majority of dietary exposure, and therefore uncertainty in the sediment ingestion rate is unlikely to influence risk conclusions for mammals in this BERA.

9.3 Weight of Evidence Risk Findings for Mammals

As summarized in Section 3.5, a WOE approach was used to evaluate COPECs with LOAEL HQs ≥ 1 (preliminary COCs; Table 9-7) and potential for unacceptable risk to mammal populations in the NBSA.

Table 9-7. Summary of Preliminary COCs for Mammal Dietary Assessment

Preliminary COCs	Exposure Area	Range of LOAEL HQs					
		Mammal Diet LOE					
		NBSA TRVs			LPR FFS TRVs		
		River Otter	Muskrat	Harbor Seal	River Otter	Muskrat	Harbor Seal
2,3,7,8-TCDD	NBSA-wide	<1	<1	<1	<1	<1	<1
	Zones	<1	<1	<1	<1- **1**	<1	<1
Total Dioxin/Furan TEQ Mammal	NBSA-wide	<1	<1	<1	<1	<1	<1
	Zones	<1	<1	<1	<1 - **1**	<1	<1
Total Dioxin/Furan/PCB TEQ Mammal	NBSA-wide	<1	<1	<1	<1	<1	<1
	Zones	<1	<1	<1	<1 - **1**	<1	<1
Mercury	NBSA-wide	<1	<1	<1	<1	<1	<1
	Zones	<1	<1	<1	<1	<1 - **1**	<1

For mammals, a range of dietary HQs (including HQs based on sensitivity analyses) provides the LOE used in this BERA. The range of HQs includes:

- HQs based on dietary doses in wildlife food web models estimated using measured prey tissue concentrations compared to literature-derived dietary TRVs specific to the NBSA
- HQs based on dietary doses in wildlife food web models estimated using measured prey tissue concentrations compared to literature-derived dietary TRVs derived for the LPR FFS (USEPA 2014).

HQs were calculated for the NBSA (sitewide for river otter and harbor seal; shorelines habitat for muskrat), and also independently for the North, Southeast, and Southwest Zones. A variety of sensitivity analyses for the dietary HQs were conducted as well. Secondary LOEs, such as reference comparisons or site-specific toxicity data, were not available for mammals.

Uncertainties in the HQs, discussed in Section 9.2, were evaluated in the WOE assessment according to the factors presented in Section 3.5 to arrive at an overall risk conclusion for each preliminary COC. The risk conclusions based on the WOE are presented in Table 9-8 and discussed below.

As discussed above in Section 9.2, mammalian TRVs are a key uncertainty in the risk estimates and apply to all mammalian receptors evaluated in this BERA. However, the two sets of TRVs were included for bounding purposes and given equal weight in this WOE evaluation. Additional LOE are discussed below for each receptor and preliminary COC.

9.3.1 River Otter

For river otter, dietary LOAEL HQs ≥ 1 were predicted for COPECs presented in Table 9-9. Sensitivity analyses conducted for this receptor included evaluation of NDs for the dietary HQs, modified prey size assumptions for the dietary HQs, use of an uptake model for polychaete worm dietary fraction, and evaluation of an SUF of 1.

Using the primary exposure and toxicity assumptions, dietary LOAEL HQs ≥ 1 were predicted only for 2,3,7,8-TCDD, total dioxin/furan TEQ, and total dioxin/furan/PCB TEQ in the North Zone using the LPR FFS TRVs. Sensitivity analyses, including evaluation of a SUF of 1 and calculation of total concentrations using the half and full quantitation limit for NDs resulted in identification of additional assessment zones

for some of the preliminary COCs and total PCBs as an additional preliminary COC based on LOAEL HQs equal to 1 for the NBSA-wide area and/or one or more individual assessment zones.

Table 9-9. Exceedances of TRVs for River Otter Dietary Assessment

Preliminary COCs	Dietary HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 9-5)		
2,3,7,8-TCDD	None	North Zone
Total Dioxin/Furan TEQ	None	North Zone
Total Dioxin/Furan/PCB TEQ	None	North Zone
Sensitivity Analyses (Table 9-6)		
2,3,7,8-TCDD	None	NBSA-wide, North, Southeast Zones (SUF=1)
Total Dioxin/Furan TEQ	None	NBSA-wide, North, Southeast Zones (SUF=1); NBSA-wide (NDs = ½QL)
Total Dioxin/Furan/PCB TEQ	None	NBSA-wide, North, Southeast, Southwest Zones (SUF=1); NSBA-wide (ND=1/2QL, ND=QL).
Total PCBs	NBSA-wide, North, Southwest Zones (SUF=1)	NBSA-wide, North, Southwest Zones (SUF=1)

Notes: ND – non detected; QL – quantitation limit; SUF – site use factor

Inputs to the HQs, including SUFs, EPCs, and TRVs, are discussed below as part of the WOE evaluation for this receptor.

SUF: For river otter, the NBSA-wide area represents the most realistic exposure scenario, as the individual assessment zones (1.4, 1.0, and 2.1 square miles for the North, Southeast, and Southwest Zones, respectively) are small relative to the home range of an individual river otter (range 3-30 square miles; Helon et al. 2004; Wilson 2012). Even the NBSA-wide area (6.3 square miles) is unlikely to be large enough to accommodate a population of river otters, and no river otters have been observed in the NBSA, either as noted in historic studies or during the 2013 reconnaissance survey (Tierra 2015b). As such, it is reasonable to assume that the SUF of 0.5 represents a conservative estimate of time spent in the NBSA (both NBSA-wide and specifically for the North Zone). A lower SUF is likely appropriate.

Diet: The prey diet evaluated in this BERA consists primarily of fish, with some of invertebrates with high potential for uptake. The diet evaluated is considered unlikely to significantly over- or underestimate exposure.

EPCs: In general, EPCs were based on 95%UCL concentrations which are appropriate exposure estimates for a BERA.

Based on the various factors considered in the dietary HQ LOE, the resulting risk conclusions for preliminary COCs are as follows:

- Dioxins/furans and TEQ: Unacceptable risk is unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using NBSA TRVs; 2) low magnitude of the LOAEL HQs ≥ 1 using LPR FFS TRVs; 3) conservative assumptions used in the risk estimates (e.g., conservative TRVs and SUFs; and 4) LOAEL HQs < 1 using both sets of TRVs and most realistic assumptions for river otter populations (primary exposure assumptions and NBSA-wide area).
- Total PCBs: Unacceptable risk is unlikely. This conclusion is based on: 1) LOAEL HQs < 1 using both sets of TRVs and most realistic assumptions for river otter populations (primary exposure assumptions and NBSA-wide area); 2) low magnitude of the LOAEL HQs ≥ 1 using SUF of 1; 3) conservative assumptions used in the risk estimates (e.g., conservative TRVs and SUFs)

9.3.2 Muskrat

For muskrat, dietary LOAEL HQs ≥ 1 were predicted for COPECs presented in Table 9-10. Sensitivity analyses conducted for this receptor included evaluation of NDs for the dietary assessment.

Using the primary exposure and toxicity assumptions, dietary LOAEL HQs ≥ 1 were predicted only for mercury in the Southwest Zone based on LPR FFS TRVs. No other LOAEL HQs were ≥ 1 for the NBSA-wide, North and Southeast Zones were predicted for muskrat potentially inhabiting shoreline areas based on the primary exposure assumptions or sensitivity analyses.

Table 9-10. Exceedances of TRVs for Muskrat Dietary Assessment

Preliminary COCs	Dietary HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 9-5)		
Mercury	None	Southwest Zone
Sensitivity Analyses (Table 9-6)		
No additional COCs were identified from sensitivity analyses for this receptor		

Inputs to the HQs, including SUFs, EPCs, and TRVs, are discussed below as part of the WOE evaluation for this receptor.

SUF: For muskrat, a SUF of 1 is appropriate based on the small home range for this species. Although habitat is found predominantly along the shoreline, the NBSA-wide area and individual assessment zones exceed the home range (1 to 12 acres) for an individual muskrat (Miller 2018). The shoreline habitat within the NBSA-wide area (6.3 square miles) is unlikely to be large enough to accommodate a population of muskrats; therefore, the NBSA-wide exposure area is considered more relevant than the smaller individual zones.

Diet: The diet evaluated in this BERA consists primarily of aquatic plant material, with a small proportion of invertebrates and fish with higher potential for uptake. The diet evaluated is considered unlikely to significantly over- or underestimate exposure.

EPCs: In general, EPCs were based on 95%UCL concentrations which are appropriate exposure estimates for a BERA.

Based on the various factors considered in the dietary HQ LOE, the resulting risk conclusions for the preliminary COC are as follows:

- Mercury: Unacceptable risk is unlikely. This conclusion is based on 1) LOAEL HQs < 1 for most scenarios; 2) low magnitude of the LOAEL HQs ≥ 1; 3) conservative assumptions used in the risk estimates (e.g., conservative TRVs and SUFs; and 4) LOAEL HQs < 1 using both sets of TRVs and most realistic assumptions for muskrat populations (primary exposure assumptions and NBSA-wide area).

9.3.3 Harbor Seal

No LOAEL HQs ≥ 1 were predicted for harbor seal potentially inhabiting the NBSA or any of the assessment zones (Table 9-11). Sensitivity analyses conducted for this receptor included evaluation of NDs, dietary HQs, modified prey size assumptions for the dietary HQs, and evaluation of an SUF of 1.

Table 9-11. Exceedances of TRVs for Harbor Seal Dietary Assessment

Preliminary COCs	Dietary HQs ≥ 1	
	NBSA TRVs	LPR FFS TRVs
Primary Exposure and Toxicity Assumptions (Table 9-5)		
No COCs were identified for this receptor		
Sensitivity Analyses (Table 9-6)		
No additional COCs were identified from sensitivity analyses for this receptor		

Uncertainties related to the risk estimates for harbor seal are not likely to result in changes to the risk conclusions for this receptor. No unacceptable risk was predicted for harbor seal, and no COCs are identified for this receptor.

9.3.4 Summary of Risk Findings for Mammals

Overall, no unacceptable risk to populations of mammals potentially exposed to COPECs in the NBSA is expected. Conclusions for the mammal evaluations are as follows:

- For harbor seal (piscivorous aquatic mammal): LOAEL HQs < 1 are predicted for all scenarios evaluated in the NBSA-wide and assessment zone areas.
- For muskrat (omnivorous/herbivorous mammal):
  - LOAEL HQs < 1 are predicted for all scenarios evaluated in this BERA except for mercury in the Southwest Zone using LPR FFS TRVs.
- For river otter:
  - Using primary exposure and toxicity assumptions, LOAEL HQs < 1 are predicted for all scenarios evaluated in this BERA except for dioxins/furans and TEQ using LPR FFS TRVs.

- Sensitivity analyses, including evaluation of a SUF of 1 and calculation of total concentrations using the full quantitation limit for NDs, resulted in identification of total PCBs as an additional preliminary COC based on LOAEL HQs equal to 1 for the NBSA-wide area and/or one or more individual assessment zones.
- Unacceptable risk to these COPECs is unlikely based on LOAEL HQs < 1 using most realistic assumptions for river otter populations (NBSA TRVs and both sets of TRVs in NBSA-wide area); conservative assumptions used in the risk estimates (e.g., conservative TRVs and SUFs; and low magnitude of the LOAEL HQs ≥ 1.

Based on the results of this BERA, potential exposures to COPECs in the NBSA are not expected to pose unacceptable risk to mammals. As summarized in Table 9-8, risk drivers/COCs (identified based on LOAEL HQs ≥1 and WOE supporting the conclusion of unacceptable risk) were not identified for mammals.

10 DIAMONDBACK TERRAPIN (REPTILE) ASSESSMENT

Reptiles, including the diamondback terrapin (*Malaclemys terrapin*), were evaluated qualitatively in this BERA, because of their limited potential occurrence and the lack of available species-specific TRVs. Available field survey data are insufficient to determine the presence or absence of the northern diamondback terrapin in Newark Bay. USACE (1997) notes the possibility that the diamondback terrapin could occur as a transient visitor to the NBSA as it moves between the Hackensack Meadowlands Complex and marshes and tidal creeks along the Arthur Kill during the spring and summer. The diamondback terrapin is the only species of turtle in North America that spends its life in brackish water (National Aquarium 2010). No terrapins have been collected to date in bottom trawls, but they appear to be a pollution-tolerant species (Wood 1995, as cited in USACE 1997). USACE (1997) also notes the possibility for three species of marine turtles – loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), and the green sea turtle (*Chelonias mydas*) – to utilize the shoal areas (i.e., subtidal flats) of Newark Bay. However, there is no documented evidence of these species in the NBSA.

10.1 Qualitative Risk Characterization

The exposure of terrapins or other reptiles in the NBSA would likely be comparable to that for the mammals assessed in Section 9. The terrapin is dependent upon saltmarsh and estuarine habitats in the temperate zone and requires sandy upland substrate free from predation for egg laying (Hart and Lee 2006). Available habitat for these receptors in terms of intertidal wetland areas in the Bay are small, representing only 0.7% of the total area of the NBSA. As such, it is likely that they would be exposed only on a limited basis.

Exposures for reptiles would be from surface water, sediments, and the food web. Risks to these receptors are expected to be *de minimis* based on the following:

- The surface water assessment found no unacceptable concentrations of COPECs in the NBSA either spatially, temporally, or seasonally
- No risks (i.e., LOAEL HQs >=1) were found for any of the mammal species assessed in this BERA
- The CPG (Windward 2019) undertook a quantitative assessment of risks to reptiles for the LPRSA BERA (Appendix N of the LPRSA BERA) for COPECs that had sufficient toxicological data (chromium, copper, lead, mercury, nickel, silver, and zinc) and found that all HQs were less than 1.

For these reasons, it is assumed there are no risks to reptiles in the NBSA.

10.2 Uncertainties Assessment

The potential risks to all reptiles in the NBSA are uncertain due to lack of toxicological reference data. The CPG (Windward 2019) undertook a quantitative assessment of risks to reptiles for the LPRSA BERA for chromium, copper, lead, mercury, nickel, silver, and zinc and found that all HQs were less than 1. Potential risks from other COPECs could not be determined because toxicological data are not sufficient. No relevant toxicological data have been published since the LPRSA BERA to alleviate this uncertainty.

The degree of uncertainty in the qualitative reptile assessment is assumed to be low. This is due to the fact that: 1) habitat-based exposures in the NBSA are likely limited for these organisms; 2) surface water exposure to COPECs is negligible; and, 3) the results of the mammals risk assessment (which are comparable in terms of exposure-risk potential) do not demonstrate risk.

11 RISK SUMMARY AND CONCLUSIONS

This BERA evaluated five assessment endpoints that addressed the protection and maintenance of communities or populations of benthic/epibenthic invertebrates, fish, birds, mammals, and reptiles (Table 3-1). These assessment endpoints were evaluated within a NBSA-specific risk analysis framework using the data and information collected under the Phase III RI/BERA sampling programs, and integrated site and ecosystem history information to inform the CSM and provide perspectives on potential changes in risk over time.

The potential for unacceptable risk was assessed using standard risk assessment practices and through development of LOEs to develop a WOE assessment for each receptor type, as described in Section 3. The LOEs were based on each measurement endpoint evaluated for the selected assessment endpoints, and associated strengths and uncertainties. In some cases, additional LOEs were available (e.g., site-specific toxicity data from the published literature) and were included in the WOE. The design of this risk assessment was focused on minimizing uncertainties, to the extent practicable, by being reasonably conservative in the exposure assumptions that were made and conducting sensitivity analyses using alternative assumptions for key input parameters to the exposure-risk models and calculations as described in Sections 6 through 9. In addition, conservative TRVs were generally used for all of the COPECs, and bounding of the potential effects was conducted by evaluating HQs calculated using both the NBSA TRVs and the TRVs developed by the USEPA (2014) for use in the LPR FFS. In addition, available site-specific ecotoxicity studies conducted in the NBSA were used for invertebrates, fish, and birds to quantify risks and/or inform the risk assessment.

The integrated summary of the risk findings for each AE are presented in Section 11.1. More detailed discussion can be found in the respective WOE evaluations for each receptor type, as presented above in Sections 6.4 (invertebrates), 7.6 (fish), 8.4 (birds), and 9.3 (mammals)[11]. The important sources of uncertainty in this BERA are summarized in Section 11.2. The integrated WOE risk findings and recommendations for risk drivers/final COCs are provided in Section 11.3. Final COCs selected for evaluation in the FS will be determined in consultation with USEPA.

11.1 Integrated Risk Findings

A range of risk estimates were presented above in Sections 6 through 9 based on the various ME/LOE evaluated for each AE and, in some cases, based on multiple toxicity and/or exposure assumptions evaluated within each ME/LOE. In order to draw risk conclusions, strengths and weaknesses associated with each ME/LOE and set of assumptions were evaluated as described in Section 3.5.3, along with the overall indication of risk from multiple LOE. These integrated risk findings are presented in detail for benthic invertebrate communities in Table 6-17, epibenthic invertebrates in Table 6-21, fish in Table 7-24, birds in Table 8-15, and mammals in Table 9-8. A qualitative evaluation was conducted for reptiles. Table 11-1a provides a summary of these integrated risk characterization findings for epibenthic invertebrates

[11] A formal WOE evaluation was not conducted for reptiles. See Section 10 for the qualitative risk evaluation and LOE.

(softshell clam and blue crab), fish, birds, mammals, and reptiles and the AEs identified in Section 3; Table 11-1b provides this summary for benthic invertebrate communities (including polychaete worms) based on the results of the SQT evaluation.

As summarized in Table 11-1a, the Risk Conclusions regarding the potential for unacceptable risk for epibenthic invertebrates, fish, birds, and mammals fall into the following categories:

1. Possible: LOAEL HQs ≥ 1 ***and*** sufficient and strong supporting LOEs. The COPECs associated with this Risk Conclusion are recommended as risk drivers/COCs.
2. Unlikely: LOAEL HQs ≥ 1 ***and*** sufficient and strong LOEs supporting a conclusion of no unacceptable risk. The COPECs associated with this Risk Conclusion are not recommended as risk drivers/COCs.
3. Uncertain: LOAEL HQs ≥ 1 ***and*** insufficient LOEs to draw a risk conclusion. While sufficient data were collected to evaluate ecological receptor exposures in the NBSA, toxicity data used to evaluate the exposures was selected primarily from published literature. Toxicity data for some receptors, such as tissue copper effects levels in fish, are limited in the literature. In cases where there is low confidence in the toxicity data and the various LOEs gave conflicting results, the available information was considered too uncertain to draw risk conclusions. The COPECs associated with this Risk Conclusion are recommended as COCs.
4. Not expected: LOAEL HQs < 1.

Overall, unacceptable risks to wildlife (i.e., bird and mammal) receptors are either not expected or considered unlikely in the NBSA for all COPECs.

For fish, the potential for unacceptable risk was identified only for dioxins/furans and dioxin/furan and PCB TEQ (2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish) for all fish receptors, total PCBs for forage fish in the Southwest Zone, and total DDx for white perch. Additionally, the potential for unacceptable risk to white perch from copper in the NBSA is highly uncertain due to low confidence in both the dietary and tissue TRVs (see Section 7.7.4),conflicting risk predictions based on the dietary and tissue HQs, and the fact that it is a physiologically regulated metal in fish.

For epibenthic invertebrates (i.e., softshell clam and blue crab), potential for unacceptable risks were identified for 2,3,7,8-TCDD, total PCBs, arsenic, lead, and mercury for softshell clam, and 2,3,7,8-TCDD, total PCBs, total DDx, mercury, and methylmercury for blue crab. For 2,3,7,8-TCDD and total PCBs, the finding of possible risk to softshell clam is due to tissue-based LOAEL HQs that exceed 10 based on bivalve-specific TRVs and supporting site-specific toxicity data indicating potential reproductive impairment in oysters. The HQs based on bivalve-specific TRVs are considered less reliable for blue crab, but were used to identify 2,3,7,8-TCDD and total PCBs as having potential for unacceptable risk. The finding of somewhat higher potential for unacceptable risk in softshell clams is consistent with the fact that these organisms are sessile throughout most of their life history, are particle filter feeders, and live in close association with the sediments.

For benthic invertebrate communities, the outcome of the SQT was used to draw risk conclusions, as summarized in Table 11-1b. For polychaete worms, supporting LOEs include tissue HQs and site-specific toxicity data, as presented in Table 11-1a. The benthic invertebrate (i.e., infaunal) communities that live within the sediments of the NBSA are not considered impacted, either from a species diversity/abundance/evenness standpoint, or with respect to the urban background communities that

inhabit Jamaica Bay in the southern NY/NJ Harbor Estuary. Acute toxicity, based on 10-day amphipod survival was observed in only two of 30 locations. A total of six stations had 28-day survival significantly different from control (six other stations had 28-day survival less than 80% of control, but were not significant due to the variability in this endpoint). Eighteen samples had growth, another variable endpoint, that was significantly different than control but only seven samples had growth less than 50% of control. The SQT assessment and dose response modeling indicate localized areas of measured and predicted sediment toxicity, particularly in the southwest area of the NBSA (Figures 6-6 and 6-8). However, the majority of the sediments sampled throughout the NBSA are not acutely toxic and pose no incremental risk to benthic communities above urban reference conditions. The localized toxicity that does exist appears to be related to multiple COPECs that are all at or above the 90th percentile of their NBSA-wide concentration range in surface sediments at these locations.

11.2 Summary of Key Uncertainties

A number of conservative practices were used and assumptions made for the risk assessment in this BERA, including:

- Wildlife representative receptor species were intentionally selected based on attributes (e.g., small foraging areas) that provide conservative estimates of exposure for other members of the feeding guild. Exposure parameters for the selected representative species from approved sources (e.g., USEPA Wildlife Exposure Factor Handbook [USEPA 1993]) were preferred sources of wildlife exposure information to reduce the uncertainty for the species living at this specific site.
- Prey tissue collected to evaluate avian dietary exposure was for species likely to be highly exposed (e.g., infaunal invertebrates) and assumed diets were based on these limited prey items.
- Exposure estimates assume that measured concentrations of COPECs in sediment and tissue are 100% bioaccessible via dietary uptake (dermal absorption via the gut). For many COPECs, this assumption overestimates exposure.
- Estimates of exposure assume that wildlife do not avoid contaminated areas or foods, and do not actively avoid areas of the site in close proximity to industrial development and/or uses.
- Exceedance of LOAEL-based effects thresholds developed based on exposure to individual fish, birds, or mammals is predictive of adverse population-level effects.

Specific uncertainties for each AE are discussed in detail in Sections 6.4 (invertebrates), 7.6 (fish), 8.3 (birds), and 9.2 (mammals). Because of the generally conservative approaches taken and other protective assumptions made or evaluated throughout this BERA, risk estimates are expected to be overestimated rather than underestimated.

11.3 Weight of Evidence Conclusions and Risk Driver Recommendations

Based on the integrated risk management findings summarized in Tables 11-1a and 11-1b, unacceptable risk was considered possible for the following COPECs, which are recommended as risk drivers/final COCs:

- Dioxins/furans and TEQ (i.e., 2,3,7,8-TCDD, total dioxin/furan TEQ fish, dioxin/furan/PCB TEQ fish) – for shellfish (2,3,7,8-TCDD only), forage and predatory fish (Table 11-1a) and benthic communities (2,3,7,8-TCDD only; Table 11-1b)
- PCBs (i.e., total PCBs based on sum of 209 congeners) – for shellfish, and forage fish in the Southwest Zone (Table 11-1a) and benthic communities (Table 11-1b)
- Pesticides (total chlordane, total DDx [total of 2,4'- and 4,4'-DDT, DDE, and DDD], dieldrin, and hexachlorobenzene) for benthic communities (Table 11-1b), and total DDx for blue crab and white perch (Table 11-1a)
- PAHs (total PAH, HMW PAH, LMW PAH, alkylated PAH) – for benthic communities (Table 11-1b)
- Inorganics (arsenic, cadmium, chromium, copper, lead, mercury/methylmercury, nickel, silver, and zinc) – for benthic communities (Table 11-1b), arsenic, lead, mercury, and/or methylmercury for shellfish (Table 11-1a), and copper, based on uncertain risk to white perch (Table 11-1a).

As summarized in the bullets above, these COPECs are recommended as COCs primarily based on their potential local risk to benthic infaunal communities from the sediment toxicity endpoint in the SQT assessment. Dioxins/furans, PCBs, and total DDx were also identified based on the WOE evaluation for shellfish and fish. Dioxins/furans, PCBs, total DDx, and mercury/methylmercury also showed some potential for risk in one or more of the tissue-based and/or dietary-based assessments for birds and mammals, as summarized in Table 11-1a; however, unacceptable risk was ultimately considered unlikely in the NBSA for these COPECs and receptors based on the WOE.

All compounds with LOAEL-based HQs greater than 1 will be carried into the FS for risk management consideration. These HQs are summarized for benthic invertebrates in Tables 6-17 and 6-24, fish in Table 7-24, birds in Table 8-15, and mammals in Table 9-8. These will be considered in the context of the findings and recommendations based on the WOE evaluation in this BERA.

12 REFERENCES

Able, K.W., Grothues, T.M., Rowe, P.M., Wuenschel, M.J., and J.M. Vasslides. 2011. Near-surface larval and juvenile fish in coastal habitats: comparisons between the inner shelf and an estuary in the New York Bight during summer and fall. *Estuar Coasts* 34:726–738.

Able, K.W. and M.P. Fahay. 2010. Ecology of Estuarine Fishes: Temperate Waters of the Western North Atlantic. Johns Hopkins Univ. Press. Baltimore, MD. 566p.

Able, K.W., J.P. Manderson, and A.L. Studholme. 1998. The distribution of shallow water juvenile fishes in an urban estuary: the effects of manmade structures in the Lower Hudson River. *Estuaries* 21: 731-744.

Abraham, B.J. 1985. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Mummichog and Striped Killifish. Biological Report 82-4 (11.40). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Abraham, B.J. and P.L. Dillon. 1986. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Softshell Clam. Biological Report 82-4 (11.68). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Adams, D. 2016. Overview of EPA Sediment Monitoring Activities. Presentation at the New Jersey Water Council Meeting. September 26.

Adams, W., R. Blust, U. Borgmann, K. Brix, D. DeForest, A. Green, J. McGeer, J. Meyer, P. Paquin, P. Rainbow, and C. Wood. 2011. Utility of tissue residues for predicting effects of metals on aquatic organisms. *Integr Environ Assess Manag* 7(1):75-98.

AECOM. 2010. Remedial Investigation Water Column Monitoring/Physical Data Collection for the Lower Passaic River, Newark Bay and Wet weather monitoring: Lower Passaic River Restoration Project. Quality Assurance Project Plan. Revision 5.

AECOM. 2011. Quality Assurance Project Plan/Field Sampling Plan Addendum. Remedial Investigation Water Column Monitoring/Small Volume Chemical Data Collection. Lower Passaic River Restoration Project. Revision 2. August.

AECOM. 2019. Physical Water Column Monitoring Sampling Program Characterization Summary. Lower Passaic River Restoration Project. May.

Afton, A.D., R.H. Hier, and S.L. Paulus. 1991. Lesser Scaup diets during migration and winter in the Mississippi Flyway. *Can J Zool* 69:328-333.

Akaike, H. 1981. Likelihood of a Model and Information Criteria. Journal of Econometrics 16:3-14.

Anteau, M.J., J-M. DeVink, D.N. Koons, J.E. Austin, C.M. Custer, and A.D. Afton. 2014. Lesser Scaup (*Aythya affinis*), In: Rodewald, P.G., Ed., The Birds of North America. Ithaca: Cornell Lab of Ornithology. Retrieved from: https://birdsna.org/Species-Account/bna/species/lessca. DOI: 10.2173/bna.338.

Arcadis. 2015. Risk Assessment Field Sampling and Analysis Program – Newark Bay Study Area, Technical Memorandum. November 30.

Arcadis. 2016. Summary of Preliminary Receptors, Exposure Factors, and Toxicity Reference Values Selection for the Newark Bay Study Area Baseline Ecological Risk Assessment. November 30.

Arcadis and ToxStrategies. 2011. Memorandum from ARCADIS and ToxStrategies to Tierra. Re: Revised Meeting Minutes – Baseline Human Health and Ecological Risk Assessment Workshop June 28-29, 2011. December 1.

Arnot, J.A. and F.A.P.C. Gobas. 2004. A food web bioaccumulation model for organic chemicals in aquatic ecosystems. *Environ Toxicol Chem* 23:2343-2355.

Ashley, C.M., M.G. Simpson, D.M. Holdich, and D.R. Bell. 1996. 2,3,7,8-tetrachloro-dibenzo-*p*-dioxin is a potent toxin and induces cytochrome P450 in the crayfish, *Pacifastacus leniusculus*. *Aquat Toxicol* 35:157-69.

Ashwell-Erickson, S. and R. Elsner. 1981. The Energy Cost of Free Existence for Bering Sea Harbor and Spotted Seals. In: Hood, D. W. and J.A. Calder, Eds., The Eastern Bering Sea Shelf: Oceanography and Resources. V2. Department of Commerce. Washington, DC. pp. 869-899.

ASMFC. 2000. Interstate Fishery Management Plan for the American Eel. Fishery Management Report No. 36. April.

ASMFC. 2009. Atlantic Coast Diadromous Fish Habitat: A Review of Utilization, Threats, Recommendations for Conservation and Research Needs. Habitat Management Series #9. January.

Baldwin, C. 2018. Seals Spotted in the Hackensack River in Secaucus. Available at: https://patch.com/new-jersey/secaucus/seals-spotted-hackensack-river-secaucus.

Bath, D.W. and J.M. O'Connor. 1985. Food preferences of white perch in the Hudson River Estuary. *NY Fish Game J* 32(1):63-70.

Battelle. 2008. Screening-Level Ecological Risk Assessment Report for the Newark Bay Study Area. Final. December.

Beckford, C. 2016. Dead Whale, Struck by Ship Days Ago, Resurfaces in Hudson River. NBC New York July 27, 2016. Available at: https://www.nbcnewyork.com/news/local/Dead-Humpback-Whale-Hudson-River-New-Jersey-388474762.html.

Bernick, A.J. and E. Craig. 2008. NYC Audubon Harbor Herons Project: 2008 Interim Nesting Survey. NYC Audubon, New York, 42p.

Black, D.E., R. Gutjahr-Gobell, R.J. Pruell, B. Bergen, and A.E. McElroy. 1998. Effects of a mixture of non-ortho and mono-ortho-polychlorinated biphenyls on reproduction in *Fundulus heteroclitus*. *Environ Toxicol Chem* 17(7):1396-1404.

Blumberg, A.F., L.A. Khan, and J.P. St. John. 1999. Three-dimensional hydrodynamic model of New York Harbor region. *J Hydraul Eng* 125(8):799-816.

Branson, D.R., I.T. Takahashi, W.M. Parker, and G.E. Blau. 1985. Bioconcentration kinetics of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in rainbow trout. *Environ Toxicol Chem* 4(6):779-788.

Brown, R. F. and B.R. Mate. 1983. Abundance, movements, and feeding habits of harbor seals, *Phoca vitulina*, at Nearts and Tillamook Bays, Oregon. *U.S. Natl. Mar. Fish. Serv. Fish. Bull.* 81:291-301.

Brydon, N.F. 1974. The Passaic River: Past, Present, Future. Rutgers University Press, New Brunswick, New Jersey.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34p.

Bugel S.M., L.A. White, and K.R. Cooper. 2010. Impaired reproductive health of killifish (*Fundulus heteroclitus*) inhabiting Newark Bay, NJ, a chronically contaminated estuary. *Aquat Toxicol* 96:182-193.

Bugel, S.M., L.A. White, and K.R. Cooper. 2011. Decreased vitellogenin inducibility and 17ß-estradiol levels correlated with reduced egg production in killifish (*Fundulus heteroclitus*) from Newark Bay, New Jersey. *Aquat Toxicol* 105:1-12.

Bugel, S.M., J.A. Bonventre, L.A. White, R.L Tanguay, and K.R. Cooper. 2014. Chronic exposure of killifish to a highly polluted environment desensitizes estrogen-responsive reproductive and biomarker genes. *Aquat Toxicol* 152:222-231.

Bury, N.R., P.A. Walker, and C.N. Glover. 2003. Review - Nutritive metal uptake in teleost fish. *J Exp Biol* 206:11-23.

Chant, R.J. 2006. Hydrodynamics of the Newark Bay/Kills System: The New Jersey Toxics Reduction Workplan for New York-New Jersey Harbor Study I-E. Prepared for the New Jersey Department of Environmental Protection, Division of Science, Research, and Technology. April.

Choi, Y., Y-M. Cho, and R.G. Luthy. 2013. Polyethylene−water partitioning coefficients for parent- and alkylated-polycyclic aromatic hydrocarbons and polychlorinated biphenyls. *Environ Sci Technol* 47: 6943-6950.

Chu, F-L.E., P. Soudant, L.A. Cruz-Rodriguez, and R.C. Hale. 2000. PCB uptake and accumulation by oysters (*Crassostrea virginica*) exposed via a contaminated algal diet. *Mar Environ Res* 50:217-221.

Chu, F-LE, P. Soudant, and R.C. Hale. 2003. Relationship between PCB accumulation and reproductive output in conditioned oysters *Crassostrea virginica* fed a contaminated algal diet. *Aquat Toxicol* 65:293-307.

Cohen-Barnhouse, A.M., M.J. Zwiernik, J.E. Link, S.D. Fitzgerald, S.W. Kennedy, J.C. Herve, J.P. Giesy, S. Wiseman, Y. Yang, P.D. Jones, Y. Wan, B. Collins, J.L. Newsted, D. Kay, and S.J. Bursian. 2011. Sensitivity of Japanese quail (*Coturnix japonica*), common pheasant (*Phasianus colchicus*), and white leghorn chicken (*Gallus domesticus*) embryos to in ovo exposure to TCDD, PeCDF, and TCDF. *Toxicol Sci* 11(1):93-103.

Cooper, K.R. and G.A. Buchanan. 2007. Integrated Biomarkers for Assessing the Exposure and Effects of Endocrine Disruptors and Other Contaminants on Marine/Estuarine Fish. Second Year Grant Number SR03-038. Rutgers University Cook College and the New Jersey Department of Environmental Protection.

Cooper, K.R. and M. Wintermyer. 2009. A Critical Review: 2,3,7,8 – tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) effects on gonad development in bivalve mollusks. *J Environ Sci Health Part C, Environ Carcin Ecotox Rev* 27:226-45.

Cornelissen, G., Cousins, I.T., Wiberg, K., Tysklind, M., Holmström, H., Broman, D. 2008. Black carbon-dominated PCDD/Fs sorption to soils at a former wood impregnation site. *Chemosphere* 72(10):1455-14.

Couillard, C.M., B. Legare, A. Bernier, and Z. Dionne. 2011. Embryonic exposure to environmentally relevant concentrations of PCB126 affects prey capture ability of *Fundulus heteroclitus* larvae. *Mar Environ Res* 71(4).

Cunningham, J.T. 1954. Made in New Jersey: The Industrial Story of a State. Rutgers University Press, New Brunswick, New Jersey.

Cunningham, J.T. 1966. Newark. Revised and Expanded. New Jersey Historical Society. Newark, NJ.

Daniels, R.A., K.E. Limburg, R.E. Schmidt, D.L. Strayer, and R.C. Chambers. 2005. Changes in fish assemblages in the tidal Hudson River, New York. *Am Fish Sym* 45:471-503.

Dewey, T. and E. Ellis. 2003. *Lontra canadensis*. Animal Diversity Web. Accessed on August 03, 2010 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Lontra_canaden sis.html

Di Giulio, R.T. and D.E. Hinton. 2008. The Toxicology of Fishes. CRC Press/Taylor and Francis Group.

Di Toro, D.M., J.A. Mcgrath, and D.J. Hansen. 2000. Technical basis for narcotic chemicals and polycyclic aromatic hydrocarbon criteria. I. Water and tissue. *Environ Toxicol Chem* 19(8):1951-1970.

Dorr, B.S., J.J. Hatch, and D.V. Weseloh. 2014. Double-crested Cormorant (*Phalacrocorax auritus*), In; Rodewald, P.G., Ed., The Birds of North America. Ithaca Cornell Lab of Ornithology. Available at: https://birdsna.org/Species-Account/bna/species/doccor. DOI: 10.2173/bna.441.

Dozier, H. L. 1953. Muskrat Production and Management. U.S. Fish Wildl. Serv. Circ. 18., Washington DC. 42p.

Duffy-Anderson, J.T., J.P. Manderson, and K.W. Able. 2003. A characterization of juvenile fish assemblages around man-made structures in the New York-New Jersey Harbor Estuary, USA. *Bull Mar Sci* 72: 877-889.

Eickhoff, C., M. Grey, J. Pickard, S. Reimer, and D. MacDonald. 2014. The Co-dependency of Growth and Reproduction: A Closer Look at the 28 day *Leptocheirus plumulosus* Survival, Growth and Reproduction Test. A presentation at the Society of Environmental Toxicology and Chemistry Annual Meeting, Vancouver BC. November.

Eisler, R. 1985. Dioxin Hazards to Fish, Wildlife, and Invertebrates. A Synoptic Review. Contaminant Hazard Reviews. Biological Report 85(1.8). U.S. Fish and Wildlife Service.

Eisler, R. 1987. Polycyclic Aromatic Hydrocarbon Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. Contaminant Hazards Reviews. Biological Report 11. U.S. Fish and Wildlife Service.

Elphick, C., J.D. Dunning, and D.A. Sibley (Eds.). 2001. The Sibley Guide to Bird Life and Behavior. Alfred A. Knopf, New York.

Eng, M.L., J.E. Elliott, S.P. Jones, T.D. Williams, K.G. Drouillard, and S.W. Kennedy. 2014. Amino acid sequence of the AhR1 ligand-binding domain predicts avian sensitivity to dioxin like compounds: in vivo verification in European starlings. *Environ Toxicol Chem* 33(12):2753-8.

EPL. 2016a. Newark Bay Study Area Fish Sampling and Analysis. 2014 Amended Pathology Report. EPL Project Number A41-001. Amended Final Report. July 12.

EPL. 2016b. Newark Bay Study Area Fish Sampling and Analysis. 2015 Amended Pathology Report. EPL Project Number A41-002. Amended Final Report. July 12.

Errington, P.L. 1939. Observations on young muskrats in Iowa. *J Mammal* 20:465-478.

Everitt, R.D., P.J. Gearin, J.S. Skidmore, and R.L. DeLong. (1981) Prey items of harbor seals and California sea lions in Puget Sound, Washington. *The Murrelet* 62(3):83-86.

Farag, A.M., T. May, G.D. Marty, M. Easton, D.D. Harper, E.E. Little, and L. Cleveland. 2006. The effect of chronic chromium exposure on the health of Chinook salmon (*Oncorhynchus tshawytscha*). *Aquatic Toxicol* 76(3-4):246-257.

Farmahin, R., D. Wu, D. Crump, J.C. Hervé, S.P. Jones, M.E. Hahn, S.I. Karchner, J.P. Giesy, S.J. Bursian, M.J. Zwiernik, and S.W. Kennedy. 2012. Sequence and in vitro function of chicken, ring-necked pheasant, and Japanese quail AHR1 predict in vivo sensitivity to dioxins. *Environ Sci Tech* 46:2967-2975.

Farmahin, R., G.E. Manning, D. Crump, D. Wu, L.J. Mundy, S.P. Jones, M.E. Hahn, S.I. Karchner, J.P. Giesy, S.J. Bursian, M.J Zwiernik, T.B. Fredricks, and S.W. Kennedy. 2013. Amino acid sequence of the ligand-binding domain of the aryl hydrocarbon receptor 1 predicts sensitivity of wild birds to effects of dioxin-like compounds. *Toxicol Sci* 131(1):139-152.

Fernandez, L.A., C.F. Harvey, and P.M. Gschwend. 2009. Using performance reference compounds in polyethylene passive samplers to deduce sediment porewater concentrations for numerous target chemicals. *Environ Sci Technol* 43:8888-8894.

Fernandez, M.P., M.G. Ikonomou, S.C. Courtenay, and I.I. Wirgin. 2004. Spatial variation in hepatic levels and patterns of PCBs and PCDD/Fs among young-of-the-year and adult Atlantic tomcod (*Microgadus tomcod*) in the NY/NJ Harbor Estuary. *Environ Sci Technol* 38:976-983.

Fernandez, L. A., W. Lao, K.A. Maruya, C. White, and R.M. Burgess. 2012. Passive sampling to measure baseline dissolved persistent organic pollutant concentrations in the water column of the Palos Verdes Shelf Superfund site. *Environ Sci Technol* 46(21):11937-11947.

Frazier, I. 2011. Back to the Harbor - Seals Return to New York. The New Yorker. March 21, 2011, pp. 34-39.

Galishoff, S. 1988. Newark: The Nation's Unhealthiest City 1832-1895. Rutgers University Press, New Brunswick, New Jersey.

Galvez, F., C. Hogstrand, J.C. McGeer, and C.M. Wood. 2001. The physiological effects of a biologically incorporated silver diet on rainbow trout (*Oncorhynchus mykiss*). *Aquat Toxicol* 55(1-2):95-112.

Garten, C.T Jr. 1980. Ingestion of soil by hispid cotton rats, white-footed mice, and eastern chipmunks. *J Mammal* 61(1):136-137.

Ghosh, U., S.K. Driscoll, R.M. Burgess, M.T.O. Jonker, D. Reible, F. Gobas, Y. Choi, S.E. Apitz, K.A. Maruya, W.R. Gala, M. Mortimer, and C. Beegan. 2014. Passive sampling methods for contaminated sediments: practical guidance for selection, calibration, and implementation. *Integr Environ Assess Manag* DOI: 10.1002/ieam. 1507.

Grimes, B.H., M.T. Huish, J.H. Kerby, and D. Poran. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Summer and Winter Flounder. Biological Report 82(11.112). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

GSH. 2017a. Newark Bay Study Area. Sediment Quality Triad and Porewater Data Report. Baseline Human Health and Ecological Risk Assessment. Revision 2. September.

GSH. 2017b. Newark Bay Study Area. Crab and Clam Data Report. Baseline Human Health and Ecological Risk Assessment. Revision 1. March.

GSH. 2017c. Newark Bay Study Area. Phase III Sediment Investigation Field Report. Revision 1. June.

GSH. 2017d. Newark Bay Study Area. Sediment Quality Triad and Porewater Field Report. Baseline Human Health and Ecological Risk Assessment. Revision 1. September.

GSH. 2020. In preparation. Newark Bay Study Area. Draft Remedial Investigation Report.

Halle, D. 1984. America's Working Man: Work, Home, and Politics Among Blue-Collar Property Owners. University of Chicago Press, Chicago, Illinois.

Hansen, D.J., P.R. Parrish, and J. Forester. 1974. Aroclor 1016: Toxicity to and uptake by estuarine animals. *Environ Res* 7:363-373.

Harmon, B.G. 1962. Mollusks as food of Lesser Scaup along the Louisiana coast. *Trans N Am Wildl Nat Resour Conf* 27:132-138.

Hart, K.M. and D.S. Lee. 2006. The diamondback terrapin: the biology, ecology, cultural history, and conservation status of an obligate estuarine turtle. *Stud Avian Biol* 32:206-213.

Hassler, F.R. 1844. Map of New-York Bay and Harbor and the Environs. 1:30,000. United States Coast Survey. Washington, DC.

Hays, H. 1972. Polyandry in the spotted sandpiper. *Living Bird* 11:43-57.

Helon, D.A. J.T. Anderson, C.P. Dwyer, J.W. Edwards. 2004. Summer Home Range Size and Habitat Use by River Otters in Ohio. IUCN Otter Spec. Group Bull 21A.

Herrington, T.O., K.L. Rankin, and M.S. Bruno. 2002. Frequency of sediment suspension events in Newark Bay. *Proc Inter Conf Prot Rest Environ VI. Skiathos*. July 1-5:371-378.

Hill J., D.L. Fowler, and M.J. Van den Avyle. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Blue crab. Biological Report 82(11.100). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Hobbs, W., J. Weakland, and C. Eickhoff, 2018. Environmental Effects-Based Concentrations for Total Petroleum Hydrocarbons (TPH): Toxicity in Marine Water and Freshwater. Washington State Department of Ecology, Olympia, Washington. Publication No. 18-03-002.

Hochberg, Y., and A.C. Tamhane. 1987. Multiple Comparison Procedures. John Wiley and Sons, New York.

Hochstein, J.R., J.A. Render, S.J. Bursian, and R.J. Aulerich. 2001. Chronic toxicity of dietary 2,3,7,8-tetrachlorodibenzo-*p*-dioxin to mink. *Vet Hum Toxicol* 43(3):134-139.

Horowitz, A.J. 1991. A primer on sediment trace-element chemistry. 2nd Revision. Lewis/CRC Press. Boca Raton, FL.

Iannuzzi, T.J. and D.F. Ludwig. 2004. Historical and current ecology of the lower Passaic River. *Urban Habitats* 2(1):147-173.

Iannuzzi, T.J., D.F. Ludwig, J.C. Kinnell, J.M. Wallin, W.H. Desvousges, and R.W. Dunford. 2002. A Common Tragedy: History of an Urban River. Amherst, Massachusetts, USA. Amherst Scientific.

Iannuzzi, T.J., T.N. Armstrong, E.R. Long, J. Iannuzzi, and D.F. Ludwig. 2008. Sediment quality triad assessment of an industrialized estuary of the northeastern USA. *Environ Monit Assess* 139:257-275.

Iocco, L.E., P. Wilber, R.J. Diaz, D.G. Clarke, and R.J. Will. 2000. Final Report. Benthic Habitats of New York/New Jersey Harbor: 1995 Survey of Jamaica, Upper, Newark, Bowery, and Flushing Bays. National Oceanic and Atmospheric Administration, Virginia Institute of Marine Sciences, and U.S. Army Corps of Engineers.

Jackson, J.E. 1991. A User's Guide to Principal Components. John Wiley & Sons, Inc. New York.

Johnson, C. E. 1925. The muskrat in New York: its natural history and economics. *Roosevelt Wildl Bull* 3:205-321.

Jones, J.J., and R.D. Drobney. 1986. Winter feeding ecology of scaup and Common Goldeneye in Michigan. *J Wildl Manag* 50:446-452.

Kennedy, A.J., J.A. Steevens, G.R. Lotufo, and T.S. Bridges. 2009. A comparison of acute and chronic toxicity methods for marine sediments. *Mar Environ Res* 68(3):118-127.

Kersten, M. and F. Smedes. 2002. Normalization procedures for sediment contaminants in spatial and temporal trend monitoring. *J Environ Monitor* 4(1):109e115.

Kiviat, E. and K. MacDonald. 2002. Hackensack Meadowlands, New Jersey, biodiversity: A review and synthesis. Retrieved from Hackensack Meadowlands Partnership site at: http://meadowlandspartnership.org/bn.html#A.

Kramer, C.Y. 1956. Extension of multiple range tests to group means with unequal numbers of replications. *Biometrics* 12:307–310.

Krebs, J.R. 1974. Colonial nesting and social feeding as strategies for exploiting food resources in the great blue heron (*Ardea herodias*). *Behaviour* 51:99-131.

Kushlan, J.A. 1978. Feeding Ecology of Wading Birds. In: Sprunt A., J. Oge, and S. Winckler, Eds., Wading birds, Research Report No. 7. National Audubon Society, New York, NY. pp. 249-297.

Lawler, Matusky and Skelly Engineers, Inc. 1996. Biological Survey of Newark Bay Shoal Areas and Adjacent Kill Van Kull and Arthur Kill Channels. Prepared for the Port Authority of New York and New Jersey.

Liao, C.M., J.W. Tsai, M.P. Ling, Y.H. Chou, and P.T. Yang. 2004. Organ-Specific Toxicokinetics and Dose–Response of Arsenic in Tilapia (*Oreochromis mossambicus)*. *Arch Environ Con Toxicol* 47(4):502-510.

Lohmann, R., R.M. Burgess, M.G. Cantwell, S.A.Ryba, J.K. MacFarlane, and P.M. Gschwend. 2004. Dependency of polychlorinated biphenyl and polycyclic aromatic hydrocarbon bioaccumulation in *Mya arenaria* on both water column and sediment bed chemical activities. *Environ Toxicol Chem* 23:2551-2562.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environ Manag* 19:81-97.

Long, E.R., C.G. Ingersoll, and D.D. MacDonald. 2006. Calculation and uses of mean sediment quality guideline quotients: A critical review. *Environ Sci Technol* 40:1726-1736.

Lowry, L.F. and K.J. Frost. 1981 Feeding and Trophic Relationships of Phocid Seals and Walruses in the Eastern Bering Sea. In: Hood, D.W. and J.A. Calder, Eds., The Eastern Bering Sea Shelf: Oceanography and Resources: V2. Department of Commerce. Washington, DC. pp. 813-824.

Ludwig, D.F., J. Iannuzzi, T.J. Iannuzzi, and J.K. Shisler. 2010. Spatial and temporal habitat use patterns by water birds in an urban estuarine ecosystem: Implications for ecosystem management and restoration. *Human Ecol Risk Assess* 16(1):163-184.

Ludwig, J.A. and J.F. Reynolds. 1988. Statistical Ecology: A Primer on Methods and Computing. John Wiley & Sons, Inc. New York.

Luoma, S.N. and P.S. Rainbow. 2005. Why is metal bioaccumulation so variable? Biodynamics as a unifying concept. *Environ Sci Technol* 39(7):1921-1931.

MacRae's Blue Book, Inc. 1986. MacRae's State Industrial Directory, New Jersey. MacRae's Blue Book, Inc. New York, NY.

McDonald, B.G., C.A. McPherson, R. DeWynter, P. Kickham, and C. Brown. 2010. Incorporation of 28-d *Leptocheirus plumulosus* toxicity data in a sediment weight-of-evidence framework. *Ecotox Environ Safe* 73:51-55.

Melquist, W. E., J.S. Whitman, and M.G. Hornocker. 1981. Resource Partitioning and Coexistence of Sympatric Mink and River Otter Populations. In: Chapman, J.A. and D. Pursley, Eds., Worldwide Furbearer Conference Proceedings, V1; August 3-11, 1980. Frostburg, Maryland. pp. 187-220.

Meyers, W.S. 1945. The Story of New Jersey. Vols. 1-4. Lewis Historical Publishing, New York, NY.

Miller, J.E. 2018. Muskrats. Wildlife Damage Management Technical Series. USDA APHIS. January 2018.

Morgan, G.W., F.W. Edens, P. Thaxton, and C.R. Parkhurst. 1975. Toxicity of dietary lead in Japanese quail. *Poult Sci* 54:1636-1642.

Mount, D.R., A.K. Barth, T.D. Garrison, K.A. Barten, and J.R. Hockett. 1994. Dietary and waterborne exposure of rainbow trout (Oncorhynchus mykiss) to copper, cadmium, lead and zinc using a live diet. *Environ Toxicol Chem* 13(12):2031-41.

Mueller, J.A., T.A. Gerrish, and M.C. Casey. 1982. Contaminant Inputs to the Hudson-Raritan Estuary. NOAA Technical Memorandum OMPA-21. NOAA, Boulder, Colorado.

Murai, T., J.W. Andrews, and R.G. Smith Jr. 1981. Effects of dietary copper on channel catfish. *Aquaculture* 22:353-357.

Murphy, D. 1990. Humpback Whale Explores New Jersey River. Associated Press News November 22, 1990.

Nagy, K.A. 2001. Food requirements of wild animals: predictive equations for free-living mammals, reptiles, and birds. *Nutrit Abs Rev Series B: Livestock Feeds Feeding.* 71(10):21R-31R.

National Aquarium. 2010. Diamondback Terrapin. Available at: https://www.aqua.org/Experience/Animal-Index/diamondback-terrapin.

Naval Facilities Engineering Command. 2003. Appendix B – Geochemical Normalizers in the Interpretation of Sediment Contaminant Data, In: Implementation Guide for Assessing and Managing Contaminated Sediment at Navy Facilities. UG-2053-ENV, SPAWAR Systems Center, San Diego, California.

New Jersey Meadowlands Commission. 2010. Seal Seen in Hackensack River at Carlstadt. Meadowlands Nature Blog, New Jersey Meadowlands Commission, April 26. Available at: http://www.meadowblog.net/2010/04/seal-seen-in-hackensack-river-at-carlstadt.html.

New Jersey Meadowlands Commission. 2011. Rare Seal Sighting along the Hackensack River. Meadowlands Nature Blog, March 4.

New Jersey Sea Grant. 2014. Harbor Seal and Gray Seal Information Sheet. http://njseagrant.org/wp-content/uploads/2014/03/seals.pdf.

NY Times. 1975. A Dead Whale is Found off Bayonne. April 13, 1975. https://www.nytimes.com/1975/04/13/archives/a-dead-whale-is-found-off-bayonne.html.

Niimi, A.J. 1983. Biological and toxicological effects of environmental contaminants in fish and their eggs. *Can J Fish Aquatic Sci* 40:306-312.

NJDEP. 2009. Remote Sensing. Available at: http://njdep.rutgers.edu/aircraft/.

NJDEP. 2016. New Jersey Administrative Code 7:9B Surface Water Quality Standards. October 17.

NJDEP. 2016. Species Status Review of Amphibian and Reptiles. http://www.nj.gov/dep/fgw/ensp/pdf/herp_status_rprt.pdf. Accessed Oct 2, 2019

NYSDEC. Marine Mammals of New York. https://www.dec.ny.gov/animals/108573.html.

NMFS. 2019. Essential Fish Habitat Mapper. https://www.habitat.noaa.gov/application/efhmapper/index.html. Accessed on October 1, 2019.

NOAA. 1994a. The Biological and Hydrographical Characterization of Newark Bay, New Jersey May 1993 - April 1994. Northeast Fisheries Science Center.

NOAA. 1994b. New York Harbor. Nautical Chart No. 12327. National Oceanic and Atmospheric Administration. November. Available at: https://historicalcharts.noaa.gov/search.php.

NOAA. 2013. Environmental data retreived from NOAA Query Manager and MARPLOT applications, data, and maps database [online]. National Ocean Service, National Oceanic and Atmospheric Administration, Washington, DC. Available at: http://response.restoration.noaa.gov/environmental-restoration/environmental-assessment-tools/query-manager-marplot-data-maps.html.

Normandeau. 2017. Final Newark Bay Study Area Environmental Sample Collection Report. June.

Nosek, J.A., S.R. Craven, J.R. Sullivan, S.S. Hurley, and R.E. Peterson. 1992. Toxicity and reproductive effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin in ring-necked pheasant hens. *J Toxicol Environ Health* 35:187-198.

Packer, D.B., S.J. Greisbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life history and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-151.September.

Palmer, R.S. 1962. Handbook of North American birds: V1. Yale University Press, New Haven, Connecticut.

Panigrahi A.K. and B.N. Misra. 1978. Toxicological effects of mercury on a freshwater fish, *Anabas scandens*, Cuv. & Val. and their ecological implications. *Environ Pollut* 16(1):31-39.

Parrish, P.R., S.C. Schimmel, D.J. Hansen, J.M. Patrick Jr., and J. Forester. 1976. Chlordane: effects on several estuarine organisms. *J Toxicol Environ Health* 1:485-494.

Parsons, K.C. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. Contract No. C003858. Submitted to NYSDEC. February 28.

Pielou, E.C. 1966. The measurement of diversity in different types of biological collections. *J Theor Biol* 13:131-144.

Pitcher, K.W. and D.G. Calkins. 1979. Biology of the Harbor Seal, *Phoca vitulina richardsi*, in the Gulf of Alaska. Final Report. Outer Continental Shelf Environmental Assessment Program Research Unit 229, Contract No. 03-5-002-69.

Powell, D.C., R.J. Aulerich, J.C. Meadows, D.E. Tillitt, J.F. Powell, J.C. Restum, K.L Stromborg, J.P. Giesy, and S.J. Bursian. 1997. Effects of 3,3',4,4',5-pentachlorobiphenyl (PCB 126), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), or an extract derived from field-collected cormorant eggs injected into double-crested cormorant (*Phalacrocorax auritus*) eggs. *Environ Toxicol Chem* 16(7):1450-1455.

Reed, J. M, L.W. Oring, and E.M. Gray. 2013. Spotted Sandpiper (*Actitis macularius*), In: Rodewald, P.G., Ed., The Birds of North America. Ithaca Cornell Lab of Ornithology. Available at: https://birdsna.org/Species-Account/bna/species/sposan. DOI: 10.2173/bna.289.

Roffe, T.J. and B.R. Mate. 1984. Abundances and feeding habits of pinnipeds in the Rogue River, Oregon. *J Wildlife Manag* 48:1262-1274.

Russell, R.W., F.A.P.C. Gobas, G.D. Haffner. 1999. Maternal transfer and in ovo exposure of organochlorines in oviparous organisms: a model and field verification. *Environ Sci Technol* 33(3):416-420.

Sample, B.E., M.S. Aplin, R.A. Efroymson, G.W. Suter II, and C.J.E. Welsh. 1997. Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants. Publication No. 4650. Environmental Sciences Division, U.S. Department of Energy Office of Environmental Policy and Assistance Air, Water, and Radiation Division. October.

San Francisco Estuary Institute. 2006. 2004-2005 Annual Monitoring Results. The Regional Monitoring Program for Water Quality in the San Francisco Estuary. San Francisco Estuary Institute. Oakland, California.

Sangalang, G.B., H.C. Freeman, and R. Crowell. 1981. Testicular abnormalities in cod (*Gadus morhua*) fed Aroclor 1254. *Arch Environ Contam Toxicol* 10(5):617-626.

Scheffe, H. 1959. The Analysis of Variance. John Wiley & Sons, Inc. New York, pp. 334-353.

Schlekat, C.E., K.J. Scott, R.C. Swartz, B. Albrecht, L. Antrim, K. Doe, S. Douglas, J.A. Ferretti, D.J. Hansen, D.W. Moore, C. Mueller, and A. Tang. 1995. Interlaboratory comparison of a 10-day sediment toxicity test method using *Ampelisca abdita*, *Eohaustorius estuarius* and *Leptocheirus plumulosus*. *Environ Toxicol Chem* 14:2163-2174.

Schuytema, G.S., D.F. Krawczyk, W.L. Griffis, A.V. Nebeker, and M.L. Robideaux. 1990. Hexachlorobenzene uptake by fathead minnows and macroinvertebrates in recirculating sediment/water systems. *Arch Environ Contam Toxicol* 19:1-9.

Shannon, C.E. 1948. A mathematical theory of communication. *Bell Systems Tech J* 27(July and October):379-423 and 623-656.

Stanley, J.G. and D.S. Danie. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic). White Perch. FWS/OBS-82/11.7. U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Steevens, J.A., M.R. Reiss, and A.V. Pawlisz. 2005. A methodology for deriving tissue residue benchmarks for aquatic biota: a case study for fish exposed to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin and equivalents. *Integr Environ Assess Manage* 1(2):142-151.

Suszkowski, D.J. 1978. Sedimentology of Newark Bay, New Jersey: an urban estuarine bay. Doctoral Dissertation, University of Delaware.

Suter, G.W. 2006. Ecological Risk Assessment. 2nd Ed. CRC Press. 680p.

Swartz, R.C., D.W. Schultz, G.R. Ditsworth, W.A. DeBen, and F.A. Cole. 1985. Sediment Toxicity, Contamination, and Macrobenthic Communities Near a Large Sewage Outfall. In: Boyle T.T., Ed., Validation and Predictability of Laboratory Methods for Assessing the Fate and Effects of Contaminants in Aquatic Ecosystems. STP 865. American Society for Testing and Materials, Philadelphia, Pennsylvania, pp 152-175.

Tashjian, D.H., S.J. Teh, A. Sogmonyan, and S.S.O. Hung. 2006. Bioaccumulation and chronic toxicity of dietary l-selenomethionine in juvenile white sturgeon (*Acipenser transmontanus*). *Aquat Toxicol* 79(4):401-409

Thompson, B.C., J. E. Tabor, and C.L. Turner. 1988. Diurnal Behavior Patterns of Waterfowl Wintering on the Columbia River, Oregon and Washington. In: Weller, M.W., Ed., Waterfowl in Winter. pp. 153-167. Minneapolis: University of Minnesota Press.

Tierra. 2004. Newark Bay Study Area RIWP. Sediment Sampling and Source Identification Program. Volume 1a of 3. Inventory and Overview Report of Historical Data. Revision 0. Tierra Solutions, Inc., East Brunswick, New Jersey. June.

Tierra. 2005. Investigation Work Plan (IWP)/Sampling and Analysis Plan (SAP)/Site Management Plan (SMP)/Quality Assurance Project Plan (QAPP). Volume 2 of Newark Bay Study Area Remedial Investigation Work Plan. Sediment Sampling and Source Identification Program, Newark Bay, New Jersey. Revision 1. September.

Tierra. 2006. Newark Bay Study Area RIWP. Report on Investigation of Sources of Pollutants and Contaminants. September.

Tierra. 2007. Newark Bay Study Area Remedial Investigation Work Plan, Sediment Sampling and Source Identification Program, Newark Bay, New Jersey, Phase II, Revision 2, Amendment 1. November.

Tierra. 2008a. Newark Bay Study Area Remedial Investigation Phase I and Phase II Sediment Investigation Field and Data Report (*Draft*). Revision 0. December.

Tierra. 2008b. Estimation of the Biologically Active Zone. Newark Bay, New Jersey. Prepared by Dr. Robert Diaz and ARCADIS. Tierra Solutions, Inc., East Brunswick, New Jersey. Revision 2. September.

Tierra. 2011. Final Newark Bay Study Area Remedial Investigation Phase I and Phase II Sediment Deposition Report. Revision 1. October.

Tierra. 2013a. Final Newark Bay Study Area Problem Formulation. Baseline Human Health and Ecological Risk Assessment. June.

Tierra. 2013b. Multi-beam and Single-beam Bathymetric Survey Final Report. Newark Bay Study Area Remedial Investigation. Revision 0. August.

Tierra. 2013c. Reconnaissance Survey Work Plan. Newark Bay Study Area Baseline Human Health and Ecological Risk Assessment. September.

Tierra. 2014a. Crab and Clam Sampling and Analysis Quality Assurance Project Plan. Newark Bay Study Area. Revision 3a. August.

Tierra. 2014b. Fish Sampling and Analysis Quality Assurance Project Plan. Newark Bay Study Area. Revision 2. October.

Tierra. 2014c. Phase I and Phase II Data Evaluation and Analysis Report. Newark Bay Study Area Remedial Investigation. Revision 2. September.

Tierra. 2015a. Newark Bay Study Area Reconnaissance Survey Report. Baseline Human Health and Ecological Risk Assessment. April.

Tierra. 2015b. Sediment Quality Triad and Porewater Sampling and Analysis Quality Assurance Project Plan. Newark Bay Study Area. Revision 2. August.

Tierra. 2016. Newark Bay Study Area Phase III Sediment Investigation Quality Assurance Project Plan Amendment. Revision 2. September.

Tierra. 2017. Newark Bay Study Area. Fish Data Report. Baseline Human Health and Ecological Risk Assessment. Revision 1. February.

Tillitt, D.E., R.W. Gale, J.C. Meadows, J.L. Zajicek, P.H. Peterman, S.N. Heaton, P.D. Jones, S.J. Bursian, T.J. Kubiak, J.P. Giesy, and R.J. Aulerich. 1996. Dietary exposure of mink to carp from Saginaw Bay. 3. Characterization of dietary exposure to planar halogenated hydrocarbons, dioxin equivalents, and biomagnification. *Environ Sci Technol* 30:283-291.

Tumlison, R., A.W. King, and V.R. McDaniel. 1986. The river otter in Arkansas. IV. Winter food habits in eastern Arkansas. *ProcArkansas AcadSci* 40:76–77.

United States Coast Guard. 2010. Goethals Bridge Replacement Project Final Environmental Impact Statement. Volumes 1-3. August.

United States District Court for the District of New Jersey. 1990. United States of America, State of New Jersey v. Occidental Chemical Corporation, Chemical Land Holdings, Inc. Consent Decree. November.

USACE. 1997. Final Environmental Impact Statement on the Newark Bay Confined Disposal Facility. U.S. Army Corps of Engineers, New York District. April. Available at: https://www.nj.gov/dep/passaicdocs/docs/NJDOTSupportingCosts/CDF-REPORT-EIS-FINAL-4-1997_USACE-0009153.pdf.

USACE. 2002. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2003. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2004a. Limited Reevaluation Report and Environmental Assessment on Consolidated Implementation of the New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District. January.

USACE. 2004b. Essential Fish Habitat Assessment. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2004c. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2005. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2006a. Geomorphological/Geophysical Characterization of the Nature and Dynamics of Sedimentation and Sediment Transport in Newark Bay Focusing on the Effects Related to Continued and Future Federal Navigation Channel Deepening and Maintenance. Contract W912DS-06-D-0001. December 31.

USACE. 2006b. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2007a. Final Environmental Assessment. Effects of the NY/NJ Harbor Deepening Project on the Remedial Investigation/Feasibility Study of the Newark Bay Study Area. U.S. Army Corps of Engineers, New York District. June.

USACE 2007b. Essential Fish Habitat Assessment for Newark Bay Maintenance Dredging: Newark Bay – Port Newark Channel, Port Newark Pierhead Channel, and Port Elizabeth Channel of Newark Bay, Hackensack and Passaic Rivers Federal Navigation Project Analysis. New York: U.S. Army Corps of Engineers, Operations Division, New York District.

USACE. 2007c. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2008. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2009a. Bayonne Bridge Air Draft Analysis, U.S. Army Corps of Engineers, New York District.

USACE. 2009b. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2010. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2011. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2013a. Final Essential Fish Habitat Knowledge Gained During the Harbor Deepening Project Parts I and II. September. U.S. Army Corps of Engineers, New York District.

USACE. 2013b. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2015a. Migratory Finfish Summary Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District.

USACE. 2015b. Demersal Fish Assemblages of New York / New Jersey Harbor and Near-Shore Fish Communities of New York Bight. U.S. Army Corps of Engineers, New York District.

USACE. 2019. Environmental Residue Effects Database. Environmental Laboratory, U.S. Army Engineer Research and Development Center. Available online at: https://ered.el.erdc.dren.mil/. Accessed on February 28, 2019.

USEPA. 1993. Wildlife Exposure Factors Handbook. EPA/600/R-93/187. U.S. Environmental Protection Agency. December.

USEPA. 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. EPA/540/R-97/OCS. June.

USEPA. 1998. Guidelines for Ecological Risk Assessment. EPA/630/R-95/002F. Risk Assessment Forum.

USEPA. 1999. Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund sites. OSWER Directive 99285.7-28 P. October 7.

USEPA. 2001. Methods for Assessing the Chronic Toxicity of Sediment-associated Contaminants with the Amphipod *Leptocheirus plumulosus*. EPA/600/R-01/020.

USEPA. 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10. December. Available at: https://nepis.epa.gov/Exe/tiff2png.cgi/P100CYCE.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C00THRU05%5CTIFF%5C00001807%5CP100CYCE.TIF.

USEPA. 2003a. Sediment Quality of the NY/NJ Harbor System: A 5-year Revisit (1993/1994–1998). EPA/902-R-03-002. Region II, Edison, New Jersey.

USEPA. 2003b. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Office of Research and Development. Washington, DC.

USEPA. 2004. Administrative Order on Consent for Remedial Investigation and Feasibility Study, Newark Bay Study Area USEPA Index No. CERCLA-02-2004-2010. Including all attachments, amendments, and updates.

USEPA. 2005a. Predicting Toxicity to Amphipods from Sediment Chemistry. EPA/600/R-04/030. National Center for Environmental Assessment. Washington, DC.

USEPA. 2005b. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver and Zinc). EPA-600-R-02-011.

USEPA. 2006a. Data Quality Assessment: A Reviewer's Guide. EPA/240/B-06/002. February.

USEPA. 2006b. Data Quality Assessment: Statistical Methods for Practitioners. EPA/240/B-06/003. February.

USEPA. 2007a. Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study, Lower Passaic River Study Area portion of the Diamond Alkali Superfund site. U.S. EPA Region 2 CERCLA docket no. 02-2007-2009.

USEPA. 2007b. Framework for Metals Risk Assessment. EPA 120/R-07/001. Office of the Science Advisor, Risk Assessment Forum. March.

USEPA. 2007c. Updated Attachment 4-1 to USEPA's 2005 Guidance for Developing Ecological soil screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. Office of Solid Waste and Emergency Response, Washington DC. February.

USEPA. 2008. Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment. EPA/100/R-08-004. June.

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. Prepared by The Louis Berger Group, Inc. in conjunction with Battelle and HDR|HydroQual.

USEPA. 2015a. Letter from Eugenia Naranjo of USEPA to Cliff Firstenberg of Tierra Solutions Regarding Response to Tierra's Email Dated August 27, 2015, 2014 Oceanographic Data Collection – Administrative Order on Consent, for Remedial Investigation/Feasibility Study (RI/FS) – Index No. CERCLA-02-2004-2010. September 15.

USEPA. 2015b. ProUCL 5.1. Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations.

USEPA. 2016a. Record of Decision. Lower 8.3 Miles of the Lower Passaic River Part of the Diamond Alkali Superfund Site Essex and Hudson Counties, New Jersey. March 3.

USEPA. 2016b. ECOTOXicology database [online database]. US Environmental Protection Agency, Available at: http://cfpub.epa.gov/ecotox/ecotox_home.cfm.

USEPA 2017a. Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Non-ionic Organic Contaminants. EPA/600/R. Office of Research and Development. Washington, DC.

USEPA. 2017b. Final Oversight Report: 2014-2016 Softshell Clam, Blue Crab, and Fish Oversight; 2015 Sediment Quality Triad Oversight; Newark Bay Study Area RI/FS Oversight. June 30.

USEPA. 2018. Superfund Site: Diamond Alkali Co., Newark, NJ. Available at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0200613.

USEPA/SERDP/ESTCP. 2017. Laboratory, Field, and Analytical Procedures for Using Passive Sampling in the Evaluation of Contaminated Sediments: User's Manual. EPA/600/R-16/357. Office of Research and Development, Washington, DC.

USEPA and USACE. 1998. Evaluation of Material Proposed for Discharge to Waters of the US – Testing Manual (Inland Testing Manual). EPA/823/B-98/004. U.S Environmental Protection Agency. Washington, DC.

USFWS. 1997. Significant Habitats and Habitat Complexes of the New York Bight Watershed. CD ROM. U.S. Fish and Wildlife Service, Southern New England-New York Bight Coastal Ecosystems Program. Charlestown, Rhode Island.

Van Den Avyle, M.J. 1984. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Atlantic). Blue Crab. FWS/OBS-82/11.19, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Van den Berg, M., L. Birnbaum, A.T.C. Bosveld, B. Brunström, P. Cook, M. Feeley, J.P. Giesy, A. Hanberg, R. Hasegawa, S. Kennedy, T. Kubiak, J.C. Larsen, F.X.R. van Leeuwen, A.K. Djien Liem, C. Nolt, R.E. Peterson, L. Poellinger, S. Safe, D. Schrenk, D. Tillitt, M Tysklind, M. Younes, F. Waern, and T. Zacharewski. 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. *Environ Health Perspect* 106(12):775-792.

Vennesland, R.G. and R.W. Butler. 2011. Great Blue Heron (*Ardea herodias*), version 2.0. In: Poole, A.F., Ed., The Birds of North America. Cornell Lab of Ornithology, Ithaca, New York. Available at: https://doi.org/10.2173/bna.25.

von Westernhagen, H., V. Dethlefsen, and H. Rosenthal. 1980. Correlation between cadmium concentrations in the water and tissue residue levels in dab, *Limanda limanda*, L and plaice, *Pleuronectes platessa*, L. *J Mar Biol Assoc United Kingdom* 60:45-58.

Wakeman III, T.H. 2006. Effects of Changes in Sediment and Contaminant Loads in Newark Bay on Future Disposal of Dredged Sediments, Columbia University, New York, NY.

Walsh, J., V. Elia, R. Kane, and T. Halliwell. 1999. Birds of New Jersey. New Jersey Audubon Society. Bernardsville, New Jersey.

Wang, X.L. 2002. Interactions of trace metals and different marine food chains. *Marine Ecol Prog Ser* 243:295-309.

Weis, J.S. 2005. Diet and food web support of the white perch, *Morone americana*, in the Hackensack meadowlands of New Jersey. *Environ Biol Fish* 74:109-113.

Weisberg, S.B., J.A. Ranasinghe, J.S. O'Connor, and D.A. Adams. 1998. A Benthic Index of Biotic Integrity (B-IBI) for the New York/New Jersey Harbor. Appendix C In: Adams, D.A., J.S. O'Connor, and S.B Weisberg. 1998. Sediment Quality of the NY/NJ Harbor System. EPA/902-R-98-001. U.S. Environmental Protection Agency, Region 2, Edison, New Jersey.

Willner, G.R., G.A. Feldhamer, and E.E. Zucker, and J.A. Chapman. 1980 *Ondatra zibethicus*. The American Society of Mammologists. *Mammalian Species*141:1-8.

Wilson, S.P. 2012. River Otter (*Lontra canadensis*) Home Range, Habitat Use, Overnight Movement, and Survival in the Platte River of Nebraska. MS Thesis University of Nebraska.

Windward. 2011. Lower Passaic River Restoration Project. Lower Passaic River Study Area RI/FS. Avian community survey data report for the Lower Passaic River Study Area summer and fall 2010 field efforts. Final. Prepared for Cooperating Parties Group, Newark, New Jersey. Windward Environmental LLC, Seattle, Washington. August 8.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June 17.

Wintermyer, M.L. and K.R. Cooper. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica Gmelin*) tissues and the effects on egg fertilization and development. *J Shellfish Res* 22(3):737-746.

Wirgin, I. 2004. Resistance of Atlantic Tomcod from the Hudson River to PCBs and TCDD, but not PAHs. A Presentation at the SBRP Annual Meeting, Seattle, Washington. November.

Wirgin, I. and R.C. Chambers. 2006. Atlantic tomcod (*Microgadus tomcod*): a model species for the responses of Hudson River fish to toxicants. *Am Fish Soc Sym* 51:331-365.

Wise, M.H., I.J. Linn, and C.R. Kennedy. 1981. A comparison of the feeding biology of the mink (*Mustela vison*) and otter (*Lutra lutra*). *J Zool* 195:181-212.

Wood, R. 1995. Diamondback Terrapin. In: Dove, L.E. and R.M. Nyman, Eds., Living Resources of the Delaware Estuary. Delaware Estuary Program. pp. 299-304.

Woodhead, P.M.J. 1991. Inventory and Characterization of Habitat and Fish Resources and Assessment of Information on Toxic Effects of the New York-New Jersey Harbor Estuary. A Report to the NY/NJ Harbor Estuary Program. Marine Sciences Research Center, Stony Brook, New York. May.

Yang, Y., S. Wiseman, A.M. Cohen-Barnhouse, Y. Wan, P.D. Jones, J.L. Newsted, D.P. Kay, S.W. Kennedy, M.J. Zwiernik, S.J. Bursian, and J.P. Giesy. 2010. Effects of in ovo exposure of white leghorn chicken, common pheasant, and Japanese quail to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin and two chlorinated dibenzofurans on CYP1A induction. *Environ Toxicol Chem* 29(7):1490-1502.

Zdepski, J.M. 1992. Industrial Development, Urban Land-use Practices, and Resulting Groundwater Contamination, Newark, New Jersey. JM2 Geology, Flemington, New Jersey. Pre-Print from NGWA Focus Eastern Conference, October 13-15. Boston, Massachusetts.

Zhang, Y.M., D.J. Huang, Y.Q. Wang, J.H. Liu, and J. Long. 2005. *Bull Environ Contam Tox* 75:1191-1199.

TABLES



Table 2-1
History of Dredging Activities within Newark Bay

Area	Year	New Dredge Depth (feet Mean Low Water)	Wetlands and Channel Widths
Newark Bay	1844	< 10	The bay was bordered by extensive wetlands in the western and northern areas.
Newark Bay navigation channel south, central, and north reaches	1912	16	The wetlands in the western and northern areas were mostly intact but were bisected by multiple railways.
Newark Bay navigation channel south, central, and north reaches	1916	20-21	Port Newark terminal was built over reclaimed wetlands. The width of the shipping channel in the southern bay was increased to 400 feet.
Arthur Kill	1917	25	
Newark Bay navigation channel south and middle reaches and Port Newark reaches	1923	30	
Passaic River and Newark Bay navigation channel north reach	1923	20	
Passaic River and Newark Bay navigation channel north reach	Early 1930s	30	
Hackensack River	1954	32-34	
Newark Bay navigation channel south and middle reaches and Port Elizabeth reaches	1960s to 1970s	Not applicable	Most of the remaining wetlands in the western area were reclaimed. The width of southern Newark Bay was reduced in half with the building of the Elizabeth Channel.
Newark Bay navigation channel south, central, and north reaches	1960s to 1970s	35	
Newark Bay navigation channel south reach	1966	Not applicable	Channel near Kill van Kull was widened to 700 feet.
Newark Bay navigation channel south reach	1973	Not applicable	Channel near Kill van Kull was widened to 800 feet.
Newark Bay navigation channel south reach	1980	Not applicable	Channel near Kill van Kull was widened to 1,000 feet.
Newark Bay navigation channel south, central, and north reaches	1980s	40	
Newark Bay navigation channel south, central, and north reaches	1999 to 2016	50-52	See Figure 1-3 in the Remedial Investigation Report (GSH 2020) for extent of dredging.
Kill van Kull	1999 to 2016	50-52	See Figure 1-3 in the Remedial Investigation Report (GSH 2020) for extent of dredging.
Newark Bay navigation channel south reach	1999 to 2016	Not applicable	Channel near Kill van Kull was widened to 1,700 feet.
Kill van Kull navigation channel Elizabethport reach	1999 to 2016	40-43	See Figure 1-3 in the Remedial Investigation Report (GSH 2020) for extent of dredging.

References:

GSH. 2020 in preparation. Newark Bay Study Area Draft Remedial Investigation Report.

Table 2-6
Dominant Benthic Invertebrate Species in Newark Bay

Sampling Program	NOAA May 1993 to April 1994[a]	REMAP Summer 1993/94[b]	USACE June 1995[c]	USACE October 1995[c]	USACE Monthly 1995/96[d]	REMAP Summer 1998/99[b]	REMAP Summer 2003[e]	REMAP 2008[f]	REMAP 2013[f]	BERA September 2015[g]
Number of Stations	25	28	10	10	5	28	28	28	28	30
Taxa - Scientific Name	**Dominant**	**Species Dominance Ranking**								
Annelida - Polychaeta										
Capitella*	--	--	--	--	--	--	--	--	6	--
Cirratulidae	–	–	2	–	–	–	--	--	--	--
Glycera americana	–	–	–	9	–	–	--	--	--	--
Glycera spp.	–	–	–	–	9	–	--	--	--	--
Heteromastus filiformis	–	9	6	–	–	–	--	--	--	--
Leitoscoloplos fragilis	–	–	8	–	–	–	--	--	--	7
Leitoscoloplos robustus	✓	4	–	7	–	8	7	--	--	--
Leitoscoloplos sp.	–	5	3	–	–	–	--	--	--	2
Marenzelleria viridis	–	–	5	–	–	–	--	--	--	--
Mediomastus sp.	–	–	–	–	–	2	--	--	--	--
Mediomastus ambiseta	✓	6	4	2	–	–	6	1	--	3
Paraonidae	–	–	–	–	4	–	--	--	--	--
Pectinaria gouldii	–	–	–	5	–	–	8	9	--	--
Phyllodocidae	–	–	10	–	8	–	--	--	--	--
*Polydora cornuta**	✓	–	–	10	–	3	5	10	--	--
Polydora ligni	–	–	–	--	10	–	--	--	--	--
Prionospio heterobranchia	–	--	--	--	--	--	--	--	7	--
Sabellaria vulgaris	✓	–	–	6	–	–	9	--	--	--
Scoloplos sp.	–	–	–	–	1	–	--	--	--	--
Scoloplos robustus	–	--	--	--	--	--	--	6	1	--
*Streblospio benedicti**	✓	1	1	3	2	1	1	3	2	1
Tharyx sp. A	✓	7	9	–	–	–	--	--	4	--
Tubificidae	–	--	--	--	--	--	4	5	--	--
Annelida - Oligochaeta										
*Oligochaeta**	✓	2	7	8	–	4	--	--	3	4
Mollusca - Arthropoda										
Bivalvia	–	–	–	4	–	–	--	--	--	--
Odostomia sp.	✓	–	–	–	–	–	--	--	--	--
Macoma balthica	–	--	--	--	--	--	--	--	--	10
Mercenaria mercenaria	–	--	--	--	--	--	--	--	9	--
*Mulinia lateralis**	–	10	–	1	3	9	3	7	8	--
Mya arenaria	✓	–	--	–	6	–	--	2	--	6
Mytilus edulis	–	–	–	–	–	6	--	--	--	--
Rictaxis punctostriatus	–	–	–	–	–	10	--	--	--	--
Tellina	–	--	--	--	--	--	--	--	10	--
Crustacea										
Ampelisca sp.	–	--	--	--	--	--	--	8	--	--
Ampelisca abdita	–	–	–	–	–	7	2	--	--	8
Corophium tuberculatum	–	–	–	–	–	5	--	--	--	--
Cyathura polita	–	–	–	–	5	–	--	--	--	--
Gammarus daiberi	–	3	–	–	–	–	--	--	--	--
Grandidierella japonica	–	--	--	--	--	--	--	--	--	5
Leucon americanus	✓	8	–	–	–	–	--	4	5	--
Microdeutopus gryllotalpa	–	--	--	--	--	--	--	--	--	9
Neomysis americana	–	--	--	--	--	--	10	--	--	--
Oxyurostylis smithi	–	–	–	–	7	–	--	--	--	--

Table 2-6
Dominant Benthic Invertebrate Species in Newark Bay

Notes:
* Indicates pollution indicative species (USEPA 2003).
✓ indicates dominant species (NOAA 1994).

Acronyms and Abbreviations:
BERA = baseline ecological risk assessment
NOAA = National Oceanic and Atmospheric Administration
REMAP = Regional Environmental Monitoring and Assessment Program
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency
The top 10 most dominant species are ranked from 1-10, 1 being the most dominant and 10 being the least dominant.

Sources:
a. NOAA. 1994. Results of a Biological and Hydrographical Characterization of Newark Bay, New Jersey, May 1993–April 1994. Report prepared by U.S. Department of Commerce, National Marine Fisheries, and Northeast Fisheries Service Center, National Oceanic and Atmospheric Administration. Also available online at: http://sh.nefsc.noaa.gov.

b. USEPA. 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Office of Research and Development. November.

c. Iocco, L.E., P. Wilber, R.J. Diaz, D.G. Clarke, and R.J. Will. 2000. Final Report. Benthic Habitats of New York/New Jersey Harbor: 1995 Survey of Jamaica, Upper, Newark, Bowery, and Flushing Bays. National Oceanic and Atmospheric Administration, Virginia Institute of Marine Sciences, and U.S. Army Corps of Engineers.

d. USACE. 1997. Final Environmental Impact Statement on the Newark Bay Confined Disposal Facility. U.S. Army Corps of Engineers, New York District, New York, New York. April. USACE. 1999. Draft Feasibility Report for New York and New Jersey Harbor Investigation Study. Draft Environmental Impact Statement (DEIS). U.S. Army Corps of Engineers, New York District, New York, New York.

e.USEPA. 2003. https://archive.epa.gov/emap/archive-emap

f. USEPA. 2008 and 2013. https://www.waterqualitydata.us/

g. Tierra. 2017. Sediment Quality Triad and Porewater Data Report. Newark Bay Study Area. Baseline Human Health and Ecological Risk Assessment Survey, Revision 2. September.

Table 2-8
2015 Benthic Community Metrics for Newark Bay

Station	Total Taxa (Richness)[a]	Total Mean Density (no./m²)[b]	Shannon Wiener Diversity Index[c]	Pielou's Evenness[d]	Swartz's Dominance[e]
North					
136	22	6,363	2.2	0.7	6
137	21	7,739	2.1	0.7	4
138	20	5,985	2.4	0.8	5
139	22	6,232	2.2	0.7	5
140	22	6,826	2.1	0.7	4
158	46	10,756	2.1	0.6	4
159	23	1,974	2.3	0.7	6
160	16	3,167	2.2	0.8	6
161	18	2,667	1.5	0.5	3
162	15	1,406	2.1	0.8	5
163	21	2,899	2.0	0.7	4
164	21	11,101	1.8	0.6	3
165	22	9,725	2.4	0.8	6
Summary					
Minimum	*15*	*1,406*	*1.5*	*0.5*	*3*
Maximum	*46*	*11,101*	*2.4*	*0.8*	*6*
Average	*22*	*5,911*	*2.1*	*0.7*	*5*
Median	*21*	*6,232*	*2.1*	*0.7*	*5*
Standard Deviation	*8*	*3,321*	*0.24*	*0.1*	*1*
Central					
141	19	3,870	2.1	0.7	5
142	29	11,237	2.0	0.6	4
143	25	5,870	2.3	0.7	5
144	11	710	2.1	0.9	5
145	28	8,870	2.1	0.6	4
156	16	1,812	2.2	0.8	5
157	19	1,218	2.4	0.8	8
Summary					
Minimum	*11*	*710*	*2.0*	*0.6*	4
Maximum	*29*	*11,237*	*2.4*	*0.9*	8
Average	*21*	*4,798*	*2.2*	*0.7*	5
Median	*19*	*3,870*	*2.1*	*0.7*	5
Standard Deviation	*7*	*4,052*	*0.14*	*0.1*	1
South					
146	42	2,788	2.7	0.7	8
147	14	2,116	1.9	0.7	5
148	8	406	1.5	0.7	3
149	15	7,019	1.8	0.6	3
150	23	2,276	2.6	0.8	7
151	22	1,667	2.2	0.7	5
152	43	7,186	2.2	0.6	4
153	42	5,595	2.7	0.7	8
154	33	1,301	3.0	0.9	12
155	20	2,340	1.9	0.7	4
Summary					
Minimum	*8*	*406*	*1.5*	*0.6*	*3*
Maximum	*43*	*7,186*	*3.0*	*0.9*	*12*
Average	*26*	*3,269*	*2.3*	*0.7*	*6*
Median	*23*	*2,308*	*2.2*	*0.7*	*5*
Standard Deviation	*13*	*2,423*	*0.48*	*0.1*	*3*

Table 2-8
2015 Benthic Community Metrics for Newark Bay

Station	Total Taxa (Richness)[a]	Total Mean Density (no./m²)[b]	Shannon Wiener Diversity Index[c]	Pielou's Evenness[d]	Swartz's Dominance[e]
Overall					
Summary					
Minimum	*8*	*406*	*1.5*	*0.5*	*3*
Maximum	*46*	*11,237*	*3.0*	*0.9*	*12*
Average	*23*	*4,771*	*2.2*	*0.7*	*5*
Median	*22*	*3,518*	*2.2*	*0.7*	*5*
Standard Deviation	*9*	*3,338*	*0.32*	*0.1*	*2*

Notes:
[a] Total Taxa (Richness) is the total number of species [or higher order taxa, if not identified to species] in a sample.
[b] Total Mean Density is the number of individual organisms found per sample area. The values are prepared by counting the number of distinct individual organisms in a given sample.
[c] Shannon Wiener Diversity Index is a measure of the species diversity of a sample and takes into account species richness and evenness of each species within the community.
[d] Pielou's Evenness is related to the Shannon-Wiener diversity index in that it also examines the distribution of individuals among taxa relative to an idealized distribution.
[e] Swartz's Dominance is an indicator of whether a small number of taxa dominate the sample.

Acronyms/Abbreviations:
no./m² = number of organisms per square meter

Table 2-9
2015 Benthic Index of Biotic Integrity Metrics for Newark Bay

Station	Salinity (bottom)	Salinity Class	Grain Size (% silt/clay)	Sediment Type	Total Taxa	B-IBI Taxa Score	Total Mean Density (no./m²)	B-IBI Density Score	Pollution Indicative Species (no./m²)	% Abundance Pollution Indicative Species	B-IBI Pollution Indicative Species Score	Pollution Sensitive Species (no./m²)	% Abundance Pollution Sensitive Species	B-IBI Pollution Sensitive Species Score	Biomass	B-IBI Biomass Score	Overall B-IBI Score
North Zone																	
136	22.4	polyhaline	95.9	mud	22	5	6362.6	5	2434.9	38.3%	3	0	0.0%	1	6.7	5	3.8
137	22.7	polyhaline	79.3	mud	21	5	7739.1	5	3289.9	42.5%	1	0	0.0%	1	6.4	5	3.4
138	24.52	polyhaline	75.1	mud	20	3	5985.4	5	2043.5	34.1%	3	115.9	1.9%	1	5.4	5	3.4
139	24.48	polyhaline	55	mud	22	5	6231.9	5	1318.9	21.2%	3	144.9	2.3%	1	12.5	3	3.4
140	23.7	polyhaline	28.9	sand	22	5	6826.3	5	2058	30.1%	3	0	0.0%	1	8.6	3	3.4
158	24.47	polyhaline	20.7	sand	46	5	10756	3	3916.7	36.4%	3	134.6	1.3%	1	33.9	3	3
159	24.5	polyhaline	52.9	mud	23	5	1974.1	3	320.5	16.2%	3	89.7	4.5%	3	1.6	3	3.4
160	23.7	polyhaline	56.8	mud	16	3	3166.8	5	512.8	16.2%	3	0	0.0%	1	14.9	3	3
161	23.14	polyhaline	86.9	mud	18	3	2666.9	3	1913.1	71.7%	1	0	0.0%	1	5.1	5	2.6
162	23.74	polyhaline	84.2	mud	15	3	1405.8	1	463.8	33.0%	3	144.9	10.3%	3	0.5	1	2.2
163	23.62	polyhaline	54.4	mud	21	5	2898.7	3	145	5.0%	5	144.9	5.0%	3	4.0	5	4.2
164	24.29	polyhaline	43.3	mud	21	5	11101.4	3	5971	53.8%	1	0	0.0%	1	32.2	3	2.6
165	23.68	polyhaline	91.5	mud	22	5	9724.9	5	2565.2	26.4%	3	0	0.0%	1	6.2	5	3.8
															Average B-IBI for North		***3.2***
Central Zone																	
141	24.12	polyhaline	94.7	mud	19	3	3869.7	5	1463.8	37.8%	3	29	0.7%	1	12.2	3	3
142	24.07	polyhaline	13.7	sand	29	5	11237	3	2179.4	19.4%	3	51.3	0.5%	1	2.8	5	3.4
143	25.46	polyhaline	70.6	mud	25	5	5869.5	5	2318.8	39.5%	3	29	0.5%	1	4.2	5	3.8
144	23.97	polyhaline	79.5	mud	11	1	710.1	1	159.4	22.4%	3	58	8.2%	3	1.3	3	2.2
145	25.53	polyhaline	41.6	mud	28	5	8869.7	5	3550.7	40.0%	1	29	0.3%	1	11.9	3	3
156	24.52	polyhaline	89.9	mud	16	3	1811.8	3	478.3	26.4%	3	58	3.2%	3	1.4	3	3
157	24.32	polyhaline	90.3	mud	19	3	1217.7	1	101.5	8.3%	5	29	2.4%	1	3.5	5	3
															Average B-IBI for Central		***3.1***
South Zone																	
146	24.91	polyhaline	26.9	sand	42	5	2787.9	5	519.2	18.6%	3	57.6	2.1%	1	6.3	5	3.8
147	24.64	polyhaline	40.5	mud	14	1	2115.9	3	652.2	30.8%	3	0	0.0%	1	1.5	3	2.2
148	24.69	polyhaline	66.9	mud	8	1	405.8	1	0	0.0%	5	0	0.0%	1	0.5	1	1.8
149	24.63	polyhaline	67	mud	15	3	7019.1	5	2794.8	39.8%	3	0	0.0%	1	5.0	5	3.4
150	24.67	polyhaline	67.1	mud	23	5	2275.5	3	695.7	30.6%	3	87	3.8%	3	2.5	3	3.4
151	24.91	polyhaline	69.7	mud	22	5	1666.8	3	840.6	50.4%	1	14.5	0.9%	1	11.8	3	2.6
152	24.03	polyhaline	29.8	sand	43	5	7185.5	5	3980.8	55.4%	1	57.7	0.8%	1	5.7	5	3.4
153	24.73	polyhaline	50.8	mud	42	5	5594.6	5	1840.6	32.9%	3	173.9	3.1%	3	5.1	5	4.2
154	24.86	polyhaline	64.9	mud	33	5	1301.3	1	211.6	16.3%	3	0	0.0%	1	19.2	3	2.6
155	24.71	polyhaline	17.4	sand	20	3	2339.6	3	961.5	41.1%	1	0	0.0%	1	3.3	5	2.6
															Average B-IBI for South		***3.0***

Notes:
Bottom-most salinity included out of multiple depth readings.
Grainsize percentage from sieve size number 200 for silt/clay content.

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
no./m² = number per square meter
% = percent

B-IBI Score:
1 to <2 = impacted
2 to <3 = slightly impacted
3 to 5 = non-impacted

Table 2-12
Annual Ichthyoplankton Catch 1999-2006

Species	Annual Ichthyoplankton Catch								Total Number Caught
	1999	2000	2001	2002	2003	2004	2005	2006	
Acipenser sp.									
Larvae	–	–	–	–	–	–	–	1	1
Alosa sp.									
Egg	–	–	1	–	–	–	–	–	1
Larvae	–	–	2	–	–	–	–	–	2
American sandlance									
Larvae	–	–	9	1	2	1	1	–	14
American shad									
Larvae	–	–	–	–	–	–	39	–	39
Atlantic cod									
Larvae	–	–	–	–	–	1	–	–	1
Atlantic croaker									
Juvenile	–	–	–	–	1	–	1	18	20
Larvae	–	–	–	–	5	1	13	13	32
Atlantic herring									
Juvenile	–	–	–	–	–	1	–	–	1
Larvae	6	–	5	–	9	8	–	2	30
Atlantic mackerel									
Larvae	–	–	–	–	1	–	–	–	1
Atlantic menhaden									
UID	–	–	–	–	–	–	59	2	61
Egg	39	–	9	85	105	469	1311	44	2062
Larvae	257	1	2	7	61	100	172	9	609
Atlantic silverside									
Larvae	–	–	–	2	3	1	1	–	7
Atlantic tomcod									
Juvenile	–	–	5	–	1	3	4	–	13
Larvae	–	–	11	–	1	20	31	–	63
Bay anchovy									
Egg	705	–	144	2431	66	19068	30112	849	53375
Juvenile	–	1	–	–	1	–	1	–	3
Larvae	37	1	2	721	589	1929	525	110	3914
Blennidae									
Larvae	–	–	1	2	–	–	–	–	3
Butterfish									
Larvae	–	–	–	1	–	–	–	–	1
Clupeid unidentified									
Larvae	–	–	16	362	10	–	–	–	388
Conger eel (unidentified)	–	–	1	–	–	–	–	–	1
Cunner									
Larvae	–	–	–	2	–	–	5	–	7
Fourbeard rockling									
Egg	28	–	9	1	1	–	19	5	63

Table 2-12
Annual Ichthyoplankton Catch 1999-2006

Species	Annual Ichthyoplankton Catch								Total Number Caught
	1999	2000	2001	2002	2003	2004	2005	2006	
Fourspot flounder									
Egg	73	–	–	–	–	–	–	–	73
Larvae	–	–	–	–	1	–	–	–	1
Gadid unidentified									
Egg	–	–	–	–	–	1	39	3	43
Larvae	–	–	–	–	–	–	2	–	2
Gobiid unidentified									
Larvae	6	–	–	1208	44	29	158	496	1941
Goosefish									
Larvae	–	–	–	1	–	–	–	–	1
Grubby									
UID	–	–	–	–	–	4	3	–	7
Juvenile	–	–	–	–	–	2	–	–	2
Larvae	–	–	478	244	35	430	358	81	1626
Hogchocker									
Larvae	–	–	–	–	–	–	1	–	1
Egg	55	–	2	25	–	–	–	–	82
Labridae									
Egg	350	–	680	391	24	886	1640	90	4061
Longhorn sculpin									
Larvae	–	–	–	–	–	3	–	–	3
Myoxocephalus sp.									
Larvae	68	–	–	–	–	–	–	–	68
Northern pipefish									
Juvenile	2	–	–	6	1	–	–	–	9
Larvae	8	–	8	92	10	13	62	20	213
Northern puffer									
Larvae	–	–	–	–	–	–	1	–	1
Prionotus sp.									
Larvae	–	–	–	–	–	–	1	–	1
Egg	–	–	–	–	6	–	132	10	148
Rock gunnel									
Larvae	–	–	4	11	1	4	5	1	26
Spot									
Larvae	–	–	–	2	–	–	–	–	2
Striped bass									
Larvae	–	–	1	–	1	–	–	–	2
Striped cuskeel									
Larvae	–	–	1	–	–	–	–	–	1
Summer flounder									
Larvae	–	6	6	1	–	–	–	–	13
Tautog									
Larvae	–	–	–	2	–	3	29	0	34

Table 2-12
Annual Ichthyoplankton Catch 1999-2006

Species	Annual Ichthyoplankton Catch								Total Number Caught
	1999	2000	2001	2002	2003	2004	2005	2006	
Unidentified									
UID	–	–	–	–	–	1	1	–	2
Egg	–	–	–	1	–	–	–	–	1
Larvae	6	–	–	34	16	350	–	–	406
Walleye									
Larvae	–	–	–	–	–	–	–	2	2
Weakfish									
Egg	870	–	52	108	4	25	5884	2	6945
Juvenile	–	–	1	–	–	–	1	–	2
Larvae	9	9	–	72	7	28	114	–	239
White perch									
Larvae	–	–	–	–	13	–	–	–	13
Windowpane									
Egg	–	–	396	551	77	256	13	–	1293
Juvenile	–	–	1	1	3	–	–	–	5
Larvae	35	–	21	10	6	4	37	5	118
Winter flounder									
UID	–	–	–	–	–	4	13	–	17
Egg	15	–	–	6	1	1	4	–	27
Juvenile	–	–	–	–	2	–	1	–	3
Larvae	34	–	230	537	626	721	198	97	2443

Notes:
2007, 2008, and 2009 data are given in density only and are, therefore, not included.

Acronyms and Abbreviations:
UID = unidentified
USACE = U.S. Army Corps of Engineers

Sources:
USACE. 2003. Aquatic Biological Sampling Program 1998–2003. Raw data in Access database. New York and New Jersey Harbor Navigation Project. U.S. Army Corps of Engineers, New York District, New York, New York. August.

USACE. 2004, 2005, and 2006. Aquatic Biological Survey Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District, New York, New York.

Table 2-13
List of Fish and Shellfish Collected 2014-2016

Family	Common Name	Scientific Name
Fish Species		
Achiridae	Hogchoker	*Trinectes maculatus*
Acipenseridae	Atlantic Sturgeon	*Acipenser oxyrhynchus*
Anguillidae	American Eel	*Anguilla rostrata*
Atherinidae	Atlantic Silverside	*Menidia menidia*
Batrachoididae	Oyster Toadfish	*Opsanus tau*
Carangidae	Atlantic Moonfish	*Selene setapinnis*
	Lookdown	*Selene vomer*
Clupeidae	Alewife	*Alosa pseudoharengus*
	American Shad	*Alosa sapidissima*
	Atlantic Menhaden	*Brevoortia tyrannus*
	Blueback Herring	*Alosa aestivalis*
	Gizzard Shad	*Dorosoma cepedianum*
Cottidae	Longhorn Sculpin	*Myoxocephalus octodecemspinosus*
Engraulidae	Bay Anchovy	*Anchoa mitchilli*
	Striped Anchovy	*Anchoa hepsetus*
Fundulidae	Mummichog	*Fundulus heteroclitus*
	Striped Killifish	*Fundulus majalis*
Gadidae	Atlantic Tomcod	*Microgadus tomcod*
Gobiidae	Naked Goby	*Gobiosoma bosc*
Labridae	Cunner	*Tautogolabrus adspersus*
	Tautog	*Tautoga onitis*
Moronidae	Striped Bass	*Morone saxatilis*
	White Perch	*Morone americana*
Mugilidae	Striped Mullet	*Mugil cephalus*
	White Mullet	*Mugil curema*
Paralichthyidae	Smallmouth Flounder	*Etropus microstomus*
	Summer Flounder	*Paralichthys dentatus*
Phycidae	Red Hake	*Urophycis chuss*
	Spotted Hake	*Urophycis regia*
Pleuronectidae	Winter Flounder	*Pseudopleuronectes americanus*
Pomatomidae	Bluefish	*Pomatomus saltatrix*
Rajidae	Little Skate	*Leucoraja erinacea*
Sciaenidae	Atlantic Croaker	*Micropogonias undulatus*
	Northern Kingfish	*Menticirrhus saxatilis*
	Silver Perch	*Bairdiella chrysoura*
	Weakfish	*Cynoscion regalis*
Scophthalmidae	Windowpane	*Scophthalmus aquosus*
Serranidae	Black Seabass	*Centropristis striata*
Sparidae	Scup	*Stenotomus chrysops*
Stromateidae	Butterfish	*Peprilus triacanthus*
Syngnathidae	Northern Pipefish	*Syngnathus fuscus*
Tetraodontidae	Northern Pufferfish	*Sphoeroides maculatus*
Triglidae	Striped Searobin	*Prionotus evolans*
Shellfish Species		
Epialtidae	Spider Crab	*Libinia emarginata*
Limulidae	Horseshoe Crab	*Limulus polyphemus*
Panopeidae	Mud Crab	*Dyspanopeus sayi*
Portunidae	Blue Crab	*Callinectes sapidus*

Table 2-15
Fall 2014 Target Fish Collection Summary

Common Name	Counts by Collection Method							Counts by Geographic Zone		
	Crab Trap	Eel Pot	Gillnet	Minnow Trap	Seine	Trawl	Total [a]	North Zone	Central Zone	South Zone
American Eel		12		1		1	14	8		6
Atlantic Menhaden					4	4	8	4		4
Atlantic Silverside				12	788		800	211	356	233
Bay Anchovy						54	54	21	33	
Bluefish					80	1	81	10	41	30
Mummichog				641	511		1152	417		735
Spotted Hake						1	1	1		
Striped Killifish					909		909	294	210	405
Summer Flounder	1		2			7	10	4	3	3
White Perch					4		4	2	2	
Windowpane Flounder						5	5	5		
Winter Flounder					37	3	40	13	22	5
Total Number of Individuals	1	12	2	653	2332	76	3078	990	667	1421
Total Number of Species	1	1	1	3	7	8	12	12	7	8

Notes:

[a] All individuals processed for tissue samples.

Table 2-16
Fall 2014 Non-Target[a] Fish Collection Summary

Common Name [b]	Crab Trap	Eel Pot	Gillnet	Seine	Trawl	Total
Atlantic Menhaden			1	6		7
Atlantic Moonfish					6	6
Atlantic Silverside				777	1	778
Bay Anchovy					69	69
Black Seabass		50			2	52
Blueback Herring				14		14
Butterfish					2	2
Gizzard Shad			1		1	2
Gobiidae				2		2
Hogchoker					4	4
Mummichog				1969		1969
Naked Goby					1	1
Northern Kingfish				5	7	12
Northern Pipefish				2		2
Oyster Toadfish	7	8			5	20
Scup		1			57	58
Silver Perch					3	3
Smallmouth Flounder					4	4
Spotted Hake					1	1
Striped Anchovy				1		1
Striped Bass	3	1		32	3	39
Striped Killifish				228		228
Striped Mullet				1		1
Striped Searobin					16	16
Summer Flounder					3	3
Weakfish					76	76
White Mullet				5		5
Windowpane Flounder					1	1
Total Number of Individuals	10	60	2	3042	262	3376
Total Number of Species	2	4	2	12	19	28

Notes:

[a] Table includes both fish collected that were non-target species and target species that were not needed for analysis (target sample mass had already been attained or individuals were of insufficient size/length for analysis).

[b] Family name is provided if fish were not identified to the species level by the field team.

Table 2-17
Spring 2015 Target Fish Collection Summary

Common Name	Count by Collection Method						Count by Geographic Area		
	Angling	Eel Pot	Gillnet	Trawl	Trotline	Total[a]	North Zone	Central Zone	South Zone
American Eel		67		1		68	29	25	14
Bluefish	20		1		2	23	3	18	2
Hogchoker				8		8		7	1
Smallmouth Flounder				7		7		6	1
Spotted Hake				140		140	19	114	7
Striped Bass	18					18			18
Summer Flounder	29			11		40	9	15	16
White Perch			261	442		703	306	139	258
Windowpane Flounder			2	10		12		9	3
Winter Flounder			2	220		222	39	156	27
Total Number of Individuals	67	67	266	839	2	1241	405	489	347
Total Number of Species	3	1	4	8	1	10	6	9	10

Notes:
[a] All individuals processed for tissue samples.

Table 2-18
Spring 2015 Non-Target[a] Fish Collection Summary

Common Name[b]	Angling	Eel Pot	Gillnet	Trawl	Total
Alewife			5	169	174
American Shad				73	73
Atlantic Herring				1	1
Atlantic Menhaden			89		89
Atlantic Tomcod				8	8
Blueback Herring				55	55
Clupeidae				4	4
Cunner				2	2
Little Skate			1	1	2
Longhorn Sculpin				8	8
Lookdown				2	2
Northern Pipefish				4	4
Northern Pufferfish				1	1
Oyster Toadfish		2		2	4
Spotted Hake				1	1
Striped Bass	23		13	241	277
Striped Searobin				1	1
Summer Flounder	249			12	261
White Perch				26	26
Windowpane Flounder				1	1
Winter Flounder				8	8
Total Number of Individuals	272	2	108	620	1002
Total Number of Species[c]	2	1	4	19	20

Notes:

[a]Table includes both fish collected that were non-target species and target species that were not needed for analysis (target sample mass had already been attained or individuals were of insufficient size/length for analysis).

[b]Family name is provided if fish were not identified to the species level by the field team.

[c]Fish identified within the same family (e.g., American Shad and Clupeidae) are counted as a single species with regard to the tally of 'Total Number of Species' per gear type.

Table 2-19
Spring 2016 Target Fish Collection Summary

Common Name	Count by Collection Method			Count by Geographic Area		
	Gillnet	Trawl	Total	North Zone	Central Zone	South Zone
White Perch	187	49	236	64	128	44
Total Number of Individuals	187	49	236	64	128	44
Total Number of Species	1	1	1	1	1	1

Table 2-20
Spring 2016 Non-Target[a] Fish Collection Summary

Common Name [b]	Gillnet	Trawl	Total
Alewife	76	103	179
American Eel		1	1
American Shad	3	27	30
Atlantic Croaker		2	2
Atlantic Menhaden	136	2	138
Atlantic Silverside		1	1
Atlantic Sturgeon	1		1
Atlantic Tomcod		1	1
Bay Anchovy		2	2
Black Sea Bass		1	1
Blue Crab		5	5
Blueback Herring		2	2
Cunner		2	2
Gizzard Shad	2	7	9
Northern Pipefish		7	7
Red Hake		3	3
Little Skate	1		1
Spotted Hake	1	382	383
Striped Bass	432	571	1003
Striped Searobin		1	1
Summer Flounder		6	6
Tautog	2		2
White Perch		1751	1751
Windowpane Flounder	1	4	5
Winter Flounder	12	37	49
Total Number of Individuals	667	2918	3585
Total Number of Species	11	22	25

Notes:

[a] Table includes both fish collected that were non-target species and target species that were not needed for analysis (target sample mass had already been attained or individuals were of insufficient size/length for analysis).

[b] Family name is provided if fish were not identified to the species level by the field team.

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Loons					
Loon, common	–	✓	✓	✓	–
Loon, red-throated	–	✓	–	✓	–
Grebes					
Grebe, eared	–	–	–	✓	–
Grebe, horned	–	✓	–	✓	–
Grebe, pied-billed	–	✓	–	✓	–
Pelicaniformes					
Cormorant, double-crested	✓	✓	✓	✓	✓
Cormorant, great	–	–	–	✓	–
Pelican, brown	–	–	–	✓	–
Wading Birds					
Bittern, American	–	✓	–	✓	–
Bittern, least	–	✓	–	✓	–
Egret, cattle	–	✓	✓	✓	✓
Egret, great	✓	✓	✓	✓	✓
Egret, snowy	✓	✓	✓	✓	✓
Heron, black-crowned night	✓	✓	✓		✓
Heron, great blue	✓	✓	–	✓	–
Heron, green	✓	✓	✓	✓	✓
Heron, little blue	✓	✓	✓	✓	✓
Heron, tricolored	–	✓	✓	✓	✓
Heron, yellow-crowned night	–	✓	✓	✓	
Ibis, glossy	–	✓	✓	✓	✓
Swans, Geese and Ducks					
Brant	✓	✓	✓	✓	–
Bufflehead	✓	✓	–	✓	–
Canvasback	✓	✓	✓	✓	–
Duck, American black	✓	✓		✓	✓
Duck, fulvous whistling	–	✓	–	–	–
Duck, long-tailed	–	✓	–	✓	–
Duck, ring-necked	–	✓	–	–	–
Duck, ruddy	✓	✓	–	✓	–
Duck, wood	✓	✓	–	✓	–
Gadwall	✓	✓	✓	✓	✓
Goldeneye, common	–	✓	–	✓	–
Goose, Canada	✓	✓	✓	✓	✓
Goose, cackling	✓	–	–	–	–
Goose, snow	✓	✓	–	–	–
Mallard	✓	✓	✓	✓	✓
Merganser, common	✓	–	–	✓	–
Merganser, hooded	✓	✓	–	✓	–
Merganser, red-breasted	✓	✓	–	✓	–
Northern pintail	✓	✓	–	✓	–
Northern shoveler	–	✓	–	✓	–
Redhead	–	✓	–	–	–
Scaup, greater	–	✓	✓	✓	–
Scaup, lesser	–	✓	–	✓	–
Scoter, black	✓	–	–	✓	–
Scoter, surf	–	✓	–	✓	–

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Scoter, white-winged	✓	✓	–	✓	–
Swan, mute	✓	✓	–	✓	–
Swan, tundra	–	✓	–	–	–
Teal, blue-winged	–	✓	–	✓	–
Teal, green-winged	–	✓	–	✓	–
Wigeon, American	–	–	–	✓	–
Diurnal Raptors					
American kestrel	✓	✓	✓	✓	–
Bald eagle	✓	✓	✓	–	–
Falcon, peregrine	✓	✓	✓	✓	–
Hawk, broad-winged	–	✓	✓	✓	–
Hawk, Cooper's	✓	✓	✓	✓	–
Hawk, red-shouldered	✓	✓	✓	✓	–
Hawk, red-tailed	✓	✓	✓	✓	–
Hawk, rough-legged	–	✓	–	✓	–
Hawk, sharp-shinned	✓	✓	✓	✓	–
Merlin	✓	✓	✓	✓	–
Northern goshawk	–	✓	–	–	–
Northern harrier	✓	✓	✓	✓	✓
Osprey	✓	✓	✓	✓	–
Vulture, turkey	✓	✓	✓	✓	–
Upland Game Birds					
Pheasant, ring-necked	–	✓	–	✓	✓
Gruiformes					
American coot	–	✓	–	✓	–
Common moorhen	–	✓	–	✓	✓
Rail, clapper	–	✓	–	✓	–
Rail, king	–	✓	–	–	–
Rail, Virginia	–	✓	–	✓	✓
Rail, yellow	–	✓	–	–	–
Sora	–	✓	–	✓	–
Shorebirds					
American avocet	–	✓	–	–	–
American oystercatcher	–	–	✓	–	–
American woodcock	–	✓	✓	✓	–
Common snipe	–	✓	–	✓	–
Dunlin	–	✓	–	✓	–
Dowitcher, long-billed	–	✓	–	✓	–
Dowitcher, short-billed	–	✓	–	–	–
Godwit, Hudsonian	–	✓	–	–	–
Godwit, marbled	–	✓	–	–	–
Killdeer	✓	✓	–	✓	–
Phalarope, red	–	✓	–	–	–
Phalarope, Wilson's	–	✓	–	–	–
Plover, American golden	–	✓	✓	–	–
Plover, black-bellied	✓	✓	–	✓	–
Plover, semipalmated	✓	✓	–	✓	–
Red knot	–	✓	–	✓	–
Ruff	–	✓	–	–	–

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Sanderling	✓	✓	–	✓	–
Sandpiper, Baird's	–	✓	–	–	–
Sandpiper, buff-breasted	–	✓	–	–	–
Sandpiper, curlew	–	✓	–	–	–
Sandpiper, least	✓	✓	–	✓	–
Sandpiper, pectoral	✓	✓	–	✓	–
Sandpiper, purple	–	–	–	✓	–
Sandpiper, semipalmated	✓	✓	–	✓	–
Sandpiper, solitary	✓	✓	–	✓	–
Sandpiper, spotted	✓	✓	✓	✓	✓
Sandpiper, stilt	–	✓	–	–	–
Sandpiper, upland	–	✓	✓	–	–
Sandpiper, western	✓	✓	–	–	–
Sandpiper, white-rumped	✓	✓	–	–	–
Stilt, black-necked	–	✓	–	–	–
Turnstone, ruddy	–	✓	–	✓	–
Whimbrel	–	✓	–	✓	–
Willet	–	✓	–	✓	–
Yellowlegs, greater	✓	✓	–	✓	–
Yellowlegs, lesser	✓	✓	–	–	–
Gulls, Terns and Skimmers					
Gull, great black-backed	✓	✓	✓	✓	✓
Gull, lesser black-backed	✓	–	–	–	–
Gull, Bonaparte's	–	✓	–	✓	–
Gull, common black-headed	✓	✓	–	✓	–
Gull, glaucus	✓	✓	–	✓	–
Gull, herring	✓	✓	✓	✓	✓
Gull, Iceland	✓	✓	–	–	–
Gull, laughing	✓	✓	✓	✓	–
Gull, little	–	–	–	✓	–
Gull, ring-billed	✓	✓	✓	✓	–
Skimmer, black	–	✓	–	–	–
Tern, black	–	✓	–	✓	–
Tern, Caspian	–	✓	–	✓	–
Tern, common	✓	✓	✓	✓	–
Tern, Forster's	–	✓	–	✓	–
Tern, gull-billed	–	✓	–	✓	–
Tern, least	–	✓	✓	✓	–
Tern, roseate	–	✓	–	✓	–
Tern, royal	–	✓	–	–	–
Pigeons and Doves					
Dove, mourning	✓	✓	✓	✓	–
Dove, rock	✓	✓	✓	✓	✓
Cuckoos and their Allies					
Cuckoo, black-billed	–	✓	–	✓	–
Cuckoo, yellow-billed	✓	✓	✓	✓	–
Owls					
Owl, barn	–	✓	–	✓	–
Owl, barred	–	–	–	✓	–
Owl, eastern-screech	–	✓	–	–	–

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Owl, great horned	–	✓	–	✓	–
Owl, long-eared	–	✓	–	–	–
Owl, short-eared	–	✓	–	✓	–
Owl, snowy	–	✓	–	–	–
Goatsuckers and Swifts					
Chimney swift	✓	✓	–	✓	–
Nighthawk, common	✓	✓	–	✓	–
Hummingbirds					
Hummingbird, ruby-throated	✓	✓	–	✓	–
Kingfishers					
Kingfisher, belted	✓	✓	✓	✓	✓
Woodpeckers					
Flicker, northern	✓	✓	–	✓	✓
Sapsucker, yellow-bellied	✓	✓	–	✓	✓
Woodpecker, hairy	✓	✓	–	–	–
Woodpecker, red-bellied	✓	–	–	✓	–
Woodpecker, downy	✓	✓	✓	✓	✓
Woodpecker, red-headed	–	✓	–	–	–
Tyrant Flycatchers					
Eastern wood-pewee	–	✓	–	✓	–
Flycatcher, great-crested	–	✓	–	✓	–
Flycatcher, least	✓	✓	–	✓	–
Flycatcher, olive-sided	–	–	–	✓	–
Flycatcher, willow	–	–	–	✓	–
Flycatcher, yellow-bellied	–	✓	–	✓	–
Kingbird, eastern	✓	✓	–	✓	–
Kingbird, western	–	✓	✓	–	–
Phoebe, eastern	✓	✓	–	✓	✓
Shrikes and Vireos					
Shrike, northern	–	✓	–	–	–
Vireo, blue-headed	✓	–	–	–	–
Vireo, red-eyed	✓	✓	–	✓	✓
Vireo, solitary	–	✓	–	✓	–
Vireo, warbling	✓	✓	✓	✓	–
Vireo, white-eyed	–	✓	–	–	–
Vireo, yellow-throated	–	✓	–	–	–
Jays, Crows and their Allies					
Crow, American	✓	✓	✓	✓	–
Crow, fish	✓	✓	✓	✓	–
Jay, blue	✓	✓	–	✓	–
Larks					
Lark, horned	✓	✓	–	–	–
Swallows					
Purple martin	–	✓	✓	–	–
Swallow, bank	–	✓	–	✓	–
Swallow, barn	✓	✓	✓	✓	–
Swallow, cliff	✓	✓	–	–	–
Swallow, northern rough-winged	✓	✓	–	✓	–
Swallow, tree	✓	✓	✓	✓	–

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Chickadees and their Allies					
Chickadee, black-capped	✓	✓	–	✓	–
Titmouse, tufted	✓	✓	–	✓	–
Nuthatches and Creepers					
Brown creeper	✓	✓	–	✓	–
Nuthatch, red-breasted	–	✓	–	✓	–
Nuthatch, white-breasted	✓	✓	–	✓	–
Wrens					
Wren, Carolina	✓	✓	✓	✓	–
Wren, house	✓	✓	✓	✓	✓
Wren, marsh	–	✓	–	✓	–
Wren, sedge	–	✓	–	–	–
Wren, winter	–	✓	–	✓	–
Old World Warblers, Thrushes and their Allies					
Eastern bluebird	✓	–	–	–	–
Robin, American	✓	✓	–	✓	✓
Gnatcatcher, blue-gray	–	✓	–	✓	–
Kinglet, golden-crowned	✓	✓	–	✓	✓
Kinglet, ruby-crowned	✓	✓	–	✓	✓
Thrush, gray-cheeked	✓	✓	✓	✓	–
Thrush, hermit	✓	✓	–	✓	✓
Thrush, Swainson's	✓	✓	✓	✓	✓
Thrush, wood	–	✓	–	✓	–
Veery	–	✓	–	✓	–
Mimids					
Brown thrasher	✓	✓	–	✓	✓
Catbird, gray	✓	✓	✓	✓	✓
Mockingbird, northern	✓	✓	–	✓	–
Starlings and Minas					
Starling, European	✓	✓	✓	✓	–
Wagtails and Pipits					
American pipit	✓	✓	–	–	–
Waxwings					
Waxwing, cedar	✓	✓	–	✓	✓
Wood-Warblers					
American redstart	✓	✓	✓	✓	✓
Chat, yellow-breasted	–	–	✓	–	–
Northern parula	–	✓	–	✓	–
Ovenbird	–	✓	–	✓	✓
Warbler, bay-breasted	✓	✓	–	✓	–
Warbler, black-and-white	–	✓	✓	✓	✓
Warbler, blackburnian	–	✓	–	✓	–
Warbler, blackpoll	✓	✓	–	✓	✓
Warbler, black-throated blue	–	✓	✓	✓	✓
Warbler, black-throated green	–	✓	–	✓	–
Warbler, blue-winged	–	✓	–	✓	✓
Warbler, Canada	✓	✓	–	✓	–
Warbler, Cape May	✓	✓	–	✓	–
Warbler, cerulean	–	–	✓	✓	–
Warbler, chestnut-sided	–	✓	–	✓	✓

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Warbler, Connecticut	–	✓	✓	✓	✓
Warbler, golden-winged	–	–	✓	–	–
Warbler, hooded	–	–	✓	✓	–
Warbler, Kentucky	–	–	–	✓	–
Warbler, magnolia	–	✓	✓	✓	✓
Warbler, mourning	–	–	✓	✓	–
Warbler, Nashville	–	✓	–	✓	✓
Warbler, orange-crowned	✓	✓	–	–	–
Warbler, palm	✓	✓	–	✓	✓
Warbler, pine	–	–	✓	–	–
Warbler, prairie	–	✓	–	✓	–
Warbler, prothonotary	–	–	–	✓	–
Warbler, Tennessee	✓	✓	–	✓	–
Warbler, Wilson's	–	✓	–	–	✓
Warbler, worm-eating	–	–	✓	✓	–
Warbler, yellow	✓	✓	✓	✓	–
Warbler, yellow-rumped	✓	✓	–	✓	✓
Warbler, yellow-throated	–	–	✓	✓	–
Waterthrush, Louisiana	–	✓	–	✓	–
Waterthrush, northern	✓	✓	✓	✓	✓
Yellowthroat, common	✓	✓	–	✓	✓
Tanagers, Cardinals and their Allies					
Bunting, indigo	✓	✓	–	✓	–
Dickcissel	–	✓	–	–	–
Grosbeak, blue	–	✓	–	–	–
Grosbeak, rose-breasted	✓	✓	–	✓	–
Northern cardinal	✓	✓	–	✓	–
Tanager, scarlet	–	✓	–	✓	–
Emberizine Sparrows and their Allies					
Bunting, snow	–	✓	–	–	–
Junco, dark-eyed	✓	✓	–	✓	✓
Longspur, lapland	–	✓	–	–	–
Sparrow, American tree	✓	✓	–	✓	–
Sparrow, chipping	✓	✓	–	✓	–
Sparrow, field	✓	✓	–	✓	✓
Sparrow, fox	✓	✓	✓	–	–
Sparrow, Lincoln's	✓	✓	✓	–	–
Sparrow, savannah	✓	✓	–	✓	–
Sparrow, seaside	–	✓	–	✓	–
Sparrow, sharp-tailed	–	✓	–	✓	–
Sparrow, song	✓	✓	✓	✓	✓
Sparrow, swamp	✓	✓	–	✓	✓
Sparrow, vesper	–	✓	–	–	–
Sparrow, white-crowned	✓	✓	–	✓	–
Sparrow, white-throated	✓	✓	–	✓	✓
Towhee, eastern	✓	✓	–	✓	✓

Table 2-21
Inventory of Bird Observations in the Newark Bay Region

Species	Passaic River	Hackensack River	Newark Bay	Arthur Kill	Kill van Kull
Icterids					
Blackbird, red-winged	✓	✓	–	✓	–
Blackbird, rusty	✓	✓	–	–	–
Blackbird, yellow-headed	–	✓	–	–	–
Bobolink	–	✓	–	–	–
Cowbird, brown-headed	✓	✓	–	✓	–
Eastern meadowlark	–	✓	–	✓	–
Grackle, common	✓	✓	✓	✓	–
Grackle, boat-tailed	✓	–	–	✓	–
Oriole, Baltimore	✓	✓	✓	✓	–
Oriole, orchard	–	–	✓	–	–
Finches and Old World Sparrows					
Common redpoll	–	✓	–	–	–
Finch, house	✓	✓	–	✓	–
Finch, purple	✓	✓	–	✓	–
Goldfinch, American	✓	✓	✓	✓	✓
Siskin, pine	✓	✓	–	✓	–
Sparrow, house	✓	✓	–	✓	–
Total Number of Species	**141**	**248**	**81**	**213**	**59**

Notes:

✓ indicates species was observed during any of the following surveys: Tierra (2004), Ludwig et al. (2010), Kerlinger (2004), Bernick (2007), Bernick and Craig (2008), Mizrahi et al. (2006).

The Passaic River Bird Survey was conducted on the lower six miles of the river in August and October 2010 and January and May of 2011. Data from non-aquatic foraging species on the Passaic River in January and May of 2011 were not available.

References:

Bernick, A.J. 2007. NYC Audubon's Harbor Herons Project: 2007 Nesting Survey. NYC Audubon, New York. 48 pp.

Bernick, A.J. and E. Craig. 2008. NYC Audubon's Harbor Herons Project: 2008 Interim Nesting Survey. NYC Audubon, New York. 42 pp.

Kerlinger, P. 2004. NYC Audubon's Harbor Herons Project: 2004 Nesting Survey. NYC Audubon, New York. 30 pp.

Ludwig, D.F., J. Iannuzzi, T.J. Iannuzzi, and J.K. Shisler. 2010. Spatial and temporal habitat use patterns by water birds in an urban estuarine ecosystem: Implications for ecosystem management and restoration. *Human Ecol Risk Assess* 16(1):163-184.

Mizrahi, D.S., N. Tsipoura, and K. Witkowski. 2007. Avian Abundance and Distribution in the New Jersey Meadowlands District: The Importance of Habitat, Landscape, and Disturbance. New Jersey Audubon Society. A Final Report Submitted to New Jersey Meadowlands Commission. November 28.

Tierra. 2004. Newark Bay Study Area RIWP. Sediment Sampling and Source Identification Program. Volume 1 of 3. Inventory Report. Revision 0. Tierra Solutions, Inc., East Brunswick, New Jersey. June.

Windward. 2011. Avian Community Survey Data Report for the Lower Passaic River Study Area, Summer and Fall 2010. Prepared for the Cooperating Parties Group.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Prepared for USEPA Region 2 as part of the 17-mile LPRSA Remedial Investigation/Feasibility Study.

Table 3-1
Assessment and Measurement Endpoints[a]

Receptor Group and Assessment Endpoint	Risk Question	Final Measurement Endpoint	Data Use Objective	Biological Data/Media to be Sampled	Representative Species
Assessment Endpoint No. 1 - Survival, growth, and/or reproduction of invertebrates	Are invertebrate communities in the NBSA different from those found in similar nearby water bodies with chemical concentrations at regional background levels?	Community structure data (e.g., total invertebrate abundance, species richness, and abundance of species or specific taxonomic groups) and ecosystem characteristics data (e.g., grain size, TOC, and other attributes) from Newark Bay to reference populations from Jamaica Bay via statistical comparisons of community indices. This line of evidence is part of the SQT assessment (Appendix A; Section 6), which is a sediment assessment technique that incorporates information about sediment chemistry, toxicity, and benthic community metrics.	Evaluating the data in the context of the overall health of the benthic community using the sediment quality triad approach; a sediment assessment technique that incorporates information about sediment chemistry, toxicity, and benthic community metrics.	Benthic invertebrate taxonomic survey and identification data.	NA
	Are COPECs in invertebrate tissues from the NBSA greater than whole body tissue toxicity benchmarks for the survival, growth, and/or reproduction of invertebrates?	COPEC concentrations in laboratory- exposed and/or site-collected invertebrate tissues as compared with literature-based TRVs.	Estimating the exposure of infaunal and epibenthic invertebrates to COPECs in the NBSA.	Site-collected invertebrate tissue from softshell clams (*Mya arenaria*) and blue crabs (*Callinectes sapidus*); whole-body benthic infaunal invertebrate (polychaete; *Nereis virens*) tissue from 28-day laboratory field bioaccumulation tests using NBSA surface sediment.	Polychaetes, softshell clam, and blue crab
	Are COPEC concentrations in sediments from the BAZ greater than benchmarks for the survival, growth, and/or reproduction of invertebrates?	COPEC concentrations in sediment as compared with toxicological sediment benchmarks from the literature.	Evaluating the potential effects of COPEC concentrations in sediment on the benthic invertebrate community of the NBSA.	Surface sediment (from the BAZ) chemistry and conventional parameters.	NA
	Is the survival, growth, and/or reproduction of invertebrates exposed to whole sediments from the BAZ of the NBSA significantly lower than that in reference sediments?	Laboratory toxicity tests (a 10-day and 28-day study with *Leptocheirus plumulosus* for survival, growth, and reproduction) using NBSA surface sediment statistically compared to bioassays conducted with control sediment and in comparison to similar studies conducted in the Jamaica Bay reference location.	Assessing the adverse effects of chemicals (and evaluation of conventional parameters such as grain size, TOC, sulfide, and ammonia) in sediment to the benthic invertebrate community.	Surface sediment (from the BAZ) chemistry and conventional parameters.	*Amphipods Leptocheirus plumulosus* and *Ampelisca abdita*
	Are COPEC concentrations in porewater and surface water from the NBSA greater than benchmarks for the survival, growth, and/or reproduction of invertebrates?	Dissolved COPEC concentrations in porewater and surface water collected from benthic invertebrate exposure areas as compared with toxicological benchmarks.	Estimating the exposure of the benthic invertebrate community to COPECs the surface water and porewater exposure pathways.	Surface water and porewater data.	NA

Table 3-1
Assessment and Measurement Endpoints[a]

Receptor Group and Assessment Endpoint	Risk Question	Final Measurement Endpoint	Data Use Objective	Biological Data/Media to be Sampled	Representative Species
Assessment Endpoint No. 2 - Survival, growth, and/or reproduction of fish	Are COPEC concentrations in fish tissues from the NBSA greater than toxicity benchmarks for the survival, growth, and/or reproduction of fish?	Whole-body and liver tissue chemical analyses, modeled egg tissue data, and external health observations of identified fish receptors as compared with literature-based TRVs.	Estimating the exposure of fish to COPECs in the NBSA.	Whole-body fish tissue chemical concentrations, liver chemical concentrations, gross histological analysis, and gross histology of representative species from each of three trophic levels (forage fish, benthic/demersal, and pelagic predatory). Egg concentrations for PCDD/PCDF TEQ and PCBs are also estimated via modeling from existing sediment data.	*Fundulus* spp., white perch, summer/winter flounder, American eel, Atlantic menhaden, Atlantic silverside
	Are fish communities in the NBSA different from those found in similar nearby water bodies?	Distribution, diversity, abundance, and seasonal patterns of adult and ichthyoplankton communitites in NBSA compared to other areas of the New York Harbor.	Comparing NBSA fish community metrics to other areas in New York Harbor	Individual fish collected by USACE ABS surveys from 2002 - 2011.	Species sampled by USACE ABS surveys
	Are COPEC concentrations in porewater, surface water, and sediment from the NBSA greater than benchmarks for the survival, growth, and/or reproduction of fish?	COPEC concentrations in dissolved porewater and surface water collected from the NBSA as compared with toxicological benchmarks.	Estimating the exposure of fish via the surface water exposure pathway to COPECs in surface water.	Data (COPECs and conventional parameters such as DO, salinity, pH, hardness) collected as part of the surface water monitoring program.	NA
		COPEC concentrations in sediment as compared with toxicological sediment benchmarks from the literature.	Evaluating the effects of COPEC concentrations in sediment on fish populations in the NBSA.	Surface sediment collected from the BAZ.	NA
	Does the daily dose of COPECs received by fish (including forage fish, benthic omnivore, pelagic invertivore, and pelagic piscivore) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of fish?	Receptor-specific modeled daily doses associated with the ingestion of COPECs in surface water, sediment, and prey tissue as compared with literature-based dietary dose TRVs.	Estimating exposure of fish receptors via various exposure pathways to COPECs in surface water, sediment, and prey tissue.	Surface sediment chemistry (from the BAZ) and benthic invertebrate and/or fish prey tissue chemical concentrations, depending on receptor-specific diet.	*Fundulus* spp., white perch, summer/winter flounder, American eel

Table 3-1
Assessment and Measurement Endpoints[a]

Receptor Group and Assessment Endpoint	Risk Question	Final Measurement Endpoint	Data Use Objective	Biological Data/Media to be Sampled	Representative Species
Assessment Endpoint No. 3 - Survival, growth, and/or reproduction of birds	Does the daily dose of COPECs received by birds (including piscivorous, benthivorous/sediment-probing, omnivorous birds) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of birds?	Receptor-specific modeled daily doses associated with the ingestion of COPECs in surface water, sediment, and prey tissue as compared with literature-based dietary dose TRVs. Bird egg collection was considered for the NBSA BERA; however, sampling was ultimately not conducted under the program due to nest access, schedule, and permitting constraints. Risks to birds are also assessed by evaluating field-collected tissue residues of birds (specifically egg tissue) collected from an existing study from Shooter's Island (Parsons 2003). The egg tissue data collected from this study are compared to literature-based TRVs for avian eggs.	Estimating exposure of bird receptors via various exposure pathways to COPECs in surface water, sediment, and prey tissue.	Surface sediment chemistry (from the BAZ) and benthic invertebrate and/or fish prey tissue chemical concentrations, depending on receptor-specific diet. Double-crested cormorant reproductive success data from the NBSA published in Parsons (2003).	Spotted sandpiper, great blue heron, lesser scaup, double-crested cormorant
Assessment Endpoint No. 4 - Survival, growth, and/or reproduction of mammals	Does the daily dose of COPECs received by mammals (including piscivorous, omnivorous, and invertivorous) from consumption of the tissues of prey species and from other media in the NBSA exceed the TRVs for survival, growth, and/or reproduction of mammals?	Receptor-specific modeled daily doses associated with the ingestion of COPECs in surface water, sediment, and prey tissue as compared with literature-based dietary dose TRVs.	Estimating exposure of aquatic and semi-aquatic mammals to chemicals in NBSA surface water, sediment, and prey tissue.	Surface sediment chemistry (from the BAZ) and benthic invertebrate and/or fish prey tissue chemical concentrations, depending on receptor-specific diet.	Harbor seal, river otter, muskrat
Assessment Endpoint No. 5 - Survival, growth, and/or reproduction of reptiles	Are COPEC concentrations in site surface water and sediment at levels that might adversely affect survival, growth, and/or reproduction of reptiles?	Qualitative discussion of the possibility of reptiles inhabiting the NBSA, particularly the diamond-backed terrapin, which is the only species observed or noted in the Bay. Concentrations of COPECs in surface water and surface sediment from subtidal and intertidal areas are compared to available, relevant toxicity-based benchmarks.	Estimating the exposure of reptiles via direct contact and uptake of COPECs in surface water and sediment.	Surface water and surface sediment chemistry and conventional parameters from the NBSA.	NA

Table 3-1
Assessment and Measurement Endpoints[a]

Notes:
a. Table based on discussions/documentation among Tierra, USEPA, and Partner Agencies, including the following:
A conference call among all parties on January 22, 2013
A meeting between Tierra and USEPA on February 22, 2013
Meeting Minutes from the February 22, 2013 Meeting
Responses to USEPA Comments on the Draft Problem Formulation document (February 28, 2013)
USEPA's Resolution on Comments and Responses to Comments (March 22, 2013)
Email from E. Naranjo dated April 4, 2013 (USEPA 2013)
USEPA Comments on "Summary of Preliminary Receptors, Exposure Factors, and Toxicity Reference Values Selection for the Newark Bay Study Area Baseline Ecological Risk Assessment" Memo

Acronyms and Abbreviations:
ABS - Aquatic Biological Survey
BAZ = biologically active zone
BERA = baseline ecological risk assessment
COPEC = constituent of potential ecological concern
DO = dissolved oxygen
NA = not applicable
NBSA = Newark Bay Study Area
PCB = polychlorinated biphenyl
PCDD/PCDF = polychlorinated dibenzodioxins/polychlorinated dibenzofurans
SQT = sediment quality triad
TBD = to be determined
TEQ = toxic equivalency
TOC = total organic carbon
TRV = toxicity reference value
USACE = United States Army Corps of Engineers

References:
Parsons, K.C. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. Contract No. C003858. Submitted to NYSDEC February 28.

Table 3-4
SLERA Identified COPECs

Chemical	Sediment	Benthic Invertebrates	Fish	Mollusk	Crab	Avian Embryo
Dioxins/Furans						
2,3,7,8-TCDD	✓					✓
DIOX TEQ Bird		✓	✓		✓	✓
DIOX TEQ Fish			✓	✓	✓	✓
DIOX TEQ Mammal		✓	✓		✓	✓
PCB TEQ Bird			✓	✓	✓	✓
PCB TEQ Fish			✓	✓	✓	✓
PCB TEQ Mammal			✓	✓	✓	✓
Total TEQ Bird		✓	✓	✓	✓	✓
Total TEQ Fish			✓	✓	✓	✓
Total TEQ Mammal	✓	✓	✓	✓	✓	✓
PCBs						
Aroclor 1016			✓			
Aroclor 1242	✓		✓			✓
Aroclor 1248	✓		✓			✓
Aroclor 1254	✓		✓	✓	✓	✓
Aroclor 1260	✓					✓
Total Aroclor	✓		✓	✓	✓	✓
Total PCBs	✓	✓	✓	✓	✓	✓
Pesticides/Herbicides						
2,4'-DDD	✓	✓				✓
2,4'-DDE	✓			✓		✓
2,4'-DDT	✓					✓
4,4'-DDD	✓	✓	✓	✓		✓
4,4'-DDE	✓	✓	✓	✓		✓
4,4'-DDT	✓	✓				✓
Total DDx	✓	✓	✓	✓	✓	✓
Aldrin	✓	✓		✓		✓
alpha-BHC	✓					✓
beta-BHC	✓					✓
delta-BHC	✓					✓
gamma-BHC (Lindane)	✓					✓
Total BHC	✓					✓
Chlordane	✓					✓
Chlordane alpha (cis)	✓					✓
Chlordane gamma (trans)	✓					✓
Chlordane oxy	✓					✓
Total chlordane	✓	✓	✓	✓	✓	✓
Dieldrin	✓	✓	✓	✓		✓
Endrin	✓					✓
Endrin aldehyde						✓
Endrin ketone						✓
Total endrin	✓		✓			✓
Endosulfan sulfate						✓
Endosulfan alpha						✓
Endosulfan beta						✓
Total endosulfan	✓	✓		✓		✓
Heptachlor	✓					✓
Heptachlor epoxide	✓					✓
Total heptachlor	✓					✓
Hexachlorobenzene	✓					✓
Methoxychlor	✓					✓
Mirex						✓
Nonachlor cis-						✓
Nonachlor trans-						✓
Total Nonachlor			✓			✓

Table 3-4
SLERA Identified COPECs

Chemical	Sediment	Benthic Invertebrates	Fish	Mollusk	Crab	Avian Embryo
SVOCs (PAHs)						
1-Methylnaphthalene						✓
1-Methylphenanthrene						✓
2,3,5-Trimethylnaphthalene						✓
2,6-Dimethylnaphthalene						✓
2-Methylnaphthalene	✓					✓
Acenaphthene	✓					✓
Acenaphthylene	✓					✓
Anthracene	✓					✓
Benzo(a)anthracene	✓	✓	✓	✓	✓	✓
Benzo(a)pyrene	✓	✓		✓		✓
Benzo(b)fluoranthene	✓	✓		✓	✓	
Benzo(g,h,i)perylene	✓					✓
Benzo(k)fluoranthene	✓	✓		✓	✓	
Benzo[e]pyrene						✓
Benzofluoranthenes (total)	✓					
Biphenyl						✓
Chrysene	✓	✓	✓	✓	✓	✓
Dibenzo(a,h)anthracene	✓	✓	✓	✓		✓
Fluoranthene	✓					✓
Fluorene	✓					✓
Indeno[1,2,3-cd]-pyrene	✓	✓	✓	✓	✓	✓
Naphthalene	✓					✓
Perylene						✓
Phenanthrene	✓					✓
Pyrene	✓					✓
Total PAHs	✓	✓	✓	✓	✓	✓
HMW PAHs	✓	✓	✓	✓	✓	✓
LMW PAHs	✓	✓	✓	✓	✓	✓
SVOCs (Non-PAHs)						
1,2,4-Trichlorobenzene	✓					
1,3-Dichlorobenzene	✓					
1,4-Dichlorobenzene	✓					
Bis(2-ethylhexyl)phthalate	✓					
Metals						
Antimony	✓					
Arsenic	✓	✓		✓		
Cadmium	✓	✓		✓		✓
Chromium	✓	✓		✓		
Copper	✓	✓		✓		
Iron	✓					
Lead	✓	✓	✓	✓		
Manganese	✓					
Mercury	✓					
Mercury (Total)			✓	✓	✓	✓
Methyl mercury			✓		✓	✓
Nickel	✓	✓		✓		
Selenium	✓					
Silver	✓	✓		✓		
Zinc	✓	✓		✓		
VOCs						
Ethylbenzene	✓					

Table 3-4
SLERA Identified COPECs

Acronyms and Abbreviations:
BHC = benzene hexachloride
COPEC = constituent of potential ecological concern
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
SLERA = screening level ecological risk assessment
SVOC = semi-volatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
VOC = volatile organic compound
DIOX TEQ = dioxin TEQ
PCB TEQ = dioxin-like PCBs TEQ
Total TEQ = sum of dioxin and dioxin-like PCB TEQ

Source:
Battelle. 2008. Screening-Level Ecological Risk Assessment for Newark Bay Study Area. Submitted to USEPA Region 2 and USACE Kansas City District. Prepared by Battelle under contract to Malcolm Pirnie, Inc. December 15.

Table 4-1a
Summary of NBSA Phase I-III Risk Assessment-Related Sampling Programs

RI Phase	Year Conducted	Sampling Program	Number of Sampling Locations	Sampling Depth (feet bss)	Sample Type	Sample Analyses	Number of Samples	Sampling Program Details
Phase I	2005	BAZ Investigation	NA	NA	NA	NA	NA	Investigation activities confirmed 0.5-foot depth bss was sufficient for BAZ sampling.
Phase III	2011-2013	CPG Chemical Water Quality Monitoring Program	6 locations within the NBSA	Water Column	Surface Water	Chemistry, Water Quality	158-233	Sampling included five events under normal flow conditions, a single low-flow event, and two high-flow events. Grab samples collected from 3 feet (0.9 meter) above the bottom and 3 feet (0.9 meter) below the surface. Samples collected at four intervals (i.e., high water slack tide, low water slack tide, maximum ebb tide, and maximum flood tide) at each location and depth.
	2013	Reconnaissance Survey	NA	NA	NA	NA	NA	Conducted to provide qualitative observations of shoreline features and characteristics of the NBSA as part of the Baseline Human Health and Ecological Risk Assessments.
	2014	Crab and Clam Sampling Program	18	0 to 0.5	Sediment	Chemistry	18	Co-located clam and surface sediment collected at each location.
			18	NA	Softshell Clam Tissue	Chemistry	18	
			37	NA	Blue Crab Tissue	Chemistry	111	Hepatopancreas, edible muscle, and carcass tissue samples collected at each location.
	2014, 2015, 2016	Fish Sampling Program	NA	NA	Tissue	Chemistry	190	Target species selected to represent key trophic levels and feeding guilds. Whole body, fillet, and liver fish tissue samples collected.
	2015	SQT & Porewater Sampling Program	43	0 to 0.5	Sediment	Chemistry	43	SQT analyses, benthic invertebrate community analysis, and porewater chemistry analyses conducted at 30 stations. Bioaccumulation tests conducted at a subset of eight stations. Chemistry analyses conducted on an additional 13 locations to support the Baseline Human Health Risk Assessment.
			8	NA	Tissue	Chemistry	8	
			30	0 to 0.5	Porewater	Chemistry	30	
			30	0 to 0.5	Toxicity	NA	30	
			30	0 to 0.5	Benthic Invertebrate Community	NA	90	
	2016	Sediment Investigation	220	0 to 0.5	Sediment	Chemistry	193[a]	Sampling interval: 0- to 0.5-foot.

Notes:
[a] A total of 173 discrete vibracore surface sediment samples and 47 grab samples were collected in 2016, for a total of 220 individual sampling locations. The vibracore samples and 10 of the grab samples were analyzed as discrete samples, while the remaining grab samples were combined into 10 composite samples for analysis.

Acronyms and Abbreviations:
BAZ = biologically active zone
bss = below sediment surface
CPG = Cooperating Parties Group
NA = not applicable
NBSA = Newark Bay Study Area
RI = remedial investigation
SQT = Sediment Quality Triad

Table 4-1b
Summary of NBSA Phase III Biota Tissue Samples

Sampling Program	Year Conducted	Number of Sampling Locations	Sample Type	Species	Tissue Type	Number of Samples	Sample Analyses	Sampling Program Details
SQT Polychaete Bioaccumulation Tests	2015	8	Laboratory Bioaccumulation Test/Polychaete Tissue	Polychaete Worm	Whole body composites	8	Chemistry	
Crab and Clam Sampling Program	2014	18	Softshell Clam Tissue	Softshell clam	Whole body	18	Chemistry	
		37	Blue Crab Tissue	Blue crab	Whole body (calculated), Carcass, hepatopancreas, muscle	37	Chemistry	Hepatopancreas, edible muscle, and carcass tissue samples collected at each location.
Fish Sampling Program	2014, 2015, 2016	not applicable	Fish Tissue	American Eel	Fillet, whole body composites	18	Chemistry	Target species selected to represent key trophic levels and feeding guilds. Whole body, fillet, and liver fish tissue samples collected.
				Summer flounder	Fillet, whole body composites	18		
				Winter flounder	Whole body composites	10		
				White perch	Fillet, liver, whole body composites	27		
				Striped bass	Fillet individuals	18		
				Bluefish	Fillet composites and individuals	18		
				Atlantic menhaden	Whole body individuals	2		
				Atlantic silverside	Whole body individuals	7		
				Mummichog/Striped Killifish (*Fundulus* sp)	Whole body individuals	17		

Table 4-2
Chemical Analytes for the NBSA Sampling Programs

Parameter Group[a]	Phase III					
	Crab/Clam Sediment	SQT Sediment	Surface Sediment	Biota Tissue	Porewater	Surface Water
Dioxins/Furans	X	X	X	X	X	X
PCB Aroclors	X	X	X	X	-	-
PCB Congeners	X	X	X	X	X	X
Pesticides	X	X	X	X	X	X
PAHs	X	X	X	X	X	X
Semivolatiles	X	X	X	X	-	X
TPH	X	X	X	-	-	-
Metals[b]	X	X	X	X	X	X
Grain Size	X	X	X	-	-	-
TOC	X	X	X	-	-	X
Ammonia Nitrogen	X	X	-	-	X	X
AVS/SEM	X	X	-	-	-	-
DOC	-	-	-	-	X	X
POC	-	-	-	-	-	X
Herbicides	X	X	X	-	-	-
Hexavalent Chromium	X	X	-	-	-	X
Lipids	-	-	-	X	-	-
Organotins	X	X	-	X	-	X
ORP	X	X	-	-	-	-
Percent Moisture	X	X	X	X	-	-
pH	X	X	-	-	-	-
TEPH Alkanes	X	X	X	-	-	-
Total Cyanide	X	X	X	-	-	X
Total Kjeldahl Nitrogen (TKN)	X	X	-	-	-	X
Total Phosphorus	X	X	-	-	-	X
Total Sulfide	X	X	-	-	X	X
Volatiles	X	X	X	-	-	X
Miscellaneous[c]	-	-	-	-	-	X

Notes:

[a] For specific analytical methods and target analytes in each parameter group, refer to program-specific work plans, quality assurance project plans, and data reports, as referenced in Section 4.

[b] Includes mercury and methylmercury.

[c] Chloride, chlorophyll-A, sulfate, alkalinity, hardness, salinity, suspended solids, dissolved solids.

Acronyms and Abbreviations:

- = not analyzed
AVS/SEM = acid volatile sulfide/simultaneously extracted metals
DOC = dissolved organic carbon
ORP = oxidation reduction potential
PAHs = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
POC = particulate organic carbon
SQT = Sediment Quality Triad
TEPH = total extractable petroleum hydrocarbons
TOC = total organic carbon
TPH = total petroleum hydrocarbon

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	Total	pg/L	233	70%	4.48	3.43	4.08	1.05	19.8	1.56	11.7
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	Total	pg/L	233	76%	4.32	4.73	3.08	0.623	44	0.825	13.9
	1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin	Total	pg/L	115	100%	7.84	4.84	6.3	1.71	27.3	--	--
	1,2,3,4,6,7,9-Heptachlorodibenzofuran	Total	pg/L	115	1%	0.585	0.447	<0.939	4.06	4.06	0.373	3.44
	1,2,3,4,6,7-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.29	--	<1.22	--	--	0.379	3.26
	1,2,3,4,6,7-Hexachlorodibenzofuran	Total	pg/L	115	3%	0.508	0.49	<0.86	1.02	5.03	0.223	2.37
	1,2,3,4,6,8,9-Heptachlorodibenzofuran	Total	pg/L	115	74%	1.96	1.54	1.51	0.542	7.68	0.401	3.44
	1,2,3,4,6,8-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	3%	0.733	0.829	<1.23	0.433	8.95	0.379	3.26
	1,2,3,4,6,8-Hexachlorodibenzofuran	Total	pg/L	115	10%	0.526	0.33	<0.878	0.441	1.95	0.223	2.37
	1,2,3,4,6,9-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.29	--	<1.22	--	--	0.379	3.26
	1,2,3,4,6,9-Hexachlorodibenzofuran	Total	pg/L	115	0%	<0.904	--	<0.842	--	--	0.223	2.37
	1,2,3,4,6-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,4,6-Pentachlorodibenzofuran	Total	pg/L	115	2%	0.457	0.295	<0.794	0.852	2.58	0.242	2.4
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	Total	pg/L	233	2%	0.659	0.428	<1.14	0.554	4.71	0.361	4.27
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	Total	pg/L	233	0.4%	0.607	0.29	<1.15	0.625	0.625	0.333	3.79
	1,2,3,4,7,8-Hexachlorodibenzofuran	Total	pg/L	233	46%	1.07	1.08	<1.06	0.408	8.01	0.221	2.34
	1,2,3,4,7,9-Hexachlorodibenzofuran	Total	pg/L	115	0%	<0.904	--	<0.842	--	--	0.223	2.37
	1,2,3,4,7-Pentachlorodibenzofuran	Total	pg/L	115	2%	0.546	0.981	<0.794	3.38	10.3	0.242	2.4
	1,2,3,4,7-pentachlorodibenzo-p-Dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,4,8,9-hexachlorodibenzofuran	Total	pg/L	115	0%	<0.904	--	<0.842	--	--	0.223	2.37
	1,2,3,4,8-Pentachlorodibenzofuran	Total	pg/L	115	2%	0.49	0.555	<0.794	1.39	5.86	0.242	2.4
	1,2,3,4,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4
	1,2,3,4-Tetrachlorodibenzo-p-Dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,3,4-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.582	0.593	<0.826	0.363	5.38	0.368	2.12
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	Total	pg/L	233	3%	0.632	0.301	<1.17	0.43	1.16	0.312	3.65
	1,2,3,6,7,8-Hexachlorodibenzofuran	Total	pg/L	233	12%	0.467	0.263	<0.816	0.192	1.88	0.179	2.19
	1,2,3,6,7,9-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	21%	1.01	0.858	<1.32	0.663	4.95	0.419	3.26
	1,2,3,6,7,9-Hexachlorodibenzofuran	Total	pg/L	115	0%	<0.904	--	<0.842	--	--	0.223	2.37
	1,2,3,6,7-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,6,7-Pentachlorodibenzofuran	Total	pg/L	115	1%	0.455	0.319	<0.783	2.98	2.98	0.242	2.4
	1,2,3,6,8,9-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	21%	1.01	0.858	<1.32	0.663	4.95	0.419	3.26
	1,2,3,6,8,9-Hexachlorodibenzofuran	Total	pg/L	115	0%	<0.904	--	<0.842	--	--	0.223	2.37
	1,2,3,6,8-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,6,8-Pentachlorodibenzofuran	Total	pg/L	115	17%	0.796	1.39	<0.843	0.714	13.4	0.311	2.4
	1,2,3,6,9-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,6,9-Pentachlorodibenzofuran	Total	pg/L	115	1%	0.452	0.29	<0.783	2.53	2.53	0.242	2.4
	1,2,3,6-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,3,6-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.582	0.593	<0.826	0.363	5.38	0.368	2.12
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	Total	pg/L	233	19%	0.807	0.317	<1.32	0.662	1.89	0.559	3.96
	1,2,3,7,8,9-Hexachlorodibenzofuran	Total	pg/L	233	0.4%	0.53	0.257	<0.998	0.495	0.495	0.3	2.79
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	Total	pg/L	233	1%	0.622	0.3	<1.14	0.557	0.706	0.313	3.62
	1,2,3,7,8-Pentachlorodibenzofuran	Total	pg/L	233	1%	0.468	0.24	<0.856	0.309	1.66	0.193	2.51
	1,2,3,7,9-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,7,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4
	1,2,3,7-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	9%	0.643	0.324	<1.1	0.448	2.24	0.481	2.72
	1,2,3,7-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.444	0.198	<0.803	1.37	1.37	0.285	2.12
	1,2,3,8,9-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,3,8,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans (cont.)	1,2,3,8-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	9%	0.643	0.324	<1.1	0.448	2.24	0.481	2.72
	1,2,3,8-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.582	0.593	<0.826	0.363	5.38	0.368	2.12
	1,2,3,9-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,3,9-Tetrachlorodibenzofuran	Total	pg/L	115	0%	<0.874	--	<0.803	--	--	0.285	2.12
	1,2,4,6,7,8-Hexachlorodibenzofuran	Total	pg/L	115	57%	1.32	1.23	1.06	0.434	6.97	0.374	2.13
	1,2,4,6,7,9-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	19%	0.935	0.715	<1.32	0.654	3.8	0.438	3.26
	1,2,4,6,7,9-Hexachlorodibenzofuran	Total	pg/L	115	1%	0.458	0.235	<0.842	1.46	1.46	0.223	2.37
	1,2,4,6,7-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,4,6,7-Pentachlorodibenzofuran	Total	pg/L	115	3%	0.543	1.03	<0.794	0.923	11.2	0.242	2.4
	1,2,4,6,8,9-Hexachlorodibenzo-p-dioxin	Total	pg/L	115	19%	0.935	0.715	<1.32	0.654	3.8	0.438	3.26
	1,2,4,6,8,9-Hexachlorodibenzofuran	Total	pg/L	115	16%	0.58	0.424	<0.877	0.326	3.01	0.223	2.37
	1,2,4,6,8-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,4,6,8-Pentachlorodibenzofuran	Total	pg/L	115	10%	0.645	0.59	<0.907	1.13	3.93	0.287	3
	1,2,4,6,9-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	2%	0.644	0.346	<1.13	1.97	2.17	0.341	3.62
	1,2,4,6,9-Pentachlorodibenzofuran	Total	pg/L	115	11%	0.535	0.418	<0.816	0.477	3.73	0.311	2.4
	1,2,4,6-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,4,6-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.492	0.623	<0.803	6.84	6.84	0.285	2.12
	1,2,4,7,8-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,4,7,8-Pentachlorodibenzofuran	Total	pg/L	115	17%	0.796	1.39	<0.843	0.714	13.4	0.311	2.4
	1,2,4,7,9-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,4,7,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4
	1,2,4,7-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,4,7-Tetrachlorodibenzofuran	Total	pg/L	115	5%	0.691	2.2	<0.814	0.359	23.8	0.31	2.12
	1,2,4,8,9-Pentachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.238	--	<1.13	--	--	0.341	3.62
	1,2,4,8,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4
	1,2,4,8-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,4,8-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.745	1.5	<0.859	0.625	15.7	0.285	2.12
	1,2,4,9-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.45	0.234	<0.803	2.07	2.07	0.285	2.12
	1,2,4,9-Tetrachlorodlbenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,6,7,8-Pentachlorodibenzofuran	Total	pg/L	115	1%	0.455	0.319	<0.783	2.98	2.98	0.242	2.4
	1,2,6,7,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4
	1,2,6,7-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,6,7-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.459	0.301	<0.803	3.04	3.04	0.285	2.12
	1,2,6,8-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,6,8-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.461	0.323	<0.803	3.33	3.33	0.285	2.12
	1,2,6,9-Tetrachlorodibenzo-p-dloxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,6,9-Tetrachlorodibenzofuran	Total	pg/L	115	0%	<0.874	--	<0.803	--	--	0.285	2.12
	1,2,7,8-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,7,8-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.467	0.373	<0.803	3.95	3.95	0.285	2.12
	1,2,7,9-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,7,9-Tetrachlorodibenzofuran	Total	pg/L	115	2%	0.506	0.734	<0.803	0.621	8.08	0.285	2.12
	1,2,8,9-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,2,8,9-Tetrachlorodibenzofuran	Total	pg/L	115	0%	<0.874	--	<0.803	--	--	0.285	2.12
	1,3,4,6,7,8-Hexachlorodibenzofuran	Total	pg/L	115	57%	1.32	1.23	1.06	0.434	6.97	0.374	2.13
	1,3,4,6,7,9-Hexachlorodibenzofuran	Total	pg/L	115	0%	<0.904	--	<0.842	--	--	0.223	2.37
	1,3,4,6,7-Pentachlorodibenzofuran	Total	pg/L	115	3%	0.543	1.03	<0.794	0.923	11.2	0.242	2.4
	1,3,4,6,8-Pentachlorodibenzofuran	Total	pg/L	115	10%	0.645	0.59	<0.907	1.13	3.93	0.287	3
	1,3,4,6,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans (cont.)	1,3,4,6-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.492	0.623	<0.803	6.84	6.84	0.285	2.12
	1,3,4,7,8-Pentachlorodibenzofuran	Total	pg/L	115	17%	0.796	1.39	<0.843	0.714	13.4	0.311	2.4
	1,3,4,7,9-Pentachlorodibenzofuran	Total	pg/L	115	0%	<0.868	--	<0.783	--	--	0.242	2.4
	1,3,4,7-Tetrachlorodibenzofuran	Total	pg/L	115	5%	0.691	2.2	<0.814	0.359	23.8	0.31	2.12
	1,3,4,8-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.45	0.231	<0.803	2.01	2.01	0.285	2.12
	1,3,4,9-Tetrachlorodibenzofuran	Total	pg/L	115	0%	<0.874	--	<0.803	--	--	0.285	2.12
	1,3,6,7,8-Pentachlorodibenzofuran	Total	pg/L	115	3%	0.543	1.03	<0.794	0.923	11.2	0.242	2.4
	1,3,6,7-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.745	1.5	<0.859	0.625	15.7	0.285	2.12
	1,3,6,8-Tetrachlorodibenzo-P-Dioxin	Total	pg/L	115	56%	1.48	1.36	1.54	0.925	12.9	0.589	2.72
	1,3,6,8-Tetrachlorodibenzofuran	Total	pg/L	115	2%	0.447	0.201	<0.803	0.353	1.48	0.285	2.12
	1,3,6,9-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,3,6,9-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.444	0.198	<0.803	1.37	1.37	0.285	2.12
	1,3,7,8-Tetrachlorodibenzo-P-Dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,3,7,8-Tetrachlorodibenzofuran	Total	pg/L	115	5%	0.691	2.2	<0.814	0.359	23.8	0.31	2.12
	1,3,7,9-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	6%	0.669	0.758	<1.07	0.785	8.29	0.411	2.72
	1,3,7,9-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.745	1.5	<0.859	0.625	15.7	0.285	2.12
	1,4,6,7,8-Pentachlorodibenzofuran	Total	pg/L	115	1%	0.442	0.232	<0.783	1.4	1.4	0.242	2.4
	1,4,6,7-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.453	0.252	<0.803	2.35	2.35	0.285	2.12
	1,4,6,8-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.469	0.393	<0.803	4.19	4.19	0.285	2.12
	1,4,6,9-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,4,6,9-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.582	0.593	<0.826	0.363	5.38	0.368	2.12
	1,4,7,8-Tetrachlorodibenzo-p-dioxin	Total	pg/L	115	0%	<1.136	--	<1.07	--	--	0.411	2.72
	1,4,7,8-Tetrachlorodibenzofuran	Total	pg/L	115	2%	0.468	0.323	<0.803	1.5	3.13	0.285	2.12
	1,6,7,8-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.582	0.593	<0.826	0.363	5.38	0.368	2.12
	2,3,4,6,7,8-Hexachlorodibenzofuran	Total	pg/L	233	4%	0.449	0.258	<0.822	0.149	1.76	0.215	3.61
	2,3,4,6,8-Pentachlorodibenzofuran	Total	pg/L	115	11%	0.535	0.418	<0.816	0.477	3.73	0.311	2.4
	2,3,4,6-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.45	0.234	<0.803	2.07	2.07	0.285	2.12
	2,3,4,7,8-Pentachlorodibenzofuran	Total	pg/L	233	6%	0.472	0.452	<0.781	0.321	6.46	0.166	2.3
	2,3,4,7-Tetrachlorodibenzofuran	Total	pg/L	115	2%	0.506	0.734	<0.803	0.621	8.08	0.285	2.12
	2,3,4,8-Tetrachlorodibenzofuran	Total	pg/L	115	15%	0.622	0.641	<0.831	0.601	5.23	0.31	2.12
	2,3,6,7-Tetrachloro-Dibenzofuran	Total	pg/L	115	3%	0.477	0.391	<0.803	0.552	4.18	0.285	2.12
	2,3,6,8-Tetrachlorodibenzofuran	Total	pg/L	115	9%	0.581	1.08	<0.824	0.431	11.8	0.368	2.12
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	Total	pg/L	233	36%	1.02	1.02	<1.24	0.219	7.98	0.241	3.84
	2,3,7,8-Tetrachlorodibenzofuran	Total	pg/L	233	6%	0.469	0.261	<0.826	0.267	2.73	0.197	2.48
	2,4,6,7-Tetrachlorodibenzofuran	Total	pg/L	115	1%	0.484	0.54	<0.803	5.9	5.9	0.285	2.12
	2,4,6,8-Tetrachlorodibenzofuran	Total	pg/L	115	4%	0.476	0.283	<0.814	0.513	2.44	0.285	2.12
	3,4,6,7-Tetrachlorodibenzofuran	Total	pg/L	72	0%	<0.922	--	<0.855	--	--	0.285	2.12
	3,4,6,7-tetrachloro-Dibenzofuran	Total	pg/L	43	9%	0.503	0.587	<0.724	0.552	4.18	0.515	1.73
	Heptachlorinated Dibenzo-p-dioxins, (Total)	Total	pg/L	233	69%	10.4	7.97	9.8	1.48	47.1	1.71	26
	Heptachlorinated Dibenzofurans, (Total)	Total	pg/L	233	80%	5.97	5.9	4.29	1.04	45.9	0.876	21.6
	Hexachlorinated Dibenzo-p-dioxins, (Total)	Total	pg/L	233	30%	1.62	2.01	<1.61	0.651	19.6	0.531	3.81
	Hexachlorinated Dibenzofurans, (Total)	Total	pg/L	233	56%	2.43	3.09	1.44	0.434	21.1	0.331	15
	Octachlorodibenzo-p-dioxin	Total	pg/L	233	88%	53.8	39.1	42.8	14.1	230	8.25	51.3
	Octachlorodibenzofuran	Total	pg/L	233	73%	7.71	9.71	6.01	1.39	115	1.49	45.6
	Pentachlorinated Dibenzo-p-dioxins, (Total)	Total	pg/L	233	2%	0.651	0.361	<1.17	1.29	2.61	0.313	3.62
	Pentachlorinated Dibenzofurans, (Total)	Total	pg/L	233	21%	1.29	4.35	<0.96	0.379	62.3	0.244	2.4

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans (cont.)	Pentachlorodibenzofuran; 2,3,4,6,7-	Total	pg/L	115	1%	0.452	0.29	<0.783	2.53	2.53	0.242	2.4
	Tetrachlorinated Dibenzo-p-dioxins, (Total)	Total	pg/L	233	27%	1.74	2.22	<1.87	0.925	24.2	0.558	10.4
	Tetrachlorinated Dibenzofurans, (Total)	Total	pg/L	233	22%	1.59	7.95	<1.01	0.314	119	0.256	2.48
PCBs	Chlorobiphenyl; 2- (PCB 1)	Total	ng/L	233	89%	0.0213	0.017	0.0188	0.00422	0.187	0.00363	0.0154
	Chlorobiphenyl; 3- (PCB 2)	Total	ng/L	233	25%	0.00155	0.00116	<0.00239	0.00107	0.00716	0.00021	0.0101
	Chlorobiphenyl; 4- (PCB 3)	Total	ng/L	233	29%	0.00337	0.00258	<0.00494	0.00169	0.027	0.000229	0.0129
	Decachlorobiphenyl (PCB 209)	Total	ng/L	233	99%	0.027	0.0587	0.0184	0.00611	0.888	0.00856	0.0193
	Dichlorobiphenyl	Total	ng/L	233	100%	0.457	0.181	0.42	0.207	1.52	--	--
	Dichlorobiphenyl; 2,2'- (PCB 4)	Total	ng/L	233	100%	0.167	0.0831	0.155	0.0785	0.797	--	--
	Dichlorobiphenyl; 2,3'- (PCB 6)	Total	ng/L	233	85%	0.0182	0.0114	0.0171	0.00633	0.11	0.00272	0.0374
	Dichlorobiphenyl; 2,3- (PCB 5)	Total	ng/L	233	20%	0.00114	0.00136	<0.00161	0.000542	0.00623	0.000519	0.0397
	Dichlorobiphenyl; 2,4'- (PCB 8)	Total	ng/L	233	93%	0.0603	0.034	0.0584	0.0162	0.29	0.00826	0.0418
	Dichlorobiphenyl; 2,4- (PCB 7)	Total	ng/L	233	41%	0.00256	0.00226	<0.00302	0.000965	0.0182	0.000958	0.0384
	Dichlorobiphenyl; 2,5- (PCB 9)	Total	ng/L	233	50%	0.00363	0.00304	<0.0041	0.000766	0.0269	0.00114	0.0386
	Dichlorobiphenyl; 2,6- (PCB 10)	Total	ng/L	233	99.6%	0.0243	0.0121	0.0224	0.00894	0.154	0.0415	0.0415
	Dichlorobiphenyl; 3,3'- (PCB 11)	Total	ng/L	233	33%	0.0477	0.0366	<0.0593	0.0476	0.224	0.016	0.0907
	Dichlorobiphenyl; 3,4'- (PCB 13)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Dichlorobiphenyl; 3,4- (PCB 12)	Total	ng/L	233	78%	0.016	0.00941	0.0153	0.00653	0.0673	0.00402	0.0377
	Dichlorobiphenyl; 3,5- (PCB 14)	Total	ng/L	233	6%	0.000852	0.00108	<0.00139	0.000405	0.00252	0.000299	0.0325
	Dichlorobiphenyl; 4,4'- (PCB 15)	Total	ng/L	233	100%	0.0953	0.0384	0.0877	0.0395	0.36	--	--
	Heptachlorobiphenyl; 2,2',3,3',4',5,6- (PCB 177)	Total	ng/L	233	96%	0.0214	0.0143	0.0162	0.00453	0.0796	0.00672	0.0287
	Heptachlorobiphenyl; 2,2',3,3',4,4',5- (PCB 170)	Total	ng/L	233	94%	0.0329	0.0241	0.024	0.00667	0.133	0.00565	0.0426
	Heptachlorobiphenyl; 2,2',3,3',4,4',6- (PCB 171)	Total	ng/L	233	97%	0.0101	0.00718	0.00752	0.00249	0.0388	0.000901	0.0302
	Heptachlorobiphenyl; 2,2',3,3',4,5',6- (PCB 175)	Total	ng/L	233	21%	0.000982	0.00126	<0.00111	0.000843	0.00544	0.000459	0.0269
	Heptachlorobiphenyl; 2,2',3,3',4,5,5'- (PCB 172)	Total	ng/L	233	84%	0.00512	0.00436	0.0036	0.00116	0.0223	0.000793	0.0299
	Heptachlorobiphenyl; 2,2',3,3',4,5,6'- (PCB 174)	Total	ng/L	233	96%	0.0338	0.0235	0.0246	0.00816	0.127	0.0135	0.028
	Heptachlorobiphenyl; 2,2',3,3',4,5,6- (PCB 173)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Heptachlorobiphenyl; 2,2',3,3',4,6,6'- (PCB 176)	Total	ng/L	233	93%	0.00437	0.00322	0.00342	0.00127	0.0198	0.00054	0.0205
	Heptachlorobiphenyl; 2,2',3,3',5,5',6- (PCB 178)	Total	ng/L	233	97%	0.00883	0.00589	0.00678	0.0029	0.0337	0.000867	0.0291
	Heptachlorobiphenyl; 2,2',3,3',5,6,6'- (PCB 179)	Total	ng/L	233	99.6%	0.0194	0.0122	0.0146	0.00438	0.0727	0.0216	0.0216
	Heptachlorobiphenyl; 2,2',3,4',5,5',6- (PCB 187)	Total	ng/L	233	99.6%	0.0572	0.035	0.0429	0.0147	0.194	0.025	0.025
	Heptachlorobiphenyl; 2,2',3,4',5,6,6'- (PCB 188)	Total	ng/L	233	0.4%	0.000402	0.00063	<0.000676	0.000721	0.000721	0.000319	0.0195
	Heptachlorobiphenyl; 2,2',3,4,4',5',6- (PCB 183)	Total	ng/L	233	99.6%	0.0265	0.0178	0.0195	0.00558	0.0973	0.0267	0.0267
	Heptachlorobiphenyl; 2,2',3,4,4',5,5'- (PCB 180)	Total	ng/L	233	94%	0.0784	0.054	0.0585	0.0204	0.274	0.0301	0.0796
	Heptachlorobiphenyl; 2,2',3,4,4',5,6'- (PCB 182)	Total	ng/L	233	1%	0.000568	0.000847	<0.000943	0.000881	0.00155	0.000446	0.0261
	Heptachlorobiphenyl; 2,2',3,4,4',5,6- (PCB 181)	Total	ng/L	233	0%	<0.001148	--	<0.000963	--	--	0.000459	0.0269
	Heptachlorobiphenyl; 2,2',3,4,4',6,6'- (PCB 184)	Total	ng/L	233	1%	0.000501	0.000768	<0.000804	0.00104	0.00384	0.000379	0.0222
	Heptachlorobiphenyl; 2,2',3,4,5,5',6- (PCB 185)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Heptachlorobiphenyl; 2,2',3,4,5,6,6'- (PCB 186)	Total	ng/L	233	0%	<0.00092	--	<0.000772	--	--	0.000368	0.0216
	Heptachlorobiphenyl; 2,3,3',4',5,5',6- (PCB 193)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Heptachlorobiphenyl; 2,3,3',4,4',5,6- (PCB 191)	Total	ng/L	233	27%	0.000935	0.00117	<0.000874	0.000681	0.00513	0.000397	0.0205
	Heptachlorobiphenyl; 2,3,3',4,4',5,5'- (PCB 189)	Total	ng/L	233	24%	0.000848	0.000937	<0.000925	0.000561	0.0062	0.000262	0.0156
	Heptachlorobiphenyl; 2,3,3',4,4',5,6- (PCB 190)	Total	ng/L	233	91%	0.00581	0.00474	0.00445	0.00115	0.0292	0.000621	0.0208
	Heptachlorobiphenyl; 2,3,3',4,5,5',6- (PCB 192)	Total	ng/L	233	0%	<0.000976	--	<0.000819	--	--	0.000391	0.0229
	Hexachlorobiphenyl; 2,2',3,3',4,4'- (PCB 128)	Total	ng/L	233	96%	0.0224	0.0143	0.0181	0.00484	0.0901	0.0122	0.0204
	Hexachlorobiphenyl; 2,2',3,3',4,5'- (PCB 130)	Total	ng/L	233	98%	0.00932	0.00586	0.00772	0.00284	0.0358	0.000886	0.0262
	Hexachlorobiphenyl; 2,2',3,3',4,5- (PCB 129)	Total	ng/L	233	99%	0.17	0.0987	0.134	0.0415	0.662	0.0928	0.0998
	Hexachlorobiphenyl; 2,2',3,3',4,6'- (PCB 132)	Total	ng/L	233	98%	0.053	0.0321	0.0436	0.0112	0.216	0.0279	0.0369

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Hexachlorobiphenyl; 2,2',3,3',4,6- (PCB 131)	Total	ng/L	233	21%	0.00142	0.00147	<0.00176	0.000993	0.00822	0.000734	0.0269
	Hexachlorobiphenyl; 2,2',3,3',5,5'- (PCB 133)	Total	ng/L	233	57%	0.00241	0.00207	0.00213	0.00114	0.0101	0.00078	0.0247
	Hexachlorobiphenyl; 2,2',3,3',5,6'- (PCB 135)	Total	ng/L	233	99.6%	0.0565	0.0353	0.0437	0.0124	0.208	0.0316	0.0316
	Hexachlorobiphenyl; 2,2',3,3',5,6- (PCB 134)	Total	ng/L	233	98%	0.00929	0.00612	0.00753	0.00176	0.046	0.0012	0.0263
	Hexachlorobiphenyl; 2,2',3,3',6,6'- (PCB 136)	Total	ng/L	233	99.6%	0.0205	0.0126	0.0163	0.00316	0.0748	0.0232	0.0232
	Hexachlorobiphenyl; 2,2',3,4',5',6- (PCB 149)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,2',3,4',5,5'- (PCB 146)	Total	ng/L	233	99.6%	0.027	0.0157	0.0217	0.00672	0.104	0.0214	0.0214
	Hexachlorobiphenyl; 2,2',3,4',5,6'- (PCB 148)	Total	ng/L	233	0%	<0.001676	--	<0.00153	--	--	0.000628	0.031
	Hexachlorobiphenyl; 2,2',3,4',5,6- (PCB 147)	Total	ng/L	233	100%	0.148	0.0842	0.124	0.0354	0.6	--	--
	Hexachlorobiphenyl; 2,2',3,4',6,6'- (PCB 150)	Total	ng/L	233	2%	0.000615	0.00074	<0.00107	0.000853	0.00319	0.000438	0.0216
	Hexachlorobiphenyl; 2,2',3,4,4',5'- (PCB 138)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,2',3,4,4',5- (PCB 137)	Total	ng/L	233	95%	0.00564	0.00392	0.00426	0.00161	0.023	0.000764	0.0226
	Hexachlorobiphenyl; 2,2',3,4,4',6'- (PCB 140)	Total	ng/L	3	0%	<0.001224	--	<0.00129	--	--	0.00105	0.00133
	Hexachlorobiphenyl; 2,2',3,4,4',6- (PCB 139)	Total	ng/L	233	52%	0.0023	0.0022	0.00193	0.000711	0.0125	0.000712	0.0225
	Hexachlorobiphenyl; 2,2',3,4,5',6- (PCB 144)	Total	ng/L	233	74%	0.0051	0.00449	0.0039	0.00146	0.0263	0.000863	0.0293
	Hexachlorobiphenyl; 2,2',3,4,5,5'- (PCB 141)	Total	ng/L	233	97%	0.0263	0.0176	0.0209	0.00629	0.12	0.0106	0.0234
	Hexachlorobiphenyl; 2,2',3,4,5,6'- (PCB 143)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,2',3,4,5,6- (PCB 142)	Total	ng/L	233	0%	<0.00169	--	<0.00147	--	--	0.000604	0.0258
	Hexachlorobiphenyl; 2,2',3,4,6,6'- (PCB 145)	Total	ng/L	233	0%	<0.001198	--	<0.00109	--	--	0.000449	0.0222
	Hexachlorobiphenyl; 2,2',3,5,5',6- (PCB 151)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,2',3,5,6,6'- (PCB 152)	Total	ng/L	233	0.4%	0.000604	0.000724	<0.00109	0.00259	0.00259	0.000446	0.022
	Hexachlorobiphenyl; 2,2',4,4',5',6- (PCB 154)	Total	ng/L	233	86%	0.00405	0.00418	0.00284	0.000948	0.044	0.00102	0.0257
	Hexachlorobiphenyl; 2,2',4,4',5,5'- (PCB 153)	Total	ng/L	233	100%	0.151	0.0863	0.123	0.0362	0.571	--	--
	Hexachlorobiphenyl; 2,2',4,4',6,6'- (PCB 155)	Total	ng/L	233	9%	0.000756	0.000949	<0.00108	0.000881	0.00479	0.000425	0.021
	Hexachlorobiphenyl; 2,3',4,4',5',6- (PCB 168)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,3',4,4',5,5'- (PCB 167)	Total	ng/L	233	94%	0.00494	0.00339	0.00389	0.000934	0.019	0.000829	0.0134
	Hexachlorobiphenyl; 2,3,3',4',5',6- (PCB 164)	Total	ng/L	233	99.6%	0.0105	0.00706	0.00812	0.00251	0.0511	0.0179	0.0179
	Hexachlorobiphenyl; 2,3,3',4',5,5'- (PCB 162)	Total	ng/L	233	15%	0.000782	0.000854	<0.00102	0.000633	0.00489	0.000397	0.017
	Hexachlorobiphenyl; 2,3,3',4',5,6- (PCB 163)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,3,3',4,4',5'- (PCB 157)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,3,3',4,4',5- (PCB 156)	Total	ng/L	233	90%	0.0142	0.00999	0.0107	0.00435	0.0515	0.00607	0.0217
	Hexachlorobiphenyl; 2,3,3',4,4',6- (PCB 158)	Total	ng/L	233	99%	0.0142	0.0093	0.0109	0.00296	0.0594	0.0057	0.016
	Hexachlorobiphenyl; 2,3,3',4,5',6- (PCB 161)	Total	ng/L	233	0%	<0.00112	--	<0.00097	--	--	0.0004	0.0171
	Hexachlorobiphenyl; 2,3,3',4,5,5'- (PCB 159)	Total	ng/L	233	19%	0.000921	0.000954	<0.00112	0.000583	0.00425	0.000402	0.0172
	Hexachlorobiphenyl; 2,3,3',4,5,6- (PCB 160)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 2,3,3',5,5',6- (PCB 165)	Total	ng/L	233	0%	<0.00123	--	<0.00107	--	--	0.00044	0.0188
	Hexachlorobiphenyl; 2,3,4,4',5,6- (PCB 166)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Hexachlorobiphenyl; 3,3',4,4',5,5'- (PCB 169)	Total	ng/L	233	2%	0.000482	0.000449	<0.000804	0.000347	0.00179	0.000266	0.0124
	Nonachlorobiphenyl; 2,2',3,3',4,4',5,5',6- (PCB 206)	Total	ng/L	233	93%	0.0236	0.0159	0.0192	0.0063	0.084	0.00835	0.0372
	Nonachlorobiphenyl; 2,2',3,3',4,4',5,6,6'- (PCB 207)	Total	ng/L	233	47%	0.0019	0.00183	<0.0016	0.000657	0.00816	0.000489	0.027
	Nonachlorobiphenyl; 2,2',3,3',4,5,5',6,6'- (PCB 208)	Total	ng/L	233	98%	0.00902	0.00587	0.00701	0.00253	0.0324	0.0012	0.0295
	Octachlorobiphenyl; 2,2',3,3',4,4',5,5'- (PCB 194)	Total	ng/L	233	93%	0.0206	0.0162	0.0155	0.00428	0.0996	0.0058	0.0226
	Octachlorobiphenyl; 2,2',3,3',4,4',5,6'- (PCB 196)	Total	ng/L	233	96%	0.00948	0.0073	0.00656	0.0021	0.0403	0.000907	0.019
	Octachlorobiphenyl; 2,2',3,3',4,4',5,6- (PCB 195)	Total	ng/L	233	91%	0.0069	0.00586	0.00514	0.00158	0.0363	0.00073	0.0148
	Octachlorobiphenyl; 2,2',3,3',4,4',6,6'- (PCB 197)	Total	ng/L	233	14%	0.000583	0.000619	<0.000743	0.00058	0.00257	0.000334	0.0142
	Octachlorobiphenyl; 2,2',3,3',4,5',6,6'- (PCB 201)	Total	ng/L	233	78%	0.00284	0.00231	0.00227	0.00098	0.0122	0.000533	0.0134
	Octachlorobiphenyl; 2,2',3,3',4,5,5',6'- (PCB 199)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Octachlorobiphenyl; 2,2',3,3',4,5,5',6- (PCB 198)	Total	ng/L	233	95%	0.0273	0.0195	0.0199	0.00696	0.105	0.0097	0.0246

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Octachlorobiphenyl; 2,2',3,3',4,5,6,6'- (PCB 200)	Total	ng/L	233	55%	0.00179	0.00178	0.00137	0.000909	0.00928	0.00039	0.0139
	Octachlorobiphenyl; 2,2',3,3',5,5',6,6'- (PCB 202)	Total	ng/L	233	99%	0.00839	0.00542	0.00671	0.00226	0.0419	0.0014	0.0151
	Octachlorobiphenyl; 2,2',3,4,4',5,5',6- (PCB 203)	Total	ng/L	233	99%	0.0164	0.0118	0.0118	0.00409	0.0652	0.0084	0.0175
	Octachlorobiphenyl; 2,2',3,4,4',5,6,6'- (PCB 204)	Total	ng/L	233	0%	<0.000854	--	<0.000712	--	--	0.000315	0.0147
	Octachlorobiphenyl; 2,3,3',4,4',5,5',6- (PCB 205)	Total	ng/L	233	19%	0.00072	0.000745	<0.000862	0.000524	0.00579	0.00026	0.0115
	Pentachlorobiphenyl; 2',3,3',4,5- (PCB 122)	Total	ng/L	233	63%	0.00201	0.00175	0.00173	0.000683	0.00883	0.000485	0.0133
	Pentachlorobiphenyl; 2',3,4,4',5- (PCB 123)	Total	ng/L	233	87%	0.00258	0.00193	0.00213	0.000573	0.0129	0.000657	0.0124
	Pentachlorobiphenyl; 2',3,4,5,5'- (PCB 124)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2',3,4,5,6'- (PCB 125)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',3',4,5- (PCB 97)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',3',4,6- (PCB 98)	Total	ng/L	233	97%	0.0115	0.00679	0.00983	0.0035	0.0433	0.0011	0.0206
	Pentachlorobiphenyl; 2,2',3,3',4- (PCB 82)	Total	ng/L	233	99%	0.0224	0.0136	0.0185	0.00557	0.0819	0.00188	0.0259
	Pentachlorobiphenyl; 2,2',3,3',5- (PCB 83)	Total	ng/L	233	100%	0.128	0.0663	0.106	0.0355	0.381	--	--
	Pentachlorobiphenyl; 2,2',3,3',6- (PCB 84)	Total	ng/L	233	100%	0.0563	0.0282	0.0478	0.0144	0.174	--	--
	Pentachlorobiphenyl; 2,2',3,4',5- (PCB 90)	Total	ng/L	233	100%	0.189	0.0979	0.158	0.0585	0.583	--	--
	Pentachlorobiphenyl; 2,2',3,4',6- (PCB 91)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',3,4,4'- (PCB 85)	Total	ng/L	233	99%	0.032	0.0191	0.0256	0.0105	0.111	0.0013	0.0179
	Pentachlorobiphenyl; 2,2',3,4,5'- (PCB 87)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',3,4,5- (PCB 86)	Total	ng/L	233	99.6%	0.119	0.0637	0.0981	0.0446	0.375	0.0367	0.0367
	Pentachlorobiphenyl; 2,2',3,4,6'- (PCB 89)	Total	ng/L	233	25%	0.00174	0.00204	<0.00167	0.00169	0.0104	0.000584	0.0239
	Pentachlorobiphenyl; 2,2',3,4,6- (PCB 88)	Total	ng/L	233	99.6%	0.0373	0.0195	0.0315	0.0106	0.117	0.022	0.022
	Pentachlorobiphenyl; 2,2',3,5',6- (PCB 95)	Total	ng/L	233	100%	0.168	0.0792	0.141	0.0537	0.504	--	--
	Pentachlorobiphenyl; 2,2',3,5,5'- (PCB 92)	Total	ng/L	233	100%	0.034	0.0178	0.0285	0.0112	0.108	--	--
	Pentachlorobiphenyl; 2,2',3,5,6'- (PCB 94)	Total	ng/L	233	30%	0.00196	0.00219	<0.00172	0.00119	0.0113	0.000713	0.0239
	Pentachlorobiphenyl; 2,2',3,5,6- (PCB 93)	Total	ng/L	233	95%	0.00749	0.00633	0.00574	0.000558	0.0373	0.000931	0.0212
	Pentachlorobiphenyl; 2,2',3,6,6'- (PCB 96)	Total	ng/L	233	47%	0.00203	0.00194	<0.00157	0.00127	0.00969	0.000545	0.0179
	Pentachlorobiphenyl; 2,2',4,4',5- (PCB 99)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',4,4',6- (PCB 100)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',4,5',6- (PCB 103)	Total	ng/L	233	64%	0.00364	0.00317	0.00304	0.00164	0.016	0.000699	0.021
	Pentachlorobiphenyl; 2,2',4,5,5'- (PCB 101)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',4,5,6'- (PCB 102)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,2',4,6,6'- (PCB 104)	Total	ng/L	233	6%	0.000636	0.000706	<0.001	0.00147	0.00403	0.000361	0.0159
	Pentachlorobiphenyl; 2,3',4,4',5- (PCB 118)	Total	ng/L	233	100%	0.143	0.0821	0.113	0.0455	0.473	--	--
	Pentachlorobiphenyl; 2,3',4,4',6- (PCB 119)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,3',4,5',6- (PCB 121)	Total	ng/L	233	0%	<0.001026	--	<0.00095	--	--	0.000351	0.0155
	Pentachlorobiphenyl; 2,3',4,5,5'- (PCB 120)	Total	ng/L	233	6%	0.000613	0.000665	<0.000972	0.000852	0.00427	0.000349	0.0154
	Pentachlorobiphenyl; 2,3,3',4',5- (PCB 107)	Total	ng/L	233	99%	0.0114	0.00691	0.00905	0.00363	0.0388	0.0049	0.0119
	Pentachlorobiphenyl; 2,3,3',4',6- (PCB 110)	Total	ng/L	233	100%	0.213	0.112	0.176	0.0304	0.661	--	--
	Pentachlorobiphenyl; 2,3,3',4,4'- (PCB 105)	Total	ng/L	233	97%	0.0555	0.0343	0.0436	0.0156	0.197	0.0295	0.035
	Pentachlorobiphenyl; 2,3,3',4,5'- (PCB 108)	Total	ng/L	233	87%	0.00474	0.00334	0.00376	0.00137	0.0177	0.000526	0.0125
	Pentachlorobiphenyl; 2,3,3',4,5- (PCB 106)	Total	ng/L	233	2%	0.0219	0.328	<0.000722	0.000333	5	0.000279	0.0122
	Pentachlorobiphenyl; 2,3,3',4,6- (PCB 109)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,3,3',5',6- (PCB 113)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Pentachlorobiphenyl; 2,3,3',5,5'- (PCB 111)	Total	ng/L	233	0%	<0.000988	--	<0.000916	--	--	0.000339	0.015
	Pentachlorobiphenyl; 2,3,3',5,6- (PCB 112)	Total	ng/L	233	0%	<0.001074	--	<0.000995	--	--	0.000368	0.0163
	Pentachlorobiphenyl; 2,3,4',5,6- (PCB 117)	Total	ng/L	1	0%	<0.0013	--	<0.0013	--	--	0.0013	0.0013
	Pentachlorobiphenyl; 2,3,4,4',5- (PCB 114)	Total	ng/L	233	80%	0.00273	0.00216	0.00215	0.000794	0.0124	0.000415	0.0112
	Pentachlorobiphenyl; 2,3,4,4',6- (PCB 115)	Total	ng/L	C	--	--	--	--	--	--	--	--

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Pentachlorobiphenyl; 2,3,4,5,6- (PCB 116)	Total	ng/L	1	0%	<0.0013	--	<0.0013	--	--	0.0013	0.0013
	Pentachlorobiphenyl; 3,3',4,4',5- (PCB 126)	Total	ng/L	233	17%	0.000575	0.000575	<0.000816	0.000372	0.00524	0.000252	0.0113
	Pentachlorobiphenyl; 3,3',4,5,5'- (PCB 127)	Total	ng/L	233	1%	0.000408	0.000402	<0.000714	0.000446	0.000449	0.000276	0.0121
	Tetrachlorobiphenyl; 2',3,4,5- (PCB 76)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,2',3,3'- (PCB 40)	Total	ng/L	233	100%	0.159	0.0642	0.145	0.0639	0.466	--	--
	Tetrachlorobiphenyl; 2,2',3,4'- (PCB 42)	Total	ng/L	233	100%	0.0759	0.0324	0.0678	0.027	0.222	--	--
	Tetrachlorobiphenyl; 2,2',3,4- (PCB 41)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,2',3,5'- (PCB 44)	Total	ng/L	233	100%	0.314	0.136	0.279	0.116	0.982	--	--
	Tetrachlorobiphenyl; 2,2',3,5- (PCB 43)	Total	ng/L	233	99.6%	0.00968	0.00446	0.00863	0.00284	0.026	0.0173	0.0173
	Tetrachlorobiphenyl; 2,2',3,6'- (PCB 46)	Total	ng/L	233	99.6%	0.0211	0.00948	0.0193	0.00581	0.0567	0.0226	0.0226
	Tetrachlorobiphenyl; 2,2',3,6- (PCB 45)	Total	ng/L	233	100%	0.0883	0.0437	0.0776	0.0246	0.266	--	--
	Tetrachlorobiphenyl; 2,2',4,4'- (PCB 47)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,2',4,5'- (PCB 49)	Total	ng/L	233	100%	0.207	0.0841	0.191	0.0845	0.608	--	--
	Tetrachlorobiphenyl; 2,2',4,5- (PCB 48)	Total	ng/L	233	99.6%	0.0431	0.0197	0.0383	0.0147	0.141	0.0166	0.0166
	Tetrachlorobiphenyl; 2,2',4,6'- (PCB 51)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,2',4,6- (PCB 50)	Total	ng/L	233	100%	0.0655	0.0277	0.0597	0.0231	0.176	--	--
	Tetrachlorobiphenyl; 2,2',5,5'- (PCB 52)	Total	ng/L	233	100%	0.331	0.134	0.302	0.131	0.954	--	--
	Tetrachlorobiphenyl; 2,2',5,6'- (PCB 53)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,2',6,6'- (PCB 54)	Total	ng/L	233	60%	0.00506	0.00451	0.00392	0.00168	0.0216	0.00093	0.0306
	Tetrachlorobiphenyl; 2,3',4',5- (PCB 70)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,3',4',6- (PCB 71)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,3',4,4'- (PCB 66)	Total	ng/L	233	100%	0.196	0.0954	0.159	0.0695	0.672	--	--
	Tetrachlorobiphenyl; 2,3',4,5'- (PCB 68)	Total	ng/L	233	68%	0.00267	0.00158	0.00286	0.000785	0.0104	0.000609	0.0124
	Tetrachlorobiphenyl; 2,3',4,5- (PCB 67)	Total	ng/L	233	99%	0.00618	0.00328	0.00537	0.00194	0.0227	0.000871	0.0123
	Tetrachlorobiphenyl; 2,3',4,6- (PCB 69)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,3',5',6- (PCB 73)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,3',5,5'- (PCB 72)	Total	ng/L	233	90%	0.00354	0.00183	0.00335	0.00129	0.0119	0.000571	0.0133
	Tetrachlorobiphenyl; 2,3,3',4'- (PCB 56)	Total	ng/L	233	100%	0.0861	0.0418	0.0734	0.0293	0.296	--	--
	Tetrachlorobiphenyl; 2,3,3',4- (PCB 55)	Total	ng/L	233	86%	0.00422	0.0027	0.00388	0.000642	0.0149	0.000705	0.0143
	Tetrachlorobiphenyl; 2,3,3',5'- (PCB 58)	Total	ng/L	233	63%	0.0011	0.000955	0.00104	0.000308	0.00716	0.000404	0.0136
	Tetrachlorobiphenyl; 2,3,3',5- (PCB 57)	Total	ng/L	233	48%	0.00115	0.000915	<0.00122	0.000439	0.00508	0.000468	0.0136
	Tetrachlorobiphenyl; 2,3,3',6- (PCB 59)	Total	ng/L	233	100%	0.0268	0.0111	0.0242	0.0106	0.08	--	--
	Tetrachlorobiphenyl; 2,3,4',5- (PCB 63)	Total	ng/L	233	99.6%	0.00798	0.00384	0.00698	0.00276	0.0258	0.0126	0.0126
	Tetrachlorobiphenyl; 2,3,4',6- (PCB 64)	Total	ng/L	233	100%	0.099	0.0433	0.0856	0.0376	0.298	--	--
	Tetrachlorobiphenyl; 2,3,4,4'- (PCB 60)	Total	ng/L	233	99.6%	0.0299	0.0153	0.0243	0.00926	0.109	0.0121	0.0121
	Tetrachlorobiphenyl; 2,3,4,5- (PCB 61)	Total	ng/L	233	99.6%	0.302	0.149	0.25	0.0942	1.09	0.137	0.137
	Tetrachlorobiphenyl; 2,3,4,6- (PCB 62)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,3,5,6- (PCB 65)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,4,4',5- (PCB 74)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 2,4,4',6- (PCB 75)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Tetrachlorobiphenyl; 3,3',4,4'- (PCB 77)	Total	ng/L	233	99.6%	0.0184	0.0104	0.0155	0.0047	0.0705	0.0125	0.0125
	Tetrachlorobiphenyl; 3,3',4,5'- (PCB 79)	Total	ng/L	233	62%	0.00169	0.00133	0.00158	0.000808	0.00677	0.000425	0.0124
	Tetrachlorobiphenyl; 3,3',4,5- (PCB 78)	Total	ng/L	233	0%	<0.001006	--	<0.000913	--	--	0.00034	0.0141
	Tetrachlorobiphenyl; 3,3',5,5'- (PCB 80)	Total	ng/L	233	0%	<0.000862	--	<0.000782	--	--	0.000291	0.0121
	Tetrachlorobiphenyl; 3,4,4',5- (PCB 81)	Total	ng/L	233	21%	0.000611	0.000532	<0.000886	0.000366	0.00254	0.00031	0.0131
	Total Heptachlorobiphenyls	Total	ng/L	233	97%	0.305	0.206	0.222	0.0661	1.1	0.122	0.201
	Total Hexachlorobiphenyls	Total	ng/L	233	100%	0.758	0.448	0.596	0.172	3	--	--
	Total Monochlorobiphenyls	Total	ng/L	233	75%	0.0268	0.0209	0.0264	0.00492	0.221	0.00553	0.0434

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total Nonochlorobiphenyls	Total	ng/L	233	94%	0.0343	0.0235	0.0269	0.00757	0.122	0.0138	0.0921
	Total Octachlorobiphenyls	Total	ng/L	233	97%	0.0944	0.0689	0.0683	0.0209	0.366	0.0222	0.167
	Total PCB Congeners (209)	Total	ng/L	233	100%	6.54	2.96	5.8	2.2	20.4	--	--
	Total Pentachlorobiphenyls	Total	ng/L	233	100%	1.25	0.662	1.04	0.386	3.96	--	--
	Total Tetrachlorobiphenyls	Total	ng/L	233	100%	2.11	0.915	1.83	0.818	6.61	--	--
	Total Trichlorobiphenyls	Total	ng/L	233	100%	1.53	0.588	1.41	0.601	4.23	--	--
	Trichlorobiphenyl; 2',3,4- (PCB 33)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Trichlorobiphenyl; 2',3,5- (PCB 34)	Total	ng/L	233	76%	0.00172	0.00118	0.00165	0.00059	0.00775	0.000365	0.0119
	Trichlorobiphenyl; 2,2',3- (PCB 16)	Total	ng/L	233	100%	0.0768	0.0376	0.0641	0.0253	0.219	--	--
	Trichlorobiphenyl; 2,2',4- (PCB 17)	Total	ng/L	233	100%	0.127	0.0501	0.119	0.0445	0.362	--	--
	Trichlorobiphenyl; 2,2',5- (PCB 18)	Total	ng/L	233	100%	0.229	0.0968	0.2	0.0855	0.588	--	--
	Trichlorobiphenyl; 2,2',6- (PCB 19)	Total	ng/L	233	99.6%	0.066	0.025	0.0631	0.0276	0.184	0.0289	0.0289
	Trichlorobiphenyl; 2,3',4- (PCB 25)	Total	ng/L	233	100%	0.0398	0.0171	0.0367	0.0153	0.118	--	--
	Trichlorobiphenyl; 2,3',5- (PCB 26)	Total	ng/L	233	100%	0.0683	0.027	0.0641	0.0249	0.233	--	--
	Trichlorobiphenyl; 2,3',6- (PCB 27)	Total	ng/L	233	100%	0.0402	0.0136	0.0395	0.018	0.102	--	--
	Trichlorobiphenyl; 2,3,3'- (PCB 20)	Total	ng/L	233	100%	0.327	0.131	0.301	0.128	0.94	--	--
	Trichlorobiphenyl; 2,3,4'- (PCB 22)	Total	ng/L	233	100%	0.0659	0.0289	0.0581	0.0231	0.23	--	--
	Trichlorobiphenyl; 2,3,4- (PCB 21)	Total	ng/L	233	98%	0.0519	0.0302	0.0451	0.0159	0.284	0.00743	0.023
	Trichlorobiphenyl; 2,3,5- (PCB 23)	Total	ng/L	233	0.4%	0.00038	0.000413	<0.000659	0.000398	0.000398	0.00022	0.0121
	Trichlorobiphenyl; 2,3,6- (PCB 24)	Total	ng/L	233	85%	0.00309	0.00195	0.00283	0.000765	0.00984	0.000774	0.0198
	Trichlorobiphenyl; 2,4',5- (PCB 31)	Total	ng/L	233	100%	0.253	0.1	0.233	0.0912	0.757	--	--
	Trichlorobiphenyl; 2,4',6- (PCB 32)	Total	ng/L	233	99.6%	0.105	0.0398	0.0977	0.0466	0.262	0.00132	0.00132
	Trichlorobiphenyl; 2,4,4'- (PCB 28)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Trichlorobiphenyl; 2,4,5- (PCB 29)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Trichlorobiphenyl; 2,4,6- (PCB 30)	Total	ng/L	C	--	--	--	--	--	--	--	--
	Trichlorobiphenyl; 3,3',4- (PCB 35)	Total	ng/L	233	91%	0.00478	0.00276	0.00431	0.0016	0.0207	0.000751	0.0122
	Trichlorobiphenyl; 3,3',5- (PCB 36)	Total	ng/L	233	40%	0.000639	0.00052	<0.000789	0.000327	0.00229	0.000336	0.0118
	Trichlorobiphenyl; 3,4',5- (PCB 39)	Total	ng/L	233	73%	0.00158	0.00108	0.0015	0.00065	0.00507	0.000367	0.0111
	Trichlorobiphenyl; 3,4,4'- (PCB 37)	Total	ng/L	233	100%	0.064	0.0286	0.0557	0.0248	0.188	--	--
	Trichlorobiphenyl; 3,4,5- (PCB 38)	Total	ng/L	233	6%	0.000427	0.000436	<0.000703	0.000468	0.00126	0.000245	0.0124
Pesticides	Aldrin	Total	ng/L	157	16%	0.08	0.097	<0.024	0.0071	0.6	0.004	0.41
	Dieldrin	Total	ng/L	158	97%	0.33	0.22	0.27	0.1	2.1	0.2	0.32
	Endosulfan sulfate	Total	ng/L	157	55%	0.042	0.042	0.036	0.015	0.38	0.0085	0.13
	Endrin	Total	ng/L	157	20%	0.13	0.21	<0.13	0.016	2.3	0.0084	0.41
	Endrin aldehyde	Total	ng/L	157	6%	0.12	0.095	<0.27	0.018	0.65	0.014	0.41
	Endrin ketone	Total	ng/L	157	25%	0.13	0.091	<0.18	0.016	0.72	0.02	0.42
	Heptachlor	Total	ng/L	157	34%	0.053	0.11	<0.01	0.0034	1.1	0.0019	0.41
	Heptachlor epoxide	Total	ng/L	158	91%	0.14	0.099	0.12	0.026	0.67	0.051	0.19
	Hexachlorobenzene	Total	ng/L	158	5%	0.12	0.61	<0.086	0.1	6.8	0.024	0.51
	Methoxychlor	Total	ng/L	157	24%	0.099	0.09	<0.067	0.02	0.43	0.0092	0.41
	Oxychlordane	Total	ng/L	157	8%	0.1	0.092	<0.17	0.008	0.031	0.0049	0.41
	Total Alpha + Gamma Chlordane	Total	ng/L	158	100%	0.35	0.19	0.29	0.048	0.85	--	--
	Total DDx (2,4 and 4,4)	Total	ng/L	157	92%	1.1	1.3	0.75	0.12	12	0.1	0.69
	Total DDx (4,4)	Total	ng/L	157	91%	0.84	0.92	0.62	0.17	8.1	0.1	0.69
	alpha-Chlordane	Total	ng/L	158	99%	0.2	0.1	0.16	0.048	0.53	0.013	0.03
	alpha-Endosulfan	Total	ng/L	157	10%	0.13	0.1	<0.26	0.063	0.85	0.018	0.5
	alpha- BHC	Total	ng/L	158	88%	0.15	0.37	0.11	0.049	4.6	0.047	0.19
	beta-Chlordane	Total	ng/L	158	91%	0.16	0.09	0.13	0.06	0.56	0.015	0.18

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	beta-Endosulfan	Total	ng/L	157	6%	0.14	0.1	<0.38	0.073	0.96	0.037	0.68
	beta- BHC	Total	ng/L	158	68%	0.12	0.31	0.078	0.031	3.7	0.015	0.4
	cis-Nonachlor	Total	ng/L	157	54%	0.074	0.064	0.052	0.019	0.16	0.012	0.4
	delta-BHC	Total	ng/L	157	17%	0.13	0.24	<0.12	0.012	2.1	0.0069	0.41
	gamma-BHC (Lindane)	Total	ng/L	158	75%	0.07	0.092	0.066	0.021	1.1	0.011	0.4
	o,p'-DDD	Total	ng/L	157	80%	0.15	0.16	0.12	0.066	1.4	0.019	0.32
	o,p'-DDE	Total	ng/L	157	42%	0.15	0.24	<0.1	0.041	2.2	0.02	0.49
	o,p'-DDT	Total	ng/L	157	6%	0.11	0.083	<0.16	0.016	0.13	0.021	0.42
	p,p'-DDD	Total	ng/L	158	85%	0.4	0.41	0.31	0.17	3.9	0.071	0.43
	p,p'-DDE	Total	ng/L	157	76%	0.4	0.49	0.31	0.17	3.9	0.045	0.81
	p,p'-DDT	Total	ng/L	157	48%	0.1	0.094	<0.099	0.046	0.64	0.026	0.48
	trans-Nonachlor	Total	ng/L	158	90%	0.088	0.052	0.078	0.022	0.33	0.013	0.4
PAHs-SIM	1,6,7-Trimethylnapthalene	Total	ng/L	157	62%	4.41	4.47	4.96	1.61	55.1	10	10
	1-Methylnaphthalene	Total	ng/L	157	43%	9	9.22	<10	4.13	88.7	10	10
	1-Methylphenanthrene	Total	ng/L	157	92%	3.73	4.73	2.59	0.713	47.2	10	10
	2,6-Dimethylnapthalene	Total	ng/L	157	70%	5.47	5.93	6.64	2.2	70.7	10	10
	2-Methylnaphthalene	Total	ng/L	157	36%	14.2	10.7	<20	8.36	106	20	20
	Acenaphthene	Total	ng/L	157	99%	12.3	10.3	8.73	2.69	76.8	10	10
	Acenaphthylene	Total	ng/L	157	71%	3.52	2.93	2.76	0.595	25.2	10	10
	Anthracene	Total	ng/L	157	62%	6.07	6.85	8.34	1.08	55.7	10	10
	Benzo(a)anthracene	Total	ng/L	157	76%	9.29	15.5	7.62	2.16	151	10	13
	Benzo(a)pyrene	Total	ng/L	157	59%	11.9	21.4	10	3.79	207	10	18.1
	Benzo(b)fluoranthene	Total	ng/L	157	62%	15	23.5	10.7	5.08	210	10	23.7
	Benzo(g,h,i)perylene	Total	ng/L	157	64%	9.55	13	10	2.88	128	10	11.9
	Benzo(k)fluoranthene	Total	ng/L	157	68%	7.31	10.6	8.59	1.98	108	10	11.9
	Benzo[e]pyrene	Total	ng/L	157	77%	9.56	12.3	9.64	3.09	116	10	11.4
	C1 Phenanthrenes/Anthracenes	Total	ng/L	157	43%	11.6	16.5	<10	10.2	162	10	10
	C1-Benzo[a]anthracenes/Chrysenes	Total	ng/L	157	37%	11.5	17.2	<10	10.1	158	10	10
	C1-Dibenzothiophenes	Total	ng/L	157	3%	5.9	7.73	<10	11.9	94.5	10	10
	C1-Fluoranthenes/Pyrenes	Total	ng/L	157	79%	18	20.5	13.2	10	198	10	10
	C1-Fluorenes	Total	ng/L	157	5%	5.78	4.68	<10	10	56.6	10	10
	C2 Phenanthrenes/Anthracenes	Total	ng/L	157	56%	12.7	13.8	10.7	10.1	132	10	10
	C2-Benzo[a]anthracenes/Chrysenes	Total	ng/L	157	9%	6.7	7.28	<10	10.4	68.2	10	10
	C2-Dibenzothiophenes	Total	ng/L	157	8%	6.16	5.69	<10	10.8	55.1	10	10
	C2-Fluorenes	Total	ng/L	157	15%	7.02	7.22	<10	10.2	79.9	10	10
	C2-Naphthalenes	Total	ng/L	157	36%	10.9	15.1	<10	10.1	168	10	10
	C3-Benzo[a]anthracenes/Chrysenes	Total	ng/L	157	4%	5.39	2.28	<10	10.2	27.3	10	10
	C3-Dibenzothiophenes	Total	ng/L	157	8%	5.9	3.78	<10	11.4	39.5	10	10
	C3-Fluorenes	Total	ng/L	157	11%	6.42	5.42	<10	10.2	58.5	10	10
	C3-Naphthalenes	Total	ng/L	157	32%	9.03	12.4	<10	10	146	10	10
	C3-Phenanthrenes/Anthracenes	Total	ng/L	157	23%	8.42	8.88	<10	10	75.7	10	10
	C4-Benzo[a]anthracenes/Chrysenes	Total	ng/L	157	1%	5.05	0.567	<10	12.1	12.1	10	10
	C4-Dibenzothiophenes	Total	ng/L	157	3%	5.51	3.88	<10	10.3	50.3	10	10
	C4-Naphthalenes	Total	ng/L	157	47%	10.4	11.7	<10	10.1	133	10	10
	C4-Phenanthrenes/Anthracenes	Total	ng/L	157	8%	5.89	3.55	<10	10.1	32.8	10	10
	Chrysene	Total	ng/L	157	92%	15.5	19.8	10.6	3.62	194	10	10.4
	Dibenz(a,h)anthracene	Total	ng/L	157	63%	3.5	3.43	2.69	0.788	31.8	10	10
	Dibenzothiophene (Synfuel)	Total	ng/L	157	72%	3.13	4.03	2.2	0.693	46.6	10	10

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs-SIM (cont.)	Fluoranthene	Total	ng/L	157	94%	32.3	29.9	25.2	10.1	282	10	15.7
	Fluorene	Total	ng/L	157	45%	6.54	5.33	<10	2	56	10	13.7
	Indeno(1,2,3-c,d)pyrene	Total	ng/L	157	73%	7.96	11.2	8.75	1.86	112	10	10.8
	Naphthalene	Total	ng/L	157	43%	30.6	17.1	<50	16	196	50	64.2
	Perylene	Total	ng/L	157	69%	6.04	6.57	6.66	1.79	63.8	10	10
	Phenanthrene	Total	ng/L	157	48%	17.7	16.7	<20	11.5	166	20	30.4
	Pyrene	Total	ng/L	157	100%	35.9	29	27.8	11.2	266	--	--
	Total HMW PAHs	Total	ng/L	157	100%	135	177	91.2	17.2	1690	--	--
	Total LMW PAHs	Total	ng/L	157	100%	58.9	76.2	28	2.72	660	--	--
	Total PAHs	Total	ng/L	157	100%	194	221	134	20.9	1960	--	--
Semivolatiles	1,1'-Biphenyl	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	1,2,4,5-Tetrachlorobenzene	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	1,4-Dioxane (p-Dioxane)	Total	µg/L	157	1%	0.97	0.068	<1.9	0.21	0.21	1.9	2.2
	2,3,4,6-Tetrachlorophenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2,4,5-Trichlorophenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2,4,6-Trichlorophenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2,4-Dichlorophenol	Total	µg/L	157	2%	0.096	0.0083	<0.19	0.038	0.047	0.19	0.22
	2,4-Dimethylphenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2,4-Dinitrophenol	Total	µg/L	157	0%	<4.8	--	<4.9	--	--	4.7	5.4
	2,4-Dinitrotoluene	Total	µg/L	157	2%	0.48	0.04	<0.97	0.2	0.23	0.94	1.1
	2,6-Dinitrotoluene	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2-Chloronaphthalene	Total	µg/L	157	1%	0.097	0.0072	<0.19	0.035	0.043	0.19	0.22
	2-Chlorophenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2-Methylnaphthalene	Total	µg/L	157	5%	0.094	0.015	<0.19	0.012	0.059	0.19	0.22
	2-Methylphenol (o-Cresol)	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	2-Nitroaniline	Total	µg/L	157	0%	<4.8	--	<4.9	--	--	4.7	5.4
	2-Nitrophenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	3,3'-Dichlorobenzidine	Total	µg/L	156	0%	<0.98	--	<0.97	--	--	0.94	1.1
	3-Nitroaniline	Total	µg/L	157	0%	<4.8	--	<4.9	--	--	4.7	5.4
	4,6-Dinitro-2-methylphenol	Total	µg/L	157	0%	<4.8	--	<4.9	--	--	4.7	5.4
	4-Bromophenyl phenyl ether	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	4-Chloro-3-methylphenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	4-Chloroaniline	Total	µg/L	156	1%	0.49	0.014	<0.97	0.52	0.52	0.94	1.1
	4-Chlorophenyl phenyl ether	Total	µg/L	157	1%	0.48	0.037	<0.97	0.053	0.053	0.94	1.1
	4-Methylphenol (p-Cresol)	Total	µg/L	157	1%	0.48	0.045	<0.97	0.089	0.12	0.94	1.1
	4-Nitroaniline	Total	µg/L	157	0%	<4.8	--	<4.9	--	--	4.7	5.4
	4-Nitrophenol	Total	µg/L	157	0%	<4.8	--	<4.9	--	--	4.7	5.4
	Acenaphthene	Total	µg/L	157	4%	0.095	0.012	<0.19	0.016	0.066	0.19	0.22
	Acenaphthylene	Total	µg/L	157	1%	0.097	0.0068	<0.19	0.041	0.045	0.19	0.22
	Acetophenone	Total	µg/L	157	1%	0.48	0.034	<0.97	0.092	0.092	0.94	1.1
	Anthracene	Total	µg/L	157	3%	0.096	0.011	<0.19	0.035	0.057	0.19	0.22
	Atrazine	Total	µg/L	150	1%	0.49	0.014	<0.97	0.42	0.42	0.94	1.1
	Benzaldehyde	Total	µg/L	157	6%	0.49	0.037	<0.97	0.22	0.62	0.94	1.1
	Benzo(a)anthracene	Total	µg/L	157	10%	0.1	0.067	<0.19	0.027	0.88	0.19	0.22
	Benzo(a)pyrene	Total	µg/L	157	6%	0.1	0.053	<0.19	0.033	0.73	0.19	0.22
	Benzo(b)fluoranthene	Total	µg/L	157	9%	0.11	0.1	<0.19	0.027	0.93	0.19	0.22
	Benzo(g,h,i)perylene	Total	µg/L	157	6%	0.1	0.082	<0.19	0.036	1.1	0.19	0.22
	Benzo(k)fluoranthene	Total	µg/L	157	6%	0.1	0.065	<0.19	0.054	0.89	0.19	0.22

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	Benzyl butyl phthalate	Total	µg/L	157	29%	0.41	0.13	<0.96	0.14	0.73	0.94	1.1
	Bis(2-chloro-1-methylethyl) ether	Total	µg/L	157	1%	0.097	0.0055	<0.19	0.045	0.072	0.19	0.22
	Bis(2-chloroethoxy) methane	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	Bis(2-chloroethyl) ether (2-Chloroethyl ether)	Total	µg/L	157	0%	<0.194	--	<0.19	--	--	0.19	0.22
	Bis(2-ethylhexyl) phthalate	Total	µg/L	157	3%	1	0.27	<1.9	1.8	2.7	1.9	2.2
	Caprolactam	Total	µg/L	157	3%	2.4	0.16	<4.9	1.3	2.2	4.7	5.4
	Carbazole	Total	µg/L	157	2%	0.097	0.0068	<0.19	0.047	0.064	0.19	0.22
	Chrysene	Total	µg/L	157	10%	0.1	0.07	<0.19	0.018	0.91	0.19	0.22
	Di-n-butyl phthalate	Total	µg/L	157	4%	0.48	0.047	<0.97	0.13	0.48	0.94	1.1
	Di-n-octylphthalate	Total	µg/L	157	1%	0.49	0.013	<0.97	0.5	0.5	0.94	1.1
	Dibenz(a,h)anthracene	Total	µg/L	157	6%	0.11	0.083	<0.19	0.039	1	0.19	0.22
	Dibenzofuran	Total	µg/L	157	1%	0.48	0.036	<0.97	0.064	0.064	0.94	1.1
	Diethyl phthalate	Total	µg/L	157	13%	0.45	0.11	<0.97	0.14	0.24	0.94	1.1
	Dimethyl phthalate	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	Fluoranthene	Total	µg/L	157	25%	0.089	0.044	<0.19	0.018	0.45	0.19	0.22
	Fluorene	Total	µg/L	157	2%	0.097	0.0073	<0.19	0.042	0.062	0.19	0.22
	Hexachlorobenzene	Total	µg/L	157	1%	0.097	0.0065	<0.19	0.042	0.052	0.19	0.22
	Hexachlorobutadiene	Total	µg/L	157	1%	0.097	0.0073	<0.19	0.035	0.041	0.19	0.22
	Hexachlorocyclopentadiene	Total	µg/L	137	0%	<0.98	--	<0.97	--	--	0.94	1.1
	Hexachloroethane	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	Indeno(1,2,3-c,d)pyrene	Total	µg/L	157	6%	0.11	0.086	<0.19	0.048	1.1	0.19	0.22
	Isophorone	Total	µg/L	157	1%	0.48	0.036	<0.97	0.065	0.065	0.94	1.1
	Naphthalene	Total	µg/L	157	10%	0.092	0.018	<0.19	0.017	0.12	0.19	0.22
	Nitrobenzene	Total	µg/L	157	0%	<1.94	--	<1.9	--	--	1.9	2.2
	Pentachlorophenol	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
	Phenanthrene	Total	µg/L	157	10%	0.094	0.012	<0.19	0.043	0.097	0.19	0.22
	Phenol	Total	µg/L	157	3%	0.097	0.0065	<0.19	0.055	0.14	0.19	0.22
	Pyrene	Total	µg/L	157	22%	0.09	0.034	<0.19	0.021	0.32	0.19	0.22
	n-Nitrosodi-n-propylamine	Total	µg/L	157	0%	<0.194	--	<0.19	--	--	0.19	0.22
	n-Nitrosodiphenylamine	Total	µg/L	157	0%	<0.98	--	<0.97	--	--	0.94	1.1
Metals	Aluminum	Dissolved	µg/L	158	61%	28.3	42.5	20	1.3	355	2	50
	Aluminum	Total	µg/L	158	100%	191	146	148	41.6	974	--	--
	Antimony	Dissolved	µg/L	158	8%	0.507	0.0604	<1	0.248	1.06	1	1
	Antimony	Total	µg/L	158	20%	0.582	0.273	<1	0.41	2.55	1	1
	Arsenic	Dissolved	µg/L	158	100%	1.15	0.241	1.1	0.67	1.65	--	--
	Arsenic	Total	µg/L	158	100%	1.28	0.28	1.22	0.73	2.3	--	--
	Barium	Dissolved	µg/L	158	100%	22.4	4.87	21.8	11.5	36.9	--	--
	Barium	Total	µg/L	158	100%	24	5.3	23.4	12.4	51.7	--	--
	Beryllium	Dissolved	µg/L	158	23%	0.0102	0.0163	<0.02	0.0006	0.204	0.02	0.02
	Beryllium	Total	µg/L	158	27%	0.0135	0.0153	<0.02	0.0038	0.124	0.02	0.02
	Cadmium	Dissolved	µg/L	274	99.6%	0.0543	0.0144	0.053	0.006	0.101	0.02	0.02
	Cadmium	Total	µg/L	274	100%	0.0676	0.0241	0.062	0.027	0.233	--	--
	Calcium	Dissolved	µg/L	158	100%	239000	35100	246000	143000	321000	--	--
	Calcium	Total	µg/L	158	100%	242000	35700	250000	143000	320000	--	--
	Chromium	Dissolved	µg/L	158	99%	0.371	0.278	0.3	0.11	2.7	0.2	0.2
	Chromium	Total	µg/L	158	100%	1.17	0.811	0.895	0.43	5.61	--	--
	Chromium, Hexavalent	Dissolved	µg/L	119	45%	0.209	0.22	<0.11	0.044	0.83	0.02	1.19
	Cobalt	Dissolved	µg/L	158	100%	0.105	0.0367	0.098	0.041	0.3	--	--

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals (cont.)	Cobalt	Total	µg/L	158	100%	0.188	0.0788	0.167	0.098	0.55	--	--
	Copper	Dissolved	µg/L	274	100%	1.77	0.474	1.74	0.832	4.48	--	--
	Copper	Total	µg/L	274	100%	2.92	1.32	2.59	1.29	13.1	--	--
	Iron	Dissolved	µg/L	158	90%	58.4	105	23.5	3	905	10	10
	Iron	Total	µg/L	158	100%	414	342	296	116	2320	--	--
	Lead	Dissolved	µg/L	274	100%	0.268	0.343	0.161	0.035	3.85	--	--
	Lead	Total	µg/L	274	100%	1.81	1.52	1.31	0.533	12	--	--
	Magnesium	Dissolved	µg/L	158	100%	693000	117000	724000	376000	980000	--	--
	Magnesium	Total	µg/L	158	100%	699000	116000	718000	386000	974000	--	--
	Manganese	Dissolved	µg/L	158	100%	48.5	20.2	44.8	11.2	106	--	--
	Manganese	Total	µg/L	158	100%	61.3	20.4	55	28.9	117	--	--
	Mercury	Dissolved	ng/L	274	91%	3.15	5.13	1.46	0.25	53.5	0.39	4.28
	Mercury	Total	ng/L	274	100%	21.4	23.4	14.5	0.38	296	--	--
	Methyl Mercury	Dissolved	ng/L	158	31%	0.0278	0.0109	<0.05	0.021	0.102	0.048	0.052
	Methyl Mercury	Total	ng/L	158	90%	0.0517	0.0365	0.048	0.021	0.294	0.049	0.052
	Nickel	Dissolved	µg/L	158	100%	1.14	0.312	1.08	0.62	1.92	--	--
	Nickel	Total	µg/L	158	100%	1.45	0.497	1.31	0.85	5.05	--	--
	Potassium	Dissolved	µg/L	158	100%	225000	32700	232000	126000	295000	--	--
	Potassium	Total	µg/L	158	100%	224000	32500	228000	127000	293000	--	--
	Selenium	Dissolved	µg/L	158	8%	0.485	0.0585	<1	0.2	0.6	1	1
	Selenium	Total	µg/L	158	16%	0.484	0.163	<1	0.2	2.1	1	1
	Silver	Dissolved	µg/L	158	59%	0.00959	0.00564	0.013	0.003	0.056	0.02	0.02
	Silver	Total	µg/L	158	88%	0.0315	0.0676	0.021	0.004	0.838	0.02	0.02
	Sodium	Dissolved	µg/L	158	100%	5820000	927000	5920000	3250000	7730000	--	--
	Sodium	Total	µg/L	158	100%	5830000	931000	5960000	3250000	7400000	--	--
	Thallium	Dissolved	µg/L	158	39%	0.00897	0.00189	<0.02	0.005	0.019	0.02	0.02
	Thallium	Total	µg/L	158	49%	0.0112	0.00577	<0.02	0.006	0.048	0.02	0.02
	Titanium	Dissolved	µg/L	158	28%	4.46	5.89	<1	0.7	16.4	1	30
	Titanium	Total	µg/L	158	78%	8.81	6.95	7.4	0.7	43.3	1	30
	Vanadium	Dissolved	µg/L	158	83%	2.74	1.09	2.8	1.4	6.2	2	2
	Vanadium	Total	µg/L	158	87%	3.34	1.36	3.4	1.7	8.4	2	2
	Zinc	Dissolved	µg/L	158	100%	6.32	1.88	6.07	2.2	13.9	--	--
	Zinc	Total	µg/L	158	100%	8.53	3.18	7.85	3.56	28.9	--	--
Volatiles	1,1,1-Trichloroethane	Total	µg/L	158	8%	0.24	0.043	<0.5	0.08	0.15	0.5	0.5
	1,1,2,2-Tetrachloroethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,1,2-Trichloroethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,1-Dichloroethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,1-Dichloroethene	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,2,3-Trichlorobenzene	Total	µg/L	157	0%	<2	--	<2	--	--	2	2
	1,2,4-Trichlorobenzene	Total	µg/L	157	1%	0.99	0.069	<2	0.13	0.13	2	2
	1,2-Dibromo-3-chloropropane	Total	µg/L	158	0%	<2	--	<2	--	--	2	2
	1,2-Dibromoethane (Ethylene dibromide)	Total	µg/L	158	0%	<2	--	<2	--	--	2	2
	1,2-Dichlorobenzene	Total	µg/L	157	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,2-Dichloroethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,2-Dichloropropane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,3-Dichlorobenzene	Total	µg/L	157	0%	<0.5	--	<0.5	--	--	0.5	0.5
	1,4-Dichlorobenzene	Total	µg/L	157	1%	0.25	0.01	<0.5	0.12	0.12	0.5	0.5
	2-Hexanone	Total	µg/L	158	0%	<20	--	<20	--	--	20	20

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Volatiles (cont.)	Acetone	Total	µg/L	158	1%	10	0.53	<20	3.4	3.4	20	20
	Benzene	Total	µg/L	157	1%	0.25	0.02	<0.5	0.07	0.07	0.5	0.5
	Bromochloromethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Bromodichloromethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Bromoform	Total	µg/L	158	1%	0.25	0.0048	<0.5	0.19	0.19	0.5	0.5
	Bromomethane	Total	µg/L	158	1%	0.25	0.011	<0.5	0.11	0.11	0.5	0.5
	Carbon disulfide	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Carbon tetrachloride	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Chlorobenzene	Total	µg/L	157	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Chloroethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Chloroform	Total	µg/L	158	35%	0.21	0.061	<0.5	0.09	0.23	0.5	0.5
	Chloromethane	Total	µg/L	158	25%	0.21	0.073	<0.5	0.07	0.18	0.5	0.5
	Cyclohexane	Total	µg/L	158	0%	<1	--	<1	--	--	1	1
	Dibromochloromethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Dichlorodifluoromethane (Freon 12)	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Ethylbenzene	Total	µg/L	157	4%	0.24	0.038	<0.5	0.05	0.06	0.5	0.5
	Isopropylbenzene (Cumene)	Total	µg/L	157	0%	<2	--	<2	--	--	2	2
	Methyl acetate	Total	µg/L	158	0%	<1	--	<1	--	--	1	1
	Methyl ethyl ketone (2-Butanone)	Total	µg/L	158	0%	<20	--	<20	--	--	20	20
	Methyl isobutyl ketone (4-Methyl-2-pentanone)	Total	µg/L	158	0%	<20	--	<20	--	--	20	20
	Methylcyclohexane	Total	µg/L	158	0%	<1	--	<1	--	--	1	1
	Methylene chloride (Dichloromethane)	Total	µg/L	158	3%	0.98	0.13	<2	0.1	0.25	2	2
	Styrene	Total	µg/L	157	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Tetrachloroethylene (PCE)	Total	µg/L	158	61%	0.19	0.062	0.21	0.1	0.33	0.5	0.5
	Toluene	Total	µg/L	157	5%	0.25	0.022	<0.5	0.07	0.27	0.5	0.53
	Trichloroethylene (TCE)	Total	µg/L	158	46%	0.2	0.062	<0.5	0.1	0.25	0.5	0.5
	Trichlorofluoromethane (Freon 11)	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Trichlorotrifluoroethane	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	Vinyl chloride	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	cis-1,2-Dichloroethylene	Total	µg/L	158	100%	0.12	0.023	0.12	0.07	0.19	--	--
	cis-1,3-Dichloropropene	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	m,p-Xylenes	Total	µg/L	158	11%	0.24	0.036	<0.5	0.11	0.22	0.5	0.5
	o-Xylene (1,2-Dimethylbenzene)	Total	µg/L	158	2%	0.25	0.022	<0.5	0.08	0.1	0.5	0.5
	tert-Butyl methyl ether (MTBE)	Total	µg/L	158	1%	0.25	0.0095	<0.5	0.13	0.13	0.5	0.5
	trans-1,2-Dichloroethene	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
	trans-1,3-Dichloropropene	Total	µg/L	158	0%	<0.5	--	<0.5	--	--	0.5	0.5
Miscellaneous	Chloride (As Cl)	Total	mg/L	274	100%	11000	2300	11000	4100	15000	--	--
	Chlorophyll-A	Total	mg/m^3	274	100%	2.3	1.2	2.1	0.58	7.7	--	--
	Cyanide	Total	mg/L	158	3%	0.005	0.00046	<0.01	0.003	0.009	0.01	0.01
	Nitrogen, Ammonia	Total	mg/L	201	100%	0.43	0.094	0.42	0.2	0.82	--	--
	Phosphorus, Dissolved (as P)	Total	mg/L	158	100%	0.14	0.053	0.14	0.011	0.29	--	--
	Sulfate (As So4)	Total	mg/L	274	100%	1500	860	1500	500	9000	--	--
	Sulfide	Total	mg/L	274	1%	1	0.087	<2	0.4	2	2	2
	Total Kjeldahl Nitrogen	Total	mg/L	201	100%	1.6	0.41	1.6	0.7	3.1	--	--

Table 4-3
Phase III Surface Water Chemistry Summary Statistics

Parameter Group	Analyte	Fraction	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Organotins	Dibutyltin	Total	µg/L	158	1%	0.025	0.0015	<0.05	0.0096	0.013	0.05	0.05
	Monobutyltin	Total	µg/L	158	1%	0.025	0.0047	<0.05	0.029	0.084	0.05	0.05
	Tetrabutyltin	Total	µg/L	158	0%	<0.05	--	<0.05	--	--	0.05	0.05
	Tri-n-butyltin hydride	Total	µg/L	77	0%	<0.05	--	<0.05	--	--	0.05	0.05
	Tributyltin cation	Total	µg/L	81	0%	<0.05	--	<0.05	--	--	0.05	0.05
Water Quality	Alkalinity, Total (As CaCO3)	Total	mg/L	274	99.6%	94.8	9.77	97.6	71.6	132	9	9
	Dissolved Organic Carbon	Dissolved	mg/L	274	100%	2.25	0.546	2.3	0.77	4.23	--	--
	Hardness (As CaCO3)	Total	mg/L	158	100%	3480	571	3610	1950	4810	--	--
	Particulate Organic Carbon	Total	mg/L	238	73%	0.957	0.514	1.2	0.4	3.7	1.3	1.3
	Salinity	Total	ppt	273	100%	19.1	3.65	20	8.07	25.7	--	--
	Suspended Solids	Total	mg/L	274	100%	14.3	10.2	10.7	4	80.5	--	--
	Total Dissolved Solids (Residue, Filterable)	Total	mg/L	274	100%	19200	5140	19800	7830	77800	--	--
	Total Organic Carbon	Total	mg/L	274	100%	2.09	0.473	2.1	0.8	3.56	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
C = Co-eluted with another PCB congener and therefore no result is reported
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/L = milligram per liter
mg/m^3 = milligram per cubic meter
ng/L = nanogram per liter
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/L = picogram per liter
ppt = parts per thousand
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
µg/L = microgram per liter
-- = not applicable due to frequency of detection
% = percent

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	254	100%	2640	3410	2100	9.4	32100	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	254	100%	510	764	295	0.746	6910	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	254	100%	241	296	198	0.62	2320	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	254	100%	298	492	181	0.397	5960	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	254	99%	12.5	15.1	8.55	0.205	129	4.95	4.98
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	254	99%	3.09	2.85	2.96	0.024	28.1	4.72	4.98
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	250	100%	72.4	132	38.7	0.124	1570	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	254	100%	13.5	14.2	11.2	0.0439	95	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	254	100%	17.6	23.1	11.9	0.0451	246	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	254	100%	7.5	6.69	6.77	0.0238	38.3	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	254	61%	3	3.76	4.8	0.0447	44.5	3.94	5.13
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	254	98%	3.46	3.46	3.01	0.0314	25.1	4.72	4.99
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	254	100%	7.88	7.61	6.56	0.0631	49.6	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	253	100%	8.33	8.07	6.6	0.0405	44	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	254	100%	13.7	13.1	10.7	0.0351	80.5	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	254	100%	87.1	182	42.8	0.12	1710	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	254	100%	11.5	9.57	11.1	0.0924	57.3	0.971	0.971
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	254	100%	131	210	79.7	0.322	1870	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	254	100%	131	210	79.8	0.347	1870	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	254	100%	131	210	80	0.372	1870	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	254	100%	114	200	63.2	0.223	1810	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	254	100%	114	200	63.3	0.247	1810	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	254	100%	114	200	63.4	0.272	1810	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	254	100%	115	201	64.4	0.223	1810	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	254	100%	115	201	64.4	0.248	1810	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	254	100%	115	201	64.4	0.273	1810	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	254	100%	606	699	497	1.88	5410	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	254	100%	474	678	299	0.666	7210	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	254	100%	145	133	130	0.881	826	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	254	100%	266	348	186	0.523	3620	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	254	100%	49.9	45.9	42.6	0.307	286	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	254	100%	242	285	172	0.443	1690	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	254	100%	163	277	103	0.333	2520	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	254	100%	404	535	290	0.583	4100	--	--

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	254	91%	1170	1350	695	68	8720	36.6	41.4
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	254	76%	220	214	158	28.6	1190	83.1	565
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	254	81%	188	185	139	22.3	1250	91.5	565
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	254	19%	57.3	26.7	<98.3	28.2	152	75.4	565
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	254	94%	5940	9370	3100	54.6	67700	94.4	144
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	254	3%	58.3	26.5	<99.1	35.4	143	75.4	565
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	254	94%	1100	1580	616	33.4	9800	91.5	122
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	254	81%	616	973	307	58.7	6320	183	394
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	254	97%	4600	6940	2630	253	47700	173	869
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	254	94%	18100	26400	10300	142	190000	151	243
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	254	3%	57.8	26	<99	30.1	65.2	75.4	565
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	253	23%	64.2	48.7	<98.7	27.2	618	83.1	565
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	254	80%	376	602	178	33	3740	91.5	164
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	254	98%	15000	22400	8210	66.8	141000	189	204
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	254	97%	1560	2120	1100	37	23200	86.6	252
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	254	56%	72.9	50.5	96.9	25.9	506	83.1	565
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	254	0%	58	25.9	<99.2	41.6	41.6	75.4	565
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	253	74%	232	369	124	24.3	3280	91.5	565
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	254	79%	336	538	165	35.1	4750	91.5	252
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	254	43%	85.1	90.4	<98.5	30.5	1100	83.1	565
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	254	33%	78.1	63.2	<98.8	26	553	83.1	565
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	254	92%	2130	2930	1240	61.2	20300	189	328
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	254	95%	15400	20900	8950	128	146000	378	486
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	254	94%	905	1230	513	29.7	8510	94.4	164
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	254	66%	191	273	115	33.4	2060	83.1	252
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	254	93%	4290	6180	2320	83.9	43100	94.4	122
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	254	83%	247	296	153	23.8	1800	91.5	164
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	254	85%	821	1180	450	71.2	8190	173	394
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	254	95%	4460	5720	2690	119	36800	191	243
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	254	94%	1540	2050	894	41	14000	91.9	422
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	254	87%	676	1000	354	33.7	6710	94.4	197
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	254	66%	267	326	200	59.6	2390	166	1130
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	254	3%	23.6	10.6	<39.6	23.1	51.9	30.2	226
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	254	97%	2480	3640	1240	40.7	24100	95.3	102
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	254	0%	58	25.9	<99.1	43.8	43.8	75.4	565
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	254	5%	117	52.9	<198	74.5	222	151	1130
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	254	89%	614	842	334	30.7	6040	91.5	164
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	254	1%	58	25.9	<99.1	39.9	61.3	75.4	565

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	254	97%	1900	2370	1230	43.5	14500	95.3	103
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	254	95%	10300	13700	6290	84.2	89100	189	243
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	254	33%	63.2	33.3	<97.9	29.1	217	83.1	565
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	254	100%	7780	8520	5800	142	78100	103	103
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	254	44%	75.8	51	<98.3	30.1	312	83.1	565
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	254	17%	56.7	26.9	<98.4	28.1	121	75.4	565
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	254	96%	12200	15700	7420	99.5	99100	189	207
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	254	57%	280	250	216	92.1	1830	166	1130
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	254	54%	96.7	128	98.1	24.4	1510	83.6	565
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	254	95%	1780	2590	962	53.8	16900	189	243
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	254	91%	1370	1960	726	41.6	12800	94.4	122
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	254	4%	64.6	61.1	<99.2	31	710	75.4	565
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	254	98%	4120	8490	1530	57.4	63400	39.1	42.9
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	254	0%	<464	--	<397	--	--	302	2260
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	254	0%	<116	--	<99.2	--	--	75.4	565
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	254	10%	69.2	60	<99.2	27.7	588	75.4	565
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	254	93%	928	1260	534	31.3	8130	94.4	122
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	254	1%	57.9	26	<99.1	29.3	31.6	75.4	565
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	254	92%	574	781	341	27.1	4920	94.4	164
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	254	0%	58	25.9	<99.2	30.6	30.6	75.4	565
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	254	98%	4930	8490	2360	70.9	63900	39.1	40.1
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	254	98%	3230	4290	1920	30.8	28000	94.4	102
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	254	89%	1010	1300	589	59	9130	189	328
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	254	92%	596	772	356	25.6	5420	91.5	164
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	254	97%	2970	4150	1680	34.3	32600	94.4	102
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	254	71%	172	195	113	24.5	1290	83.1	252
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	254	89%	434	558	262	23.4	3740	94.4	197
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	254	97%	2030	2620	1260	22.4	19700	95.3	164
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	254	94%	800	947	536	27.6	5970	94.4	164
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	254	97%	1480	1870	961	29.8	13200	95.3	103
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	254	98%	8990	17600	3580	152	141000	97.9	565
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	254	96%	7460	10100	4250	59.3	75000	189	367
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	254	28%	61.6	37	<97.9	26.7	271	83.1	565
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	254	20%	56.7	27.5	<98.4	22	129	83.1	565
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	254	96%	2620	3470	1490	59.7	27400	189	207
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	254	5%	57.5	26.3	<99	26.8	93.5	75.4	565
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	254	0%	<116	--	<99.2	--	--	75.4	565

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	254	98%	5060	6130	3300	41.5	41400	96.9	102
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	254	26%	61	47	<97.9	29	612	75.4	565
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	254	73%	152	170	103	28.3	1130	86.6	252
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	254	97%	1310	2470	580	24	21900	39.2	226
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	254	92%	690	898	408	29.4	5840	94.4	164
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	254	70%	156	181	107	26	1220	83.1	252
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	254	0%	58	25.9	<99.2	30.4	30.4	75.4	565
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	254	97%	2260	2950	1280	50.3	22200	94.4	102
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	254	89%	756	1000	444	44.2	7570	94.4	164
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	254	93%	1160	1470	685	39.4	10000	94.4	122
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	253	64%	339	403	216	88.4	3040	166	504
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	254	96%	3070	3910	1860	84.9	24900	189	207
	(PCB 2) 3-Chlorobiphenyl	ng/kg	254	96%	295	365	185	20.1	2870	36.6	101
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	254	100%	23900	37800	12900	287	306000	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	254	79%	351	410	220	44.5	2790	91.5	164
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	254	91%	948	1210	592	50.1	8290	189	328
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	254	95%	1870	2340	1130	39.8	14700	94.4	103
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	254	0%	<116	--	<99.2	--	--	75.4	565
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	254	65%	127	140	99.9	33.5	1040	83.1	252
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	254	96%	2950	4980	1550	51.1	38300	94.4	121
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	254	76%	245	309	150	38.2	2240	91.5	252
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	254	94%	1100	1970	580	34.4	15700	94.4	103
	(PCB 209) Decachlorobiphenyl	ng/kg	254	89%	3220	6550	1370	86.1	58800	94.4	638
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	254	100%	6980	14200	2830	119	121000	98.4	98.4
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	254	100%	6200	11200	2740	101	94100	39.3	39.3
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	254	22%	28.5	22.5	<39.6	12.5	188	33.2	226
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	254	63%	102	181	53.3	21.3	1790	33.2	226
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	254	100%	2360	3870	1380	30	47400	38.9	38.9
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	254	95%	3910	5740	2290	54.5	48400	94.5	100
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	254	97%	1060	1820	574	15.9	20200	39.1	42.9
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	254	100%	707	730	482	33.8	5160	91.5	91.5
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	254	100%	18700	31100	9720	216	265000	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	254	100%	4100	6790	2010	58	50800	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	254	74%	115	155	64.9	13.6	1100	34.6	226
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	254	94%	722	1030	379	21.2	7060	37.8	41
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	254	31%	25.8	12	<39.2	13.9	62.3	30.2	226
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	254	100%	6140	9200	3690	89.8	91100	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	254	20%	27.3	20.2	<39.6	14.5	173	33.2	226
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	254	76%	129	186	70.4	15.9	1320	34.6	226
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	254	98%	3150	4210	1860	143	29500	83.1	252

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	254	98%	7730	12700	3880	80.5	88200	194	372
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	254	72%	964	2060	338	87.8	16300	173	1130
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	254	98%	5370	8800	2640	46.4	66700	96.9	186
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	253	77%	647	1140	260	28.8	8250	86.6	565
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	254	100%	16700	27600	8600	92.8	208000	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	254	94%	2260	4280	903	52.3	30900	94.4	186
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	254	93%	894	1640	383	22.8	12300	37.8	78.8
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	254	97%	3090	5640	1290	30.2	41700	96.9	186
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	254	99%	12000	19700	6450	53.7	179000	204	372
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	254	46%	82.6	100	<97.7	16.2	761	83.1	565
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	254	89%	2320	4100	1130	49.6	33200	189	372
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	254	90%	877	1180	502	52.4	8660	94.4	565
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	254	96%	18300	30800	9170	181	211000	94.4	186
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	254	54%	95.5	91.2	98.8	26.6	686	83.6	565
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	254	68%	199	353	105	24.4	2890	86.6	565
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	254	93%	7600	14400	3700	97.3	115000	94.5	503
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	254	63%	106	116	98.8	22.4	1100	83.1	565
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	254	54%	80.9	73.5	97.5	27.9	762	83.1	565
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	254	89%	1560	2550	807	77.5	21700	366	2260
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	254	96%	1350	2070	899	78	26700	36.6	226
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	254	99%	3450	6630	1420	30.3	56200	96.9	102
	Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-	ng/kg	254	97%	30000	53400	13800	334	431000	378	410
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	254	93%	752	1170	389	25.7	8070	91.5	164
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	254	98%	7570	12700	3630	74.5	87200	96.9	186
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	254	98%	19100	34600	9330	223	337000	96.9	186
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	254	89%	527	886	278	25	8040	91.5	565
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	254	76%	144	141	111	26.9	1470	83.1	565
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	254	57%	167	285	88.9	14.7	1880	30.2	315
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	254	80%	205	232	134	26.5	2210	91.5	565
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	254	7%	60.6	48	<98.9	28.7	700	75.4	565
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	254	98%	2700	4310	1510	29.1	43400	96.9	102
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	254	1%	58.2	25.9	<99.1	60.3	79	75.4	565
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	254	69%	157	212	106	22.7	1320	83.1	565
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	254	100%	6540	8650	3770	178	53800	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	254	0%	<116	--	<99.2	--	--	75.4	565
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	254	41%	94.4	134	<98.5	35.8	1540	83.1	565
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	254	96%	2020	3310	1030	29.5	22300	95.3	102
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	254	81%	836	1250	432	57.7	8260	183	1130

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	254	94%	3890	6030	2040	28.5	38900	37.8	74.4
	PeCB	ng/kg	254	94%	2970	4540	1630	83.5	32100	366	486
	PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	254	92%	9950	15300	5250	166	108000	378	2260
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	254	2%	92.4	315	<99.2	52.7	3780	75.4	565
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	254	74%	253	432	122	25.1	3050	91.5	565
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	254	83%	278	393	167	13.5	2790	36.6	325
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	254	94%	13900	20000	8250	230	147000	378	486
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	254	96%	2550	3600	1550	46.5	24900	94.4	102
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	254	88%	2190	3210	1240	52.7	24300	91.9	503
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	254	54%	364	271	397	155	2040	332	2260
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	254	64%	131	144	107	24.9	1060	86.6	565
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	254	95%	12900	19600	6590	158	125000	378	486
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	254	64%	164	234	107	31	1780	83.1	565
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	254	70%	754	1000	490	160	8260	332	2260
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	254	98%	7950	10900	5010	56.4	69700	189	204
	Aroclor-1016 (PCB-1016)	µg/kg	254	0%	<48.8	--	<32.5	--	--	20	340
	Aroclor-1221 (PCB-1221)	µg/kg	254	0%	<48.8	--	<32.5	--	--	20	340
	Aroclor-1232 (PCB-1232)	µg/kg	254	0%	<48.8	--	<32.5	--	--	20	340
	Aroclor-1242 (PCB-1242)	µg/kg	254	0%	24.8	26.2	<33	99	99	20	340
	Aroclor-1248 (PCB-1248)	µg/kg	254	91%	108	174	54	5.3	1500	21	180
	Aroclor-1254 (PCB-1254)	µg/kg	254	91%	97.1	126	56.5	6.5	850	21	140
	Aroclor-1260 (PCB-1260)	µg/kg	254	63%	43.4	45.3	33	10	260	21	340
	Aroclor-1262 (PCB-1262)	µg/kg	254	4%	24.5	25.9	<32	14	160	20	270
	Aroclor-1268 (PCB-1268)	µg/kg	254	0%	24.5	25.7	<32.5	20	20	20	340
	Total PCB congeners (NOAA 1989)	ng/kg	254	100%	367000	525000	217000	1900	3740000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	254	100%	367000	525000	217000	3970	3740000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	254	100%	367000	525000	217000	6030	3740000	--	--
	Total PCBs (7)	µg/kg	254	94%	237	314	140	6.4	2400	21	46
	Total PCBs (7) (ND*0.5)	µg/kg	254	94%	340	403	210	64	2900	21	46
	Total PCBs (7) (ND*1)	µg/kg	254	94%	445	510	280	120	3400	21	46
	Total PCBs (9)	µg/kg	254	94%	239	317	140	6.4	2500	21	46
	Total PCBs (9) (ND*0.5)	µg/kg	254	94%	388	451	240	85	3100	21	46
	Total PCBs (9) (ND*1)	µg/kg	254	94%	538	602	350	160	3800	21	46
	Total PCBs congener (209 specified)	ng/kg	254	100%	480000	691000	278000	2480	5030000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	254	100%	483000	691000	279000	11500	5040000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	254	100%	486000	690000	281000	20500	5040000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	254	100%	147	238	78.9	0.000668	2440	10.2	10.2
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	254	100%	154	236	86.2	11.1	2440	10.2	10.2

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	254	100%	161	235	90.1	20.6	2440	10.2	10.2
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	254	100%	0.67	1.09	0.383	0.000334	11.7	0.51	0.51
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	254	100%	0.863	1.05	0.508	0.269	11.7	0.51	0.51
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	254	100%	1.06	1.05	0.688	0.356	11.7	0.51	0.51
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	254	100%	6	11	1.23	0.002	121	10.2	10.2
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	254	100%	11.2	10.3	7.33	4.91	123	10.2	10.2
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	254	100%	16.4	11.4	13.1	6.34	125	10.2	10.2
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	254	100%	278	398	182	0.322	2760	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	254	100%	285	397	187	13	2770	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	254	100%	293	395	188	22.5	2770	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	254	100%	114	200	63.6	0.223	1810	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	254	100%	115	200	63.6	0.538	1810	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	254	100%	115	201	63.9	0.853	1820	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	254	100%	121	205	71.1	0.223	1820	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	254	100%	126	205	74.9	6.91	1820	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	254	100%	132	205	77.6	13.6	1830	--	--
	Total decachlorobiphenyl	ng/kg	254	89%	3220	6550	1370	86.1	58800	94.4	638
	Total dichlorobiphenyl	ng/kg	254	100%	25600	31100	17700	675	204000	--	--
	Total heptachlorobiphenyl	ng/kg	254	99%	28800	37200	17300	41.5	271000	194	204
	Total hexachlorobiphenyl	ng/kg	254	98%	63300	84400	37800	93.1	558000	388	407
	Total monochlorobiphenyl	ng/kg	254	100%	2160	2300	1380	105	16800	91.5	91.5
	Total nonachlorobiphenyl	ng/kg	254	96%	4270	7220	2270	51.1	56200	94.4	102
	Total octachlorobiphenyl	ng/kg	254	97%	10800	13600	6320	50.3	91300	189	204
	Total pentachlorobiphenyl	ng/kg	254	100%	103000	150000	58900	36.3	1020000	407	407
	Total tetrachlorobiphenyl	ng/kg	254	100%	145000	247000	72600	92.8	1840000	--	--
	Total trichlorobiphenyl	ng/kg	254	100%	93800	156000	48500	887	1260000	--	--
Pesticides	2,4'-DDD	pg/g	253	99%	7660	12000	3580	11.3	88700	39.7	234
	2,4'-DDE	pg/g	253	100%	29700	90000	3910	10.7	712000	--	--
	2,4'-DDT	pg/g	248	53%	580	2450	156	15.3	28000	34.7	1240
	4,4'-DDD	pg/g	254	100%	23300	38300	9580	35.7	235000	--	--
	4,4'-DDE	pg/g	253	100%	65200	170000	14900	42.1	1590000	--	--
	4,4'-DDT	pg/g	236	86%	5550	31900	690	15.4	451000	37.9	811
	Aldrin	pg/g	145	3%	532	268	<954	26.3	838	40.1	2390
	Dieldrin	pg/g	253	95%	1740	3510	947	39.4	37400	39.7	1560
	Endosulfan I	pg/g	249	2%	255	342	<236	68.3	352	65.9	4690
	Endosulfan II	pg/g	248	1%	235	307	<229	233	328	65.9	4690
	Endosulfan sulfate	pg/g	237	0%	<504	--	<223	--	--	65.9	4690
	Endrin	pg/g	250	0%	50.6	66.6	<54.5	472	472	26.4	939
	Endrin aldehyde	pg/g	158	0%	<500	--	<226	--	--	65.9	4690
	Endrin ketone	pg/g	213	1%	258	348	<214	227	1520	65.9	4690
	Heptachlor	pg/g	249	7%	64.9	142	<57.6	14.2	548	26.4	3860

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Heptachlor endo-epoxide	pg/g	253	21%	149	319	<73.3	79.5	3150	32	939
	Heptachlor epoxide	pg/g	249	33%	113	239	<79.4	14.6	2400	33.8	939
	Hexachlorobenzene	pg/g	253	100%	2870	6250	1040	13.2	46200	221	221
	Methoxychlor	pg/g	151	5%	292	1070	<57	77	7550	26.4	3860
	Mirex	pg/g	181	20%	90.9	176	<65	13.7	1660	26.4	939
	Oxychlordane	pg/g	250	3%	48.7	61.1	<51.3	29.5	208	33.8	939
	Total BHC Compounds	pg/g	253	75%	247	410	123	8.17	3300	37.9	939
	Total Chlordane (ND=0)	pg/g	253	96%	7340	6920	6210	38.8	39600	39.7	335
	Total Chlordane (ND=1)	pg/g	253	96%	7750	7010	6420	279	41000	39.7	335
	Total Chlordane (ND=1/2)	pg/g	253	96%	7550	6960	6320	159	40200	39.7	335
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	254	100%	131000	301000	34500	120	2600000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	254	100%	131000	301000	34500	130	2600000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	254	100%	131000	301000	34500	130	2600000	--	--
	Total DDx (2,4) Total Fraction	pg/g	253	100%	38100	98500	8000	22	760000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	253	100%	38100	98500	8000	42	760000	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	253	100%	38100	98500	8000	62	760000	--	--
	Total DDx (4,4) Total Fraction	pg/g	254	100%	93100	205000	26000	93	1800000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	254	100%	93100	205000	26000	93	1800000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	254	100%	93100	205000	26000	93	1800000	--	--
	Total alpha + gamma chlordane	pg/g	253	96%	5070	4800	4300	39	32000	39.7	335
	Total alpha + gamma chlordane (ND*0.5)	pg/g	253	96%	5070	4790	4300	39	32000	39.7	335
	Total alpha + gamma chlordane (ND*1)	pg/g	253	96%	5080	4790	4300	39	32000	39.7	335
	alpha-BHC	pg/g	252	68%	118	174	63	6.32	1260	37.9	939
	alpha-Chlordane	pg/g	253	94%	2240	2040	1850	11.7	12600	39.7	346
	beta-BHC	pg/g	253	58%	117	174	74.8	6.24	1430	32	1090
	cis-Nonachlor	pg/g	248	81%	879	877	781	22.3	4830	39	394
	delta-BHC	pg/g	253	15%	58.7	88.7	<54	6.07	770	26.4	939
	gamma-BHC (lindane)	pg/g	253	24%	66.2	137	<53.1	6.29	1800	26.4	939
	gamma-Chlordane	pg/g	250	97%	2860	2890	2280	27.1	22100	39.7	239
	trans-Nonachlor	pg/g	249	91%	1280	1180	1080	43.7	8620	39.7	1560
PAHs	1-Methylnaphthalene	µg/kg	254	88%	45	63	33	0.2	340	33	1400
	2-Methylnaphthalene	µg/kg	254	85%	59	68	44	0.34	370	33	1400
	Acenaphthene	µg/kg	254	82%	87	150	53	0.18	1500	32	1400
	Acenaphthylene	µg/kg	254	93%	200	210	140	1	1500	35	1400
	Anthracene	µg/kg	254	95%	330	520	160	1.2	4400	35	1400
	Benzo(a)anthracene	µg/kg	254	95%	1100	1500	650	3.6	12000	35	1400
	Benzo(a)pyrene	µg/kg	254	98%	1300	1400	930	5.7	10000	41	1400
	Benzo(b)fluoranthene	µg/kg	254	97%	1100	1100	830	5.3	8900	40	1400
	Benzo(e)pyrene	µg/kg	254	99%	860	830	660	4.4	5900	41	1400
	Benzo(g,h,i)perylene	µg/kg	254	96%	660	660	480	3.6	4000	35	1400
	Benzo(k)fluoranthene	µg/kg	254	96%	1000	1100	760	5.1	8800	35	1400

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	C1-Chrysenes	µg/kg	254	94%	1200	1400	750	3.8	8500	35	1400
	C1-Fluoranthenes/Pyrenes	µg/kg	254	94%	1700	1900	1000	6.7	12000	35	1400
	C1-Fluorenes	µg/kg	254	39%	110	180	<74	41	1600	0.63	1400
	C1-Naphthalenes	µg/kg	254	19%	61	76	<70	49	410	0.63	1400
	C1-Phenanthrenes/Anthracenes	µg/kg	254	91%	620	940	300	1.9	6200	35	1400
	C2-Chrysenes	µg/kg	254	93%	820	910	500	2.9	4400	33	1400
	C2-Fluoranthenes/Pyrenes	µg/kg	254	94%	1200	1300	690	5.1	7300	35	1400
	C2-Fluorenes	µg/kg	254	68%	290	790	97	0.71	7600	33	1400
	C2-Naphthalenes	µg/kg	254	87%	250	330	160	1.2	2700	33	1400
	C2-Phenanthrenes/Anthracenes	µg/kg	254	93%	1200	2500	430	2.3	23000	35	1400
	C3-Chrysenes	µg/kg	254	89%	460	510	280	2.5	2800	33	1400
	C3-Fluoranthenes/Pyrenes	µg/kg	254	91%	680	830	390	2.6	5000	33	1400
	C3-Fluorenes	µg/kg	254	78%	470	1200	160	1	9200	33	1400
	C3-Naphthalenes	µg/kg	254	93%	730	2200	250	2	25000	35	1400
	C3-Phenanthrenes/Anthracenes	µg/kg	254	91%	1200	2800	360	1.9	22000	33	1400
	C4-Chrysenes	µg/kg	254	66%	150	170	97	0.98	1000	33	1400
	C4-Naphthalenes	µg/kg	254	85%	1200	4100	170	1.4	37000	33	1400
	C4-Phenanthrenes/Anthracenes	µg/kg	254	88%	810	1700	250	1.5	11000	33	1400
	Chrysene	µg/kg	254	99%	1100	1400	680	3.9	12000	41	45
	Dibenz(a,h)anthracene	µg/kg	254	94%	260	270	180	1.3	1600	35	1400
	Fluoranthene	µg/kg	254	96%	1600	2200	840	4.6	20000	35	1400
	Fluorene	µg/kg	254	70%	80	140	52	0.41	1100	33	1400
	Indeno(1,2,3-cd)pyrene	µg/kg	254	99%	650	680	460	3.6	4200	39	45
	Naphthalene	µg/kg	254	88%	100	97	76	0.57	540	33	1400
	Perylene	µg/kg	254	98%	600	3500	320	2.2	56000	40	65
	Phenanthrene	µg/kg	254	93%	540	1200	260	1.5	11000	35	1400
	Pyrene	µg/kg	254	98%	2000	2400	1200	21	20000	40	52
	Total Alkylated PAHs	µg/kg	254	96%	13000	21000	6000	38	170000	35	1400
	Total HMW PAHs	µg/kg	254	99%	11000	12000	7000	37	100000	41	45
	Total HMW PAHs (ND*0.5)	µg/kg	254	99%	11000	12000	7000	41	100000	41	45
	Total HMW PAHs (ND*1)	µg/kg	254	99%	11000	12000	7000	45	100000	41	45
	Total LMW PAHs	µg/kg	254	96%	1400	2100	790	5.2	17000	35	1400
	Total LMW PAHs (ND*0.5)	µg/kg	254	96%	1400	2100	800	5.2	17000	35	1400
	Total LMW PAHs (ND*1)	µg/kg	254	96%	1400	2100	800	5.2	17000	35	1400
	Total PAH	µg/kg	254	99%	12000	14000	7700	37	110000	41	45
	Total PAH (ND*0.5)	µg/kg	254	99%	12000	14000	7800	46	110000	41	45
	Total PAH (ND*1)	µg/kg	254	99%	12000	14000	7800	50	110000	41	45
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	1,2-Diphenylhydrazine	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	247	0%	31.7	10.4	<61	56	56	40	230
	2,3,4,6-Tetrachlorophenol	µg/kg	247	0%	<316	--	<300	--	--	200	1100

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	2,4,5-Trichlorophenol	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	2,4,6-Trichlorophenol	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	2,4-Dichlorophenol	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	2,4-Dimethylphenol	µg/kg	247	1%	32.2	12.7	<61	92	130	40	230
	2,4-Dinitrophenol	µg/kg	247	0%	<1902	--	<1800	--	--	1200	6900
	2,4-Dinitrotoluene	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	2,6-Dinitrotoluene	µg/kg	247	0%	31.6	10.3	<61	31	31	40	230
	2-Chloronaphthalene	µg/kg	247	0%	<62.6	--	<60	--	--	40	230
	2-Chlorophenol	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	2-Methylphenol	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	2-Nitroaniline	µg/kg	247	0%	31.6	10.3	<61	33	33	40	230
	2-Nitrophenol	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	3,3'-Dichlorobenzidine	µg/kg	247	0%	<632	--	<610	--	--	400	2300
	3-Nitroaniline	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	4,6-Dinitro-2-methylphenol	µg/kg	247	0%	<948	--	<910	--	--	600	3400
	4-Bromophenyl phenyl ether	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	4-Chloro-3-methylphenol	µg/kg	247	0%	31.9	10.9	<61	88	88	40	230
	4-Chloroaniline	µg/kg	247	0%	61.9	22.8	<120	89	89	41	460
	4-Chlorophenyl phenyl ether	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	4-Methylphenol	µg/kg	249	65%	70	165	59	23	2500	40	200
	4-Nitroaniline	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	4-Nitrophenol	µg/kg	247	0%	<948	--	<910	--	--	600	3400
	Acetophenone	µg/kg	253	32%	45.1	45.7	<60	22	470	40	230
	Atrazine	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	Benzaldehyde	µg/kg	247	1%	159	51	<300	180	250	200	1100
	Benzidine	µg/kg	247	0%	<2080	--	<1000	--	--	600	8900
	Benzoic acid	µg/kg	247	7%	485	164	<900	270	1100	600	3400
	Biphenyl (1,1-Biphenyl)	µg/kg	247	17%	35.3	17.4	<60	25	160	40	230
	Butyl benzylphthalate (BBP)	µg/kg	247	1%	158	50.7	<300	110	140	200	1100
	Caprolactam	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	Carbazole	µg/kg	248	25%	67.5	295	<63	26	4600	40	230
	Di-n-butylphthalate (DBP)	µg/kg	247	0%	158	50.6	<300	170	170	200	1100
	Di-n-octyl phthalate (DnOP)	µg/kg	247	0%	158	51	<300	250	250	200	1100
	Dibenzofuran	µg/kg	248	38%	50.8	73.9	<58	20	970	40	230
	Diethyl phthalate	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	Dimethyl phthalate	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	Hexachlorobutadiene	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	Hexachlorocyclopentadiene	µg/kg	247	0%	<948	--	<910	--	--	600	3400
	Hexachloroethane	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	Isophorone	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	N-Nitrosodi-n-propylamine	µg/kg	247	0%	<63.2	--	<61	--	--	40	230

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	N-Nitrosodiphenylamine	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	Nitrobenzene	µg/kg	247	0%	31.6	10.3	<61	34	34	40	230
	Pentachlorophenol	µg/kg	247	0%	<322	--	<310	--	--	200	1200
	Phenol	µg/kg	247	17%	38	37.1	<59	20	480	40	230
	Pyridine	µg/kg	247	0%	<316	--	<300	--	--	200	1100
	bis(2-Chloroethoxy)methane	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	bis(2-Chloroethyl)ether	µg/kg	247	0%	<63.2	--	<61	--	--	40	230
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	253	78%	1120	3360	400	96	38000	210	460
Volatiles	1,2,4-Trichlorobenzene	µg/kg	254	1%	17.4	65.9	<9	4	10	4	1000
	1,2-Dichlorobenzene	µg/kg	254	0%	<43.6	--	<12	--	--	5	1300
	1,3-Dichlorobenzene	µg/kg	254	0%	<43.6	--	<12	--	--	5	1300
	1,4-Dichlorobenzene	µg/kg	254	1%	21.7	83.4	<11	4	6	5	1300
Herbicides	2,4,5-T	µg/kg	249	9%	3.2	4.8	<3.3	1.7	22	2	66
	2,4,5-TP (Silvex)	µg/kg	251	2%	3	4.6	<3.2	2.5	14	2	66
	2,4-DB	µg/kg	253	2%	30	45	<33	44	89	20	660
	2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/kg	252	4%	62	96	<67	22	93	43	1400
Petroleum Hydrocarbons	Eicosane	mg/kg	254	33%	0.11	0.131	<0.0874	0.0166	0.751	0.0398	1.64
	Heneicosane	mg/kg	254	50%	0.116	0.132	0.0966	0.0153	1.15	0.0398	1.64
	Heptacosane	mg/kg	254	31%	0.309	0.481	<0.245	0.0423	5.69	0.115	4.71
	Heptadecane	mg/kg	253	72%	0.206	0.247	0.131	0.0317	1.64	0.0398	1.64
	Hexatriacontane	mg/kg	254	36%	0.154	0.244	<0.0926	0.019	2.6	0.0398	1.64
	N-Decane	mg/kg	254	18%	0.192	0.328	<0.125	0.0276	2.78	0.0537	2.21
	N-Docosane	mg/kg	254	84%	0.418	0.612	0.209	0.0166	4.66	0.0398	0.817
	N-Dodecane	mg/kg	254	44%	0.139	0.154	<0.121	0.0171	1.04	0.0398	1.62
	N-Dotriacontane	mg/kg	254	80%	0.331	0.451	0.185	0.0262	3.9	0.0403	1.64
	N-Hentriacontane	mg/kg	254	54%	0.224	0.296	0.159	0.0207	2.74	0.0587	2.41
	N-Heptatriacontane	mg/kg	254	52%	0.123	0.202	0.0811	0.0158	2.34	0.0398	1.64
	N-Hexacosane	mg/kg	254	38%	0.127	0.163	<0.0895	0.0247	1.12	0.0398	1.64
	N-Hexadecane	mg/kg	254	23%	0.108	0.131	<0.0894	0.0141	0.697	0.0398	1.64
	N-Nonacosane	mg/kg	254	91%	0.317	0.508	0.186	0.0182	4.44	0.0403	1.64
	N-Nonadecane	mg/kg	254	28%	0.152	0.226	<0.122	0.0275	2.23	0.0398	1.64
	N-Octatriacontane	mg/kg	254	19%	0.108	0.168	<0.0885	0.0255	2.03	0.0398	1.64
	N-Tetracontane	mg/kg	254	61%	0.116	0.157	0.0779	0.0144	1.5	0.0403	1.64
	N-Tetracosane	mg/kg	254	70%	0.184	0.382	0.1	0.0153	4.8	0.0403	1.64
	N-Tetradecane	mg/kg	254	50%	0.194	0.215	<0.146	0.0186	1.76	0.0398	1.64
	N-Tetratriacontane	mg/kg	254	23%	0.111	0.162	<0.0894	0.0204	1.73	0.0398	1.64
	N-Triacontane	mg/kg	254	33%	0.259	0.353	<0.218	0.028	2.44	0.0735	3.01
	N-Tridecane	mg/kg	254	24%	0.109	0.178	<0.0886	0.0143	1.81	0.0398	1.64
	N-Tritriacontane	mg/kg	254	35%	0.121	0.143	<0.0911	0.0351	1.04	0.0398	1.64
	N-Undecane	mg/kg	254	6%	0.178	0.207	<0.17	0.0445	0.952	0.0733	3.01
	Nonane	mg/kg	254	12%	0.0949	0.11	<0.0905	0.015	0.33	0.0398	1.64

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Petroleum Hydrocarbons (cont.)	Nonatriacontane (C39)	mg/kg	254	9%	0.179	0.22	<0.163	0.0267	1.6	0.0724	2.98
	Octacosane	mg/kg	254	97%	0.904	1.16	0.517	0.0209	8.97	0.0403	0.427
	Octadecane	mg/kg	254	61%	0.131	0.135	0.0911	0.0208	0.773	0.0403	1.64
	PHC as Gasoline	mg/kg	254	30%	8.18	16.4	<3.25	0.3	130	0.6	54
	Pentacosane	mg/kg	254	83%	0.187	0.245	0.115	0.0175	2.3	0.0403	0.942
	Pentadecane	mg/kg	254	52%	0.114	0.149	0.082	0.0144	1.01	0.0398	1.64
	Pentatriacontane	mg/kg	254	81%	0.156	0.213	0.106	0.0156	2.37	0.0403	1.64
	Phytane	mg/kg	254	65%	0.152	0.211	0.0802	0.0169	1.15	0.0398	0.701
	Pristane	mg/kg	254	45%	0.192	0.409	<0.0905	0.0273	5.2	0.0398	1.64
	Total Petroleum Hydrocarbons (C9-C40)	mg/kg	254	97%	342	435	190	6.45	2910	14.6	135
	Tricosane	mg/kg	254	90%	0.282	0.335	0.172	0.0206	2.79	0.0403	0.405
Butyltins	Dibutyltin	µg/kg	61	21%	2.2	2.4	<2.8	2.7	15	1.5	3.6
	Monobutyltin hydride	µg/kg	61	0%	<38	--	<38	--	--	24	58
	Tetrabutyltin	µg/kg	61	2%	1.6	0.44	<3.1	2.6	2.6	2	4.8
	Tributyl tin	µg/kg	61	20%	2.2	2.3	<2.9	2.6	16	1.8	4.1
Metals	Aluminum	mg/kg	254	100%	13700	5960	14000	1650	35000	--	--
	Antimony	mg/kg	254	91%	0.933	1.17	0.497	0.126	7.79	0.167	0.444
	Arsenic	mg/kg	254	100%	18.3	16.8	13.3	1.18	115	--	--
	Barium	mg/kg	254	100%	156	161	117	5.5	1260	--	--
	Beryllium	mg/kg	254	100%	0.855	0.499	0.817	0.0807	4.39	--	--
	Cadmium	mg/kg	254	99%	2.06	3.28	0.905	0.0592	24.6	0.0867	0.103
	Calcium	mg/kg	252	100%	9900	18000	6940	416	239000	--	--
	Chromium	mg/kg	254	100%	123	117	95.8	3.95	777	--	--
	Chromium VI (hexavalent)	mg/kg	55	9%	1.57	0.952	<2.9	1.1	8	1.8	4.1
	Cobalt	mg/kg	254	100%	9.95	4.8	9.83	1.26	37.4	--	--
	Copper	mg/kg	254	100%	149	152	100	1.5	924	--	--
	Iron	mg/kg	254	100%	2.69E+04	13600	27200	2.91E+03	148000	--	--
	Lead	mg/kg	254	100%	166	220	111	2.18	2190	--	--
	Magnesium	mg/kg	254	100%	7160	3250	7140	943	27800	--	--
	Manganese	mg/kg	254	100%	335	140	351	37.5	676	--	--
	Mercury	ng/g	254	100%	2350	2850	1480	5.11	22100	--	--
	Methyl mercury	ng/g	254	100%	1.1	1.15	0.833	0.027	11.9	0.058	0.058
	Nickel	mg/kg	254	100%	40.9	28.9	37.9	3.83	282	--	--
	Potassium	mg/kg	254	100%	3460	1590	3410	519	9720	--	--
	Selenium	mg/kg	253	99%	1.02	1.11	0.704	0.0939	7.58	0.347	0.484
	Silver	mg/kg	254	100%	1.81	1.64	1.46	0.0448	12	0.103	0.103
	Sodium	mg/kg	254	100%	8170	3990	7880	1630	21400	--	--
	Thallium	mg/kg	254	98%	0.221	0.108	0.211	0.0358	0.717	0.0835	0.13
	Titanium	mg/kg	254	100%	431	148	446	104	738	--	--
	Vanadium	mg/kg	254	100%	37.8	17.9	37.4	4.43	142	--	--
	Zinc	mg/kg	254	100%	300	486	220	8.18	6810	--	--

Table 4-4
Phase III Surface Sediment Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
AVS/SEM	Acid volatile sulfide	µmol/g	59	97%	11.1	14.5	5.8	0.66	85.9	2	2
	Cadmium	µmol/g	61	100%	0.00543	0.00993	0.00277	0.000193	0.0591	--	--
	Copper	µmol/g	61	98%	0.366	0.26	0.292	0.0482	1.4	0.00376	0.00376
	Lead	µmol/g	61	100%	0.257	0.27	0.175	0.0137	1.61	--	--
	Mercury	µmol/g	58	9%	0.0000366	0.0000149	<0.0000729	7.4E-06	0.000138	0.0000714	0.0000746
	Nickel	µmol/g	61	100%	0.132	0.0917	0.11	0.0177	0.369	--	--
	Zinc	µmol/g	61	100%	1.39	1.69	0.941	0.198	10.4	--	--
Miscellaneous	Ammonia	mg/kg	58	28%	280	281	<322	94.4	241	226	2710
	Cyanide (total)	mg/kg	253	6%	0.485	0.392	<0.89	0.26	6.4	0.56	1.6
	Nitrogen	mg/kg	60	88%	1370	1300	1190	74.3	8520	191	254
	Oxidation reduction potential (ORP)	millivolts	61	100%	125	94.6	97	12	467	--	--
	Phosphorus	mg/kg	61	100%	765	425	698	67.2	2090	--	--
	Sulfide	mg/kg	60	100%	458	572	204	10.4	3440	--	--
	Total organic carbon (TOC)	mg/kg	254	99%	23600	16100	22200	1030	151000	668	689
	pH	s.u.	61	100%	7.73	0.272	7.72	6.73	8.6	--	--
Grain Size	Sieve, #200, passing	% passed	254	100%	56	27	61.1	2.6	96.8	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
AVS/SEM = acid-volatile sulfide/simultaneously extracted metals
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
s.u. = standard units
TEQ = toxic equivalency
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
µmol/g = micromole per gram
-- = not applicable due to frequency of detection
% = percent

Table 4-5
Organic Carbon Normalization Evaluation of Phase III Sediment Chemistry Data

Parameter Group	Analyte	Units	Number of Samples	Number of Detects	Frequency of Detection	Raw Data			Organic Carbon Normalized Data		
						Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Dioxins/ Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	254	254	100%	87.1	182	2.1	3,870	8,190	2.1
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	254	254	100%	115	201	1.7	5,220	9,500	1.8
PCBs	Total PCBs (9)	µg/kg	254	239	94%	239	317	1.3	11,700	14,800	1.3
	Total PCBs congener (209 specified)	ng/kg	254	254	100%	480,000	691,000	1.4	21,600,000	27,500,000	1.3
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	254	254	100%	6	11	1.8	281	531	1.9
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	254	254	100%	121	205	1.7	5,470	9,670	1.8
Pesticides	Dieldrin	pg/g	253	240	95%	1,740	3,508	2.0	81,000	152,000	1.9
	Hexachlorobenzene	pg/g	253	252	100%	2,870	6,250	2.2	120,000	218,000	1.8
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	254	254	100%	131,000	301,000	2.3	5,050,000	10,500,000	2.1
	Total DDx (4,4) Total Fraction	pg/g	254	254	100%	93,100	205,000	2.2	3,600,000	7,020,000	2.0
	Total alpha + gamma chlordane	pg/g	254	244	96%	5,070	4,800	0.9	262,000	469,000	1.8
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	253	198	78%	1,120	3,360	3.0	53,000	118,000	2.2
PAHs	Total Alkylated PAHs	µg/kg	254	245	96%	12,900	21,200	1.6	590,000	773,000	1.3
	Total HMW PAHs	µg/kg	254	252	99%	10,900	12,400	1.1	579,000	796,000	1.4
	Total LMW PAHs	µg/kg	254	245	96%	1,360	2,130	1.6	72,300	175,000	2.4
	Total PAH	µg/kg	254	252	99%	12,200	14,200	1.2	650,000	943,000	1.5
Total Petroleum Hydrocarbons (C9-C40)		mg/kg	254	246	97%	342	435	1.3	19,000	25,600	1.3

Acronyms and Abbreviations:
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TEQ = toxic equivalency
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
WHO = toxic equivalency
µg/kg = microgram per kilogram
% = percent

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	pg/L	30	100%	0.214	0.532	0.0665	0.037	2.24	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	pg/L	30	100%	0.0273	0.0436	0.0145	0.006	0.223	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	pg/L	30	100%	0.0601	0.107	0.0305	0.021	0.531	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	pg/L	30	100%	0.0612	0.0784	0.0445	0.017	0.413	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	pg/L	30	100%	0.00467	0.00484	0.003	0.001	0.022	--	--
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	pg/L	30	93%	0.00373	0.00222	0.0035	0.002	0.011	0.001	0.001
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	pg/L	30	100%	0.059	0.0791	0.0455	0.018	0.461	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	pg/L	30	100%	0.0161	0.0133	0.012	0.005	0.075	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	pg/L	30	100%	0.0176	0.021	0.013	0.006	0.123	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	pg/L	30	100%	0.00877	0.00729	0.007	0.004	0.04	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	pg/L	30	100%	0.00905	0.00397	0.008	0.005	0.023	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	pg/L	30	93%	0.0164	0.00996	0.014	0.007	0.046	0.003	0.004
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	pg/L	30	100%	0.0393	0.0309	0.032	0.019	0.187	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	pg/L	30	100%	0.0127	0.00869	0.01	0.006	0.043	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	pg/L	30	100%	0.074	0.0575	0.0605	0.032	0.349	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	30	100%	0.761	1.65	0.423	0.119	9.35	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	pg/L	30	100%	0.109	0.0457	0.094	0.063	0.307	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/L	30	100%	0.217	0.254	0.157	0.0518	1.43	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/L	30	97%	0.182	0.8	0.0284	0.0109	4.42	0.00556	0.00556
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/L	30	100%	0.00448	0.00142	0.0041	0.00251	0.00826	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/L	30	83%	0.00162	0.00106	0.00158	0.00061	0.00433	0.00031	0.00054
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/L	30	100%	0.0239	0.0297	0.0143	0.0072	0.164	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/L	30	3%	0.0000277	1.68E-05	<0.00005	0.00011	0.00011	0.00004	0.00011
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/L	30	100%	0.00493	0.00497	0.00338	0.00188	0.0289	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/L	30	100%	0.00251	0.00293	0.00163	0.00081	0.0165	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/L	30	100%	0.27	0.528	0.0706	0.0318	2.73	--	--
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/L	28	96%	0.107	0.0569	0.101	0.0466	0.245	0.00018	0.00018
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/L	30	80%	0.000053	2.36E-05	0.000055	0.00004	0.0001	0.00002	0.00007
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/L	30	90%	0.000374	0.000208	0.00033	0.00015	0.00088	0.00005	0.00007
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/L	30	100%	0.00197	0.00244	0.00118	0.0006	0.0137	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/L	30	100%	0.0605	0.0625	0.04	0.0211	0.35	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/L	30	100%	0.0652	0.0916	0.0257	0.01	0.469	--	--
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/L	30	100%	0.000337	0.000215	0.000265	0.0002	0.00136	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/L	30	77%	0.0000515	2.21E-05	0.00006	0.00003	0.0001	0.00003	0.00008
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/L	30	100%	0.00089	0.000855	0.00061	0.00029	0.00476	--	--
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/L	30	100%	0.00129	0.00137	0.00086	0.00044	0.00785	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/L	22	86%	0.000112	0.000213	0.000065	0.00003	0.00105	0.00002	0.00002
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/L	28	68%	0.0000338	3.01E-05	0.000025	0.00002	0.00012	0.00001	0.00005
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/L	30	100%	0.00541	0.00442	0.00423	0.00247	0.0255	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/L	30	100%	0.0485	0.0306	0.0389	0.0237	0.183	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/L	30	100%	0.00337	0.00199	0.00279	0.0016	0.0114	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/L	30	100%	0.0013	0.00113	0.000945	0.0005	0.00641	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/L	28	100%	0.0274	0.0212	0.0204	0.0124	0.117	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/L	30	100%	0.000943	0.000494	0.000785	0.00057	0.00307	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/L	30	100%	0.00601	0.00408	0.00459	0.00281	0.0235	--	--

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/L	30	100%	0.0323	0.0205	0.0264	0.0159	0.121	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/L	30	100%	0.0253	0.018	0.0208	0.0117	0.107	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/L	30	100%	0.00246	0.00145	0.00203	0.00107	0.00774	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/L	30	100%	0.00164	0.00103	0.00132	0.00077	0.00609	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/L	30	23%	0.000793	0.000782	<0.000935	0.001	0.00375	0.0007	0.00104
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/L	30	100%	0.00824	0.0059	0.00605	0.00335	0.0317	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/L	30	0%	<0.0000726	--	<0.00007	--	--	0.00005	0.00015
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/L	30	70%	0.000153	8.83E-05	0.000135	0.00012	0.000395	0.00008	0.00013
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/L	30	100%	0.00463	0.00507	0.00307	0.0018	0.0263	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/L	30	23%	0.0000955	5.34E-05	<0.00014	0.00012	0.00025	0.0001	0.00024
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/L	30	100%	0.00774	0.00382	0.00649	0.00414	0.0236	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/L	30	100%	0.0649	0.0385	0.0544	0.0301	0.227	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/L	30	93%	0.000273	0.00014	0.00025	0.00015	0.00069	0.00003	0.00004
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/L	30	100%	0.254	0.542	0.0954	0.0527	3.03	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/L	30	100%	0.00114	0.000747	0.000955	0.00048	0.00443	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/L	30	97%	0.000376	0.000149	0.000345	0.00023	0.00097	0.00011	0.00011
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/L	30	100%	0.0331	0.0173	0.0285	0.0163	0.102	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/L	30	100%	0.00231	0.00154	0.00195	0.00093	0.00826	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/L	30	97%	0.00181	0.00197	0.00151	0.0005	0.0116	0.00008	0.00008
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/L	30	100%	0.00223	0.00194	0.00155	0.00084	0.01	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/L	30	100%	0.00306	0.00208	0.00235	0.00122	0.0112	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/L	30	0%	<0.0000107	--	<0.00001	--	--	0.00001	0.00003
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/L	30	100%	0.863	2.21	0.245	0.0842	12.2	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/L	30	0%	<0.000091	--	<0.00008	--	--	0.00006	0.00024
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/L	30	3%	0.000403	0.00218	<0.00001	0.0119	0.0119	0.00001	0.00004
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/L	30	70%	0.000109	0.000164	0.000045	0.00003	0.00073	0.00001	0.00001
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/L	30	100%	0.00185	0.00131	0.00138	0.00073	0.0072	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/L	23	74%	0.0000185	8.32E-06	0.00002	0.00001	0.00003	0.00001	0.00004
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/L	30	100%	0.000656	0.000454	0.000495	0.00028	0.00247	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/L	30	3%	4.73E-06	1.80E-06	<0.00001	0.00001	0.00001	4.00E-06	0.00002
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/L	30	100%	0.852	1.85	0.31	0.119	10.3	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/L	30	100%	0.00319	0.00188	0.00252	0.00126	0.0103	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-	ng/L	19	95%	0.00192	0.000889	0.00177	0.00109	0.00403	0.00002	0.00002
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/L	30	100%	0.000587	0.000314	0.00049	0.00023	0.00176	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/L	27	100%	0.00517	0.00235	0.00435	0.0024	0.0124	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/L	25	100%	0.000318	0.000104	0.00027	0.00017	0.00057	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/L	30	100%	0.000748	0.000456	0.000545	0.00034	0.00271	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/L	25	100%	0.00885	0.00278	0.0076	0.00505	0.0155	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/L	30	100%	0.00194	0.00087	0.0017	0.001	0.00536	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/L	30	100%	0.00293	0.00159	0.00252	0.00139	0.00967	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/L	30	100%	1.25	3.08	0.381	0.136	17.1	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/L	30	100%	0.00574	0.00329	0.00462	0.00229	0.0176	--	--

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/L	25	96%	0.0000574	2.04E-05	0.00005	0.00004	0.00011	0.00001	0.00001
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/L	27	85%	0.000696	0.00343	0.00004	0.00002	0.0179	0.00001	0.00001
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/L	17	100%	0.00438	0.00146	0.00397	0.00243	0.00782	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/L	30	80%	0.0000638	3.86E-05	0.00007	0.00004	0.0002	0.00002	0.00006
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/L	30	0%	<0.000041	--	<0.00004	--	--	0.00003	0.00009
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/L	25	100%	0.0093	0.00253	0.00866	0.00525	0.0153	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/L	30	100%	0.000137	8.06E-05	0.000125	0.00006	0.0005	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/L	30	100%	0.0000423	3.53E-05	0.00003	0.00001	0.00017	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/L	30	100%	0.294	0.498	0.129	0.0632	2.78	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/L	30	100%	0.000446	0.000258	0.000355	0.00018	0.00136	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/L	30	100%	0.000078	4.37E-05	0.00006	0.00003	0.00022	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/L	30	0%	<5.04E-6	--	<3E-6	--	--	3.00E-06	0.00002
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/L	30	100%	0.000353	0.000337	0.00023	0.0001	0.00167	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/L	30	100%	0.000245	0.000209	0.00017	0.00008	0.00098	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/L	30	100%	0.000349	0.000282	0.00025	0.00013	0.00133	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/L	30	100%	0.000307	0.000232	0.000235	0.00011	0.00127	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/L	30	100%	0.00092	0.000589	0.000765	0.00044	0.00354	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/L	30	97%	0.0469	0.046	0.0263	0.0134	0.187	0.0032	0.0032
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/L	30	100%	1.17	2.4	0.429	0.209	13.4	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/L	30	100%	0.00015	9.57E-05	0.00012	0.00006	0.00049	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/L	30	100%	0.000937	0.000382	0.00083	0.00051	0.00232	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/L	30	100%	0.000563	0.000412	0.00042	0.00022	0.00198	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/L	30	0%	<0.0000123	--	<0.00001	--	--	0.00001	0.00004
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/L	30	97%	0.0000136	1.21E-05	0.00001	4.00E-06	0.00006	1.00E-06	1.00E-06
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/L	30	100%	0.00017	0.000246	0.00007	0.00004	0.00122	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/L	30	97%	0.0000347	3.71E-05	0.00002	0.00001	0.00016	3.00E-06	3.00E-06
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/L	30	100%	0.000162	0.000155	0.0001	0.00005	0.00067	--	--
	(PCB 209) Decachlorobiphenyl	ng/L	30	100%	0.000121	0.000268	0.00003	0.00001	0.00133	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/L	30	100%	0.482	1.3	0.114	0.0436	7.19	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/L	30	100%	0.342	0.833	0.0976	0.0409	4.61	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/L	30	57%	0.00133	0.00329	0.00041	0.00037	0.0181	0.0003	0.00041
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/L	30	67%	0.00651	0.00848	0.00328	0.00202	0.0375	0.00073	0.00107
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/L	30	100%	0.0795	0.121	0.0394	0.0196	0.683	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/L	30	100%	0.17	0.312	0.0663	0.0338	1.75	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/L	30	100%	0.0807	0.126	0.0409	0.0202	0.712	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/L	30	93%	0.0418	0.101	0.0178	0.0104	0.57	0.00576	0.0067
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/L	30	100%	0.715	1.48	0.252	0.119	8.18	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/L	30	100%	0.206	0.34	0.0886	0.0429	1.88	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/L	30	100%	0.00616	0.0101	0.00277	0.00116	0.0567	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/L	30	100%	0.0117	0.0258	0.00393	0.00169	0.141	--	--
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/L	30	60%	0.000269	0.000193	0.00026	0.00023	0.00074	0.00014	0.0002
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/L	30	100%	0.0906	0.136	0.0406	0.0178	0.717	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/L	30	63%	0.000448	0.000383	0.00036	0.00026	0.00143	0.00017	0.00025
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/L	30	100%	0.00379	0.00613	0.00187	0.00093	0.0347	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/L	30	100%	1.3	2.5	0.506	0.191	13.9	--	--

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/L	30	100%	0.282	0.338	0.163	0.0968	1.92	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/L	30	97%	0.0537	0.0923	0.0229	0.00981	0.493	0.0016	0.0016
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/L	30	100%	0.239	0.272	0.141	0.0744	1.54	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/L	30	100%	0.0394	0.0475	0.0223	0.0121	0.265	--	--
	(PCB 44/47/65) 2,2',3,5'-TeCB/2,2',4,4'-TeCB/2,3,5,6-TeCB	ng/L	30	100%	0.702	0.734	0.439	0.247	4.19	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/L	30	100%	0.178	0.315	0.0812	0.0436	1.77	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/L	30	100%	0.061	0.0863	0.0317	0.0171	0.484	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/L	30	100%	0.128	0.152	0.0659	0.0334	0.818	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/L	30	100%	0.361	0.337	0.235	0.137	1.93	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/L	30	73%	0.00786	0.0102	0.00418	0.00239	0.0419	0.00173	0.00233
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/L	30	100%	0.144	0.169	0.0879	0.0484	0.968	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/L	30	97%	0.0599	0.0245	0.0601	0.0252	0.114	0.00079	0.00079
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/L	30	100%	0.693	0.8	0.433	0.217	4.51	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/L	30	93%	0.0159	0.0098	0.0149	0.00736	0.0553	0.00156	0.00192
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/L	30	90%	0.00186	0.00163	0.00138	0.00067	0.00818	0.00012	0.00015
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/L	30	100%	0.124	0.182	0.0628	0.0313	1.02	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/L	30	97%	0.00291	0.00685	0.00101	0.00054	0.0354	0.00011	0.00011
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/L	30	90%	0.000883	0.000492	0.00078	0.00049	0.00198	0.00011	0.00014
	(PCB 59/62/75) 2,3,3',6-TeCB/2,3,4,6-TeCB/ 2,4,4',6-TeCB	ng/L	30	100%	0.041	0.032	0.0277	0.0154	0.172	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/L	30	97%	0.121	0.216	0.0482	0.0229	1.19	0.00148	0.00148
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/L	30	100%	0.0485	0.087	0.0211	0.0101	0.479	--	--
	(PCB 61/70/74/76) 2,3,4,5-TeCB/2,3',4',5-TeCB/2,4,4',5-TeCB/2,3',4',5'-TeCB	ng/L	30	100%	0.439	0.61	0.23	0.112	3.4	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/L	30	100%	0.026	0.0284	0.0159	0.00927	0.16	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/L	30	100%	0.123	0.193	0.0616	0.0328	1.1	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/L	30	100%	0.222	0.287	0.124	0.059	1.62	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/L	30	100%	0.00646	0.00675	0.00412	0.0021	0.0383	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/L	30	100%	0.00363	0.00139	0.00322	0.00187	0.00872	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/L	30	87%	0.0299	0.0652	0.00897	0.00255	0.352	0.00149	0.00177
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/L	30	100%	0.00276	0.00155	0.0022	0.00123	0.00901	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/L	30	83%	0.000952	0.00053	0.000925	0.00052	0.00228	0.00016	0.00021
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/L	30	100%	0.0125	0.0202	0.00609	0.00309	0.113	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/L	30	0%	<0.000101	--	<0.0001	--	--	0.00008	0.00019
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/L	30	97%	0.00162	0.00297	0.000895	0.00053	0.017	0.00006	0.00006
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/L	30	100%	0.703	1.74	0.178	0.0601	9.57	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/L	30	0%	<0.0000494	--	<0.00005	--	--	0.00004	0.0001
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/L	30	90%	0.000518	0.000768	0.000265	0.00014	0.00419	0.00011	0.00012
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/L	30	100%	0.0278	0.0283	0.0193	0.00837	0.159	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/L	30	100%	0.0123	0.00834	0.0104	0.00448	0.046	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/L	30	97%	0.0647	0.0378	0.0559	0.0273	0.16	0.00013	0.00013
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/L	30	100%	0.0387	0.0303	0.029	0.0148	0.172	--	--

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/L	30	100%	0.116	0.0993	0.0879	0.0412	0.566	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/L	30	37%	0.000331	0.00032	<0.00032	0.0003	0.00155	0.00023	0.00033
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/L	30	93%	0.00378	0.00245	0.00291	0.00169	0.011	0.00014	0.00019
	(PCB 9) 2,5-Dichlorobiphenyl	ng/L	30	97%	0.0398	0.0843	0.0107	0.00347	0.453	0.00147	0.00147
	(PCB 90/101/113) 2,2',3,4',5-PeCB/2,2',4,5,5'-PeCB/2,3,3',5',6-PeCB	ng/L	30	100%	0.152	0.102	0.122	0.0602	0.587	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/L	30	100%	0.0516	0.0302	0.0415	0.0235	0.175	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/L	30	97%	0.0332	0.0222	0.0282	0.0144	0.123	0.00006	0.00006
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/L	30	97%	0.00986	0.00393	0.00995	0.00386	0.0218	0.0007	0.0007
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/L	30	100%	0.00305	0.00146	0.0027	0.0016	0.00951	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/L	30	100%	0.191	0.172	0.145	0.0741	0.98	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/L	30	100%	0.00794	0.00779	0.00512	0.00331	0.0462	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/L	30	100%	0.0151	0.00963	0.012	0.00702	0.0587	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/L	30	100%	0.107	0.0646	0.088	0.0474	0.382	--	--
	Total PCBs congener (209 specified)	ng/L	30	100%	15.3	27.1	6.73	3.99	152	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/L	30	100%	15.3	27.1	6.74	3.99	152	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/L	30	100%	15.3	27.1	6.74	3.99	152	--	--
Pesticides	2,4'-DDD	ng/mL	30	100%	0.000175	0.000207	0.0000981	5.94E-05	0.00115	--	--
	2,4'-DDE	ng/mL	30	100%	0.0004	0.00081	0.000158	5.87E-05	0.0044	--	--
	2,4'-DDT	ng/mL	30	10%	3.62E-08	1.08E-07	<7.1E-9	1.75E-07	5.55E-07	7.10E-09	2.02E-08
	4,4'-DDD	ng/mL	30	100%	0.000378	0.000545	0.000195	0.000114	0.00296	--	--
	4,4'-DDE	ng/mL	30	100%	0.00129	0.00179	0.000777	0.000304	0.00958	--	--
	4,4'-DDT	ng/mL	30	13%	1.09E-07	3.94E-07	<1.08E-8	2.10E-07	2.13E-06	1.08E-08	2.02E-08
	Aldrin	ng/mL	30	67%	5.10E-07	4.31E-07	5.46E-07	2.60E-07	1.31E-06	8.60E-09	1.41E-08
	Dieldrin	ng/mL	30	100%	0.000248	0.000158	0.000199	0.000127	0.000868	--	--
	Endosulfan I	ng/mL	30	20%	0.00012	0.000255	<5.12E-6	0.000335	0.000834	5.12E-06	0.0000195
	Endosulfan II	ng/mL	30	0%	<0.000019	--	<0.0000153	--	--	0.0000153	0.0000254
	Endosulfan sulfate	ng/mL	30	0%	<0.000022	--	<0.0000181	--	--	0.0000181	0.0000287
	Endrin	ng/mL	30	0%	<2.08E-8	--	<1.57E-8	--	--	1.57E-08	2.95E-08
	Endrin aldehyde	ng/mL	30	3%	1.56E-06	1.89E-06	<1.9E-6	1.14E-05	1.14E-05	1.90E-06	3.32E-06
	Endrin ketone	ng/mL	27	4%	1.88E-06	7.78E-06	<6.05E-7	4.08E-05	4.08E-05	6.05E-07	1.12E-06
	Heptachlor	ng/mL	30	87%	2.94E-06	1.33E-06	3.24E-06	2.35E-06	5.74E-06	7.80E-08	7.80E-08
	Heptachlor endo-epoxide	ng/mL	30	3%	2.57E-06	1.33E-05	<1.9E-7	7.28E-05	7.28E-05	1.90E-07	4.75E-07
	Heptachlor epoxide	ng/mL	30	43%	7.65E-06	1.03E-05	<1.46E-7	9.06E-06	3.64E-05	1.42E-07	1.46E-07
	Hexachlorobenzene	ng/mL	30	100%	0.000704	0.00163	0.000237	3.83E-05	0.00778	--	--
	Methoxychlor	ng/mL	29	0%	<0.0000191	--	<7.23E-6	--	--	7.23E-06	0.0000416
	Mirex	ng/mL	28	57%	6.35E-07	6.34E-07	7.76E-07	5.87E-07	2.36E-06	5.00E-09	6.80E-09
	Oxychlordane	ng/mL	30	7%	8.27E-08	2.70E-07	<2.38E-8	8.25E-07	1.28E-06	2.38E-08	3.22E-08
	Total DDx (2,4 & 4,4) Total Fraction	ng/mL	30	100%	0.00224	0.00292	0.0013	0.00062	0.015	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	ng/mL	30	100%	0.00224	0.00292	0.0013	0.00062	0.015	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	ng/mL	30	100%	0.00224	0.00292	0.0013	0.00062	0.015	--	--
	Total DDx (4,4) Total Fraction	ng/mL	30	100%	0.00165	0.00199	0.00098	0.00047	0.01	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	ng/mL	30	100%	0.00165	0.00199	0.00098	0.00047	0.01	--	--

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total DDx (4,4) Total Fraction (ND*1)	ng/mL	30	100%	0.00165	0.00199	0.00098	0.00047	0.01	--	--
	Total alpha + gamma chlordane	ng/mL	30	100%	0.000291	8.72E-05	0.00029	0.00014	0.00047	--	--
	Total alpha + gamma chlordane (ND*0.5)	ng/mL	30	100%	0.000291	8.72E-05	0.00029	0.00014	0.00047	--	--
	Total alpha + gamma chlordane (ND*1)	ng/mL	30	100%	0.000291	8.72E-05	0.00029	0.00014	0.00047	--	--
	alpha-BHC	ng/mL	30	17%	0.0000128	3.15E-05	<2.04E-6	2.18E-05	0.000134	1.82E-06	2.04E-06
	alpha-Chlordane	ng/mL	30	100%	0.000149	5.23E-05	0.000148	0.000065	0.000283	--	--
	beta-BHC	ng/mL	30	0%	<2.78E-6	--	<3.31E-6	--	--	1.84E-06	3.31E-06
	cis-Nonachlor	ng/mL	30	97%	0.0000164	6.30E-06	0.0000162	9.89E-06	3.69E-05	2.78E-08	2.78E-08
	delta-BHC	ng/mL	30	0%	<1.084E-6	--	<1.07E-6	--	--	1.07E-06	1.11E-06
	gamma-BHC (lindane)	ng/mL	30	0%	<1.94E-6	--	<2.2E-6	--	--	1.50E-06	2.20E-06
	gamma-Chlordane	ng/mL	30	100%	0.000143	4.24E-05	0.000143	7.82E-05	0.000258	--	--
	trans-Nonachlor	ng/mL	30	100%	0.0000581	2.12E-05	0.0000568	2.12E-05	0.000109	--	--
PAHs	1-Methylnaphthalene	ng/L	30	0%	<84	--	<85	--	--	67	100
	2-Methylnaphthalene	ng/L	30	7%	64	81	<89	270	430	69	110
	Acenaphthene	ng/L	30	10%	44	86	<43	96	470	34	52
	Acenaphthylene	ng/L	30	27%	640	820	<580	580	3200	440	680
	Anthracene	ng/L	30	47%	34	63	<16	14	330	11	17
	Benzo(a)anthracene	ng/L	30	100%	4.3	4.8	2.5	0.86	24	--	--
	Benzo(a)pyrene	ng/L	30	100%	2.5	1.9	1.7	0.79	8.8	--	--
	Benzo(b)fluoranthene	ng/L	30	100%	1.7	1.3	1.3	0.6	7.6	--	--
	Benzo(e)pyrene	ng/L	30	100%	2.4	1.5	2	1	8.3	--	--
	Benzo(g,h,i)perylene	ng/L	30	100%	0.59	0.92	0.37	0.19	5.3	--	--
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	30	100%	1.1	0.83	0.84	0.35	4.2	--	--
	C1-Chrysenes	ng/L	30	100%	9.1	8.2	5.4	3.2	30	--	--
	C1-Fluoranthenes/Pyrenes	ng/L	30	100%	58	55	35	16	220	--	--
	C1-Fluorenes	ng/L	30	7%	8.4	7.5	<14	14	47	11	17
	C1-Naphthalenes	ng/L	30	0%	<86	--	<86	--	--	68	110
	C1-Phenanthrenes/Anthracenes	ng/L	30	23%	47	140	<7	19	640	5.2	8.1
	C2-Chrysenes	ng/L	30	100%	3	3.2	1.8	0.89	14	--	--
	C2-Fluoranthenes/Pyrenes	ng/L	30	100%	12	11	6.8	3.7	48	--	--
	C2-Fluorenes	ng/L	30	13%	68	200	<11	140	830	8.4	13
	C2-Naphthalenes	ng/L	30	7%	16	15	<26	33	93	20	32
	C2-Phenanthrenes/Anthracenes	ng/L	30	67%	33	86	7.7	5	440	0.83	1.2
	C3-Chrysenes	ng/L	30	100%	1.8	4.4	0.67	0.28	24	--	--
	C3-Fluoranthenes/Pyrenes	ng/L	30	100%	6.9	7.4	3.8	1.9	30	--	--
	C3-Fluorenes	ng/L	30	10%	25	86	<1.5	59	400	1.1	2.3
	C3-Naphthalenes	ng/L	30	3%	8.9	24	<8.9	140	140	7	11
	C3-Phenanthrenes/Anthracenes	ng/L	30	87%	19	40	6	3.6	210	0.36	1.1
	C4-Chrysenes	ng/L	30	100%	0.08	0.2	0.02	0.01	1.1	--	--
	C4-Naphthalenes	ng/L	30	20%	72	240	<2.1	19	1000	1.6	2.6
	C4-Phenanthrenes/Anthracenes	ng/L	30	50%	2.9	5.5	0.64	0.94	26	0.09	0.33
	Chrysene	ng/L	30	100%	4.8	4.6	2.7	1.2	23	--	--
	Dibenz(a,h)anthracene	ng/L	30	87%	0.067	0.099	0.048	0.03	0.57	0.03	0.03
	Fluoranthene	ng/L	30	100%	35	42	17	5.5	190	--	--
	Fluorene	ng/L	30	7%	22	19	<35	69	110	27	42
	Indeno(1,2,3-cd)pyrene	ng/L	30	100%	0.25	0.51	0.13	0.05	2.9	--	--
	Naphthalene	ng/L	30	3%	190	52	<380	440	440	290	460
	Perylene	ng/L	30	57%	0.19	0.18	0.17	0.14	0.75	0.12	0.18

Table 4-6
Porewater Chemistry Summary Statistics

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Phenanthrene	ng/L	30	7%	8	7.1	<13	27	39	9.8	15
	Pyrene	ng/L	30	100%	200	200	130	36	750	--	--
	Total Alkylated PAHs	ng/L	30	100%	360	840	73	34	3800	--	--
	Total HMW PAHs	ng/L	30	100%	250	240	160	59	930	--	--
	Total HMW PAHs (ND*0.5)	ng/L	30	100%	250	240	160	59	930	--	--
	Total HMW PAHs (ND*1)	ng/L	30	100%	250	240	160	59	930	--	--
	Total LMW PAHs	ng/L	30	50%	680	880	580	14	3200	440	680
	Total LMW PAHs (ND*0.5)	ng/L	30	50%	870	950	600	490	3500	440	680
	Total LMW PAHs (ND*1)	ng/L	30	50%	1100	1100	830	980	3900	440	680
	Total PAH	ng/L	30	100%	800	1200	180	59	4100	--	--
	Total PAH (ND*0.5)	ng/L	30	100%	1300	1100	740	540	4400	--	--
	Total PAH (ND*1)	ng/L	30	100%	1700	1000	1400	980	4700	--	--
Metals	Aluminum	mg/L	29	14%	0.159	0.307	<0.13	0.203	1.51	0.13	0.13
	Antimony	mg/L	29	3%	0.00108	0.00125	<0.0017	0.0076	0.0076	0.0017	0.0017
	Arsenic	mg/L	29	31%	0.0123	0.0176	<0.0054	0.0183	0.0748	0.0054	0.0054
	Barium	mg/L	29	100%	0.0757	0.031	0.0707	0.0476	0.179	--	--
	Beryllium	mg/L	29	0%	<0.00036	--	<0.00036	--	--	0.00036	0.00036
	Cadmium	mg/L	29	0%	<0.00188	--	<0.0023	--	--	0.0012	0.0023
	Calcium	mg/L	29	100%	257	19.3	257	216	296	--	--
	Chromium	mg/L	29	90%	0.00619	0.00291	0.0058	0.0036	0.0148	0.0035	0.0035
	Cobalt	mg/L	29	0%	<0.000604	--	<0.0005	--	--	0.0005	0.001
	Copper	mg/L	29	17%	0.00191	0.00292	<0.002	0.0021	0.0155	0.002	0.002
	Iron	mg/L	29	97%	1.12	1.12	0.89	0.128	5.14	0.115	0.115
	Lead	mg/L	29	21%	0.00106	0.00189	<0.00065	0.00097	0.0076	0.00065	0.00065
	Magnesium	mg/L	29	100%	713	65.3	705	624	875	--	--
	Manganese	mg/L	29	100%	1.18	1	0.907	0.114	4.29	--	--
	Mercury	ng/L	30	97%	139	62.2	130	52.9	348	1.65	1.65
	Methyl mercury	ng/L	30	100%	137	71.5	114	33.1	368	--	--
	Nickel	mg/L	29	0%	<0.0047	--	<0.0047	--	--	0.0047	0.0047
	Potassium	mg/L	29	100%	252	19.7	251	217	314	--	--
	Selenium	mg/L	29	34%	0.00183	0.000828	<0.0025	0.0025	0.0034	0.0025	0.0025
	Silver	mg/L	29	0%	<0.00055	--	<0.00055	--	--	0.00055	0.00055
	Sodium	mg/L	29	100%	6940	635	6940	5760	8550	--	--
	Thallium	mg/L	29	0%	<0.00075	--	<0.00075	--	--	0.00075	0.00075
	Titanium	mg/L	28	71%	0.00996	0.0182	0.0067	0.0039	0.0898	0.0017	0.0017
	Vanadium	mg/L	29	83%	0.00389	0.00191	0.0036	0.0025	0.0074	0.0022	0.0022
	Zinc	mg/L	29	10%	0.0399	0.0767	<0.037	0.0967	0.402	0.037	0.037
Miscellaneous	Ammonia	mg/L	29	100%	14.4	23.1	5.6	0.07	91	--	--
	Dissolved organic carbon (DOC)	mg/L	29	100%	11.4	5.1	9.9	5.3	24.6	--	--
	Sulfide	mg/L	30	100%	54.4	40.3	39.5	1.9	189	--	--

Table 4-6
Porewater Chemistry Summary Statistics

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/L = milligram per liter
ND = nondetect
ng/L = nanogram per liter
ng/mL = nanogram per milliliter
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/L = picogram per liter
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
-- = not applicable due to frequency of detection
% = percent

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	8	100%	20.5	16.7	15.1	9.4	60.4	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	8	100%	3.08	2.42	1.88	1.23	8.52	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	8	100%	3.62	3.08	2.77	1.9	11.1	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	8	100%	2.91	1.03	2.77	1.64	4.53	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	8	100%	0.159	0.0444	0.165	0.106	0.241	--	--
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	0.161	0.0575	0.145	0.106	0.291	--	--
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.902	0.491	0.831	0.42	1.96	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	0.507	0.216	0.435	0.316	0.992	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.427	0.128	0.41	0.27	0.637	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	0.219	0.0956	0.203	0.125	0.417	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.0938	0.0136	0.0963	0.0674	0.111	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	8	25%	2.07	0.807	<4.91	0.279	1.45	4.87	4.99
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	8	100%	0.613	0.11	0.572	0.486	0.819	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.238	0.0479	0.234	0.173	0.311	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	8	100%	0.952	0.235	0.908	0.645	1.32	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	8	100%	4.91	5.15	3.33	1.2	17.1	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	8	100%	1.97	0.205	1.96	1.68	2.26	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	8	100%	8.34	5.42	6.79	3.85	21.1	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	8	100%	10.2	5.87	9.13	5.37	23.6	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	8	100%	12	6.5	11.6	5.37	26.1	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	8	100%	6.02	5.21	4.52	1.83	18.4	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	8	100%	7.87	5.64	6.72	3.41	20.9	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	8	100%	9.71	6.23	9.17	3.41	23.3	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	100%	5.95	5.16	4.49	1.8	18.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	8	100%	7.8	5.59	6.62	3.34	20.7	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	8	100%	9.65	6.2	9.07	3.34	23.2	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	8	100%	7.33	4.76	6.08	4.09	18.7	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	8	100%	5.47	2.68	4.36	2.93	11.1	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	3.41	0.934	3.25	2.39	5.17	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	6.52	1.39	6.14	4.57	8.47	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	8	100%	18.9	12.4	24.1	4.09	31.2	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	8	100%	11.8	3.2	11.3	8.13	16.6	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	8	100%	8.44	8.22	5.9	3.07	28.2	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	8	100%	26.6	11.2	23.9	14.1	46.8	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	8	100%	9.34	6.86	7.22	4.35	24.6	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	8	100%	23.8	14.4	16.7	10.7	46.2	--	--

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	8	100%	44.5	13.6	42.5	28	68.2	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	8	88%	4.1	1.96	4.78	1.53	6.82	4.88	4.88
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	8	100%	728	377	506	435	1440	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	8	100%	130	43.6	114	82.2	201	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	8	100%	29.4	13.8	23.7	15.2	50.8	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	8	100%	166	144	81.8	54.9	431	--	--
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	6	100%	1520	542	1340	952	2440	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	8	88%	4.46	1.07	4.57	4.04	6.04	4.95	4.95
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	8	38%	3.64	2.5	<4.87	1.85	8.75	4.81	4.95
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	49.4	29.7	32.3	26.4	107	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	1130	474	892	696	1850	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	8	100%	25.9	20.5	16.3	6.35	59.8	--	--
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	8	100%	19	3.55	17.7	15.1	25.5	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	8	63%	2.19	0.486	2.53	1.25	2.8	4.84	4.97
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	8	88%	9.92	6.77	6.69	5.35	23	4.88	4.88
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	48.1	19.4	39	32.2	89.5	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	6	100%	7.75	3.25	6.42	5.09	13.8	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	7	14%	2.77	0.837	<4.93	4.67	4.67	4.84	4.97
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	8	100%	293	80.2	252	218	422	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	8	100%	2740	620	2640	2060	3570	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	8	100%	117	26	111	87.6	150	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	8	100%	13.7	5.78	11.3	7.77	23.7	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	8	100%	299	108	270	190	481	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	8	100%	73.7	11.6	72.6	56.7	90.5	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	8	100%	94.5	31.3	85.5	63.3	151	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	8	100%	722	213	702	490	992	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	8	100%	262	85.9	234	176	416	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	8	100%	94.1	30.3	82.6	60.7	146	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	8	100%	29.9	7.99	28.7	20.5	43.7	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	8	13%	0.999	0.0617	<1.95	1.15	1.15	1.92	1.98

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	8	100%	172	69.7	171	84.2	255	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	7	0%	<4.92	--	<4.93	--	--	4.84	4.97
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	8	0%	<9.8	--	<9.81	--	--	9.62	9.94
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	8	100%	86.4	29.5	81.4	55.6	123	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	8	13%	2.34	0.317	<4.91	1.56	1.56	4.81	4.97
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	8	100%	589	116	554	479	789	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	8	100%	2000	536	1900	1410	2740	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	8	100%	12.5	2.05	11.8	10.4	15.2	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	8	100%	369	300	173	126	791	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	8	100%	10.9	2.32	10.8	8.67	15	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	8	75%	2.54	0.758	2.77	1.54	3.95	4.86	4.93
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	8	100%	3290	675	3160	2630	4420	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	8	100%	86.4	16.3	84.9	66.5	105	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	8	100%	29.6	45.6	15.4	6.37	142	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	8	100%	252	74.3	227	166	363	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	8	100%	206	60.6	202	142	297	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	8	88%	27.9	31.7	12.7	5.56	78.7	1.98	1.98
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	8	0%	<19.6	--	<19.6	--	--	19.2	19.9
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	8	88%	27.4	12	27.9	22.7	38.9	4.88	4.88
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	8	100%	49.5	17.8	47.4	29.7	73.7	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	7	100%	4.59	0.629	4.38	4	5.8	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	6	100%	105	22.3	103	82.5	134	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	8	100%	93.7	89.5	43.8	20.3	226	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	8	100%	599	126	600	458	761	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	4	100%	194	50.9	186	148	257	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	8	100%	112	28.4	107	83.4	168	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	4	100%	131	57.8	118	81.6	206	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	2	100%	40.3	13.7	40.3	30.6	50	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	8	100%	71.7	17.7	72.2	53.1	96.8	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	4	100%	384	82.3	384	295	475	--	--

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	8	100%	193	36.9	188	153	250	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	8	100%	171	44.2	172	126	224	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	8	100%	1310	1290	577	334	3730	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	8	100%	1520	360	1490	1180	2170	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	2	100%	5.93	1.4	5.93	4.94	6.92	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	4	100%	6.14	2.09	5.38	4.58	9.21	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	707	288	707	503	911	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	8	100%	4.55	1.92	4.12	3.09	9.1	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	1580	502	1580	1220	1930	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	8	100%	9.32	1.04	9.48	7.87	10.8	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	8	100%	23.9	4.7	24.7	16.7	29.5	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	8	100%	231	178	131	79.4	573	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	8	100%	147	28.6	147	112	187	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	8	100%	29.8	7.44	28.6	22.1	43.7	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	8	100%	240	44.4	243	175	308	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	8	100%	130	21.6	132	93.8	159	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	8	100%	202	37.1	201	165	260	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	8	100%	40.5	6.96	40.4	32.8	50.7	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	8	100%	413	65.4	414	336	491	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	8	100%	2.09	1.18	1.7	0.902	4.11	--	--
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	8	100%	1740	1380	960	553	3750	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	8	100%	64.7	9	64	54.3	76.5	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	8	100%	115	17	119	90.4	134	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	8	100%	371	55.9	362	297	444	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	8	100%	22	3.6	21.9	16.6	26.5	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	8	100%	454	50.4	451	383	519	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	8	100%	55.4	5.25	54.4	47.1	63	--	--

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	8	100%	149	19.7	149	120	172	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	6	100%	340	44.6	336	273	392	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	8	100%	32.9	31.9	19.4	5.2	91.6	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	8	100%	358	333	164	78.1	854	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	8	50%	1.63	1.06	1.97	0.725	3.52	1.95	1.98
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	8	100%	13.9	13.6	6.47	3.01	36.7	--	--
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	8	100%	87	56.7	57.1	35.6	162	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	8	100%	149	112	90.2	48.6	299	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	8	100%	104	73.6	62.3	41.8	220	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	8	75%	3.03	0.845	3.53	2.19	4.63	4.86	4.88
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	8	100%	451	405	223	90.7	1010	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	8	100%	303	255	158	95.8	728	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	8	100%	6.44	4.48	4.33	2.46	13.1	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	8	100%	16.6	13.2	8.67	4.68	35	--	--
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	8	50%	1.58	0.741	1.98	1.71	3.03	1.94	1.99
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	8	100%	425	369	200	105	939	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	8	75%	1.62	0.844	1.94	1.11	3.32	1.98	1.98
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	8	100%	8.96	5.78	5.66	4.01	17.1	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	8	100%	175	149	92.2	47.8	441	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	8	100%	320	236	192	129	766	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	8	0%	<9.8	--	<9.81	--	--	9.62	9.94
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	8	100%	388	265	251	152	907	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	8	100%	109	80.4	66.5	40.9	262	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	8	100%	1680	945	1220	725	3490	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	8	100%	239	202	136	75.9	605	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	8	100%	45.3	35.6	28	16.8	114	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	8	100%	181	155	101	52.8	457	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	8	100%	1160	641	879	485	2300	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	8	100%	711	504	458	284	1780	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	8	100%	162	75	160	63.3	301	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	8	100%	3100	2020	2110	1350	7160	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	8	100%	13	5.76	14.1	4.33	20.6	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	8	38%	6.24	6.77	<4.87	3.47	18.4	4.81	4.95

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	8	100%	748	587	431	285	1950	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	8	100%	11.2	6.68	7.17	5.56	23.5	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	8	100%	7.68	3.01	6.78	4.43	13.8	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	8	100%	275	183	177	115	638	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	8	88%	8.34	7.73	5.34	2.53	23.9	1.92	1.92
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	8	100%	383	340	195	132	1090	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	8	100%	1110	787	721	416	2500	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	8	100%	134	86.2	89	62.2	305	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	8	100%	965	679	608	362	2280	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	8	100%	1180	748	808	490	2550	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	8	100%	41.2	25.5	28.3	16.2	88.3	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	8	100%	26.7	6.28	25	19.4	36.7	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	8	75%	4.7	3.33	5.75	0.966	9.78	1.95	1.98
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	8	100%	19.5	5.82	18.8	12.4	28.1	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	8	25%	6.88	8.3	<4.95	17.6	22.7	4.81	4.97
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	8	100%	184	124	111	85.8	412	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	8	100%	20.2	11.8	14.3	9.33	41.5	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	8	88%	27.6	25.1	17.1	7.04	66.1	4.86	4.86
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	8	100%	8.19	6.03	4.78	3.52	19.5	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	8	100%	36.8	25.2	23.6	17.2	84.7	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	8	100%	81.5	30	75.3	50.2	131	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	8	100%	459	266	321	259	1010	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	8	100%	395	178	312	229	758	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	8	100%	700	354	532	380	1400	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	8	0%	<4.9	--	<4.91	--	--	4.81	4.97
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	8	88%	4.45	3.1	4.03	1.81	10.4	4.88	4.88
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	8	75%	5.46	5.5	2.16	1.18	12.8	1.98	1.98
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	8	100%	1780	681	1600	1030	2960	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	8	100%	386	162	307	237	720	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	8	100%	300	111	263	180	491	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	8	100%	60.2	20.3	63.1	29.9	89.2	--	--

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	8	100%	27.9	9.96	26.7	15.1	48	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	8	100%	2160	969	1750	1290	4000	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	8	100%	18.9	11.6	14.5	8.79	43.9	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	8	100%	103	47.4	83.4	55.7	195	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	1040	337	929	658	1630	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	8	0%	<33.6	--	<33.5	--	--	33	34
	Aroclor-1221 (PCB-1221)	µg/kg	8	0%	<33.6	--	<33.5	--	--	33	34
	Aroclor-1232 (PCB-1232)	µg/kg	8	0%	<33.6	--	<33.5	--	--	33	34
	Aroclor-1242 (PCB-1242)	µg/kg	8	0%	<33.6	--	<33.5	--	--	33	34
	Aroclor-1248 (PCB-1248)	µg/kg	8	75%	33.1	22.8	33.5	19	82	33	34
	Aroclor-1254 (PCB-1254)	µg/kg	8	100%	27.4	9.93	26.5	15	44	--	--
	Aroclor-1260 (PCB-1260)	µg/kg	8	38%	16.5	1.65	<33	13	19	33	34
	Aroclor-1262 (PCB-1262)	µg/kg	8	0%	<33.6	--	<33.5	--	--	33	34
	Aroclor-1268 (PCB-1268)	µg/kg	8	0%	<33.6	--	<33.5	--	--	33	34
	Total PCB congeners (NOAA 1989)	ng/kg	8	100%	45100	18200	39200	26600	77200	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	8	100%	45100	18200	39200	26600	77200	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	8	100%	45100	18200	39200	26600	77200	--	--
	Total PCBs (7)	µg/kg	8	100%	62.1	37.6	53.5	15	140	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	8	100%	144	32	130	110	210	--	--
	Total PCBs (7) (ND*1)	µg/kg	8	100%	226	28.2	210	200	280	--	--
	Total PCBs (9)	µg/kg	8	100%	62.1	37.6	53.5	15	140	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	8	100%	178	34	160	150	250	--	--
	Total PCBs (9) (ND*1)	µg/kg	8	100%	296	28.2	280	270	350	--	--
	Total PCBs congener (209 specified)	ng/kg	8	100%	48300	20600	40700	27600	84200	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	8	100%	48300	20600	40800	27700	84300	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	8	100%	48400	20600	40900	27700	84400	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	8	100%	10.7	6.91	6.42	5.35	22.8	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	8	100%	10.7	6.89	6.54	5.35	22.8	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	8	100%	10.7	6.87	6.67	5.36	22.8	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	8	100%	0.0614	0.0327	0.052	0.0218	0.122	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	8	100%	0.0624	0.0319	0.0521	0.0219	0.122	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	8	100%	0.0633	0.0313	0.0522	0.022	0.122	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	8	100%	0.639	0.474	0.644	0.063	1.51	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	8	100%	0.728	0.464	0.718	0.137	1.58	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	8	100%	0.818	0.459	0.791	0.211	1.66	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	8	100%	19	11.9	13.2	9.2	43.9	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	8	100%	20.9	12.4	15.5	10.7	46.4	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	8	100%	22.8	12.9	18	10.7	48.9	--	--

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	8	100%	6.08	5.19	4.56	1.88	18.4	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	8	100%	7.93	5.63	6.76	3.46	20.9	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	8	100%	9.79	6.25	9.2	3.46	23.4	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	100%	6.59	5.09	5.02	2.43	18.4	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	8	100%	8.54	5.54	7.1	4.07	21	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	8	100%	10.5	6.14	9.61	4.14	23.5	--	--
	Total decachlorobiphenyl	ng/kg	6	100%	340	44.6	336	273	392	--	--
	Total dichlorobiphenyl	ng/kg	8	100%	803	651	395	271	1710	--	--
	Total heptachlorobiphenyl	ng/kg	8	100%	3820	1800	3200	2230	7790	--	--
	Total hexachlorobiphenyl	ng/kg	8	100%	11600	2750	11300	8700	15400	--	--
	Total monochlorobiphenyl	ng/kg	8	100%	13.9	8.21	10.7	8.71	33.3	--	--
	Total nonachlorobiphenyl	ng/kg	8	100%	659	74	657	550	753	--	--
	Total octachlorobiphenyl	ng/kg	8	100%	1600	251	1590	1270	1870	--	--
	Total pentachlorobiphenyl	ng/kg	8	100%	10900	4190	9370	6760	17400	--	--
	Total tetrachlorobiphenyl	ng/kg	8	100%	13200	8690	8750	5400	30100	--	--
	Total trichlorobiphenyl	ng/kg	8	100%	5370	4610	2720	1550	12800	--	--
Pesticides	2,4'-DDD	pg/g	8	100%	643	382	494	316	1470	--	--
	2,4'-DDE	pg/g	4	100%	140	115	100	57.7	302	--	--
	2,4'-DDT	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	4,4'-DDD	pg/g	8	100%	1540	1060	1110	670	3540	--	--
	4,4'-DDE	pg/g	8	100%	758	376	790	330	1460	--	--
	4,4'-DDT	pg/g	8	88%	40.9	25.6	35.6	26.1	100	39.2	39.2
	Aldrin	pg/g	8	38%	15.8	5.77	<38.5	4.77	15.3	38.5	39.6
	Dieldrin	pg/g	8	100%	1300	807	1190	438	3140	--	--
	Endosulfan I	pg/g	8	0%	<195.2	--	<196	--	--	192	198
	Endosulfan II	pg/g	8	0%	<195.2	--	<196	--	--	192	198
	Endosulfan sulfate	pg/g	8	0%	<195.2	--	<196	--	--	192	198
	Endrin	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	Endrin aldehyde	pg/g	7	0%	<195.2	--	<196	--	--	192	198
	Endrin ketone	pg/g	7	0%	<195.2	--	<196	--	--	192	198
	Heptachlor	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	Heptachlor endo-epoxide	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	Heptachlor epoxide	pg/g	8	100%	56.2	34.7	44	23.5	134	--	--
	Hexachlorobenzene	pg/g	8	100%	269	174	175	106	556	--	--
	Methoxychlor	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	Mirex	pg/g	5	0%	<39.2	--	<39.2	--	--	38.8	39.6
	Oxychlordane	pg/g	8	88%	38.8	11.5	41.1	26.1	50.8	39.6	39.6

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total BHC Compounds (ND=0)	pg/g	8	63%	15	8.4	20.9	5.71	29.3	38.5	39.6
	Total Chlordane (ND=0)	pg/g	8	100%	1900	780	1980	766	2780	--	--
	Total Chlordane (ND=1)	pg/g	8	100%	2000	765	2060	881	2860	--	--
	Total Chlordane (ND=1/2)	pg/g	8	100%	1950	773	2020	823	2820	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	8	100%	3050	1740	2350	1500	6100	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	8	100%	3090	1720	2400	1600	6100	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	8	100%	3090	1720	2400	1600	6100	--	--
	Total DDx (2,4) Total Fraction	pg/g	8	100%	713	419	515	320	1600	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	8	100%	729	412	535	340	1600	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	8	100%	753	422	555	360	1650	--	--
	Total DDx (4,4) Total Fraction	pg/g	8	100%	2350	1370	1850	1100	4500	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	8	100%	2350	1370	1850	1100	4500	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	8	100%	2350	1370	1850	1100	4500	--	--
	Total alpha + gamma chlordane	pg/g	8	100%	914	502	850	270	1600	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	8	100%	921	493	850	290	1600	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	8	100%	929	484	850	310	1600	--	--
	alpha-BHC	pg/g	4	50%	16.1	6.23	28.7	6.8	18.1	39.2	39.6
	alpha-Chlordane	pg/g	8	100%	628	370	543	222	1360	--	--
	beta-BHC	pg/g	8	63%	11.9	6.61	9.63	5.71	11.2	38.5	39.6
	cis-Nonachlor	pg/g	8	100%	339	104	340	197	479	--	--
	delta-BHC	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	gamma-BHC (lindane)	pg/g	8	0%	<39	--	<39.2	--	--	38.5	39.6
	gamma-Chlordane	pg/g	6	50%	384	405	328	616	828	38.5	39.6
	trans-Nonachlor	pg/g	8	100%	561	205	607	247	857	--	--
PAHs	1-Methylnaphthalene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	2-Methylnaphthalene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Acenaphthene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Acenaphthylene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Anthracene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Benzo(a)anthracene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Benzo(a)pyrene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Benzo(b)fluoranthene	µg/kg	8	13%	6.5	0.035	<13	6.6	6.6	13	13
	Benzo(e)pyrene	µg/kg	8	13%	6.5	0.14	<13	6.1	6.1	13	13
	Benzo(g,h,i)perylene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	8	13%	6.5	0.11	<13	6.2	6.2	13	13
	C1-Chrysenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C1-Fluoranthenes/Pyrenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C1-Fluorenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C1-Naphthalenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C1-Phenanthrenes/Anthracenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C2-Chrysenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C2-Fluoranthenes/Pyrenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C2-Fluorenes	µg/kg	8	0%	<13	--	<13	--	--	13	13

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	C2-Naphthalenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C2-Phenanthrenes/Anthracenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C3-Chrysenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C3-Fluoranthenes/Pyrenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C3-Fluorenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C3-Naphthalenes	µg/kg	8	13%	7.3	2.3	<13	13	13	13	13
	C3-Phenanthrenes/Anthracenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C4-Chrysenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	C4-Naphthalenes	µg/kg	8	13%	7.4	2.7	<13	14	14	13	13
	C4-Phenanthrenes/Anthracenes	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Chrysene	µg/kg	8	25%	7.9	2.5	<13	12	12	13	13
	Dibenz(a,h)anthracene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Fluoranthene	µg/kg	8	25%	8.1	3.2	<13	11	15	13	13
	Fluorene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Indeno(1,2,3-cd)pyrene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Naphthalene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Perylene	µg/kg	8	13%	7.4	2.7	<13	14	14	13	13
	Phenanthrene	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Pyrene	µg/kg	8	75%	12	5.9	13	9	23	13	13
	Total Alkylated PAHs	µg/kg	8	13%	9.1	7.2	<13	27	27	13	13
	Total HMW PAHs	µg/kg	8	75%	20	20	13	9	55	13	13
	Total HMW PAHs (ND*0.5)	µg/kg	8	75%	59	34	69	68	96	13	13
	Total HMW PAHs (ND*1)	µg/kg	8	75%	99	57	130	120	140	13	13
	Total LMW PAHs	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Total LMW PAHs (ND*0.5)	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Total LMW PAHs (ND*1)	µg/kg	8	0%	<13	--	<13	--	--	13	13
	Total PAH	µg/kg	8	75%	20	20	13	9	55	13	13
	Total PAH (ND*0.5)	µg/kg	8	75%	93	54	120	110	140	13	13
	Total PAH (ND*1)	µg/kg	8	75%	170	99	220	210	230	13	13
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	8	0%	<662	--	<660	--	--	650	670
	1,2-Diphenylhydrazine	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2,3,4,6-Tetrachlorophenol	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	2,4,5-Trichlorophenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2,4,6-Trichlorophenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2,4-Dichlorophenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2,4-Dimethylphenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2,4-Dinitrophenol	µg/kg	8	0%	<20000	--	<20000	--	--	20000	20000
	2,4-Dinitrotoluene	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	2,6-Dinitrotoluene	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2-Chloronaphthalene	µg/kg	8	0%	<658	--	<660	--	--	650	660
	2-Chlorophenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2-Methylphenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2-Nitroaniline	µg/kg	8	0%	<662	--	<660	--	--	650	670
	2-Nitrophenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	3,3'-Dichlorobenzidine	µg/kg	8	0%	<6620	--	<6600	--	--	6500	6700
	3-Nitroaniline	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	4,6-Dinitro-2-methylphenol	µg/kg	8	0%	<9920	--	<9900	--	--	9800	10000
	4-Bromophenyl phenyl ether	µg/kg	8	0%	<662	--	<660	--	--	650	670
	4-Chloro-3-methylphenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	4-Chloroaniline	µg/kg	8	0%	<1300	--	<1300	--	--	1300	1300
	4-Chlorophenyl phenyl ether	µg/kg	8	0%	<662	--	<660	--	--	650	670
	4-Methylphenol	µg/kg	8	0%	<662	--	<660	--	--	650	670
	4-Nitroaniline	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	4-Nitrophenol	µg/kg	8	0%	<9920	--	<9900	--	--	9800	10000
	Acetophenone	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Atrazine	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Benzaldehyde	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Benzidine	µg/kg	8	0%	<66200	--	<66000	--	--	65000	67000
	Benzoic acid	µg/kg	8	0%	<9920	--	<9900	--	--	9800	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Butyl benzylphthalate (BBP)	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Caprolactam	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Carbazole	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Di-n-butylphthalate (DBP)	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Dibenzofuran	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Diethyl phthalate	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Dimethyl phthalate	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Hexachlorobutadiene	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Hexachlorocyclopentadiene	µg/kg	8	0%	<9920	--	<9900	--	--	9800	10000
	Hexachloroethane	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Isophorone	µg/kg	8	0%	<662	--	<660	--	--	650	670
	N-Nitrosodi-n-propylamine	µg/kg	8	0%	<662	--	<660	--	--	650	670
	N-Nitrosodiphenylamine	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Nitrobenzene	µg/kg	8	0%	<662	--	<660	--	--	650	670
	Pentachlorophenol	µg/kg	8	0%	<3380	--	<3400	--	--	3300	3400
	Phenol	µg/kg	8	0%	<662	--	<660	--	--	650	670

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	Pyridine	µg/kg	8	13%	1810	442	<3300	2900	2900	3300	3300
	bis(2-Chloroethoxy)methane	µg/kg	8	0%	<662	--	<660	--	--	650	670
	bis(2-Chloroethyl)ether	µg/kg	8	0%	<662	--	<660	--	--	650	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	8	0%	<3380	--	<3400	--	--	3300	3400
Metals	Aluminum	mg/kg	8	88%	48.5	54.6	34	7.81	173	19	19
	Antimony	mg/kg	8	0%	<0.1932	--	<0.194	--	--	0.19	0.196
	Arsenic	mg/kg	8	100%	2.58	0.286	2.61	2.17	2.94	--	--
	Barium	mg/kg	8	50%	0.326	0.182	0.388	0.243	0.652	0.381	0.388
	Beryllium	mg/kg	8	0%	<0.0968	--	<0.0971	--	--	0.0952	0.098
	Cadmium	mg/kg	8	88%	0.0737	0.0259	0.0709	0.0516	0.121	0.098	0.098
	Calcium	mg/kg	8	100%	259	36.3	260	202	327	--	--
	Chromium	mg/kg	8	75%	0.422	0.296	0.388	0.223	0.927	0.388	0.388
	Cobalt	mg/kg	8	100%	0.134	0.0141	0.131	0.116	0.154	--	--
	Copper	mg/kg	8	100%	2	0.246	2.01	1.67	2.44	--	--
	Iron	mg/kg	8	100%	140	61.7	123	67.5	258	--	--
	Lead	mg/kg	8	100%	0.53	0.214	0.527	0.256	0.839	--	--
	Magnesium	mg/kg	8	100%	659	61.4	663	571	742	--	--
	Manganese	mg/kg	8	100%	1.56	0.795	1.45	0.819	3.03	--	--
	Mercury	ng/g	8	100%	27	4.13	24.7	24	34	--	--
	Methyl mercury	ng/g	8	13%	1.28	0.982	<1.9	3.7	3.7	1.5	2.1
	Nickel	mg/kg	8	100%	0.452	0.098	0.47	0.312	0.57	--	--
	Potassium	mg/kg	8	100%	3000	208	3010	2730	3220	--	--
	Selenium	mg/kg	8	100%	0.334	0.0366	0.33	0.282	0.387	--	--
	Silver	mg/kg	8	100%	0.0323	0.0073	0.0336	0.0204	0.041	--	--
	Sodium	mg/kg	8	100%	4030	451	3820	3570	4650	--	--
	Thallium	mg/kg	8	0%	<0.0968	--	<0.0971	--	--	0.0952	0.098
	Titanium	mg/kg	8	63%	1.47	0.722	1.91	0.705	2.79	1.9	1.96
	Vanadium	mg/kg	8	38%	0.0995	0.0854	<0.098	0.128	0.288	0.0952	0.098
	Zinc	mg/kg	8	100%	27.7	11.4	26.3	16.4	46.3	--	--
Butyltins	Dibutyltin	µg/kg	8	0%	<1.22	--	<1.2	--	--	1.2	1.3
	Monobutyltin hydride	µg/kg	8	0%	<19.6	--	<20	--	--	19	20
	Tetrabutyltin	µg/kg	8	0%	<1.62	--	<1.6	--	--	1.6	1.7
	Tributyl tin	µg/kg	8	0%	<1.42	--	<1.4	--	--	1.4	1.5
Miscellaneous	Lipids	%	8	100%	1.03	0.116	1.05	0.86	1.2	--	--
	Moisture	%	8	100%	85	0.65	85	84	85.9	--	--

Table 4-7a
Phase III Tissue Chemistry Summary Statistics: Polychaete Bioaccumulation

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	18	100%	39.5	26.2	32.8	16.8	126	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	17	100%	6.34	3.83	5.1	1.96	14.7	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	18	100%	4.89	2.69	4.45	2.33	13.7	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	18	100%	4.67	3.24	3.86	1.26	13	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	18	100%	0.246	0.1	0.24	0.104	0.454	--	--
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	94%	0.351	0.549	0.149	0.0658	0.779	4.77	4.77
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	1.26	0.98	0.954	0.344	3.92	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	0.512	0.25	0.429	0.21	1.02	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	0.384	0.237	0.292	0.141	1.02	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	0.277	0.125	0.228	0.111	0.513	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	94%	0.286	0.55	0.156	0.0534	0.251	4.96	4.96
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	18	83%	0.597	0.839	0.256	0.108	0.505	4.77	4.91
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	18	100%	0.682	0.304	0.593	0.331	1.27	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	0.33	0.138	0.296	0.16	0.678	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	18	100%	0.958	0.332	0.938	0.379	1.61	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	18	100%	5.18	2.8	4.77	1.69	13.4	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	18	100%	1.93	0.806	1.72	1.03	4.24	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	18	100%	8.64	3.49	8	4.34	18.6	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	18	100%	9.07	3.67	8.65	4.34	18.6	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	18	100%	9.49	4.07	8.79	4.34	18.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	18	100%	6.37	3.05	6.14	2.87	15.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	18	100%	6.86	3.26	6.39	2.87	15.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	18	100%	7.34	3.7	6.73	2.87	15.6	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	100%	6.3	3	5.95	2.73	15.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	18	100%	6.73	3.23	6.11	2.73	15.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	18	100%	7.16	3.68	6.11	2.73	15.3	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	18	100%	13.7	7.34	12.3	6.14	32.1	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	18	100%	8.61	4.45	6.97	3.01	19	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	5.92	3.58	5.23	2.55	18.8	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	7.17	3.43	6.14	3.4	15.5	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	18	100%	7.32	4.92	5.52	2.06	23.6	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	18	100%	12.6	4.33	11.9	6.62	21.7	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	18	100%	14.3	9.02	11.6	7.05	43.7	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	18	100%	41.7	15.5	36.6	19.7	76.6	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	18	100%	49.3	36.7	37.2	22.2	154	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	18	100%	20.7	15.7	16.3	10.2	79.6	--	--
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	18	100%	55.3	29.9	46.4	25.8	143	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	18	100%	12.1	4.2	12.5	6.15	23.3	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	18	100%	1480	1710	906	443	7710	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	18	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	18	100%	321	324	208	101	1450	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	18	100%	191	190	120	56.5	836	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	18	100%	376	157	321	194	640	--	--
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	18	100%	4060	3590	2920	1550	16300	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	18	89%	4.86	2.46	4.8	2.68	10.6	4.87	4.91
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	18	22%	3.09	1.45	<4.88	3.15	6.88	4.78	4.96
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	18	100%	109	137	64.4	28.5	610	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	18	94%	3530	3760	2380	1070	16600	9.73	9.73
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	18	100%	113	179	58	30.1	812	--	--
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	18	100%	18	9.94	15.9	7.81	46.4	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	18	83%	2.67	0.966	2.51	1.55	4.76	4.9	4.96
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	18	100%	80	102	45.6	23.7	464	--	--
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	18	94%	105	134	69.5	26.4	599	4.89	4.89
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	18	94%	11.1	12.6	6.93	3.43	57.5	4.8	4.8
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	10	30%	3.09	1.58	<4.9	1.75	6.57	4.8	4.93
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	18	100%	430	297	338	135	1260	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	18	94%	2890	1910	2440	1110	7160	19.5	19.5
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	18	100%	274	172	225	104	736	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	18	94%	34.2	28.4	25.9	12.9	115	4.84	4.84
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	18	100%	890	576	706	326	2250	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	18	100%	102	52	84.6	43.3	193	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	18	100%	219	137	180	85.1	566	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	18	100%	1340	786	1100	495	3160	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	18	100%	314	181	238	103	657	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	18	100%	188	146	140	62.3	637	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	18	100%	62.5	41.5	50.1	22.7	172	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	18	0%	<1.952	--	<1.96	--	--	1.91	1.98
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	18	89%	308	254	224	99.8	889	4.86	4.93
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	18	6%	2.48	0.185	<4.89	3.22	3.22	4.78	4.96
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	18	11%	5.1	1.25	<9.78	3.78	9.98	9.55	9.92

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	18	100%	127	80.3	97.6	38.1	279	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	18	33%	2.51	0.605	<4.87	1.88	4.82	4.8	4.96
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	17	100%	705	404	570	294	1440	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	18	100%	2620	1520	2220	1000	5360	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	18	94%	15.5	7.7	13.4	7.03	31	4.91	4.91
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	18	100%	403	349	285	185	1680	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	18	100%	13.5	5.7	12.9	4.88	23.5	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	18	89%	4.76	2.37	4.93	1.9	10.9	4.89	4.96
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	18	89%	2720	1890	2420	1200	6150	9.73	9.86
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	18	100%	85.4	46.3	74.5	30.3	188	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	18	100%	37.6	14.5	34.9	20.7	69	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	18	94%	284	217	213	93.7	888	9.73	9.73
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	18	94%	274	197	221	99.7	761	4.86	4.86
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	18	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	18	100%	442	266	348	184	1040	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	18	0%	<19.52	--	<19.6	--	--	19.1	19.8
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	17	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	18	56%	28.2	29.7	16.6	6.66	94.8	4.8	4.95
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	18	100%	253	149	219	103	605	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	17	82%	3.84	1.81	3.81	2.17	7.8	4.8	4.96
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	18	100%	124	80.1	95.9	40.5	331	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	17	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	18	100%	748	720	491	294	3360	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	18	83%	369	505	226	136	2230	4.86	4.93
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	13	100%	263	277	178	76.3	1100	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	18	83%	87.6	139	52.5	27.2	618	4.86	4.93
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	17	94%	609	1070	280	127	4620	4.86	4.86
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	17	100%	54.2	50.1	40.2	16.7	225	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	18	100%	115	127	79.8	32.3	586	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	16	100%	733	742	511	237	3260	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	17	100%	391	307	303	148	1420	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	18	100%	468	502	340	140	2340	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	18	100%	1200	1070	800	477	4970	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	18	89%	1500	2070	985	480	9330	9.73	9.86
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	16	100%	6.15	3.95	4.71	2.57	15.1	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	17	100%	6.32	5.44	4.98	2.18	25.1	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	17	94%	676	854	411	200	3760	9.73	9.73
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	18	89%	3.5	1.17	4	1.89	5.75	4.8	4.89
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	18	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	16	100%	1670	1800	1150	545	7950	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	18	100%	9.9	6.62	7.47	4.15	30.1	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	18	100%	15.5	13.2	10.5	5.75	59.8	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	18	100%	289	459	151	99.7	2090	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	18	83%	72.8	81.6	46.2	23	345	4.86	4.93
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	18	100%	35.8	36	24.3	13	166	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	18	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	18	83%	181	508	56.8	25.2	2210	4.86	4.93
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	18	100%	99.1	258	29.9	14.8	1130	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	18	100%	182	282	108	44.9	1290	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	15	100%	80.8	183	33	14	738	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	18	94%	502	709	323	162	3260	9.6	9.6
	(PCB 2) 3-Chlorobiphenyl	ng/kg	18	72%	5.78	4.23	5.5	3.65	14.8	1.92	1.98
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	18	100%	4110	4270	2820	1460	19800	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	18	100%	107	134	73.2	29.3	628	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	18	100%	269	218	209	103	1070	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	18	100%	200	386	108	40	1730	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	18	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	18	89%	14.2	32.6	5.75	3.19	144	4.8	4.93
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	18	100%	119	205	68.3	32.8	930	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	18	100%	15.4	33.8	6.99	2.99	150	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	18	100%	38.1	51.5	27	11.4	239	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	18	17%	18.3	36.8	<4.91	85.4	105	4.78	4.96
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	18	94%	696	582	470	262	2110	4.87	4.87

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	18	100%	970	894	705	356	4030	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	18	61%	1.6	1.01	1.95	0.776	3.87	1.92	1.98
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	18	22%	3.17	4.73	<1.96	7.23	18.1	1.91	1.98
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	18	100%	580	1070	290	152	4800	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	18	100%	928	1490	506	280	6750	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	18	100%	278	387	172	108	1790	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	13	100%	17	17.2	11.6	6.41	71.5	--	--
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	18	100%	2640	2330	1830	1020	10800	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	18	100%	784	991	472	290	4560	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	18	100%	22.6	32.4	13.3	6.52	147	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	18	94%	66.3	59.9	42.8	26	272	1.95	1.95
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	18	89%	6.45	3.61	5.75	3.21	15.3	1.93	1.96
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	18	94%	729	779	494	268	3480	1.95	1.95
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	18	100%	4.44	5.74	2.83	1.33	26.5	--	--
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	18	100%	25.5	22.8	18.9	10.1	108	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	18	100%	434	851	191	136	3810	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	18	100%	1990	2120	1270	739	9790	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	18	100%	211	224	119	61.4	981	--	--
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	18	100%	1370	1370	902	485	6240	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	18	100%	177	174	126	62	784	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	18	100%	4560	4560	3000	1670	21000	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	18	100%	430	466	257	133	2080	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	18	100%	192	200	115	68.4	918	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	18	100%	684	605	455	259	2620	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	18	100%	3040	3130	2050	1110	14300	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	18	61%	3.21	2.18	4.86	0.964	9.95	4.8	4.95
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	18	100%	636	730	401	204	3380	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	18	100%	326	238	243	164	1190	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	18	100%	4900	4890	3270	1770	22400	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	18	100%	32	19.8	26.7	16.5	104	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	18	100%	41.2	54.5	21.6	10.6	241	--	--
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	18	100%	2470	3380	1390	770	15300	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	18	94%	29.5	30	18	10.3	126	4.9	4.9
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	18	100%	28.6	25.9	19.8	10.4	122	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	18	100%	521	537	339	209	2510	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	18	100%	204	501	61.5	25.8	2180	--	--
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	18	100%	961	1470	493	227	6600	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	18	100%	7270	9160	4100	2170	41300	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	18	100%	191	246	113	59.1	1110	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	18	100%	2030	2410	1190	683	11000	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	18	100%	5460	8260	3060	1520	37300	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	18	100%	158	209	93.5	50.8	949	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	18	100%	47.5	40	34.3	22.3	191	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	18	72%	9.16	10.4	4.42	3.07	37.4	1.94	1.98
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	18	100%	81.3	68.8	58.6	35.1	327	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	18	78%	12.3	11.4	9.41	6.68	48.1	4.85	4.92
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	5	100%	387	277	267	138	831	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	18	11%	2.42	0.15	<4.88	1.87	2.67	4.78	4.96
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	18	100%	42.3	39.2	29	15.2	184	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	18	100%	293	326	152	79.8	1320	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	18	6%	2.45	0.0471	<4.89	2.61	2.61	4.78	4.96
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	18	94%	16.9	26.9	8.28	4.07	119	4.8	4.8
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	18	100%	520	618	324	168	2790	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	18	100%	275	237	205	104	1100	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	18	100%	703	677	457	255	3110	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	18	100%	835	965	544	267	4360	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	18	100%	2140	2090	1450	779	9480	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	18	0%	<4.88	--	<4.89	--	--	4.78	4.96
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	18	100%	55.1	71.1	31.5	17.1	321	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	18	83%	15.2	16.2	9.63	3.79	57.7	1.93	1.96
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	18	100%	3240	2400	2470	1300	10700	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	18	100%	609	580	416	237	2690	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	18	100%	900	684	661	368	3110	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	18	100%	130	61.8	111	71	311	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	18	100%	43.6	33.4	30.6	20.2	161	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	18	100%	2680	2210	1940	1050	10100	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	18	100%	31.3	32	20.2	10.5	148	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	18	100%	181	187	116	66.7	874	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	18	94%	1980	1800	1470	763	7980	9.73	9.73
	Aroclor-1016 (PCB-1016)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Aroclor-1221 (PCB-1221)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Aroclor-1232 (PCB-1232)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Aroclor-1242 (PCB-1242)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Aroclor-1248 (PCB-1248)	µg/kg	18	100%	45.7	44.5	34	19	210	--	--
	Aroclor-1254 (PCB-1254)	µg/kg	18	67%	28	22.7	33.5	13	110	33	34
	Aroclor-1260 (PCB-1260)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Aroclor-1262 (PCB-1262)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Aroclor-1268 (PCB-1268)	µg/kg	18	0%	<33.8	--	<34	--	--	33	34
	Total PCB congeners (NOAA 1989)	ng/kg	18	100%	77000	70400	56600	20600	323000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	18	100%	77000	70400	56600	20700	323000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	18	100%	77000	70400	56600	20700	323000	--	--
	Total PCBs (7)	µg/kg	18	100%	68.3	68.1	46	19	320	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	18	100%	159	66.9	140	120	410	--	--
	Total PCBs (7) (ND*1)	µg/kg	18	100%	249	64.8	240	200	490	--	--
	Total PCBs (9)	µg/kg	18	100%	68.3	68.1	46	19	320	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	18	100%	193	65.9	175	150	440	--	--
	Total PCBs (9) (ND*1)	µg/kg	18	100%	316	65	305	270	560	--	--
	Total PCBs congener (209 specified)	ng/kg	18	100%	102000	93400	72100	33000	431000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	18	100%	102000	93400	72200	33100	431000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	18	100%	102000	93400	72300	33200	431000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	18	100%	8.37	12.3	2.24	0.0679	47.6	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	18	100%	8.4	12.3	2.24	0.55	47.6	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	18	100%	8.43	12.3	2.24	0.988	47.6	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	18	100%	0.102	0.112	0.0699	0.00854	0.481	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	18	100%	0.103	0.111	0.07	0.0219	0.481	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	18	100%	0.104	0.111	0.0701	0.0327	0.481	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	18	100%	1.28	1.47	0.836	0.0512	6.59	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	18	100%	1.36	1.46	0.91	0.364	6.66	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	18	100%	1.44	1.45	0.958	0.522	6.73	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	18	100%	17	13.5	12.3	5.95	60.5	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	18	100%	17.5	13.3	12.5	5.95	60.5	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	18	100%	17.9	13.2	13.6	5.96	60.5	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	18	100%	6.47	3.04	6.16	2.94	15.6	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	18	100%	6.96	3.24	6.5	2.94	15.6	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	18	100%	7.44	3.68	6.89	2.94	15.6	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	100%	7.59	3.21	6.88	3.91	16.2	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	18	100%	8.09	3.35	7.88	3.98	16.2	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	18	100%	8.61	3.73	8.39	4.05	16.8	--	--
	Total decachlorobiphenyl	ng/kg	18	17%	18.3	36.8	<4.91	85.4	105	4.78	4.96
	Total dichlorobiphenyl	ng/kg	18	100%	1870	2260	1120	708	10500	--	--
	Total heptachlorobiphenyl	ng/kg	18	100%	6650	8370	4340	1620	38100	--	--
	Total hexachlorobiphenyl	ng/kg	18	100%	14300	8950	12100	3670	32800	--	--
	Total monochlorobiphenyl	ng/kg	18	100%	67.1	49.7	55.2	27	213	--	--
	Total nonachlorobiphenyl	ng/kg	18	100%	173	290	103	47.4	1320	--	--
	Total octachlorobiphenyl	ng/kg	18	100%	1620	2680	901	290	12200	--	--
	Total pentachlorobiphenyl	ng/kg	18	100%	24300	22500	16900	7460	102000	--	--
	Total tetrachlorobiphenyl	ng/kg	18	100%	38000	44500	23400	13200	203000	--	--
	Total trichlorobiphenyl	ng/kg	18	100%	14500	15100	9700	5420	70100	--	--
Pesticides	2,4'-DDD	pg/g	18	100%	1870	1830	1000	540	5840	--	--
	2,4'-DDE	pg/g	18	100%	2570	2740	1180	532	9910	--	--
	2,4'-DDT	pg/g	18	78%	40.4	35.8	27.6	9.01	124	35.7	189
	4,4'-DDD	pg/g	18	100%	4150	4000	2130	1120	12600	--	--
	4,4'-DDE	pg/g	18	100%	8330	7750	5100	2420	31600	--	--
	4,4'-DDT	pg/g	18	100%	380	953	93.8	55	4160	--	--
	Aldrin	pg/g	18	67%	23.5	21.6	15.3	8.02	72.7	33.1	132
	Dieldrin	pg/g	18	100%	554	168	534	342	897	--	--
	Endosulfan I	pg/g	18	0%	<152.6	--	<96.7	--	--	82.6	472
	Endosulfan II	pg/g	18	0%	<138.4	--	<96.2	--	--	64.5	472
	Endosulfan sulfate	pg/g	17	0%	<142.6	--	<96.2	--	--	82.6	472
	Endrin	pg/g	18	6%	29.8	24.7	<38.7	4.3	4.3	33.1	189
	Endrin aldehyde	pg/g	15	0%	<330	--	<192	--	--	165	943
	Endrin ketone	pg/g	17	0%	<312	--	<192	--	--	165	943
	Heptachlor	pg/g	18	0%	<61	--	<38.7	--	--	33.1	189
	Heptachlor endo-epoxide	pg/g	18	11%	42.3	38.5	<38.8	118	133	33.1	189
	Heptachlor epoxide	pg/g	18	100%	77.7	17.4	77.2	51.6	127	--	--
	Hexachlorobenzene	pg/g	18	100%	234	106	213	120	606	--	--
	Methoxychlor	pg/g	17	0%	<62.4	--	<38.5	--	--	33.1	189
	Mirex	pg/g	17	82%	37.1	19.3	35.4	22.6	92.4	38.5	132
	Oxychlordane	pg/g	18	83%	48.8	16	49.5	27.6	84.5	33.6	132
	Total BHC Compounds	pg/g	18	78%	21.6	16.8	16.4	5.74	27	35.7	132
	Total Chlordane (ND=0)	pg/g	18	100%	3070	990	3010	1780	5850	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total Chlordane (ND=1)	pg/g	18	100%	3210	965	3080	2180	5880	--	--
	Total Chlordane (ND=1/2)	pg/g	18	100%	3140	975	3050	1980	5860	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	18	100%	17400	15500	10400	5000	54000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	18	100%	17400	15500	10400	5000	54000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	18	100%	17400	15500	10400	5000	54000	--	--
	Total DDx (2,4) Total Fraction	pg/g	18	100%	4460	4260	2300	1200	13000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	18	100%	4470	4260	2300	1200	13000	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	18	100%	4480	4250	2300	1200	13000	--	--
	Total DDx (4,4) Total Fraction	pg/g	18	100%	12900	11300	7750	3800	41000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	18	100%	12900	11300	7750	3800	41000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	18	100%	12900	11300	7750	3800	41000	--	--
	Total alpha + gamma chlordane	pg/g	18	100%	1930	590	1900	1100	3600	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	18	100%	1930	590	1900	1100	3600	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	18	100%	1930	590	1900	1100	3600	--	--
	alpha-BHC	pg/g	18	67%	21.6	25.8	9.98	5.32	13.8	35.7	189
	alpha-Chlordane	pg/g	18	100%	1120	359	1070	665	2140	--	--
	beta-BHC	pg/g	18	11%	26.3	18.1	<38.5	16.3	20	33.1	132
	cis-Nonachlor	pg/g	18	100%	381	129	364	215	731	--	--
	delta-BHC	pg/g	18	0%	<61	--	<38.7	--	--	33.1	189
	gamma-BHC (lindane)	pg/g	18	50%	25.4	27.1	21.4	7.26	9.73	33.1	189
	gamma-Chlordane	pg/g	18	100%	798	241	804	471	1440	--	--
	trans-Nonachlor	pg/g	18	100%	643	220	620	379	1190	--	--
PAHs	1-Methylnaphthalene	µg/kg	18	33%	3.6	1.4	<6.5	2.9	9	6.5	6.7
	2-Methylnaphthalene	µg/kg	18	56%	4.7	3	6.5	3.1	16	6.5	6.7
	Acenaphthene	µg/kg	18	56%	4.1	1.4	6.5	2.9	7.3	6.5	6.6
	Acenaphthylene	µg/kg	18	61%	4	1.7	6.5	2.8	8.4	6.5	6.6
	Anthracene	µg/kg	18	100%	11	16	6.5	3.7	73	--	--
	Benzo(a)anthracene	µg/kg	18	100%	29	13	27	13	57	--	--
	Benzo(a)pyrene	µg/kg	18	100%	27	13	25	11	48	--	--
	Benzo(b)fluoranthene	µg/kg	18	100%	32	13	32	15	62	--	--
	Benzo(e)pyrene	µg/kg	18	100%	41	11	41	23	61	--	--
	Benzo(g,h,i)perylene	µg/kg	18	100%	29	9.4	27	15	47	--	--
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	18	100%	30	11	31	13	47	--	--
	C1-Chrysenes	µg/kg	18	100%	48	16	46	24	93	--	--
	C1-Fluoranthenes/Pyrenes	µg/kg	18	100%	84	23	80	54	140	--	--
	C1-Fluorenes	µg/kg	18	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C1-Naphthalenes	µg/kg	18	94%	5.5	3.1	5.2	2.6	16	6.6	6.6
	C1-Phenanthrenes/Anthracenes	µg/kg	18	22%	8.3	11	<6.6	8.1	33	6.5	6.7
	C2-Chrysenes	µg/kg	18	39%	20	24	<6.7	27	82	6.5	6.7
	C2-Fluoranthenes/Pyrenes	µg/kg	18	100%	54	18	53	33	110	--	--
	C2-Fluorenes	µg/kg	18	0%	<6.6	--	<6.6	--	--	6.5	6.7

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	C2-Naphthalenes	µg/kg	18	72%	6.8	3.9	6.6	4.3	19	6.5	6.6
	C2-Phenanthrenes/Anthracenes	µg/kg	18	39%	18	20	<6.7	22	58	6.5	6.7
	C3-Chrysenes	µg/kg	18	44%	12	11	<6.7	14	40	6.5	6.7
	C3-Fluoranthenes/Pyrenes	µg/kg	18	94%	41	18	39	23	90	6.5	6.5
	C3-Fluorenes	µg/kg	18	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C3-Naphthalenes	µg/kg	18	22%	6.6	7.3	<6.6	12	31	6.5	6.7
	C3-Phenanthrenes/Anthracenes	µg/kg	18	22%	17	30	<6.6	45	110	6.5	6.7
	C4-Chrysenes	µg/kg	18	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C4-Naphthalenes	µg/kg	18	22%	7	7.5	<6.6	16	28	6.5	6.7
	C4-Phenanthrenes/Anthracenes	µg/kg	18	17%	3.4	0.37	<6.6	3.3	4.6	6.5	6.7
	Chrysene	µg/kg	18	100%	39	12	39	22	62	--	--
	Dibenz(a,h)anthracene	µg/kg	18	94%	5.4	2.3	5.2	2.6	9.7	6.6	6.6
	Fluoranthene	µg/kg	18	100%	50	23	44	24	100	--	--
	Fluorene	µg/kg	18	22%	3.8	1.9	<6.6	2.6	11	6.5	6.7
	Indeno(1,2,3-cd)pyrene	µg/kg	18	94%	21	12	19	8.3	46	6.5	6.5
	Naphthalene	µg/kg	18	89%	5.2	2.8	4.7	2.6	12	6.5	6.6
	Perylene	µg/kg	18	100%	10	3.6	10	5.4	16	--	--
	Phenanthrene	µg/kg	18	100%	14	16	7.5	3.4	58	--	--
	Pyrene	µg/kg	18	100%	68	25	67	37	120	--	--
	Total Alkylated PAHs	µg/kg	18	100%	310	150	250	140	760	--	--
	Total HMW PAHs	µg/kg	18	100%	330	130	320	170	580	--	--
	Total HMW PAHs (ND*0.5)	µg/kg	18	100%	330	130	320	170	580	--	--
	Total HMW PAHs (ND*1)	µg/kg	18	100%	330	130	320	170	580	--	--
	Total LMW PAHs	µg/kg	18	100%	40	39	27	9.6	170	--	--
	Total LMW PAHs (ND*0.5)	µg/kg	18	100%	47	36	33	25	170	--	--
	Total LMW PAHs (ND*1)	µg/kg	18	100%	54	33	44	34	170	--	--
	Total PAH	µg/kg	18	100%	370	160	350	180	720	--	--
	Total PAH (ND*0.5)	µg/kg	18	100%	380	160	350	190	720	--	--
	Total PAH (ND*1)	µg/kg	18	100%	380	150	360	200	720	--	--
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	18	0%	<130	--	<130	--	--	130	130
	1,2-Diphenylhydrazine	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2,3,4,6-Tetrachlorophenol	µg/kg	18	0%	<656	--	<660	--	--	650	670
	2,4,5-Trichlorophenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2,4,6-Trichlorophenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2,4-Dichlorophenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2,4-Dimethylphenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2,4-Dinitrophenol	µg/kg	18	0%	<3940	--	<3900	--	--	3900	4000
	2,4-Dinitrotoluene	µg/kg	18	0%	<656	--	<660	--	--	650	670
	2,6-Dinitrotoluene	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2-Chloronaphthalene	µg/kg	18	0%	<130	--	<130	--	--	130	130

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	2-Chlorophenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2-Methylphenol	µg/kg	18	22%	82.5	45	<130	75	240	130	130
	2-Nitroaniline	µg/kg	18	0%	<130	--	<130	--	--	130	130
	2-Nitrophenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	3,3'-Dichlorobenzidine	µg/kg	18	0%	<1300	--	<1300	--	--	1300	1300
	3-Nitroaniline	µg/kg	18	0%	<656	--	<660	--	--	650	670
	4,6-Dinitro-2-methylphenol	µg/kg	18	0%	<1972	--	<2000	--	--	1900	2000
	4-Bromophenyl phenyl ether	µg/kg	18	0%	<130	--	<130	--	--	130	130
	4-Chloro-3-methylphenol	µg/kg	18	0%	<130	--	<130	--	--	130	130
	4-Chloroaniline	µg/kg	18	0%	<260	--	<260	--	--	260	270
	4-Chlorophenyl phenyl ether	µg/kg	18	0%	<130	--	<130	--	--	130	130
	4-Methylphenol	µg/kg	18	6%	65.3	1.41	<130	71	71	130	130
	4-Nitroaniline	µg/kg	18	0%	<656	--	<660	--	--	650	670
	4-Nitrophenol	µg/kg	18	0%	<1972	--	<2000	--	--	1900	2000
	Acetophenone	µg/kg	18	56%	93.2	47.5	130	68	230	130	130
	Atrazine	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Benzaldehyde	µg/kg	18	94%	1040	462	950	480	2000	670	670
	Benzidine	µg/kg	18	0%	<13000	--	<13000	--	--	13000	13000
	Benzoic acid	µg/kg	18	83%	2080	1180	2000	760	5600	2000	2000
	Biphenyl (1,1-Biphenyl)	µg/kg	18	0%	<130	--	<130	--	--	130	130
	Butyl benzylphthalate (BBP)	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Caprolactam	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Carbazole	µg/kg	18	0%	<130	--	<130	--	--	130	130
	Di-n-butylphthalate (DBP)	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Di-n-octyl phthalate (DnOP)	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Dibenzofuran	µg/kg	18	0%	<130	--	<130	--	--	130	130
	Diethyl phthalate	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Dimethyl phthalate	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Hexachlorobutadiene	µg/kg	18	0%	<130	--	<130	--	--	130	130
	Hexachlorocyclopentadiene	µg/kg	18	0%	<1972	--	<2000	--	--	1900	2000
	Hexachloroethane	µg/kg	18	0%	<656	--	<660	--	--	650	670
	Isophorone	µg/kg	18	0%	<130	--	<130	--	--	130	130
	N-Nitrosodi-n-propylamine	µg/kg	18	0%	<130	--	<130	--	--	130	130
	N-Nitrosodiphenylamine	µg/kg	18	0%	<130	--	<130	--	--	130	130
	Nitrobenzene	µg/kg	18	0%	<130	--	<130	--	--	130	130
	Pentachlorophenol	µg/kg	18	0%	<672	--	<670	--	--	660	680
	Phenol	µg/kg	18	17%	66.4	3.58	<130	68	77	130	130
	Pyridine	µg/kg	18	0%	<656	--	<660	--	--	650	670

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	bis(2-Chloroethoxy)methane	µg/kg	18	0%	<130	--	<130	--	--	130	130
	bis(2-Chloroethyl)ether	µg/kg	18	0%	<130	--	<130	--	--	130	130
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	18	6%	333	9.24	<670	300	300	660	680
Butyltins	Dibutyltin	µg/kg	18	22%	0.84	0.39	<1.3	1.3	2	1.3	1.3
	Monobutyltin hydride	µg/kg	18	0%	<20	--	<21	--	--	20	21
	Tetrabutyltin	µg/kg	18	0%	<1.7	--	<1.7	--	--	1.6	1.7
	Tributyl tin	µg/kg	18	100%	8.4	2.9	7.4	5.3	14	--	--
Metals	Aluminum	mg/kg	18	94%	367	137	375	197	649	20	20
	Antimony	mg/kg	18	89%	0.214	0.23	0.166	0.0668	1.07	0.196	0.2
	Arsenic	mg/kg	18	100%	4.65	2.98	3.96	1.43	12.4	--	--
	Barium	mg/kg	18	100%	9.59	6.32	8.22	0.584	27.5	--	--
	Beryllium	mg/kg	18	94%	0.0462	0.0609	0.0318	0.0149	0.288	0.1	0.1
	Cadmium	mg/kg	18	94%	0.2	0.066	0.198	0.13	0.345	0.1	0.1
	Calcium	mg/kg	18	100%	1880	628	1690	1030	3170	--	--
	Chromium	mg/kg	18	94%	3.39	1.95	3.19	1.18	7.47	0.4	0.4
	Cobalt	mg/kg	18	94%	0.657	0.442	0.464	0.23	1.56	0.1	0.1
	Copper	mg/kg	18	100%	10.6	5.49	9.05	6.29	30.2	--	--
	Iron	mg/kg	18	100%	2850	2350	2330	6.21	9970	--	--
	Lead	mg/kg	18	94%	16.4	20.9	10.4	4.61	94.8	0.2	0.2
	Magnesium	mg/kg	18	100%	778	118	783	450	964	--	--
	Manganese	mg/kg	18	100%	81.5	79.3	51.1	3.23	245	--	--
	Mercury	ng/g	18	100%	104	80.6	75.1	50.5	391	--	--
	Methyl mercury	ng/g	18	100%	35.4	14.4	33.4	14.7	63.2	--	--
	Nickel	mg/kg	18	94%	2.15	1.11	1.97	1.03	4.99	0.4	0.4
	Potassium	mg/kg	18	100%	2420	490	2360	2040	4270	--	--
	Selenium	mg/kg	18	100%	0.907	0.104	0.893	0.744	1.12	--	--
	Silver	mg/kg	18	100%	0.37	0.171	0.364	0.142	0.816	--	--
	Sodium	mg/kg	18	100%	3220	465	3140	2060	4060	--	--
	Thallium	mg/kg	18	0%	<0.098	--	<0.098	--	--	0.0952	0.1
	Titanium	mg/kg	18	100%	13	3.66	12	8.55	22.7	--	--
	Vanadium	mg/kg	18	100%	2.23	0.916	2.31	0.865	4.29	--	--
	Zinc	mg/kg	18	100%	36.5	26.8	29.2	21.9	140	--	--
Miscellaneous	Lipids	%	18	89%	0.358	0.202	0.3	0.19	0.97	0.1	0.1
	Moisture	%	18	100%	81.4	1.03	81.5	78.8	83.2	--	--

Table 4-7b
Phase III Tissue Chemistry Summary Statistics: Softshell Clam (Whole-Body)

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	37	100%	2.95	0.995	2.63	1.47	5.7	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	37	100%	0.693	1.15	0.302	0.188	6.72	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	37	100%	0.751	0.184	0.702	0.452	1.18	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	37	100%	4.05	2.45	3.72	1.05	10.2	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	37	97%	0.812	0.675	0.529	0.0633	1.85	4.87	4.87
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	37	100%	0.639	0.623	0.228	0.09	1.55	--	--
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	37	100%	3.94	2.41	3.79	0.634	9.1	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	37	100%	0.672	0.405	0.549	0.288	1.98	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	37	100%	1.22	0.522	1.2	0.449	2.34	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	37	100%	0.547	0.572	0.23	0.124	1.52	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	37	100%	0.181	0.277	0.0892	0.0374	1.16	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	37	97%	1.03	0.506	0.823	0.357	2.02	4.82	4.82
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	37	100%	1.86	0.483	1.83	1.02	2.9	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	37	100%	0.398	0.296	0.306	0.166	1.5	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	37	100%	4.25	1.38	4.62	1.51	7.1	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	37	100%	22.5	9.14	22.6	4.6	44.9	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	37	100%	8.57	1.75	8.21	5.17	13.3	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	37	100%	36.7	11.9	37	12.3	63	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	37	100%	37.2	11.8	38	12.5	63	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	37	100%	37.8	11.7	38.1	12.6	63	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	37	100%	26.4	10.3	26.5	6.67	50.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	37	100%	27.1	10.1	27.5	6.68	50.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	37	100%	27.9	10	27.6	6.69	50.6	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	37	100%	25.9	10	26	6.6	49.8	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	37	100%	26.5	9.91	27.1	6.73	49.8	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	37	100%	27.1	9.82	27.2	6.86	49.8	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	37	100%	2.11	0.565	2.07	1.23	3.33	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	37	100%	6.16	3.38	5.4	2.05	14.6	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	37	100%	5.24	1.34	5.07	3.07	8.73	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	37	100%	18.7	7.73	18.1	7.49	35.3	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	37	100%	12.3	4.75	10.8	5.75	25.3	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	37	100%	57.5	15	59.8	27.7	88.1	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	37	100%	43.5	16.4	44.6	16.6	79.5	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	37	100%	154	41.8	149	76.9	269	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	37	62%	5.4	8.25	2.89	1.54	41.3	1.9	1.99
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	37	49%	4.56	3.14	<4.87	2.29	12.3	4.76	24.5
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	37	100%	12.8	6.23	11.6	4.28	26.7	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	37	51%	3.98	2.38	4.83	2.37	10.4	4.76	24.5
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	37	100%	9360	3020	9200	4080	16600	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	37	0%	<5.8	--	<4.86	--	--	4.76	24.5
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	37	100%	2150	1260	1850	947	6850	--	--

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	37	100%	70.5	43	61.3	25.5	226	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	37	92%	108	59.8	95.8	44.4	302	9.52	9.75
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	36	100%	1760	807	1640	651	4290	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	37	100%	49.8	18.2	47.8	25	125	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	37	51%	11.1	10.3	5.23	4.68	33	4.76	9.98
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	37	100%	765	234	746	371	1440	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	36	100%	39900	12700	39000	18400	74500	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	37	89%	28.4	16.8	27.7	10	63.8	4.76	4.95
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	37	100%	270	110	244	116	672	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	37	97%	31.3	14.6	29.1	14.8	84.5	9.98	9.98
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	37	73%	11.6	11.2	8.12	3.87	53.2	4.76	24.5
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	37	100%	711	212	676	362	1250	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	36	100%	84.9	27.6	81.6	15.9	157	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	37	100%	38.2	15.7	33.8	16.4	79.6	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	37	100%	3080	969	2980	1530	6110	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	37	100%	28700	8890	26500	14200	48800	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	35	100%	423	143	392	176	744	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	28	100%	17.7	5.51	17.9	8.61	27.8	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	32	94%	51.8	31.3	45.9	23.3	165	4.9	4.97
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	37	100%	724	166	723	442	1120	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	32	100%	18	6.51	16.4	8.96	31.4	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	37	100%	214	83.3	196	85.3	484	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	37	100%	22	7.36	22.1	8.74	42.7	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	35	100%	1470	440	1430	754	2800	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	37	100%	597	186	552	300	1210	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	37	5%	1.22	0.916	<1.95	1.84	6.12	1.9	6.02
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	35	100%	118	38.6	115	49.9	192	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	33	0%	<5.76	--	<4.86	--	--	4.76	24.5
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	32	16%	6.12	4.06	<9.66	4.72	12.7	9.52	49.1
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	34	100%	47.1	16.9	45.5	12.7	73.1	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	37	0%	<5.8	--	<4.86	--	--	4.76	24.5
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	18	100%	5630	1790	5430	2930	8610	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	37	100%	1330	462	1430	514	2340	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	37	100%	139	38.7	133	68.3	223	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	37	100%	858	275	811	498	1700	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	37	78%	5.04	2.29	4.96	2.35	9.34	4.77	24.5
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	37	24%	3.14	1.94	<4.83	2.5	6.34	4.76	24.5

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	37	100%	43900	12700	42100	21500	75800	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	34	100%	1200	361	1120	546	1980	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	37	100%	364	147	354	102	782	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	37	100%	3210	926	3080	1510	6290	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	37	100%	2870	904	2780	485	5630	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	37	97%	13	5.32	12	2.71	28.8	4.89	4.89
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	37	57%	7.54	7.34	6.8	2.73	24.9	1.91	3.99
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	37	3%	11.8	7.38	<19.5	17.3	17.3	19	98.1
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	28	39%	3.78	2.19	<4.88	2.7	9.33	4.76	5
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	34	97%	155	62.2	149	14.6	290	4.94	4.94
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	37	100%	78.6	30.5	78.9	27.8	126	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	12	100%	36.8	8.84	34.7	22.6	51.3	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	37	100%	1340	365	1290	647	2550	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	37	49%	5.01	7.09	<4.84	2.21	43.1	4.76	9.98
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	37	95%	50.8	25.4	51.1	13	99.9	1.9	1.96
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	37	100%	3130	1190	2890	1370	7000	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	6	100%	1620	715	1810	713	2580	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	37	100%	864	303	808	350	1700	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	9	100%	101	41.9	110	44.8	180	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	21	100%	264	73.1	262	138	419	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	37	100%	23.7	7.67	24.6	10.2	38.1	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	8	100%	935	341	995	310	1410	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	24	100%	1930	467	1930	1030	3070	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	36	100%	35.6	15.7	33.2	12.8	87.7	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	37	95%	77.4	40.6	74.3	30.7	162	4.85	4.9
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	37	100%	14900	4720	13800	7100	30800	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	5	100%	90.9	17.4	84.1	76.7	121	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	8	100%	69.9	28	79.3	31.4	115	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	14	100%	5240	1900	4660	2670	9150	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	37	100%	49.7	17.9	45	23.3	92.6	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	34	0%	<5.74	--	<4.86	--	--	4.76	24.5
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	11	100%	11800	3370	12200	5620	17600	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	37	100%	86.7	23.7	85.1	45.9	175	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	37	100%	225	76.6	208	97.4	479	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	37	92%	7.58	4.99	6.57	2.99	22.8	1.96	3.99
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	37	100%	838	287	799	385	1620	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	37	100%	233	72	217	113	484	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	37	68%	5.19	2.76	4.96	3.15	13	4.76	24.5
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	37	100%	1830	655	1650	946	3800	--	--

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	37	100%	428	186	376	51.4	925	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	37	100%	1450	532	1360	153	2830	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	26	100%	182	54.5	166	79.5	303	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	37	100%	3310	1010	3260	1680	6440	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	37	41%	1.6	1.2	<1.94	0.998	5.57	1.9	9.81
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	37	100%	19900	8800	18300	8320	40700	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	37	100%	524	157	502	209	961	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	37	100%	1260	282	1250	535	1960	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	37	100%	1750	697	1640	168	3330	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	37	95%	9.21	3.71	8.25	4.36	16	9.98	24.5
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	37	100%	33.3	14.8	27.4	15.1	71.5	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	37	100%	1160	313	1140	608	1860	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	37	100%	180	51.4	174	88.9	297	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	37	100%	657	179	658	263	1060	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	34	100%	786	192	763	322	1170	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	37	100%	78.2	36.4	67.8	26.2	165	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	37	100%	150	73.5	143	38.7	329	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	37	0%	<2.32	--	<1.95	--	--	1.9	9.81
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	37	0%	<2.32	--	<1.95	--	--	1.9	9.81
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	37	97%	86.6	48	80.5	21.8	205	1.9	1.9
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	37	97%	103	52.5	94.8	33	226	4.76	4.76
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	37	100%	21.6	11.6	18.3	6.89	52.2	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	21	43%	4.97	4.81	<4.89	2.87	19.7	4.76	4.99
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	37	100%	454	239	447	110	1150	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	37	100%	101	48.1	90.3	27	195	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	37	100%	15.3	7.62	14.2	3.65	34	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	37	89%	10.8	5.88	10.8	3.91	22.3	1.9	1.98
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	37	89%	5.65	2.86	5.55	2.63	13.9	1.9	1.98
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	37	100%	1970	700	1920	911	3560	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	37	51%	5.91	7.26	3.83	2.63	29	1.9	9.81
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	37	100%	41.7	23.1	34.7	13.6	100	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	37	86%	25.2	21.9	16.7	6.54	75.9	4.77	4.87
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	37	100%	502	233	464	148	1140	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	37	43%	7.47	4.12	<9.67	5.01	16.2	9.52	49.1
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	37	100%	161	92.9	149	38.3	435	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	37	100%	29.8	14.8	26.2	6.12	61.4	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	37	100%	17900	6670	17100	6090	35100	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	37	81%	7.01	3.26	6.94	3.38	14.7	4.83	24.5
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	37	95%	5.43	2.63	5.11	2.08	12.5	1.9	1.93

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	37	97%	49.6	23.9	51.8	14.8	98.8	4.9	4.9
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	37	97%	327	192	309	84.7	807	9.79	9.79
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	37	0%	<5.8	--	<4.86	--	--	4.76	24.5
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	37	100%	34.5	17.5	31.5	13	82.8	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	37	100%	27.6	12.4	28.6	7.41	55.3	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	37	97%	361	223	342	120	1130	4.9	4.9
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	37	5%	2.9	1.83	<4.86	2.42	2.43	4.76	24.5
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	37	89%	26.1	17.4	22.9	6.32	76.9	4.76	5
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	37	100%	275	152	263	59.8	594	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	37	100%	12.7	4.95	12.6	5.24	26.5	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	37	97%	17.8	10.8	15.8	4.2	46.5	4.76	4.76
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	37	100%	1300	487	1210	442	2370	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	37	76%	7.7	7.09	5.59	2.21	30.4	1.9	1.99
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	37	100%	3390	1130	3300	1680	5880	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-	ng/kg	37	100%	20500	7830	18500	8770	38700	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	37	100%	341	166	309	118	724	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	37	100%	355	212	339	84.8	1100	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	37	100%	32600	12800	29500	13400	61800	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	37	100%	68.5	28.2	65.6	8	117	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	37	100%	205	90.7	190	60.9	420	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	37	43%	3.05	6.05	<1.96	1.17	34.9	1.9	6.02
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	37	100%	77	33.9	70.2	22.9	160	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	37	97%	16.8	7.3	16.6	5.61	32.8	24.5	24.5
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	11	100%	1850	647	2060	839	3030	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	37	0%	<5.8	--	<4.86	--	--	4.76	24.5
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	37	100%	77.4	31.9	67.8	27.4	143	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	37	70%	28.6	27.6	24.5	9.51	113	4.76	24.5
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	37	100%	7.57	2.77	6.66	4.29	15.5	--	--
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	37	100%	75.6	23.4	73.2	38.6	131	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	37	89%	20.3	13.7	17.4	7.66	67.8	4.87	9.98
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	37	70%	16.6	10.9	13.8	11.3	40	9.52	9.97
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	37	100%	55.6	29.6	53.7	18.1	183	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	37	100%	5810	2480	5290	2490	14200	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	37	100%	2520	1030	2390	1200	6110	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	37	11%	11.5	32.7	<4.87	11.6	181	4.76	24.5
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	37	68%	4.83	2.5	4.9	2.32	11.1	4.79	24.5
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	37	54%	1.96	1.55	1.96	1.1	8.48	1.9	3.99

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	37	100%	1390	605	1310	465	2930	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	37	100%	176	83.5	164	51.8	385	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	37	100%	190	94.2	185	69.4	538	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	37	100%	1310	765	1160	454	4710	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	37	100%	38.3	18.2	38	8.11	93.7	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	27	100%	303	110	300	126	491	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	37	19%	3	1.87	<4.85	2.18	5.29	4.76	24.5
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	37	100%	46.4	18.8	46	16.5	97.6	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	37	100%	28000	10900	26600	11900	62200	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	37	0%	<44.6	--	<34	--	--	33	170
	Aroclor-1221 (PCB-1221)	µg/kg	37	0%	<44.6	--	<34	--	--	33	170
	Aroclor-1232 (PCB-1232)	µg/kg	37	0%	<44.6	--	<34	--	--	33	170
	Aroclor-1242 (PCB-1242)	µg/kg	37	0%	<44.6	--	<34	--	--	33	170
	Aroclor-1248 (PCB-1248)	µg/kg	37	3%	23.6	20.1	<34	65.5	65.5	33	170
	Aroclor-1254 (PCB-1254)	µg/kg	37	0%	<44.6	--	<34	--	--	33	170
	Aroclor-1260 (PCB-1260)	µg/kg	37	8%	30.1	34.8	<34	72.1	188	33	170
	Aroclor-1262 (PCB-1262)	µg/kg	37	76%	59.5	24.1	64.3	38.8	114	33	170
	Aroclor-1268 (PCB-1268)	µg/kg	37	0%	<44.6	--	<34	--	--	33	170
	Total PCB congeners (NOAA 1989)	ng/kg	37	100%	444000	141000	430000	219000	790000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	37	100%	444000	141000	430000	219000	790000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	37	100%	444000	141000	431000	219000	790000	--	--
	Total PCBs (7)	µg/kg	37	11%	31.4	35.2	<34	65.5	188	33	170
	Total PCBs (7) (ND*0.5)	µg/kg	37	11%	37.4	48.9	<34	120	242	33	170
	Total PCBs (7) (ND*1)	µg/kg	37	11%	43.2	64.1	<34	174	296	33	170
	Total PCBs (9)	µg/kg	37	78%	65.3	31.9	64.3	38.8	188	33	170
	Total PCBs (9) (ND*0.5)	µg/kg	37	78%	275	169	263	182	606	33	170
	Total PCBs (9) (ND*1)	µg/kg	37	78%	483	324	416	317	1100	33	170
	Total PCBs congener (209 specified)	ng/kg	37	100%	335000	104000	319000	169000	597000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	37	100%	335000	104000	320000	169000	597000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	37	100%	336000	104000	320000	169000	597000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	37	100%	57.9	43.3	43.8	11.8	177	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	37	100%	58	43.3	43.8	11.9	177	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	37	100%	58	43.3	43.8	12	177	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	37	100%	0.804	0.262	0.764	0.326	1.39	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	37	100%	0.805	0.262	0.764	0.329	1.39	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	37	100%	0.807	0.262	0.764	0.331	1.39	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	37	100%	10	3.6	10.1	1.39	20.1	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	37	100%	10.2	3.62	10.3	1.43	20.1	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	37	100%	10.4	3.66	10.4	1.47	20.2	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	37	100%	94.6	48.8	86	33.5	238	--	--

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	37	100%	95.2	48.4	86	33.7	238	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	37	100%	95.8	48.1	87.3	33.8	238	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	37	100%	27.2	10.4	27.2	7.36	51.4	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	37	100%	27.9	10.3	28.2	7.37	51.4	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	37	100%	28.7	10.2	28.3	7.39	51.4	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	37	100%	36	12.6	35.7	15	63.5	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	37	100%	36.7	12.4	36.2	16.6	63.6	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	37	100%	37.5	12.3	36.3	17.1	63.8	--	--
	Total decachlorobiphenyl	ng/kg	34	100%	786	192	763	322	1170	--	--
	Total dichlorobiphenyl	ng/kg	37	100%	1060	350	983	572	2200	--	--
	Total heptachlorobiphenyl	ng/kg	37	100%	29900	12200	25300	13900	66600	--	--
	Total hexachlorobiphenyl	ng/kg	37	100%	93700	27100	85900	47800	155000	--	--
	Total monochlorobiphenyl	ng/kg	37	84%	9.16	12.5	4.99	3.13	63.5	4.76	4.99
	Total nonachlorobiphenyl	ng/kg	37	100%	2000	538	1970	956	3210	--	--
	Total octachlorobiphenyl	ng/kg	37	100%	10700	3290	10300	5490	19000	--	--
	Total pentachlorobiphenyl	ng/kg	37	100%	94200	29500	92200	43000	188000	--	--
	Total tetrachlorobiphenyl	ng/kg	37	100%	79500	29100	73900	32300	148000	--	--
	Total trichlorobiphenyl	ng/kg	37	100%	23100	9740	21200	9670	46100	--	--
Pesticides	2,4'-DDD	pg/g	37	100%	112	132	83.4	20.6	790	--	--
	2,4'-DDE	pg/g	35	100%	216	240	154	33.1	1370	--	--
	2,4'-DDT	pg/g	36	92%	80.5	151	48.5	17.2	932	27.8	121
	4,4'-DDD	pg/g	37	100%	25800	18200	20900	9100	111000	--	--
	4,4'-DDE	pg/g	37	100%	77300	30000	71900	35400	158000	--	--
	4,4'-DDT	pg/g	36	100%	546	716	268	105	3130	--	--
	Aldrin	pg/g	32	9%	20	10.5	<34.5	14.3	18.4	27	121
	Dieldrin	pg/g	36	100%	5220	2270	4860	1850	11100	--	--
	Endosulfan I	pg/g	23	4%	68.1	33.9	<91.7	40.5	40.5	69.4	303
	Endosulfan II	pg/g	34	3%	58.5	31	<84.4	41	41	67.6	303
	Endosulfan sulfate	pg/g	29	7%	68.8	52.3	<89.3	41.3	284	67.6	303
	Endrin	pg/g	37	0%	<38.8	--	<34.5	--	--	27	121
	Endrin aldehyde	pg/g	11	9%	121	73.4	<182	97.3	97.3	148	606
	Endrin ketone	pg/g	15	0%	<244	--	<185	--	--	144	606
	Heptachlor	pg/g	37	5%	19.2	10	<34.5	10.8	14.1	27	121
	Heptachlor endo-epoxide	pg/g	37	100%	981	410	879	434	2550	--	--
	Heptachlor epoxide	pg/g	37	100%	2990	1510	2510	1400	8430	--	--
	Hexachlorobenzene	pg/g	37	100%	955	397	876	480	2090	--	--
	Methoxychlor	pg/g	22	0%	<43.6	--	<36	--	--	27.8	121
	Mirex	pg/g	33	100%	170	35.5	168	92.2	237	--	--
	Oxychlordane	pg/g	37	100%	13300	6040	11900	5900	35700	--	--
	Total BHC Compounds	pg/g	37	100%	103	37.4	96.8	54.6	232	--	--
	Total Chlordane (ND=0)	pg/g	37	100%	32400	14700	29300	16500	90500	--	--
	Total Chlordane (ND=1)	pg/g	37	100%	32500	14700	29600	16700	90600	--	--

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total Chlordane (ND=1/2)	pg/g	37	100%	32500	14700	29400	16600	90600	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	37	100%	104000	46300	98800	45400	264000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	37	100%	104000	46400	98800	45400	264000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	37	100%	104000	46300	98800	45400	264000	--	--
	Total DDx (2,4) Total Fraction	pg/g	37	100%	380	396	248	45.4	2010	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	37	100%	394	393	282	45.4	2010	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	37	100%	409	390	288	45.4	2010	--	--
	Total DDx (4,4) Total Fraction	pg/g	37	100%	103000	46200	97600	45400	264000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	37	100%	103000	46200	97600	45400	264000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	37	100%	103000	46200	97600	45400	264000	--	--
	Total alpha + gamma chlordane	pg/g	37	100%	1940	954	1730	305	3810	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	37	100%	1950	951	1730	310	3810	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	37	100%	1960	949	1740	315	3810	--	--
	alpha-BHC	pg/g	35	100%	32.5	13.7	29.8	17.2	76.1	--	--
	alpha-Chlordane	pg/g	37	100%	1770	892	1530	307	3640	--	--
	beta-BHC	pg/g	37	100%	74.2	30.5	65.8	17.3	178	--	--
	cis-Nonachlor	pg/g	37	100%	4520	2030	4190	2040	13000	--	--
	delta-BHC	pg/g	32	13%	20	10.6	<34.1	13	18.5	27	121
	gamma-BHC (lindane)	pg/g	37	86%	20.6	12.4	18.4	8.12	58.4	34.5	121
	gamma-Chlordane	pg/g	30	93%	215	92.4	221	105	436	35.7	95.7
	trans-Nonachlor	pg/g	36	100%	8800	4700	8040	3040	27300	--	--
PAHs	1-Methylnaphthalene	µg/kg	37	30%	4.2	2.7	<6.5	3.2	11	6.5	32
	2-Methylnaphthalene	µg/kg	37	70%	5.9	4.2	6.5	3.1	16	6.5	32
	Acenaphthene	µg/kg	37	92%	8.6	5.1	7.4	3.8	28	6.6	32
	Acenaphthylene	µg/kg	37	41%	4.5	2.8	<6.5	3.2	10	6.5	32
	Anthracene	µg/kg	37	73%	7.8	15	6	3.1	93	6.5	32
	Benzo(a)anthracene	µg/kg	37	73%	5.9	4.8	6.5	3.2	28	6.5	32
	Benzo(a)pyrene	µg/kg	37	57%	5	3.3	6.5	3.2	15	6.5	32
	Benzo(b)fluoranthene	µg/kg	37	54%	4.9	3.1	6.5	3.2	13	6.5	32
	Benzo(e)pyrene	µg/kg	37	54%	4.6	2.8	6.5	3	11	6.5	32
	Benzo(g,h,i)perylene	µg/kg	37	51%	4.7	2.8	6.5	3.1	11	6.5	32
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	37	51%	4.8	3.1	6.5	3.2	14	6.5	32
	C1-Chrysenes	µg/kg	37	24%	4.2	2.6	<6.5	3.2	11	6.5	32
	C1-Fluoranthenes/Pyrenes	µg/kg	37	16%	5.3	5.6	<6.5	6.4	32	6.5	32
	C1-Fluorenes	µg/kg	37	5%	3.6	2.1	<6.5	3.2	3.7	6.5	32
	C1-Naphthalenes	µg/kg	37	86%	6.9	3.9	6.3	3.1	19	6.6	32
	C1-Phenanthrenes/Anthracenes	µg/kg	37	14%	4.6	4	<6.5	3.2	23	6.5	32
	C2-Chrysenes	µg/kg	37	3%	3.7	2.2	<6.5	7.2	7.2	6.5	32
	C2-Fluoranthenes/Pyrenes	µg/kg	37	0%	<7.2	--	<6.5	--	--	6.5	32
	C2-Fluorenes	µg/kg	37	8%	5.1	5.9	<6.5	12	31	6.5	32
	C2-Naphthalenes	µg/kg	37	46%	5.4	3.5	<6.5	3.2	15	6.5	32
	C2-Phenanthrenes/Anthracenes	µg/kg	37	8%	4.3	3.3	<6.5	5.7	18	6.5	32

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	C3-Chrysenes	µg/kg	37	0%	<7.2	--	<6.5	--	--	6.5	32
	C3-Fluoranthenes/Pyrenes	µg/kg	37	0%	<7.2	--	<6.5	--	--	6.5	32
	C3-Fluorenes	µg/kg	37	8%	3.9	2.2	<6.5	5.3	7.3	6.5	32
	C3-Naphthalenes	µg/kg	37	19%	4.1	2.6	<6.5	3.2	12	6.5	32
	C3-Phenanthrenes/Anthracenes	µg/kg	37	3%	3.6	2.1	<6.5	3.5	3.5	6.5	32
	C4-Chrysenes	µg/kg	37	0%	<7.2	--	<6.5	--	--	6.5	32
	C4-Naphthalenes	µg/kg	37	5%	3.7	2.1	<6.5	3.4	5.3	6.5	32
	C4-Phenanthrenes/Anthracenes	µg/kg	37	3%	3.7	2.1	<6.5	4.9	4.9	6.5	32
	Chrysene	µg/kg	37	73%	5.5	3.7	6.3	3.2	19	6.5	32
	Dibenz(a,h)anthracene	µg/kg	37	22%	3.8	2.2	<6.5	3.2	6.7	6.5	32
	Fluoranthene	µg/kg	37	89%	10	9.7	6.8	3.5	60	6.6	32
	Fluorene	µg/kg	37	19%	10	40	<6.5	3.2	250	6.5	32
	Indeno(1,2,3-cd)pyrene	µg/kg	37	46%	9.8	22	<6.5	3.4	110	6.5	32
	Naphthalene	µg/kg	37	43%	4.4	2.9	<6.5	3.2	13	6.5	32
	Perylene	µg/kg	37	51%	5	3.3	6.5	3.4	12	6.5	32
	Phenanthrene	µg/kg	37	73%	7.4	7.1	6.5	3.2	33	6.5	32
	Pyrene	µg/kg	37	92%	8.8	7.1	6.4	3.2	43	6.6	32
	Total Alkylated PAHs	µg/kg	37	86%	15	20	10	3.1	120	6.6	32
	Total HMW PAHs	µg/kg	37	92%	31	43	19	4.4	200	6.6	32
	Total HMW PAHs (ND*0.5)	µg/kg	37	92%	38	43	25	9.5	200	6.6	32
	Total HMW PAHs (ND*1)	µg/kg	37	92%	45	44	31	15	210	6.6	32
	Total LMW PAHs	µg/kg	37	95%	26	62	12	3.8	380	6.7	32
	Total LMW PAHs (ND*0.5)	µg/kg	37	95%	35	67	21	7.5	420	6.7	32
	Total LMW PAHs (ND*1)	µg/kg	37	95%	43	72	24	11	450	6.7	32
	Total PAH	µg/kg	37	95%	53	78	29	4.3	380	6.7	32
	Total PAH (ND*0.5)	µg/kg	37	95%	77	95	43	14	520	6.7	32
	Total PAH (ND*1)	µg/kg	37	95%	100	110	60	24	640	6.7	32
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	36	0%	<362	--	<130	--	--	130	660
	1,2-Diphenylhydrazine	µg/kg	36	3%	181	132	<130	69	69	130	660
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2,3,4,6-Tetrachlorophenol	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	2,4,5-Trichlorophenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2,4,6-Trichlorophenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2,4-Dichlorophenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2,4-Dimethylphenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2,4-Dinitrophenol	µg/kg	36	0%	<10860	--	<4000	--	--	3900	20000
	2,4-Dinitrotoluene	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	2,6-Dinitrotoluene	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2-Chloronaphthalene	µg/kg	36	0%	<360	--	<130	--	--	130	660
	2-Chlorophenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2-Methylphenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	2-Nitroaniline	µg/kg	36	0%	<362	--	<130	--	--	130	660

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	2-Nitrophenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	3,3'-Dichlorobenzidine	µg/kg	36	3%	1810	1320	<1300	569	569	1300	6600
	3-Nitroaniline	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	4,6-Dinitro-2-methylphenol	µg/kg	36	0%	<5440	--	<2000	--	--	1900	9900
	4-Bromophenyl phenyl ether	µg/kg	36	0%	<362	--	<130	--	--	130	660
	4-Chloro-3-methylphenol	µg/kg	36	0%	<362	--	<130	--	--	130	660
	4-Chloroaniline	µg/kg	36	0%	<724	--	<270	--	--	260	1300
	4-Chlorophenyl phenyl ether	µg/kg	36	0%	<362	--	<130	--	--	130	660
	4-Methylphenol	µg/kg	36	6%	182	131	<130	68.8	75.8	130	660
	4-Nitroaniline	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	4-Nitrophenol	µg/kg	36	0%	<5440	--	<2000	--	--	1900	9900
	Acetophenone	µg/kg	36	8%	190	138	<130	84.6	494	130	660
	Atrazine	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Benzaldehyde	µg/kg	36	75%	1450	729	1810	337	2990	650	3300
	Benzidine	µg/kg	36	0%	<36200	--	<13000	--	--	13000	66000
	Benzoic acid	µg/kg	36	64%	3410	1730	3520	1100	6300	1900	9900
	Biphenyl (1,1-Biphenyl)	µg/kg	36	0%	<362	--	<130	--	--	130	660
	Butyl benzylphthalate (BBP)	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Caprolactam	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Carbazole	µg/kg	36	0%	<362	--	<130	--	--	130	660
	Di-n-butylphthalate (DBP)	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Dibenzofuran	µg/kg	36	0%	<362	--	<130	--	--	130	660
	Diethyl phthalate	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Dimethyl phthalate	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Hexachlorobutadiene	µg/kg	36	0%	<362	--	<130	--	--	130	660
	Hexachlorocyclopentadiene	µg/kg	36	0%	<5440	--	<2000	--	--	1900	9900
	Hexachloroethane	µg/kg	36	0%	<1810	--	<670	--	--	650	3300
	Isophorone	µg/kg	36	0%	<362	--	<130	--	--	130	660
	N-Nitrosodi-n-propylamine	µg/kg	36	0%	<362	--	<130	--	--	130	660
	N-Nitrosodiphenylamine	µg/kg	36	0%	<362	--	<130	--	--	130	660
	Nitrobenzene	µg/kg	36	0%	<362	--	<130	--	--	130	660
	Pentachlorophenol	µg/kg	36	0%	<1852	--	<680	--	--	660	3400
	Phenol	µg/kg	36	19%	209	128	<298	110	370	130	660
	Pyridine	µg/kg	36	22%	981	628	<763	361	1650	650	3300
	bis(2-Chloroethoxy)methane	µg/kg	36	0%	<362	--	<130	--	--	130	660
	bis(2-Chloroethyl)ether	µg/kg	36	0%	<362	--	<130	--	--	130	660
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	36	0%	<1852	--	<680	--	--	660	3400
Butyltins	Dibutyltin	µg/kg	36	14%	0.74	0.3	<1.3	0.85	2	1.2	1.3
	Monobutyltin hydride	µg/kg	36	0%	<20	--	<20	--	--	20	21
	Tetrabutyltin	µg/kg	36	0%	<1.66	--	<1.7	--	--	1.6	1.7
	Tributyl tin	µg/kg	36	0%	<1.46	--	<1.5	--	--	1.4	1.5

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals	Aluminum	mg/kg	37	97%	23.4	12.5	22.3	11.5	86.4	19.2	19.2
	Antimony	mg/kg	37	3%	0.0989	0.0169	<0.192	0.199	0.199	0.19	0.198
	Arsenic	mg/kg	37	100%	2.5	0.532	2.46	1.5	3.81	--	--
	Barium	mg/kg	37	100%	1.64	0.901	1.31	0.625	4.26	--	--
	Beryllium	mg/kg	37	3%	0.0479	0.00118	<0.0962	0.0415	0.0415	0.0952	0.099
	Cadmium	mg/kg	37	100%	0.315	0.142	0.262	0.148	0.668	--	--
	Calcium	mg/kg	37	100%	4420	3070	3530	1660	15400	--	--
	Chromium	mg/kg	37	100%	0.263	0.0971	0.237	0.177	0.711	--	--
	Cobalt	mg/kg	37	100%	0.105	0.0281	0.096	0.0736	0.207	--	--
	Copper	mg/kg	37	100%	28.9	6.52	28.5	18.7	47.9	--	--
	Iron	mg/kg	37	100%	86.3	88	66	33	590	--	--
	Lead	mg/kg	37	100%	0.665	0.783	0.458	0.224	5.04	--	--
	Magnesium	mg/kg	37	100%	651	154	630	460	1260	--	--
	Manganese	mg/kg	37	100%	12.6	6.47	10.2	3.88	29.2	--	--
	Mercury	ng/g	37	100%	116	28.2	111	39.7	180	--	--
	Methyl mercury	ng/g	34	100%	124	40	121	29.7	207	--	--
	Nickel	mg/kg	37	97%	0.312	0.157	0.281	0.195	1.11	0.392	0.392
	Potassium	mg/kg	37	100%	3710	621	3670	2170	5060	--	--
	Selenium	mg/kg	37	100%	1.07	0.156	1.06	0.697	1.37	--	--
	Silver	mg/kg	37	100%	0.785	0.217	0.784	0.266	1.41	--	--
	Sodium	mg/kg	37	100%	3720	463	3670	2820	4520	--	--
	Thallium	mg/kg	37	0%	<0.0962	--	<0.0962	--	--	0.0952	0.099
	Titanium	mg/kg	37	84%	1.01	0.345	1.09	0.417	2.05	1.9	1.94
	Vanadium	mg/kg	37	100%	0.148	0.0415	0.14	0.0765	0.268	--	--
	Zinc	mg/kg	37	100%	40.4	6.6	41.1	28.8	53	--	--
Miscellaneous	Lipids	%	37	100%	1.9	0.528	1.74	0.911	3.23	--	--
	Moisture	%	37	100%	77.4	3.53	77.6	58.3	80.8	--	--

Table 4-7c
Phase III Tissue Chemistry Summary Statistics: Blue Crab (Whole-Body)

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	18	100%	1.55	0.908	1.31	0.642	3.81	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	18	100%	0.347	0.27	0.231	0.0454	0.987	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	18	100%	0.828	0.449	0.634	0.374	1.65	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	18	100%	4.75	2.19	4.85	0.558	8.65	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	18	72%	0.785	1.06	0.177	0.0419	0.271	4.79	4.97
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	0.226	0.144	0.154	0.0668	0.504	--	--
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	1.56	1.22	1.55	0.367	5.63	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	1.14	0.745	0.889	0.462	3.01	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	2.12	0.998	2.25	0.338	4.22	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	0.216	0.14	0.182	0.0626	0.474	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	0.0817	0.0219	0.0829	0.0454	0.127	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	18	78%	0.907	0.879	0.503	0.214	0.985	4.81	5
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	18	94%	1.4	0.719	1.34	0.217	2.38	5	5
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	0.245	0.161	0.204	0.0397	0.601	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	18	100%	3.85	2.18	3.56	0.597	8.2	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	18	100%	5.57	3.95	4.65	1.69	16.3	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	18	28%	0.394	0.158	<0.96	0.099	0.293	0.952	0.993
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	18	100%	10.4	5.24	11.6	2.78	21.7	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	18	100%	11.4	5.14	12.1	3.78	21.7	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	18	100%	12.4	5.22	12.5	4.29	21.7	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	18	100%	8.49	4.67	8.62	2.38	19.9	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	18	100%	9.13	4.65	9	2.77	19.9	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	18	100%	9.77	4.87	9.93	2.82	19.9	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	100%	7.73	4.51	7.3	2.28	19.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	18	100%	8.39	4.5	8.08	2.59	19.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	18	100%	9.05	4.74	8.84	2.66	19.2	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	18	100%	1.14	0.628	0.91	0.477	2.32	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	18	100%	10.3	4.71	9.35	1.3	19.1	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	18	100%	2.52	1.45	1.9	1.07	5.75	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	18	100%	18	7.39	19.4	3.19	30	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	18	100%	6.83	5.5	4.79	0.951	18.8	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	18	100%	50.8	26.2	42.6	10.4	97.6	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	18	100%	6.35	4.09	5.49	1.91	17	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	18	100%	192	105	193	39.1	403	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	15	87%	9.32	7.57	7.17	4.42	33.4	1.99	9.98
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	18	50%	11	7.33	13.1	2.75	15.7	4.98	48.1
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	18	94%	17.5	16.4	14.5	1.85	72	47.2	47.2
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	18	11%	10.1	7.95	<24.4	2.13	3.55	4.78	48.1
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	15	100%	18400	14800	14000	4030	55800	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	18	0%	<20.2	--	<24.4	--	--	4.78	48.1
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	18	100%	854	707	533	184	2560	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	18	100%	151	116	113	18.8	415	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	18	89%	80.1	54.4	67.9	43.3	195	9.78	9.95
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	15	100%	30300	21000	27200	3720	77000	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	18	100%	70.1	32.7	69	18.7	129	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	15	60%	77.5	96	74.6	66.6	376	4.83	24.4
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	18	100%	1110	968	878	221	3860	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	18	100%	53900	30600	47400	12300	133000	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	18	78%	12.2	7.63	12.1	2.37	30.1	24.4	48.1
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	18	100%	242	124	243	45.1	484	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	18	89%	39	23.1	39.3	7.16	76	4.83	4.86
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	18	94%	78.3	71.6	71.1	10.6	287	4.84	4.84
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	18	100%	1140	848	942	200	3210	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	15	47%	51.4	92.3	<24.4	8.07	350	4.83	42.7
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	14	100%	52.6	33.2	40.2	16.3	139	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	18	100%	6080	2950	6030	2070	13800	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	18	100%	55200	20900	53900	19500	106000	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	15	100%	2570	1020	2610	1090	4910	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	15	100%	64.8	38.6	64.7	11.8	126	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	15	100%	3050	1960	2610	614	7000	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	17	100%	1260	506	1270	498	2180	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	15	100%	1250	586	1270	322	2330	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	17	100%	3730	2480	3260	458	8680	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	17	100%	821	548	835	81.6	1720	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	15	100%	2050	1240	1660	683	5720	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	15	100%	818	370	779	316	1770	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	18	0%	<8.08	--	<9.76	--	--	1.91	19.2
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	18	100%	4130	2160	3650	900	10200	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	15	0%	<20.6	--	<24.4	--	--	4.83	48.1
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	15	0%	<41.2	--	<48.7	--	--	9.66	96.2
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	14	100%	161	110	161	21.8	342	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	17	0%	<19.94	--	<24.4	--	--	4.78	48.1
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	14	100%	10800	4110	10700	5730	19200	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	15	100%	16400	7390	16500	4510	30000	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	10	100%	241	86.1	266	81.2	342	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	17	100%	71.5	58	56.8	28.3	257	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	17	24%	10.8	7.83	<24.4	1.61	13.3	4.78	48.1

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	17	6%	9.96	8.21	<24.4	2.42	2.42	4.78	48.1
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	15	100%	69700	25900	62000	34800	124000	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	14	100%	1540	712	1710	468	2840	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	18	100%	540	243	515	140	1000	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	18	100%	5340	2950	4370	1880	13000	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	15	100%	4510	2080	4220	2140	10200	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	18	28%	9.94	7.55	<13.8	3.79	18.7	4.83	48.1
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	11	100%	52.9	27.5	47.2	10.2	112	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	15	0%	<82.4	--	<97.5	--	--	19.3	192
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	15	7%	10.1	8.48	<10.3	10.3	10.3	4.83	48.1
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	18	89%	330	215	292	25.3	770	4.84	4.89
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	15	100%	1690	676	1790	538	3300	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	14	100%	60.5	23.7	54.6	31.3	102	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	12	100%	2210	1040	2050	1090	4280	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	18	17%	10.2	7.97	<18.7	2.18	12.9	4.83	48.1
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	18	100%	90.1	54.6	81.3	18.4	228	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	18	100%	7990	2860	7640	3240	14900	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	14	100%	2850	910	3000	1590	4540	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	15	100%	1810	612	1590	1140	3020	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	15	100%	2380	1150	2080	795	4720	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	14	100%	503	199	464	246	891	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	15	100%	108	75.8	88.6	17.8	244	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	14	100%	5960	1870	6140	2850	8960	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	11	100%	4440	1220	4560	2460	6020	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	18	100%	1110	709	1010	121	2510	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	18	100%	276	167	236	56.4	634	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	18	100%	28000	9090	27100	12500	49800	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	13	100%	116	43.6	119	62	213	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	11	100%	100	26.3	105	55.3	142	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	15	93%	9210	4000	9700	5280	16400	9.66	9.66
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	18	100%	76.9	31.3	74.5	26.2	135	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	15	0%	<20.6	--	<24.4	--	--	4.83	48.1
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	14	100%	25100	8400	24300	13700	40400	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	18	100%	96.6	43.8	103	17.8	188	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	18	100%	398	176	322	157	744	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	18	100%	91.8	58.6	89.5	17.7	222	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	18	100%	2130	768	2080	893	3950	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	15	100%	457	166	431	245	863	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	15	53%	11.4	6.33	12.7	4.14	13	4.83	48.1
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	18	100%	4360	1590	3860	1950	7070	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	18	100%	1490	505	1360	637	2320	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	16	100%	2890	953	2690	1580	4900	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	16	100%	382	135	334	216	583	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	15	100%	8090	2960	7410	4800	13000	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	18	39%	4.01	2.96	<8.73	0.768	7.7	1.95	18.9
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	18	100%	9170	5550	8020	3250	21200	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	18	100%	896	327	853	341	1360	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	18	100%	2930	1200	2610	1330	5340	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	17	100%	5260	2020	4550	2100	8880	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	18	67%	13.1	5.53	12.1	4.54	15	24.9	48.1
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	18	100%	223	84.4	203	84.1	374	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	18	100%	3680	1520	3170	1650	6760	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	18	100%	382	134	347	179	638	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	17	100%	1480	732	1220	623	3010	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	18	100%	1860	925	1560	823	3900	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	18	78%	44.6	35.2	48.2	12.1	137	4.83	4.96
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	18	100%	461	331	393	66.8	1290	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	18	0%	<8.08	--	<9.76	--	--	1.91	19.2
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	18	50%	5.52	3.14	7.48	1.34	7.81	1.93	19.2
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	18	100%	82.7	55.6	68.4	10.9	191	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	18	100%	1030	594	1040	250	2260	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	16	100%	33.8	21.4	26.7	7.51	79.4	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	16	31%	11.1	8.62	<24.4	3.49	29.7	4.89	47.2
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	18	100%	2620	1490	2850	635	6290	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	18	100%	240	170	178	50.6	640	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	18	94%	13.7	8.2	12.2	4.17	29.8	1.99	1.99
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	18	17%	4.12	3.11	<9.76	1.04	1.74	1.93	19.2
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	18	6%	7.42	14.9	<9.76	65.8	65.8	1.91	19.2
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	18	100%	155	94.3	127	32.1	344	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	18	100%	24.4	17.2	21.5	2.93	73.8	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	18	22%	4.02	3.13	<4.21	0.969	4.46	1.93	19.2
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	18	100%	94	52.4	86.1	18	195	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	18	100%	876	548	844	171	2030	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	15	0%	<41.2	--	<48.7	--	--	9.66	96.2
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	17	100%	3040	2200	2750	543	7970	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	18	56%	34.1	37.6	24.4	14.4	138	4.83	24.4
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	18	100%	27900	18100	27000	4480	74400	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	18	100%	195	119	188	31.5	394	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	18	100%	33.4	19.7	33.2	6.92	77.1	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	18	100%	51.7	35.1	45.2	10.3	128	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	18	100%	4850	3570	4360	772	13500	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	18	0%	<20.2	--	<24.4	--	--	4.78	48.1
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	18	100%	291	190	248	48	600	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	18	100%	147	88.2	148	22.1	330	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	18	100%	33600	26100	30800	5090	101000	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	18	61%	13.7	9.46	18.3	1.87	41.2	24.4	48.1
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	15	40%	19.7	19	<24.4	11.8	64.3	4.83	47.2
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	15	100%	138	127	119	21	490	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	15	80%	43.6	48.9	33.8	11.8	191	4.83	4.96
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	15	100%	128	66.1	107	37.9	251	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	18	100%	2950	2160	2660	522	8590	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	17	94%	13.1	10	8.63	4.33	36	1.99	1.99
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	18	100%	3760	4240	2190	681	15600	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	18	100%	14000	12400	10600	3160	52300	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	15	100%	814	717	625	263	3090	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	16	100%	14600	9330	14100	3280	42800	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	15	100%	22100	19600	16900	5660	79900	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	16	94%	70.6	41.8	84.2	15.4	162	24.4	24.4
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	15	100%	168	100	166	56.1	361	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	17	24%	5.01	5.42	<6.43	1.8	22.3	1.91	19.2
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	17	100%	300	195	230	47.2	622	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	18	61%	25.8	24.4	25.6	5	76.8	4.83	25
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	18	100%	52.7	37.3	38.1	12.9	120	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	18	6%	23.1	56.4	<24.4	247	247	4.78	48.1
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	18	100%	111	98.9	98	16.4	445	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	17	82%	41.9	34.8	27.9	16.9	125	4.89	4.98
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	16	0%	<20.8	--	<24.4	--	--	4.83	48.1
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	15	20%	8.93	9.36	<4.98	10.2	36.2	4.78	24.9
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	17	100%	834	632	774	128	2440	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	15	87%	1190	712	1290	457	2320	9.68	9.73
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	18	100%	2350	1660	2050	354	5880	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	18	100%	9070	6620	8280	1770	26900	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	18	100%	8060	5600	7340	1100	19600	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	18	6%	32.2	92.4	<24.4	401	401	4.78	48.1
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	18	44%	10.1	7.36	<10.8	1.55	12.7	4.83	48.1
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	17	47%	4.22	2.85	<4.84	1.37	9.87	1.93	18.9
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	17	100%	17300	11000	17500	2040	38400	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	17	100%	2430	1750	2330	240	6550	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	15	100%	5900	3170	5870	1440	12100	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	18	100%	1430	772	1560	172	2870	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	18	94%	22.7	14.3	25.5	3.51	49.8	47.2	47.2
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	18	100%	7550	6180	6390	1070	23700	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	18	78%	14	8.71	17.2	2.62	34.2	24.4	42.7
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	18	61%	230	715	78.3	12.9	3090	19.3	189
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	15	100%	31100	17500	26600	9450	78000	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Aroclor-1221 (PCB-1221)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Aroclor-1232 (PCB-1232)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Aroclor-1242 (PCB-1242)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Aroclor-1248 (PCB-1248)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Aroclor-1254 (PCB-1254)	µg/kg	15	87%	268	259	180	110	1000	34	170
	Aroclor-1260 (PCB-1260)	µg/kg	15	100%	202	113	210	51	420	--	--
	Aroclor-1262 (PCB-1262)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Aroclor-1268 (PCB-1268)	µg/kg	15	0%	<61	--	<34	--	--	33	170
	Total PCB congeners (NOAA 1989)	ng/kg	18	100%	714000	358000	727000	144000	1730000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	18	100%	714000	358000	727000	144000	1730000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	18	100%	714000	358000	727000	144000	1730000	--	--
	Total PCBs (7)	µg/kg	15	100%	461	355	340	51	1400	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	15	100%	618	455	470	150	1800	--	--
	Total PCBs (7) (ND*1)	µg/kg	15	100%	787	607	550	260	2300	--	--
	Total PCBs (9)	µg/kg	15	100%	461	355	340	51	1400	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total PCBs (9) (ND*0.5)	µg/kg	15	100%	684	513	500	190	2000	--	--
	Total PCBs (9) (ND*1)	µg/kg	15	100%	907	704	620	320	2600	--	--
	Total PCBs congener (209 specified)	ng/kg	18	100%	603000	315000	618000	101000	1500000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	18	100%	604000	315000	619000	101000	1500000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	18	100%	605000	316000	619000	101000	1500000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	18	100%	9.67	11.3	4.76	1.74	42	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	18	100%	10.4	11.4	5.91	2.23	43.2	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	18	100%	11.2	11.5	7.63	2.72	44.4	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	18	100%	0.597	0.575	0.381	0.136	2.19	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	18	100%	0.617	0.57	0.422	0.137	2.2	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	18	100%	0.637	0.565	0.442	0.139	2.2	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	18	100%	6.32	9.4	2.31	0.896	37.6	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	18	100%	6.96	9.29	4.3	1.21	38	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	18	100%	7.59	9.24	5.13	1.44	38.3	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	18	100%	20.1	13.6	16.1	5.76	54.9	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	18	100%	21.8	13.7	17.9	6.51	56.6	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	18	100%	23.6	13.8	19.4	7.25	58.3	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	18	100%	9.09	4.89	9.03	2.79	20.5	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	18	100%	9.75	4.89	9.35	2.91	20.5	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	18	100%	10.4	5.1	10.3	2.96	20.9	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	100%	14.1	11.3	10.9	3.96	46.3	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	18	100%	15.4	11.3	12.5	4.03	46.7	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	18	100%	16.7	11.3	14.2	4.1	47.2	--	--
	Total decachlorobiphenyl	ng/kg	18	100%	1860	925	1560	823	3900	--	--
	Total dichlorobiphenyl	ng/kg	18	100%	308	193	258	52.7	724	--	--
	Total heptachlorobiphenyl	ng/kg	18	100%	81000	35100	79800	17000	157000	--	--
	Total hexachlorobiphenyl	ng/kg	18	100%	174000	82500	176000	25600	368000	--	--
	Total monochlorobiphenyl	ng/kg	18	78%	15	15	11.6	0.768	70.8	25	47.2
	Total nonachlorobiphenyl	ng/kg	18	100%	5470	2420	4720	2450	10400	--	--
	Total octachlorobiphenyl	ng/kg	18	100%	24500	10600	21500	6450	41300	--	--
	Total pentachlorobiphenyl	ng/kg	18	100%	178000	113000	160000	27700	487000	--	--
	Total tetrachlorobiphenyl	ng/kg	18	100%	124000	91400	113000	16000	402000	--	--
	Total trichlorobiphenyl	ng/kg	18	100%	14400	8330	13800	4930	33200	--	--
Pesticides	2,4'-DDD	pg/g	18	100%	2000	1240	1840	476	5980	--	--
	2,4'-DDE	pg/g	18	100%	1150	1080	841	226	4970	--	--
	2,4'-DDT	pg/g	18	100%	250	213	155	77.7	710	--	--
	4,4'-DDD	pg/g	18	100%	76800	44600	62500	18400	173000	--	--
	4,4'-DDE	pg/g	18	100%	171000	80000	153000	64100	427000	--	--
	4,4'-DDT	pg/g	18	100%	5140	4220	3380	717	16300	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Aldrin	pg/g	18	94%	36.1	12.9	34.1	14.4	60.5	32.3	32.3
	Dieldrin	pg/g	18	100%	9760	4850	9050	2890	20900	--	--
	Endosulfan I	pg/g	16	0%	<174.4	--	<187	--	--	130	200
	Endosulfan II	pg/g	18	0%	<174.8	--	<181	--	--	130	200
	Endosulfan sulfate	pg/g	18	0%	<174.8	--	<181	--	--	130	200
	Endrin	pg/g	18	28%	36.9	62.3	<35.3	20	46.5	27.6	567
	Endrin aldehyde	pg/g	18	0%	<174.8	--	<181	--	--	130	200
	Endrin ketone	pg/g	15	0%	<175	--	<179	--	--	138	200
	Heptachlor	pg/g	18	17%	15.1	5.15	<32	4.03	6.05	26	40
	Heptachlor endo-epoxide	pg/g	18	11%	180	475	<37.6	1360	1600	26	40
	Heptachlor epoxide	pg/g	18	100%	2150	1180	1740	605	4380	--	--
	Hexachlorobenzene	pg/g	18	100%	3090	1250	3060	1270	5970	--	--
	Methoxychlor	pg/g	15	0%	<35	--	<35.7	--	--	27.6	40
	Mirex	pg/g	17	100%	335	144	306	138	734	--	--
	Oxychlordane	pg/g	18	100%	7640	3280	7240	2860	15100	--	--
	Total BHC Compounds	pg/g	18	100%	163	110	132	55.5	410	--	--
	Total Chlordane (ND=0)	pg/g	18	100%	53500	17100	53200	13600	76500	--	--
	Total Chlordane (ND=1)	pg/g	18	100%	53600	17100	53300	13700	76600	--	--
	Total Chlordane (ND=1/2)	pg/g	18	100%	53600	17100	53300	13600	76600	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	18	100%	256000	123000	225000	85000	610000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	18	100%	256000	123000	225000	85000	610000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	18	100%	256000	123000	225000	85000	610000	--	--
	Total DDx (2,4) Total Fraction	pg/g	18	100%	3360	2340	2950	780	11000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	18	100%	3360	2340	2950	780	11000	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	18	100%	3360	2340	2950	780	11000	--	--
	Total DDx (4,4) Total Fraction	pg/g	18	100%	253000	123000	225000	83000	610000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	18	100%	253000	123000	225000	83000	610000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	18	100%	253000	123000	225000	83000	610000	--	--
	Total alpha + gamma chlordane	pg/g	18	100%	13500	7250	16000	1600	25000	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	18	100%	13500	7250	16000	1600	25000	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	18	100%	13500	7250	16000	1600	25000	--	--
	alpha-BHC	pg/g	17	94%	66.6	41.3	56.2	21.7	158	31.7	31.7
	alpha-Chlordane	pg/g	18	100%	10200	5700	12500	904	19600	--	--
	beta-BHC	pg/g	18	94%	72.8	51.5	54.3	25.7	178	27.6	27.6
	cis-Nonachlor	pg/g	18	100%	8870	2470	8860	2480	12900	--	--
	delta-BHC	pg/g	13	8%	17.4	2.43	<35.7	15.1	15.1	27.6	40
	gamma-BHC (lindane)	pg/g	18	100%	28.7	19	22.9	11.6	78.1	--	--
	gamma-Chlordane	pg/g	18	100%	3250	1680	3300	738	6020	--	--
	trans-Nonachlor	pg/g	18	100%	21200	5670	20500	6000	29200	--	--
PAHs	1-Methylnaphthalene	µg/kg	18	6%	8.2	5.5	<13	2.9	2.9	6.7	33
	2-Methylnaphthalene	µg/kg	18	6%	8.3	5.4	<13	4.6	4.6	6.7	33

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Acenaphthene	µg/kg	18	72%	12	6.3	12	3.6	26	13	33
	Acenaphthylene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Anthracene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Benzo(a)anthracene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Benzo(a)pyrene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Benzo(b)fluoranthene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Benzo(e)pyrene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Benzo(g,h,i)perylene	µg/kg	18	6%	8.2	5.4	<13	3.7	3.7	6.7	33
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C1-Chrysenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C1-Fluoranthenes/Pyrenes	µg/kg	18	6%	8.3	5.4	<13	5.3	5.3	6.7	33
	C1-Fluorenes	µg/kg	18	6%	8.3	5.4	<13	4	4	6.7	33
	C1-Naphthalenes	µg/kg	18	17%	8.3	5.4	<13	2.9	5.1	6.7	33
	C1-Phenanthrenes/Anthracenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C2-Chrysenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C2-Fluoranthenes/Pyrenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C2-Fluorenes	µg/kg	18	6%	10	9.7	<13	43	43	6.7	33
	C2-Naphthalenes	µg/kg	18	22%	8.5	5.2	<13	3.8	7.6	6.7	33
	C2-Phenanthrenes/Anthracenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C3-Chrysenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C3-Fluoranthenes/Pyrenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C3-Fluorenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C3-Naphthalenes	µg/kg	18	28%	8.5	5	<13	3.4	14	6.7	33
	C3-Phenanthrenes/Anthracenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C4-Chrysenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	C4-Naphthalenes	µg/kg	18	6%	8.3	5.4	<13	5.4	5.4	6.7	33
	C4-Phenanthrenes/Anthracenes	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Chrysene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Dibenz(a,h)anthracene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Fluoranthene	µg/kg	18	33%	8.6	5.3	<13	2.8	15	6.7	33
	Fluorene	µg/kg	18	11%	8.3	5.4	<13	5.5	5.8	6.7	33
	Indeno(1,2,3-cd)pyrene	µg/kg	18	6%	8.2	5.4	<13	3.5	3.5	6.7	33
	Naphthalene	µg/kg	18	39%	21	33	<11	3.4	96	6.7	33
	Perylene	µg/kg	18	0%	<16.4	--	<13	--	--	6.7	33
	Phenanthrene	µg/kg	18	11%	8.7	5.6	<13	3.9	14	6.7	33
	Pyrene	µg/kg	18	11%	8.1	5.2	<13	7.5	14	6.7	33
	Total Alkylated PAHs	µg/kg	18	33%	13	11	<13	8.2	52	6.7	33
	Total HMW PAHs	µg/kg	18	39%	9.1	5.6	<13	2.8	20	6.7	33
	Total HMW PAHs (ND*0.5)	µg/kg	18	39%	35	49	<33	33	160	6.7	33
	Total HMW PAHs (ND*1)	µg/kg	18	39%	61	96	<33	62	310	6.7	33
	Total LMW PAHs	µg/kg	18	94%	28	32	14	6.1	96	33	33

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Total LMW PAHs (ND*0.5)	µg/kg	18	94%	70	61	46	25	200	33	33
	Total LMW PAHs (ND*1)	µg/kg	18	94%	110	92	84	42	290	33	33
	Total PAH	µg/kg	18	94%	32	36	16	6.1	110	33	33
	Total PAH (ND*0.5)	µg/kg	18	94%	140	110	110	58	360	33	33
	Total PAH (ND*1)	µg/kg	18	94%	250	200	210	110	620	33	33
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	18	0%	<658	--	<660	--	--	650	670
	1,2-Diphenylhydrazine	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2,3,4,6-Tetrachlorophenol	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	2,4,5-Trichlorophenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2,4,6-Trichlorophenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2,4-Dichlorophenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2,4-Dimethylphenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2,4-Dinitrophenol	µg/kg	18	0%	<19780	--	<20000	--	--	19000	20000
	2,4-Dinitrotoluene	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	2,6-Dinitrotoluene	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2-Chloronaphthalene	µg/kg	18	0%	<652	--	<650	--	--	640	660
	2-Chlorophenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2-Methylphenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2-Nitroaniline	µg/kg	18	0%	<658	--	<660	--	--	650	670
	2-Nitrophenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	3,3'-Dichlorobenzidine	µg/kg	18	0%	<6580	--	<6600	--	--	6500	6700
	3-Nitroaniline	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	4,6-Dinitro-2-methylphenol	µg/kg	18	0%	<9860	--	<9900	--	--	9700	10000
	4-Bromophenyl phenyl ether	µg/kg	18	0%	<658	--	<660	--	--	650	670
	4-Chloro-3-methylphenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	4-Chloroaniline	µg/kg	18	0%	<1300	--	<1300	--	--	1300	1300
	4-Chlorophenyl phenyl ether	µg/kg	18	0%	<658	--	<660	--	--	650	670
	4-Methylphenol	µg/kg	18	6%	361	135	<660	900	900	650	670
	4-Nitroaniline	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	4-Nitrophenol	µg/kg	18	0%	<9860	--	<9900	--	--	9700	10000
	Acetophenone	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Atrazine	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Benzaldehyde	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Benzidine	µg/kg	18	0%	<65800	--	<66000	--	--	65000	67000
	Benzoic acid	µg/kg	18	0%	<9860	--	<9900	--	--	9700	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Butyl benzylphthalate (BBP)	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Caprolactam	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Carbazole	µg/kg	18	0%	<658	--	<660	--	--	650	670

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	Di-n-butylphthalate (DBP)	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Dibenzofuran	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Diethyl phthalate	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Dimethyl phthalate	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Hexachlorobutadiene	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Hexachlorocyclopentadiene	µg/kg	18	0%	<9860	--	<9900	--	--	9700	10000
	Hexachloroethane	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	Isophorone	µg/kg	18	0%	<658	--	<660	--	--	650	670
	N-Nitrosodi-n-propylamine	µg/kg	18	0%	<658	--	<660	--	--	650	670
	N-Nitrosodiphenylamine	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Nitrobenzene	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Pentachlorophenol	µg/kg	18	0%	<3360	--	<3400	--	--	3300	3400
	Phenol	µg/kg	18	0%	<658	--	<660	--	--	650	670
	Pyridine	µg/kg	18	0%	<3280	--	<3300	--	--	3200	3300
	bis(2-Chloroethoxy)methane	µg/kg	18	0%	<658	--	<660	--	--	650	670
	bis(2-Chloroethyl)ether	µg/kg	18	0%	<658	--	<660	--	--	650	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	18	0%	<3360	--	<3400	--	--	3300	3400
Butyltins	Dibutyltin	µg/kg	15	0%	<1.28	--	<1.3	--	--	1.2	1.3
	Monobutyltin hydride	µg/kg	15	0%	<20	--	<20	--	--	19	21
	Tetrabutyltin	µg/kg	15	0%	<1.66	--	<1.7	--	--	1.5	1.7
	Tributyl tin	µg/kg	15	27%	0.98	0.43	<1.5	1.5	1.9	1.4	1.5
Metals	Aluminum	mg/kg	18	22%	10.8	4.16	<19.5	6.85	25.6	19.4	20
	Antimony	mg/kg	18	0%	<0.1962	--	<0.196	--	--	0.192	0.2
	Arsenic	mg/kg	18	100%	0.808	0.279	0.699	0.42	1.5	--	--
	Barium	mg/kg	18	22%	0.248	0.139	<0.392	0.221	0.734	0.385	0.4
	Beryllium	mg/kg	18	0%	<0.0982	--	<0.098	--	--	0.0962	0.1
	Cadmium	mg/kg	18	0%	<0.0982	--	<0.098	--	--	0.0962	0.1
	Calcium	mg/kg	18	100%	3610	2520	2970	817	11100	--	--
	Chromium	mg/kg	18	28%	0.193	0.0461	<0.388	0.105	0.348	0.385	0.4
	Cobalt	mg/kg	18	39%	0.0415	0.0116	<0.0971	0.02	0.047	0.0962	0.1
	Copper	mg/kg	18	100%	0.873	0.526	0.752	0.61	2.94	--	--
	Iron	mg/kg	18	100%	39	39.9	27.5	14.6	183	--	--
	Lead	mg/kg	18	94%	0.231	0.146	0.167	0.0502	0.482	0.196	0.196
	Magnesium	mg/kg	18	100%	308	54.3	311	203	423	--	--
	Manganese	mg/kg	18	100%	2.28	1.89	1.54	0.318	8.24	--	--
	Mercury	ng/g	18	100%	182	83.9	174	43.3	347	--	--
	Methyl mercury	ng/g	18	100%	203	85.4	183	77.8	400	--	--
	Nickel	mg/kg	18	39%	0.332	0.28	<0.396	0.206	1.29	0.385	0.4
	Potassium	mg/kg	18	100%	3270	432	3270	2550	4140	--	--
	Selenium	mg/kg	18	100%	0.811	0.41	0.632	0.467	1.83	--	--

Table 4-7d
Phase III Tissue Chemistry Summary Statistics: American Eel (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals (cont.)	Silver	mg/kg	18	72%	0.034	0.013	0.0267	0.02	0.0475	0.0971	0.1
	Sodium	mg/kg	18	100%	1170	165	1180	891	1390	--	--
	Thallium	mg/kg	18	0%	<0.0982	--	<0.098	--	--	0.0962	0.1
	Titanium	mg/kg	18	39%	0.872	0.385	<1.94	0.272	1.99	1.94	1.98
	Vanadium	mg/kg	18	61%	0.0603	0.0221	0.0962	0.038	0.116	0.0971	0.1
	Zinc	mg/kg	18	100%	31.4	4.71	31.4	25.1	40.5	--	--
Miscellaneous	Lipids	%	18	100%	4.6	3.95	3.08	1.3	13.4	--	--
	Moisture	%	18	100%	72.5	3.13	72.6	66.9	79.4	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	2	100%	4.17	0.725	4.17	3.66	4.68	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	2	100%	0.813	0.099	0.813	0.743	0.883	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	2	100%	0.945	0.459	0.945	0.621	1.27	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	2	100%	2.28	0.279	2.28	2.09	2.48	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	2	100%	0.115	0.0106	0.115	0.107	0.122	--	--
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	2	100%	0.144	0.105	0.144	0.0697	0.218	--	--
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	2	100%	0.622	0.224	0.622	0.464	0.78	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	2	100%	0.654	0.546	0.654	0.268	1.04	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	2	100%	0.716	0.214	0.716	0.564	0.867	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	2	100%	0.294	0.243	0.294	0.122	0.465	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	2	100%	0.101	0.0618	0.101	0.0577	0.145	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	2	100%	0.611	0.37	0.611	0.349	0.872	--	--
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	2	100%	3.29	2.32	3.29	1.66	4.93	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	2	100%	0.254	0.195	0.254	0.116	0.392	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	2	100%	1.97	1.23	1.97	1.09	2.84	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	2	100%	4.33	0.58	4.33	3.92	4.74	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	2	100%	4.43	3.38	4.43	2.04	6.82	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	2	100%	11.8	4.9	11.8	8.38	15.3	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	2	100%	12.4	4.03	12.4	9.6	15.3	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	2	100%	13	3.19	13	10.8	15.3	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	2	100%	6.5	0.948	6.5	5.83	7.17	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	2	100%	7.1	0.0955	7.1	7.04	7.17	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	2	100%	7.71	0.76	7.71	7.17	8.25	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	2	100%	6.3	0.856	6.3	5.69	6.9	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	2	100%	6.9	0	6.9	6.9	6.9	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	2	100%	7.5	0.845	7.5	6.9	8.1	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	2	100%	1.87	0.976	1.87	1.18	2.56	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	2	100%	3.81	0.894	3.81	3.18	4.44	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	2	100%	2.53	1.77	2.53	1.27	3.78	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	2	100%	7.82	3.02	7.82	5.68	9.95	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	2	100%	4.95	0.803	4.95	4.39	5.52	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	2	100%	22.6	12.3	22.6	14	31.3	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	2	100%	5	0.407	5	4.71	5.29	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	2	100%	56	20	56	41.9	70.2	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	2	100%	109	26.1	109	90.1	127	--	--
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	2	100%	482	126	482	394	571	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	2	100%	16.8	11.2	16.8	8.93	24.7	--	--
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	2	100%	5790	1610	5790	4650	6920	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	2	100%	2190	636	2190	1740	2640	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	2	100%	686	167	686	569	804	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	2	0%	<9.64	--	<9.64	--	--	9.62	9.66
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	2	100%	25300	5830	25300	21200	29400	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	2	100%	57.9	24.9	57.9	40.3	75.5	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	2	100%	362	81.7	362	305	420	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	2	100%	22900	6820	22900	18100	27700	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	2	100%	281	113	281	201	361	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	2	100%	25.4	10.3	25.4	18.2	32.7	--	--
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	2	100%	160	71.4	160	109	210	--	--
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	2	100%	349	78.8	349	294	405	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	2	100%	44.7	8.73	44.7	38.6	50.9	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	2	50%	40.3	53.6	41.5	78.2	78.2	4.83	4.83
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	2	100%	3170	891	3170	2540	3800	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	2	100%	30100	7420	30100	24800	35300	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	2	100%	1720	396	1720	1440	2000	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	2	100%	180	40.7	180	152	209	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	2	100%	5320	993	5320	4620	6020	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	2	100%	780	217	780	627	933	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	2	100%	950	170	950	830	1070	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	2	100%	8370	1870	8370	7040	9690	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	2	100%	1690	332	1690	1450	1920	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	2	100%	993	208	993	846	1140	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	2	100%	470	131	470	377	562	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	2	100%	2760	283	2760	2560	2960	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	2	0%	<9.64	--	<9.64	--	--	9.62	9.66
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	2	100%	780	114	780	700	861	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	2	50%	2.97	0.795	4.17	3.53	3.53	4.81	4.81
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	2	100%	6390	1570	6390	5280	7500	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	2	100%	17700	3960	17700	14900	20500	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	2	100%	170	62.2	170	126	214	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	2	100%	157	2.12	157	155	158	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	2	100%	115	34.7	115	91	140	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	2	100%	11.3	3.25	11.3	9.01	13.6	--	--
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	2	100%	34900	8450	34900	29000	40900	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	2	100%	1130	395	1130	851	1410	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	2	100%	166	36.8	166	140	192	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	2	100%	2180	481	2180	1840	2520	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	2	100%	1920	474	1920	1580	2250	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	2	100%	1500	371	1500	1240	1760	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	2	0%	<19.26	--	<19.3	--	--	19.2	19.3
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	2	100%	1300	180	1300	1180	1430	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	2	100%	59.3	27.4	59.3	39.9	78.7	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	2	100%	975	176	975	851	1100	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	2	100%	2730	863	2730	2120	3340	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	2	100%	4440	91.9	4440	4370	4500	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	2	100%	1500	170	1500	1380	1620	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	2	100%	1040	7.07	1040	1030	1040	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	2	100%	3490	56.6	3490	3450	3530	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	2	100%	341	48.8	341	306	375	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	2	100%	496	28.6	496	476	516	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	2350	325	2350	2120	2580	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	2	100%	2260	198	2260	2120	2400	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	2	100%	4150	1190	4150	3310	4990	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	13100	106	13100	13100	13200	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	2	100%	47.1	7.57	47.1	41.7	52.4	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	2	100%	78.3	13.8	78.3	68.5	88	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	4720	361	4720	4460	4970	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	2	100%	43.1	8.27	43.1	37.2	48.9	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	14100	1630	14100	12900	15200	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	2	100%	138	51.3	138	102	174	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	2	100%	186	15.9	186	175	197	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	2	100%	756	262	756	571	941	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	2	100%	941	35.7	941	916	966	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	2	100%	192	23	192	176	208	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	2	50%	2.34	0.103	3.55	2.27	2.27	4.83	4.83
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	2	100%	2620	159	2620	2510	2730	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	2	100%	887	38.5	887	860	915	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	2	100%	1790	91.9	1790	1720	1850	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	2	100%	423	21.9	423	407	438	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	2	100%	4910	99	4910	4840	4980	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	2	100%	11300	3520	11300	8820	13800	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	2	100%	786	82	786	728	844	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	2	100%	2230	226	2230	2070	2390	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	2	100%	2830	10.6	2830	2830	2840	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	2	100%	8.12	0.976	8.12	7.43	8.81	--	--
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	2	100%	138	1.41	138	137	139	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	2	100%	3530	371	3530	3270	3790	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	2	100%	414	58.3	414	373	455	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	2	100%	1630	159	1630	1520	1740	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	2	100%	2690	269	2690	2500	2880	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	2	100%	1170	340	1170	929	1410	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	2	100%	1930	552	1930	1540	2320	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	2	100%	4.59	1.48	4.59	3.55	5.64	--	--
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	2	100%	1110	335	1110	877	1350	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	2	100%	1970	612	1970	1540	2400	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	2	100%	796	331	796	562	1030	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	2	100%	7330	2100	7330	5840	8810	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	2	100%	2020	548	2020	1640	2410	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	2	100%	73.2	15.3	73.2	62.4	84	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	2	100%	413	89.4	413	350	476	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	2	100%	9.91	3.09	9.91	7.73	12.1	--	--
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	2	100%	45.7	7.35	45.7	40.5	50.9	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	2	100%	826	192	826	690	962	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	2	100%	7410	1400	7410	6430	8400	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	2	50%	133	182	136	262	262	9.66	9.66
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	2	100%	5540	576	5540	5140	5950	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	2	100%	628	98.3	628	558	697	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	2	100%	19900	4000	19900	17100	22700	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	2	100%	1270	279	1270	1080	1470	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	2	100%	519	152	519	411	626	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	2	100%	2220	484	2220	1880	2560	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	2	100%	17400	3640	17400	14900	20000	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	2	100%	2270	728	2270	1750	2780	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	2	100%	1020	300	1020	806	1230	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	2	100%	23100	4700	23100	19800	26400	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	2	100%	56	21.8	56	40.6	71.4	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	2	100%	89.3	27.9	89.3	69.5	109	--	--
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	2	100%	4940	1470	4940	3900	5980	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	2	100%	100	21.2	100	85	115	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	2	100%	119	9.19	119	112	125	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	2	100%	1600	371	1600	1340	1860	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	2	100%	1720	428	1720	1420	2020	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	2	100%	24900	5090	24900	21300	28500	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	2	100%	827	150	827	721	933	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	2	100%	7420	781	7420	6870	7970	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	2	100%	17000	3180	17000	14700	19200	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	2	100%	372	130	372	280	464	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	2	100%	312	82.7	312	253	370	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	2	100%	458	101	458	387	530	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	2	100%	745	285	745	543	946	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	2	100%	200	45.6	200	168	232	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	2	100%	430	130	430	338	522	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	2	100%	4.94	3.75	4.94	2.29	7.59	--	--
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	2	100%	22.9	10.4	22.9	15.5	30.2	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	2	100%	1820	389	1820	1540	2090	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	2	100%	1200	203	1200	1050	1340	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	2	100%	3780	781	3780	3230	4330	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	2	100%	4530	1180	4530	3700	5370	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	2	100%	13200	3110	13200	11000	15400	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	2	100%	126	37.8	126	99.6	153	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	2	0%	<1.926	--	<1.93	--	--	1.92	1.93
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	2	100%	27400	7710	27400	21900	32800	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	2	100%	4420	930	4420	3770	5080	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	2	100%	5510	1470	5510	4470	6550	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	2	100%	664	140	664	565	763	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	2	100%	147	31.5	147	125	169	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	2	100%	14700	2690	14700	12800	16600	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	2	100%	85.7	28.7	85.7	65.4	106	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	2	100%	562	223	562	404	720	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	2	100%	19600	6360	19600	15100	24100	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Aroclor-1221 (PCB-1221)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Aroclor-1232 (PCB-1232)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Aroclor-1242 (PCB-1242)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Aroclor-1248 (PCB-1248)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Aroclor-1254 (PCB-1254)	µg/kg	2	100%	323	81.3	323	265	380	--	--
	Aroclor-1260 (PCB-1260)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Aroclor-1262 (PCB-1262)	µg/kg	2	100%	78.3	15.2	78.3	67.5	89	--	--
	Aroclor-1268 (PCB-1268)	µg/kg	2	0%	<170	--	<170	--	--	170	170
	Total PCB congeners (NOAA 1989)	ng/kg	2	100%	479000	105000	479000	405000	553000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	2	100%	479000	105000	479000	405000	553000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	2	100%	479000	105000	479000	405000	553000	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total PCBs (7)	µg/kg	2	100%	323	81.3	323	265	380	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	2	100%	833	81.3	833	775	890	--	--
	Total PCBs (7) (ND*1)	µg/kg	2	100%	1350	70.7	1350	1300	1400	--	--
	Total PCBs (9)	µg/kg	2	100%	400	99	400	330	470	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	2	100%	1020	120	1020	930	1100	--	--
	Total PCBs (9) (ND*1)	µg/kg	2	100%	1630	106	1630	1550	1700	--	--
	Total PCBs congener (209 specified)	ng/kg	2	100%	533000	120000	533000	448000	617000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	2	100%	533000	120000	533000	448000	617000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	2	100%	533000	119000	533000	449000	617000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	2	100%	38.3	26	38.3	19.9	56.7	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	2	100%	38.3	26	38.3	19.9	56.7	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	2	100%	38.3	26	38.3	19.9	56.7	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	2	100%	0.46	0.143	0.46	0.359	0.561	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	2	100%	0.46	0.143	0.46	0.359	0.561	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	2	100%	0.46	0.143	0.46	0.359	0.561	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	2	100%	5.52	1.2	5.52	4.67	6.37	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	2	100%	5.59	1.2	5.59	4.74	6.44	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	2	100%	5.67	1.2	5.67	4.82	6.52	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	2	100%	50.1	30.9	50.1	28.3	71.9	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	2	100%	50.7	30.1	50.7	29.5	72	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	2	100%	51.3	29.2	51.3	30.7	72	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	2	100%	6.96	1.09	6.96	6.19	7.73	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	2	100%	7.56	0.237	7.56	7.4	7.73	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	2	100%	8.16	0.608	8.16	7.73	8.59	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	2	100%	11.8	2.09	11.8	10.4	13.3	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	2	100%	12.5	1.17	12.5	11.7	13.3	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	2	100%	13.2	0.318	13.2	13	13.4	--	--
	Total decachlorobiphenyl	ng/kg	2	100%	2690	269	2690	2500	2880	--	--
	Total dichlorobiphenyl	ng/kg	2	100%	1520	354	1520	1270	1770	--	--
	Total heptachlorobiphenyl	ng/kg	2	100%	49400	3080	49400	47300	51600	--	--
	Total hexachlorobiphenyl	ng/kg	2	100%	124000	29100	124000	104000	145000	--	--
	Total monochlorobiphenyl	ng/kg	2	0%	<4.82	--	<4.82	--	--	4.81	4.83
	Total nonachlorobiphenyl	ng/kg	2	100%	5570	590	5570	5160	5990	--	--
	Total octachlorobiphenyl	ng/kg	2	100%	16600	672	16600	16200	17100	--	--
	Total pentachlorobiphenyl	ng/kg	2	100%	153000	45300	153000	121000	185000	--	--
	Total tetrachlorobiphenyl	ng/kg	2	100%	142000	28300	142000	122000	162000	--	--
	Total trichlorobiphenyl	ng/kg	2	100%	37300	11100	37300	29500	45200	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides	2,4'-DDD	pg/g	2	100%	30100	15900	30100	18900	41400	--	--
	2,4'-DDE	pg/g	2	100%	18200	13800	18200	8490	28000	--	--
	2,4'-DDT	pg/g	2	100%	976	613	976	543	1410	--	--
	4,4'-DDD	pg/g	2	100%	82800	35700	82800	57600	108000	--	--
	4,4'-DDE	pg/g	2	100%	85400	49000	85400	50800	120000	--	--
	4,4'-DDT	pg/g	2	100%	4260	3650	4260	1690	6840	--	--
	Aldrin	pg/g	2	100%	63.4	47.3	63.4	30	96.9	--	--
	Dieldrin	pg/g	2	100%	6110	3460	6110	3660	8550	--	--
	Endosulfan I	pg/g	2	0%	<1010	--	<1010	--	--	80	1940
	Endosulfan II	pg/g	2	0%	<1010	--	<1010	--	--	80	1940
	Endosulfan sulfate	pg/g	2	50%	521	635	1010	71.3	71.3	1940	1940
	Endrin	pg/g	2	50%	202	264	396	14.8	14.8	777	777
	Endrin aldehyde	pg/g	2	0%	<2020	--	<2020	--	--	160	3880
	Endrin ketone	pg/g	2	50%	997	1330	1970	54.8	54.8	3880	3880
	Heptachlor	pg/g	2	50%	198	269	392	7.59	7.59	777	777
	Heptachlor endo-epoxide	pg/g	2	100%	1070	1070	1070	317	1830	--	--
	Heptachlor epoxide	pg/g	2	100%	1120	456	1120	796	1440	--	--
	Hexachlorobenzene	pg/g	2	100%	958	569	958	556	1360	--	--
	Methoxychlor	pg/g	2	0%	<404	--	<405	--	--	32	777
	Mirex	pg/g	1	100%	71		71	71	71	--	--
	Oxychlordane	pg/g	2	100%	1370	1170	1370	539	2200	--	--
	Total BHC Compounds	pg/g	2	100%	228	132	228	135	321	--	--
	Total Chlordane (ND=0)	pg/g	2	100%	29300	14900	29300	18800	39900	--	--
	Total Chlordane (ND=1)	pg/g	2	100%	29700	15400	29700	18800	40600	--	--
	Total Chlordane (ND=1/2)	pg/g	2	100%	29500	15200	29500	18800	40200	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	2	100%	223000	124000	223000	135000	310000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	2	100%	223000	124000	223000	135000	310000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	2	100%	223000	124000	223000	135000	310000	--	--
	Total DDx (2,4) Total Fraction	pg/g	2	100%	49500	30400	49500	28000	71000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	2	100%	49500	30400	49500	28000	71000	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	2	100%	49500	30400	49500	28000	71000	--	--
	Total DDx (4,4) Total Fraction	pg/g	2	100%	170000	84900	170000	110000	230000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	2	100%	170000	84900	170000	110000	230000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	2	100%	170000	84900	170000	110000	230000	--	--
	Total alpha + gamma chlordane	pg/g	2	100%	12200	5440	12200	8300	16000	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	2	100%	12200	5440	12200	8300	16000	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	2	100%	12200	5440	12200	8300	16000	--	--
	alpha-BHC	pg/g	2	100%	76.7	47.1	76.7	43.4	110	--	--
	alpha-Chlordane	pg/g	2	100%	8770	4280	8770	5750	11800	--	--
	beta-BHC	pg/g	2	100%	107	57.8	107	66.2	148	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	cis-Nonachlor	pg/g	2	100%	3840	1510	3840	2770	4900	--	--
	delta-BHC	pg/g	2	0%	<404	--	<405	--	--	32	777
	gamma-BHC (lindane)	pg/g	2	100%	44.1	27.1	44.1	25	63.3	--	--
	gamma-Chlordane	pg/g	2	100%	3220	933	3220	2560	3880	--	--
	trans-Nonachlor	pg/g	2	100%	9930	5480	9930	6050	13800	--	--
PAHs	1-Methylnaphthalene	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	2-Methylnaphthalene	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	Acenaphthene	µg/kg	2	100%	14	1.4	14	13	15	--	--
	Acenaphthylene	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	Anthracene	µg/kg	2	50%	3.1	0.32	4.8	2.9	2.9	6.7	6.7
	Benzo(a)anthracene	µg/kg	2	50%	3.5	0.18	5.2	3.6	3.6	6.7	6.7
	Benzo(a)pyrene	µg/kg	2	50%	3.4	0.11	5.1	3.5	3.5	6.7	6.7
	Benzo(b)fluoranthene	µg/kg	2	50%	3.5	0.18	5.2	3.6	3.6	6.7	6.7
	Benzo(e)pyrene	µg/kg	2	50%	3.4	0.11	5.1	3.5	3.5	6.7	6.7
	Benzo(g,h,i)perylene	µg/kg	2	50%	3.3	0.11	5	3.2	3.2	6.7	6.7
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	2	50%	3.6	0.39	5.3	3.9	3.9	6.7	6.7
	C1-Chrysenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C1-Fluoranthenes/Pyrenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C1-Fluorenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C1-Naphthalenes	µg/kg	2	100%	5.5	0.14	5.5	5.4	5.6	--	--
	C1-Phenanthrenes/Anthracenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C2-Chrysenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C2-Fluoranthenes/Pyrenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C2-Fluorenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C2-Naphthalenes	µg/kg	2	50%	5.4	2.9	7.1	7.4	7.4	6.7	6.7
	C2-Phenanthrenes/Anthracenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C3-Chrysenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C3-Fluoranthenes/Pyrenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C3-Fluorenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C3-Naphthalenes	µg/kg	2	50%	6.7	4.7	8.4	10	10	6.7	6.7
	C3-Phenanthrenes/Anthracenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C4-Chrysenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C4-Naphthalenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	C4-Phenanthrenes/Anthracenes	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	Chrysene	µg/kg	2	50%	3.8	0.64	5.5	4.3	4.3	6.7	6.7
	Dibenz(a,h)anthracene	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	Fluoranthene	µg/kg	2	100%	6.6	2.2	6.6	5	8.1	--	--
	Fluorene	µg/kg	2	100%	5.9	1.7	5.9	4.7	7.1	--	--
	Indeno(1,2,3-cd)pyrene	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	Naphthalene	µg/kg	2	100%	4.7	0.071	4.7	4.6	4.7	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Perylene	µg/kg	2	0%	<6.6	--	<6.6	--	--	6.5	6.7
	Phenanthrene	µg/kg	2	100%	5.2	1.9	5.2	3.9	6.6	--	--
	Pyrene	µg/kg	2	50%	4.7	1.9	6.4	6	6	6.7	6.7
	Total Alkylated PAHs	µg/kg	2	100%	9.9	6	9.9	5.6	14	--	--
	Total HMW PAHs	µg/kg	2	100%	18	18	18	5	31	--	--
	Total HMW PAHs (ND*0.5)	µg/kg	2	100%	39	5.7	39	35	43	--	--
	Total HMW PAHs (ND*1)	µg/kg	2	100%	60	7.4	60	55	65	--	--
	Total LMW PAHs	µg/kg	2	100%	31	7.4	31	26	37	--	--
	Total LMW PAHs (ND*0.5)	µg/kg	2	100%	39	4.6	39	36	43	--	--
	Total LMW PAHs (ND*1)	µg/kg	2	100%	48	2.5	48	46	50	--	--
	Total PAH	µg/kg	2	100%	49	26	49	31	68	--	--
	Total PAH (ND*0.5)	µg/kg	2	100%	79	9.5	79	72	86	--	--
	Total PAH (ND*1)	µg/kg	2	100%	110	3.5	110	110	110	--	--
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	2	0%	<666	--	<665	--	--	660	670
	1,2-Diphenylhydrazine	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2,3,4,6-Tetrachlorophenol	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	2,4,5-Trichlorophenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2,4,6-Trichlorophenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2,4-Dichlorophenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2,4-Dimethylphenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2,4-Dinitrophenol	µg/kg	2	0%	<20000	--	<20000	--	--	20000	20000
	2,4-Dinitrotoluene	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	2,6-Dinitrotoluene	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2-Chloronaphthalene	µg/kg	2	0%	<656	--	<655	--	--	650	660
	2-Chlorophenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2-Methylphenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2-Nitroaniline	µg/kg	2	0%	<666	--	<665	--	--	660	670
	2-Nitrophenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	3,3'-Dichlorobenzidine	µg/kg	2	0%	<6660	--	<6650	--	--	6600	6700
	3-Nitroaniline	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	4,6-Dinitro-2-methylphenol	µg/kg	2	0%	<9960	--	<9950	--	--	9900	10000
	4-Bromophenyl phenyl ether	µg/kg	2	0%	<666	--	<665	--	--	660	670
	4-Chloro-3-methylphenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	4-Chloroaniline	µg/kg	2	0%	<1300	--	<1300	--	--	1300	1300
	4-Chlorophenyl phenyl ether	µg/kg	2	0%	<666	--	<665	--	--	660	670
	4-Methylphenol	µg/kg	2	0%	<666	--	<665	--	--	660	670
	4-Nitroaniline	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	4-Nitrophenol	µg/kg	2	0%	<9960	--	<9950	--	--	9900	10000
	Acetophenone	µg/kg	2	0%	<666	--	<665	--	--	660	670

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	Atrazine	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Benzaldehyde	µg/kg	2	50%	1580	106	2400	1500	1500	3300	3300
	Benzidine	µg/kg	2	0%	<66600	--	<66500	--	--	66000	67000
	Benzoic acid	µg/kg	2	0%	<9960	--	<9950	--	--	9900	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	2	0%	<666	--	<665	--	--	660	670
	Butyl benzylphthalate (BBP)	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Caprolactam	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Carbazole	µg/kg	2	0%	<666	--	<665	--	--	660	670
	Di-n-butylphthalate (DBP)	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Dibenzofuran	µg/kg	2	0%	<666	--	<665	--	--	660	670
	Diethyl phthalate	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Dimethyl phthalate	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Hexachlorobutadiene	µg/kg	2	0%	<666	--	<665	--	--	660	670
	Hexachlorocyclopentadiene	µg/kg	2	0%	<9960	--	<9950	--	--	9900	10000
	Hexachloroethane	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	Isophorone	µg/kg	2	0%	<666	--	<665	--	--	660	670
	N-Nitrosodi-n-propylamine	µg/kg	2	0%	<666	--	<665	--	--	660	670
	N-Nitrosodiphenylamine	µg/kg	2	0%	<666	--	<665	--	--	660	670
	Nitrobenzene	µg/kg	2	0%	<666	--	<665	--	--	660	670
	Pentachlorophenol	µg/kg	2	0%	<3400	--	<3400	--	--	3400	3400
	Phenol	µg/kg	2	50%	373	53	540	410	410	670	670
	Pyridine	µg/kg	2	0%	<3300	--	<3300	--	--	3300	3300
	bis(2-Chloroethoxy)methane	µg/kg	2	0%	<666	--	<665	--	--	660	670
	bis(2-Chloroethyl)ether	µg/kg	2	0%	<666	--	<665	--	--	660	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	2	0%	<3400	--	<3400	--	--	3400	3400
Butyltins	Dibutyltin	µg/kg	2	0%	<1.3	--	<1.3	--	--	1.3	1.3
	Monobutyltin hydride	µg/kg	2	0%	<22	--	<21	--	--	21	21
	Tetrabutyltin	µg/kg	2	0%	<1.7	--	<1.7	--	--	1.7	1.7
	Tributyl tin	µg/kg	2	0%	<1.5	--	<1.5	--	--	1.5	1.5
Metals	Aluminum	mg/kg	2	100%	26.8	10.6	26.8	19.3	34.3	--	--
	Antimony	mg/kg	2	0%	<0.195	--	<0.195	--	--	0.194	0.196
	Arsenic	mg/kg	2	100%	0.907	0.428	0.907	0.605	1.21	--	--
	Barium	mg/kg	2	100%	0.462	0.182	0.462	0.333	0.591	--	--
	Beryllium	mg/kg	2	0%	<0.0976	--	<0.0976	--	--	0.0971	0.098
	Cadmium	mg/kg	2	0%	<0.0976	--	<0.0976	--	--	0.0971	0.098
	Calcium	mg/kg	2	100%	4780	1630	4780	3620	5930	--	--
	Chromium	mg/kg	2	100%	0.245	0.136	0.245	0.148	0.341	--	--
	Cobalt	mg/kg	2	100%	0.0319	0.00364	0.0319	0.0294	0.0345	--	--
	Copper	mg/kg	2	100%	0.905	0.276	0.905	0.709	1.1	--	--

Table 4-7e
Phase III Tissue Chemistry Summary Statistics: Atlantic Menhaden (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals (cont.)	Iron	mg/kg	2	100%	80.4	24.9	80.4	62.8	98	--	--
	Lead	mg/kg	2	100%	0.383	0.198	0.383	0.243	0.524	--	--
	Magnesium	mg/kg	2	100%	365	51.3	365	329	402	--	--
	Manganese	mg/kg	2	100%	3.39	0.834	3.39	2.8	3.98	--	--
	Mercury	ng/g	2	100%	53.7	7.81	53.7	48.2	59.2	--	--
	Methyl mercury	ng/g	2	100%	83.1	26.8	83.1	64.2	102	--	--
	Nickel	mg/kg	2	0%	<0.39	--	<0.39	--	--	0.388	0.392
	Potassium	mg/kg	2	100%	2550	152	2550	2450	2660	--	--
	Selenium	mg/kg	2	100%	0.466	0.017	0.466	0.454	0.478	--	--
	Silver	mg/kg	2	0%	<0.0976	--	<0.0976	--	--	0.0971	0.098
	Sodium	mg/kg	2	100%	2000	753	2000	1470	2540	--	--
	Thallium	mg/kg	2	0%	<0.0976	--	<0.0976	--	--	0.0971	0.098
	Titanium	mg/kg	2	100%	1.09	0.446	1.09	0.774	1.41	--	--
	Vanadium	mg/kg	2	100%	0.367	0.041	0.367	0.338	0.396	--	--
	Zinc	mg/kg	2	100%	15.8	3.64	15.8	13.2	18.4	--	--
Miscellaneous	Lipids	%	2	100%	5.05	4.31	5.05	2	8.1	--	--
	Moisture	%	2	100%	75.3	2.9	75.3	73.2	77.3	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	7	100%	1.88	0.671	1.85	0.818	2.52	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	7	100%	0.269	0.103	0.226	0.163	0.393	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	7	100%	0.244	0.0905	0.276	0.0857	0.34	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	7	100%	0.986	0.474	1.05	0.119	1.72	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	7	86%	0.463	0.891	0.141	0.0564	0.221	4.96	4.96
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	7	29%	1.78	1.18	<4.94	0.0415	0.0795	4.91	4.98
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	7	100%	0.109	0.0294	0.11	0.067	0.158	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	7	86%	0.394	0.92	0.045	0.0353	0.0635	4.96	4.96
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	7	100%	0.484	0.156	0.416	0.337	0.752	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	7	71%	0.752	1.18	0.0707	0.0354	0.11	4.94	4.98
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	7	100%	0.0728	0.0295	0.0668	0.0418	0.121	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	7	71%	0.972	1.06	0.537	0.132	0.791	4.96	4.98
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	7	86%	0.921	0.72	0.754	0.247	0.947	4.96	4.96
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	7	71%	0.747	1.18	0.0503	0.0359	0.0996	4.96	4.96
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	7	86%	0.984	0.732	0.723	0.165	1.14	4.96	4.96
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	7	100%	8.04	2.93	7.16	5.91	14.5	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	7	100%	4.14	0.478	4.19	3.37	4.79	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	7	100%	13.2	3.26	11.9	11	20.4	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	7	100%	14.6	3.34	14.5	11.2	20.8	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	7	100%	15.9	3.95	17.6	11.3	21.1	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	7	100%	8.94	2.99	7.93	6.81	15.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	7	100%	10.8	2.8	9.66	8.73	16.8	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	7	100%	12.7	3.05	11.2	9.96	18.1	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	7	100%	9.02	2.97	8.09	6.81	15.6	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	7	100%	10.2	2.89	9.59	7.78	16.1	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	7	100%	11.4	3.31	10.8	8.03	16.6	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	7	100%	0.634	0.256	0.686	0.23	0.861	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	7	100%	2.4	0.539	2.31	1.74	3.48	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	7	100%	0.945	0.28	0.846	0.646	1.38	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	7	100%	5.72	1.33	5.41	4.53	8.46	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	7	100%	8.1	3.86	6.34	4.58	14.3	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	7	100%	19.3	7.49	15.9	11.4	29.6	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	7	100%	8.48	3.1	7.53	6.08	15.3	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	7	100%	62	31.5	54	31.1	118	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	7	43%	22.1	33.9	<2	16.5	89.8	1.92	2
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	7	100%	45.2	13.8	41.8	30.5	62.6	--	--
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	7	100%	538	110	508	422	710	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	7	100%	30.3	4.7	29	24.9	38.1	--	--

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	7	100%	13500	8060	9570	7560	27500	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	7	0%	<13.2	--	<5	--	--	4.81	24.5
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	7	100%	3270	1260	2680	2260	5330	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	7	100%	1120	521	872	682	1930	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	7	43%	28.9	29.9	<10	58.5	62.9	9.62	10
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	7	100%	37600	18700	29300	23800	72400	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	7	100%	47.6	4.88	46.4	40.8	56.2	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	7	43%	70.2	97.4	<5	63.7	213	4.81	5
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	7	100%	1060	660	782	545	2120	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	7	100%	43400	17800	35000	26300	72800	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	7	43%	9.35	9.73	<5	10	25.6	4.81	5
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	7	100%	243	30.3	233	215	295	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	7	86%	19.3	7.62	22	19.6	25.6	5	5
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	7	86%	65.1	59.4	37.8	30.2	165	24.3	24.3
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	7	100%	904	517	624	481	1740	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	7	71%	62.7	55.4	49.2	49	140	4.84	5
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	7	100%	37.9	12.3	33.8	26.5	56.7	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	7	100%	4480	1140	4060	3290	6240	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	7	100%	39200	7190	37800	31900	50200	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	7	100%	2170	441	2060	1700	2800	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	7	100%	162	56.1	146	110	260	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	7	100%	6130	1570	5620	4840	9010	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	7	100%	747	121	685	634	944	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	7	100%	918	227	894	692	1320	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	7	100%	9810	1820	8900	7980	12800	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	7	100%	1510	436	1300	1130	2290	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	7	100%	1770	489	1620	1280	2450	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	7	100%	577	116	588	432	739	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	7	0%	<5.28	--	<2	--	--	1.92	9.8
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	7	100%	4230	1230	3570	3320	6210	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	6	17%	5.59	5.03	<5	1.99	1.99	4.81	24.3
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	7	43%	24.6	26.8	<10	30.1	66	9.62	10
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	7	100%	1210	269	1120	949	1620	--	--

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	7	71%	7.5	4.04	5.4	4.36	11.5	4.84	24.3
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	5	100%	6410	502	6230	6000	7190	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	7	100%	18900	3000	18100	16000	24100	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	7	100%	116	12	112	103	138	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	7	57%	45.5	55.4	20.9	20.9	143	4.81	5
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	7	100%	96.2	25.9	90.1	69	143	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	7	100%	13.7	3.95	12.2	10.1	19.3	--	--
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	7	100%	39700	3940	38900	35600	46500	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	7	100%	1180	474	939	825	1920	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	7	100%	236	42.8	234	178	296	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	7	100%	3440	959	2880	2660	4960	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	7	100%	3210	723	2910	2400	4200	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	7	29%	5.82	4.44	<5	7.48	11.3	4.81	24.3
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	7	100%	844	243	765	623	1210	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	7	29%	21.9	16	<20	32.2	33.5	19.2	97.1
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	6	17%	4.78	3.95	<5	6.85	6.85	4.81	24
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	2	50%	119	151	125	226	226	24.3	24.3
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	7	100%	1630	313	1550	1230	2070	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	5	100%	33.5	1.77	33.4	31.8	36.4	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	7	100%	1390	303	1240	1100	1870	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	7	0%	<13.2	--	<5	--	--	4.81	24.5
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	7	100%	1930	855	1700	1220	3230	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	7	100%	5130	1400	4670	3480	7560	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	5	100%	1640	168	1550	1460	1870	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	7	100%	1100	232	1010	845	1530	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	5	100%	3180	402	2920	2840	3700	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	5	100%	325	37.5	321	269	367	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	7	100%	522	89.6	504	445	704	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	1	100%	2890		2890	2890	2890	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	7	100%	2130	313	2030	1780	2760	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	7	100%	1880	317	1750	1660	2560	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	7	100%	3020	1300	2470	1980	4960	--	--

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	7	100%	15000	3550	14000	10400	21300	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	3	100%	65.7	5.07	68.2	59.9	69.1	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	5	100%	54.1	2.82	53.9	50.9	58.3	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	6	100%	4970	322	4900	4550	5490	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	7	100%	26.9	6.62	29.5	16.8	36	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	7	29%	6.39	5.38	<5	1.7	1.74	4.81	24.5
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	5	100%	12900	1300	13300	11000	14300	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	7	100%	85	49.6	56.8	51.6	176	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	7	100%	187	36.4	177	140	249	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	7	100%	409	185	338	245	659	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	7	100%	1150	340	1110	630	1690	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	7	100%	257	60.5	233	190	367	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	7	43%	6.79	5.07	<5	1.91	4.48	5	24.5
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	7	100%	2120	477	1980	1540	2910	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	7	100%	741	153	708	505	960	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	7	100%	1480	253	1440	1150	1930	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	6	100%	330	16.8	323	315	357	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	7	100%	3760	532	3790	3150	4680	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	7	0%	<5.28	--	<2	--	--	1.92	9.8
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	7	100%	11400	5860	8890	7120	20600	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	7	100%	525	69.7	522	433	603	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	7	100%	1440	135	1370	1300	1650	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	7	100%	2440	343	2380	2040	2910	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	7	29%	7.48	4.52	<5.74	5.23	5.74	5	24.5
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	7	100%	107	18.8	106	77.2	129	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	7	100%	1590	226	1520	1420	2080	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	7	100%	192	53.2	186	120	262	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	7	100%	675	85.1	631	589	817	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	7	100%	702	71.8	730	567	791	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	7	100%	726	349	628	391	1250	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	7	100%	1320	701	1010	719	2340	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	7	86%	3.87	1.42	3.18	2.24	5.57	9.71	9.71
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	7	43%	20	25.2	<2	28.2	56.8	1.92	2

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	7	100%	928	590	706	448	1850	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	7	100%	1920	1130	1420	1080	3650	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	7	100%	528	269	390	299	906	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	7	14%	5.86	4.56	<5	7.03	7.03	4.81	24.3
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	7	100%	7630	3910	5930	4500	14100	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	7	100%	1840	1010	1390	1060	3390	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	7	100%	42.5	20.8	43	19.6	71.7	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	7	29%	2.71	2.15	<2	5.02	5.14	1.92	9.71
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	7	0%	<5.28	--	<2	--	--	1.92	9.8
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	7	100%	152	93.8	131	78.5	337	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	7	100%	14.1	7.1	9.69	7.29	24.8	--	--
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	7	100%	33.5	19.8	24.1	16.5	66.2	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	7	100%	528	291	384	268	942	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	7	100%	5330	3890	3410	2730	11900	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	7	100%	496	354	303	243	1070	--	--
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	7	100%	6530	3890	4470	3880	12500	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	7	100%	740	385	578	439	1300	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	7	100%	25800	14600	18300	16000	49100	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	7	100%	1380	1100	835	605	3450	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	7	100%	294	195	219	152	641	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	7	100%	1770	1210	1110	912	3530	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	7	100%	21900	11800	16500	13200	39200	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	7	29%	4.3	3.55	<4.84	3.86	4.25	4.81	24.3
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	7	100%	2270	1330	1730	1240	4550	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	7	100%	1060	452	901	616	1700	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	7	100%	30600	15600	22500	18900	54100	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	7	100%	59.6	18.7	53.5	42.3	89.6	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	7	57%	74.3	96.7	46.6	46.6	247	4.81	5
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	7	100%	3000	2550	1710	1250	7390	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	7	86%	77.3	48.4	68.9	57.3	150	5	5
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	7	100%	71.6	30.4	59	47	120	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	7	100%	2470	1620	1650	1390	5220	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	7	43%	124	194	<2	51	426	1.92	2
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	7	100%	5380	5060	2330	2210	13900	--	--

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	7	100%	44000	27500	28900	23600	85000	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	7	100%	1480	977	946	788	3020	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	7	100%	12800	10400	7770	6070	31400	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	7	100%	34500	25200	20700	17400	75100	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	7	100%	314	205	206	171	647	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	7	100%	316	92.9	267	244	468	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	7	43%	5.94	7.24	<2	5.12	17.5	1.92	2
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	7	100%	517	172	430	386	784	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	7	57%	48.9	48.4	55.2	55.2	125	4.81	5
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	5	100%	464	400	185	159	985	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	7	0%	<13.2	--	<5	--	--	4.81	24.5
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	7	86%	219	147	180	148	452	5	5
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	7	71%	314	282	230	176	707	4.84	5
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	7	14%	6.46	5.32	<5	1.5	1.5	4.81	24.5
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	7	100%	63.2	56.8	32.1	24.5	157	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	7	100%	2870	2060	1790	1530	6520	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	7	100%	1780	960	1250	1180	3560	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	7	100%	2950	1930	1890	1720	6620	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	7	100%	9160	5540	6520	5250	19100	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	7	100%	21500	11600	16700	12700	42100	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	7	43%	466	1190	<24.3	25.1	3170	4.81	24.3
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	7	100%	199	177	105	81.9	518	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	7	43%	11.3	14.8	<2	10.8	35.5	1.92	2
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	7	100%	43000	17300	38000	27000	74000	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	7	100%	5500	3090	3880	3370	11200	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	7	100%	7760	3030	6550	5000	13000	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	7	100%	921	177	913	673	1200	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	7	86%	141	94.7	114	105	291	4.84	4.84
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	4	100%	17400	8000	14300	11900	29300	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	7	100%	116	87.5	69.2	58.5	281	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	7	100%	372	307	193	178	937	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	7	100%	29700	12800	24000	18700	52600	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	7	0%	<150.6	--	<170	--	--	34	170

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Aroclor-1221 (PCB-1221)	µg/kg	7	0%	<150.6	--	<170	--	--	34	170
	Aroclor-1232 (PCB-1232)	µg/kg	7	0%	<150.6	--	<170	--	--	34	170
	Aroclor-1242 (PCB-1242)	µg/kg	7	0%	<150.6	--	<170	--	--	34	170
	Aroclor-1248 (PCB-1248)	µg/kg	7	14%	139	174	<170	530	530	34	170
	Aroclor-1254 (PCB-1254)	µg/kg	7	86%	359	227	320	160	710	170	170
	Aroclor-1260 (PCB-1260)	µg/kg	7	0%	<150.6	--	<170	--	--	34	170
	Aroclor-1262 (PCB-1262)	µg/kg	7	29%	73.4	22.2	<170	27	62	170	170
	Aroclor-1268 (PCB-1268)	µg/kg	7	0%	<150.6	--	<170	--	--	34	170
	Total PCB congeners (NOAA 1989)	ng/kg	7	100%	644000	239000	528000	465000	1030000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	7	100%	644000	239000	528000	465000	1030000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	7	100%	644000	239000	528000	465000	1030000	--	--
	Total PCBs (7)	µg/kg	7	86%	429	356	320	160	1100	170	170
	Total PCBs (7) (ND*0.5)	µg/kg	7	86%	804	518	830	260	1600	170	170
	Total PCBs (7) (ND*1)	µg/kg	7	86%	1160	694	1300	360	2000	170	170
	Total PCBs (9)	µg/kg	7	86%	442	349	330	190	1100	170	170
	Total PCBs (9) (ND*0.5)	µg/kg	7	86%	918	566	1000	310	1700	170	170
	Total PCBs (9) (ND*1)	µg/kg	7	86%	1400	833	1700	430	2300	170	170
	Total PCBs congener (209 specified)	ng/kg	7	100%	684000	278000	544000	483000	1150000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	7	100%	684000	278000	544000	483000	1150000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	7	100%	685000	278000	544000	483000	1150000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	7	100%	31.4	31.5	12.9	9.38	83.2	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	7	100%	31.4	31.4	13.1	9.38	83.2	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	7	100%	31.5	31.4	13.4	9.38	83.2	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	7	100%	0.693	0.473	0.528	0.225	1.43	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	7	100%	0.697	0.469	0.529	0.238	1.43	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	7	100%	0.701	0.466	0.529	0.251	1.43	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	7	100%	8.17	6.43	6.42	1.2	17.5	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	7	100%	8.45	6.48	6.78	1.52	17.9	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	7	100%	8.7	6.49	7.15	1.85	18.2	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	7	100%	44.6	30.6	29.8	23.6	94.5	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	7	100%	46	31.6	30.1	23.7	97.7	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	7	100%	47.4	32.8	30.5	23.8	101	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	7	100%	9.64	2.89	8.52	8.02	16.1	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	7	100%	11.5	2.81	11	9.25	17.3	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	7	100%	13.4	3.15	12.5	10.5	18.6	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	7	100%	17.2	6.42	16	9.17	24.6	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	7	100%	18.6	6.83	16.3	9.74	27.7	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	7	100%	20.1	7.47	16.6	10.3	31.2	--	--

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total decachlorobiphenyl	ng/kg	7	100%	702	71.8	730	567	791	--	--
	Total dichlorobiphenyl	ng/kg	7	100%	1110	807	665	299	2260	--	--
	Total heptachlorobiphenyl	ng/kg	7	100%	45100	8970	46500	29900	56600	--	--
	Total hexachlorobiphenyl	ng/kg	7	100%	148000	23500	146000	120000	182000	--	--
	Total monochlorobiphenyl	ng/kg	7	43%	24	34.2	<5	16.5	89.8	4.81	5
	Total nonachlorobiphenyl	ng/kg	7	100%	2460	341	2330	2190	3160	--	--
	Total octachlorobiphenyl	ng/kg	7	100%	12900	1680	13100	11100	15900	--	--
	Total pentachlorobiphenyl	ng/kg	7	100%	238000	112000	197000	152000	447000	--	--
	Total tetrachlorobiphenyl	ng/kg	7	100%	204000	129000	139000	115000	408000	--	--
	Total trichlorobiphenyl	ng/kg	7	100%	32800	16500	26500	19800	58100	--	--
Pesticides	2,4'-DDD	pg/g	7	100%	2370	1650	1440	1250	5490	--	--
	2,4'-DDE	pg/g	7	100%	9500	6890	4660	3630	20600	--	--
	2,4'-DDT	pg/g	7	100%	92.3	64.6	72.2	33.3	196	--	--
	4,4'-DDD	pg/g	7	100%	24400	15400	15200	11700	50200	--	--
	4,4'-DDE	pg/g	7	100%	108000	52600	74600	55300	177000	--	--
	4,4'-DDT	pg/g	7	100%	2690	1790	2290	898	5990	--	--
	Aldrin	pg/g	7	14%	22.3	20.1	<34.8	2.9	2.9	29	132
	Dieldrin	pg/g	7	100%	2000	487	1880	1310	2780	--	--
	Endosulfan I	pg/g	7	0%	<145	--	<90.9	--	--	76.9	329
	Endosulfan II	pg/g	7	0%	<145	--	<90.9	--	--	76.9	329
	Endosulfan sulfate	pg/g	7	14%	67.7	48	<87	39	39	76.9	329
	Endrin	pg/g	7	0%	<48.2	--	<34.8	--	--	29	132
	Endrin aldehyde	pg/g	5	0%	<268	--	<182	--	--	145	658
	Endrin ketone	pg/g	6	17%	122	103	<178	50.1	50.1	145	658
	Heptachlor	pg/g	7	57%	19	21.1	12.1	6.52	12.1	29	132
	Heptachlor endo-epoxide	pg/g	7	100%	723	280	649	437	1290	--	--
	Heptachlor epoxide	pg/g	7	100%	288	119	234	186	519	--	--
	Hexachlorobenzene	pg/g	7	100%	455	161	418	292	752	--	--
	Methoxychlor	pg/g	6	0%	<50.6	--	<35.6	--	--	29	132
	Mirex	pg/g	7	100%	88	27.7	77.1	51.7	140	--	--
	Oxychlordane	pg/g	7	100%	1600	481	1460	1060	2580	--	--
	Total BHC Compounds	pg/g	7	100%	40.4	14.8	41.7	21.4	62.4	--	--
	Total Chlordane (ND=0)	pg/g	7	100%	16100	4940	14500	11300	26100	--	--
	Total Chlordane (ND=1)	pg/g	7	100%	16100	4930	14500	11400	26100	--	--
	Total Chlordane (ND=1/2)	pg/g	7	100%	16100	4940	14500	11400	26100	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	7	100%	147000	77300	97000	74000	260000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	7	100%	147000	77300	97000	74000	260000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	7	100%	147000	77300	97000	74000	260000	--	--
	Total DDx (2,4) Total Fraction	pg/g	7	100%	11900	8380	5900	5200	26000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	7	100%	11900	8380	5900	5200	26000	--	--

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total DDx (2,4) Total Fraction (ND*1)	pg/g	7	100%	11900	8380	5900	5200	26000	--	--
	Total DDx (4,4) Total Fraction	pg/g	7	100%	134000	67600	92000	68000	230000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	7	100%	134000	67600	92000	68000	230000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	7	100%	134000	67600	92000	68000	230000	--	--
	Total alpha + gamma chlordane	pg/g	7	100%	3060	1020	2800	2000	4800	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	7	100%	3060	1020	2800	2000	4800	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	7	100%	3060	1020	2800	2000	4800	--	--
	alpha-BHC	pg/g	7	86%	18.6	5.31	18.2	13.8	25.9	29	29
	alpha-Chlordane	pg/g	7	100%	2390	847	2120	1510	3910	--	--
	beta-BHC	pg/g	7	71%	26.1	18.1	21.4	14.9	27.7	40	132
	cis-Nonachlor	pg/g	7	100%	2940	876	2750	2040	4640	--	--
	delta-BHC	pg/g	7	0%	<48.2	--	<34.8	--	--	29	132
	gamma-BHC (lindane)	pg/g	7	100%	10.1	3.1	9.18	6.45	15.8	--	--
	gamma-Chlordane	pg/g	7	100%	671	183	660	452	911	--	--
	trans-Nonachlor	pg/g	7	100%	7480	2350	6670	5270	12200	--	--
PAHs	1-Methylnaphthalene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	2-Methylnaphthalene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Acenaphthene	µg/kg	7	14%	7.2	6.4	<6.6	4	4	6.5	33
	Acenaphthylene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Anthracene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Benzo(a)anthracene	µg/kg	7	14%	7	6.5	<6.6	2.9	2.9	6.5	33
	Benzo(a)pyrene	µg/kg	7	14%	7.1	6.4	<6.6	3.6	3.6	6.5	33
	Benzo(b)fluoranthene	µg/kg	7	14%	7	6.5	<6.6	2.6	2.6	6.5	33
	Benzo(e)pyrene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Benzo(g,h,i)perylene	µg/kg	7	14%	7.1	6.4	<6.6	3.5	3.5	6.5	33
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	7	14%	7.1	6.4	<6.6	3.8	3.8	6.5	33
	C1-Chrysenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C1-Fluoranthenes/Pyrenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C1-Fluorenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C1-Naphthalenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C1-Phenanthrenes/Anthracenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C2-Chrysenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C2-Fluoranthenes/Pyrenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C2-Fluorenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C2-Naphthalenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C2-Phenanthrenes/Anthracenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C3-Chrysenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C3-Fluoranthenes/Pyrenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C3-Fluorenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C3-Naphthalenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C3-Phenanthrenes/Anthracenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	C4-Chrysenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C4-Naphthalenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	C4-Phenanthrenes/Anthracenes	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Chrysene	µg/kg	7	14%	7.1	6.5	<6.6	3.2	3.2	6.5	33
	Dibenz(a,h)anthracene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Fluoranthene	µg/kg	7	14%	7	6.5	<6.6	3.1	3.1	6.5	33
	Fluorene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Indeno(1,2,3-cd)pyrene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Naphthalene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Perylene	µg/kg	7	14%	7.2	6.4	<6.6	4.2	4.2	6.5	33
	Phenanthrene	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Pyrene	µg/kg	7	29%	6.9	6.5	<6.5	2.8	2.9	6.5	33
	Total Alkylated PAHs	µg/kg	7	0%	<14.2	--	<6.6	--	--	6.5	33
	Total HMW PAHs	µg/kg	7	43%	9.8	7.5	<6.6	2.9	20	6.5	33
	Total HMW PAHs (ND*0.5)	µg/kg	7	43%	20	13	<33	32	33	6.5	33
	Total HMW PAHs (ND*1)	µg/kg	7	43%	30	26	<33	46	63	6.5	33
	Total LMW PAHs	µg/kg	7	14%	7.2	6.4	<6.6	4	4	6.5	33
	Total LMW PAHs (ND*0.5)	µg/kg	7	14%	10	8.8	<6.7	24	24	6.5	33
	Total LMW PAHs (ND*1)	µg/kg	7	14%	13	15	<6.7	43	43	6.5	33
	Total PAH	µg/kg	7	57%	9.9	7.4	6.6	2.9	20	6.6	33
	Total PAH (ND*0.5)	µg/kg	7	57%	37	24	55	55	57	6.6	33
	Total PAH (ND*1)	µg/kg	7	57%	64	49	91	91	110	6.6	33
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	7	0%	<582	--	<650	--	--	130	670
	1,2-Diphenylhydrazine	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2,3,4,6-Tetrachlorophenol	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	2,4,5-Trichlorophenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2,4,6-Trichlorophenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2,4-Dichlorophenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2,4-Dimethylphenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2,4-Dinitrophenol	µg/kg	7	0%	<17560	--	<20000	--	--	3900	20000
	2,4-Dinitrotoluene	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	2,6-Dinitrotoluene	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2-Chloronaphthalene	µg/kg	7	0%	<578	--	<650	--	--	130	660
	2-Chlorophenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2-Methylphenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2-Nitroaniline	µg/kg	7	0%	<582	--	<650	--	--	130	670
	2-Nitrophenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	3,3'-Dichlorobenzidine	µg/kg	7	0%	<5820	--	<6500	--	--	1300	6700
	3-Nitroaniline	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	4,6-Dinitro-2-methylphenol	µg/kg	7	0%	<8740	--	<9800	--	--	2000	10000
	4-Bromophenyl phenyl ether	µg/kg	7	0%	<582	--	<650	--	--	130	670
	4-Chloro-3-methylphenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	4-Chloroaniline	µg/kg	7	0%	<1152	--	<1300	--	--	260	1300
	4-Chlorophenyl phenyl ether	µg/kg	7	0%	<582	--	<650	--	--	130	670
	4-Methylphenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	4-Nitroaniline	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	4-Nitrophenol	µg/kg	7	0%	<8740	--	<9800	--	--	2000	10000
	Acetophenone	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Atrazine	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Benzaldehyde	µg/kg	7	14%	1530	288	<3300	880	880	3200	3300
	Benzidine	µg/kg	7	0%	<58200	--	<65000	--	--	13000	67000
	Benzoic acid	µg/kg	7	0%	<8740	--	<9800	--	--	2000	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Butyl benzylphthalate (BBP)	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Caprolactam	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Carbazole	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Di-n-butylphthalate (DBP)	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Dibenzofuran	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Diethyl phthalate	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Dimethyl phthalate	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Hexachlorobutadiene	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Hexachlorocyclopentadiene	µg/kg	7	0%	<8740	--	<9800	--	--	2000	10000
	Hexachloroethane	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	Isophorone	µg/kg	7	0%	<582	--	<650	--	--	130	670
	N-Nitrosodi-n-propylamine	µg/kg	7	0%	<582	--	<650	--	--	130	670
	N-Nitrosodiphenylamine	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Nitrobenzene	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Pentachlorophenol	µg/kg	7	0%	<2960	--	<3300	--	--	670	3400
	Phenol	µg/kg	7	0%	<582	--	<650	--	--	130	670
	Pyridine	µg/kg	7	0%	<2900	--	<3300	--	--	660	3300
	bis(2-Chloroethoxy)methane	µg/kg	7	0%	<582	--	<650	--	--	130	670
	bis(2-Chloroethyl)ether	µg/kg	7	0%	<582	--	<650	--	--	130	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	7	0%	<2960	--	<3300	--	--	670	3400
Butyltins	Dibutyltin	µg/kg	7	0%	<1.28	--	<1.3	--	--	1.2	1.3
	Monobutyltin hydride	µg/kg	7	0%	<20	--	<20	--	--	20	21
	Tetrabutyltin	µg/kg	7	0%	<1.68	--	<1.7	--	--	1.6	1.7
	Tributyl tin	µg/kg	7	57%	1.4	0.7	1.6	1.6	2.5	1.4	1.5

Table 4-7f
Phase III Tissue Chemistry Summary Statistics: Atlantic Silverside (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals	Aluminum	mg/kg	7	86%	15.3	6.89	19.3	6	25.7	19.8	19.8
	Antimony	mg/kg	7	0%	<0.1968	--	<0.198	--	--	0.192	0.2
	Arsenic	mg/kg	7	100%	0.564	0.176	0.597	0.33	0.846	--	--
	Barium	mg/kg	7	100%	0.555	0.0949	0.549	0.445	0.7	--	--
	Beryllium	mg/kg	7	0%	<0.0984	--	<0.099	--	--	0.0962	0.1
	Cadmium	mg/kg	7	0%	<0.0984	--	<0.099	--	--	0.0962	0.1
	Calcium	mg/kg	7	100%	11400	1550	11600	9410	13300	--	--
	Chromium	mg/kg	7	57%	0.203	0.0529	0.297	0.115	0.297	0.385	0.4
	Cobalt	mg/kg	7	71%	0.0379	0.0101	0.0395	0.023	0.0433	0.0962	0.1
	Copper	mg/kg	7	86%	0.806	0.325	0.804	0.651	1.21	0.396	0.396
	Iron	mg/kg	7	100%	57.2	27.2	60.3	25.5	101	--	--
	Lead	mg/kg	7	100%	0.277	0.121	0.279	0.124	0.426	--	--
	Magnesium	mg/kg	7	100%	617	65.3	648	509	682	--	--
	Manganese	mg/kg	7	100%	4.66	1.48	4.86	2.56	6.3	--	--
	Mercury	ng/g	7	100%	65.1	11.9	68.3	53	85.1	--	--
	Methyl mercury	ng/g	7	100%	111	40.4	110	62.7	176	--	--
	Nickel	mg/kg	7	0%	<0.394	--	<0.396	--	--	0.385	0.4
	Potassium	mg/kg	7	100%	3500	227	3510	3140	3840	--	--
	Selenium	mg/kg	7	100%	0.503	0.0737	0.49	0.413	0.645	--	--
	Silver	mg/kg	7	14%	0.0453	0.0105	<0.099	0.0216	0.0216	0.0962	0.1
	Sodium	mg/kg	7	100%	1640	202	1640	1330	1940	--	--
	Thallium	mg/kg	7	0%	<0.0984	--	<0.099	--	--	0.0962	0.1
	Titanium	mg/kg	7	71%	0.945	0.477	1.17	0.426	1.82	1.96	1.98
	Vanadium	mg/kg	7	100%	0.0869	0.0175	0.0844	0.0628	0.117	--	--
	Zinc	mg/kg	7	100%	40	3.9	39.3	34.9	46.7	--	--
Miscellaneous	Lipids	%	7	100%	1.46	0.207	1.4	1.2	1.7	--	--
	Moisture	%	7	100%	75.9	1.12	75.5	74.6	77.9	--	--

Notes:

Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:

BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	4	100%	7.21	5.29	6.63	1.84	13.8	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	4	100%	5.87	9.48	1.68	0.107	20	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	4	100%	1.01	0.671	1.04	0.293	1.65	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	4	100%	5.47	7.2	2.2	1.28	16.2	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	4	50%	1.32	1.31	2.57	0.146	0.229	4.91	4.93
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	4	50%	1.26	1.38	2.49	0.0633	0.0654	4.91	4.92
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	4	100%	0.474	0.518	0.309	0.0901	1.19	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	4	100%	0.12	0.0474	0.122	0.0674	0.17	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	4	100%	1.12	0.911	0.739	0.528	2.46	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	4	100%	0.0986	0.0374	0.102	0.0535	0.138	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	4	75%	0.699	1.18	0.112	0.107	0.115	4.93	4.93
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	4	100%	0.21	0.0406	0.207	0.166	0.261	--	--
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	4	100%	0.926	0.646	0.751	0.353	1.85	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	4	100%	0.074	0.0272	0.0724	0.049	0.102	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	4	100%	1.81	1.96	0.946	0.613	4.74	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	4	100%	9.85	4.7	8.51	5.99	16.4	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	4	100%	0.769	0.363	0.671	0.446	1.29	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	4	100%	13	6.58	10.4	8.53	22.6	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	4	100%	13.1	6.53	10.5	8.8	22.7	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	4	100%	13.3	6.53	10.6	9.07	22.9	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	4	100%	11.3	5.77	9.3	7.06	19.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	4	100%	12	6.01	9.66	7.97	20.8	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	4	100%	12.7	6.29	10.4	8.24	22	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	4	100%	11	5.42	9.17	6.88	18.7	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	4	100%	11.2	5.39	9.39	7.15	18.9	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	4	100%	11.4	5.41	9.57	7.42	19.2	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	4	100%	2	1.49	1.78	0.611	3.81	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	4	100%	10.5	10.8	6.26	3.06	26.3	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	4	100%	1.8	0.774	1.88	0.945	2.5	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	4	100%	11.6	8.08	7.98	6.89	23.7	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	4	100%	8.66	2.35	9.04	5.65	10.9	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	4	100%	33.6	15.8	32.2	16.4	53.8	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	4	100%	10.7	5.13	9.28	6.27	17.8	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	4	100%	84.4	40.1	86.8	36.2	128	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	4	100%	29.7	32.9	14	11.8	79	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	4	100%	36.1	40.2	17.9	12.6	96.2	--	--
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	4	100%	582	583	358	173	1440	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	4	100%	39.1	24.6	38.9	14.1	64.7	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	4	100%	28200	40500	10300	3520	88700	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	4	0%	<9.82	--	<4.9	--	--	4.81	24.7
	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	4	100%	5030	6090	2460	1080	14100	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	4	100%	878	1170	363	165	2620	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	4	100%	74	15.8	73.8	57.2	91.3	--	--
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	4	100%	75500	97700	33700	13400	221000	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	4	100%	45.5	32.3	34.1	20.8	93	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	4	100%	224	331	65.5	43.1	720	--	--
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	4	100%	2130	3080	753	269	6730	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	4	100%	80100	103000	36600	13400	234000	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	4	100%	18.1	21.9	7.87	5.79	51	--	--
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	4	100%	241	191	172	97.7	522	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	4	100%	25.2	16.8	21.2	11	47.5	--	--
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	4	100%	46.4	65.8	16.2	8.35	145	--	--
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	4	100%	1800	2640	619	210	5750	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	4	100%	213	273	95.3	41.4	620	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	4	100%	53.9	50	36.5	15.7	127	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	4	100%	6420	5870	4400	1980	14900	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	4	100%	56600	40900	42600	25200	116000	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	4	100%	3150	2560	2210	1280	6890	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	4	100%	137	164	67.6	33.4	381	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	4	100%	8460	7310	5730	3300	19100	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	4	100%	922	572	723	484	1760	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	4	100%	992	918	633	362	2340	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	4	100%	10500	6980	7750	5620	20800	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	4	100%	1370	1140	946	565	3040	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	4	100%	2810	2690	1840	794	6750	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	4	100%	778	643	588	237	1700	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	4	25%	2.02	1.95	<1.95	1.2	1.2	1.92	9.89
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	4	100%	6800	4860	4700	3800	14000	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	4	25%	4.8	4.73	<4.9	11.9	11.9	4.81	4.93
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	4	100%	71.2	57.3	57.6	22.8	147	--	--
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	4	100%	1500	1050	1090	791	3040	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	4	100%	10.4	12.1	5.53	2.33	28.3	--	--
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	3	100%	8650	5200	6880	4570	14500	--	--
	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	4	100%	23800	14500	19100	12200	44600	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	4	100%	98.3	55.1	90.1	41.9	171	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	4	100%	51.1	28.1	49.3	18.6	87.3	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	4	100%	73.7	57.7	57.7	23.3	156	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	4	100%	11	14.7	4.53	1.86	32.9	--	--
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	4	100%	53200	29700	44200	28300	96000	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	4	100%	884	529	774	389	1600	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	4	100%	249	111	240	133	384	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	4	100%	5370	4910	3480	1940	12600	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	4	100%	4570	3410	3420	1950	9500	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	4	100%	6.29	4.83	4.44	2.98	13.3	--	--
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	4	100%	859	827	540	275	2080	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	4	100%	25.7	18.9	20.7	9.93	51.5	--	--
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	4	100%	6.83	5.19	4.89	3.12	14.4	--	--
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	3	100%	242	58.6	233	189	305	--	--
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	4	100%	2300	1740	1630	1080	4860	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	3	100%	31.7	20.8	23.7	16.2	55.3	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	4	100%	2060	1680	1440	842	4520	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	4	0%	<9.82	--	<4.9	--	--	4.81	24.7
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	4	100%	2930	3680	1320	647	8420	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	4	100%	8230	4060	6450	5740	14300	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	1	100%	3410		3410	3410	3410	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	4	100%	1630	726	1310	1190	2710	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	3	100%	5100	2430	3790	3610	7910	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	3	100%	428	143	386	311	588	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	4	100%	577	280	468	387	985	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	3	100%	2530	1150	2060	1700	3840	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	4	100%	1100	725	880	513	2140	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	4	100%	3780	4840	1690	752	11000	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	26800	12400	26800	18000	35500	--	--
	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	3	100%	70.7	40.4	61.3	35.9	115	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	3	100%	7040	2330	6350	5130	9630	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	4	100%	24.6	8.48	26.3	13.2	32.4	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	4	25%	4.87	4.99	<4.9	2.23	2.23	4.86	24.7
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	4	100%	16300	6410	13900	11500	25700	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	4	100%	41.9	21.8	40.9	17.3	68.6	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	4	100%	313	186	227	208	591	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	3	100%	742	1080	133	102	1990	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	4	100%	1700	809	1330	1230	2910	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	4	100%	363	127	313	279	549	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	4	75%	4.81	5.14	2.72	1.43	3.8	24.7	24.7
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	4	100%	2980	1250	2420	2240	4840	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	4	100%	1160	447	980	868	1830	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	4	100%	1990	551	1730	1680	2810	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	4	100%	286	226	222	111	588	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	4	100%	4890	1870	4070	3730	7690	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	4	75%	3.43	1.15	3.16	2.48	3.7	9.89	9.89
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	4	100%	36000	46800	15500	7000	106000	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	4	100%	552	171	522	383	783	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	4	100%	1370	474	1320	858	2000	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	4	100%	3020	1170	2530	2250	4760	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	4	75%	6.42	4.03	4.99	3.35	5.17	24.7	24.7
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	4	100%	115	57.6	90.5	77.5	200	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	4	100%	1370	529	1300	889	2020	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	4	100%	211	47.3	217	158	255	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	4	100%	640	182	640	457	825	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	4	100%	737	208	683	570	1010	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	4	100%	458	558	222	101	1290	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	4	100%	2880	3420	1380	783	7990	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	4	100%	5.35	5.26	3.48	1.36	13.1	--	--
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	4	100%	29.4	30.6	19.3	5.14	73.9	--	--
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	4	100%	1010	1500	298	181	3260	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	4	100%	2200	3090	785	412	6830	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	4	100%	853	1290	259	114	2780	--	--
	(PCB 3) 4-Monochlorobiphenyl	ng/kg	4	25%	3.81	2.75	<4.9	7.93	7.93	4.81	4.93
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	4	100%	11200	13300	5270	2980	31100	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	4	100%	5300	6490	2450	1320	15000	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	4	100%	58.4	85.9	18.1	10.3	187	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	4	75%	3.02	2.99	1.96	1.65	7.45	1.92	1.92
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	4	50%	2.04	1.94	1.58	1.01	1.22	1.94	9.89
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	4	100%	291	400	102	69.5	891	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	4	100%	17.9	26.1	6.07	2.46	56.9	--	--
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	4	100%	38.3	65.1	6.65	3.94	136	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	4	100%	788	1110	262	180	2450	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	4	100%	15100	20800	5780	2480	46200	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	4	100%	1050	1600	318	119	3450	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	4	100%	11700	17500	3700	1490	37800	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	4	100%	1280	1820	472	175	4000	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	4	100%	52900	76200	18500	7600	167000	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	4	100%	2380	3820	575	278	8110	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	4	100%	415	644	116	49.3	1380	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	4	100%	2400	4140	406	181	8610	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	4	100%	47900	71600	15400	5700	155000	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	4	100%	2.59	1.84	2.04	1.05	5.24	--	--
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	4	100%	3710	5470	1220	514	11900	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	4	100%	2340	2390	1340	807	5860	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	4	100%	54300	78700	19200	6650	172000	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	4	100%	52	51	34.5	13.9	125	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	4	100%	116	154	49.6	20.6	346	--	--
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	3	100%	3980	5740	865	464	10600	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	4	100%	65.9	92.8	22.2	14.3	205	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	4	100%	54.2	68.6	22.4	15.1	157	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	4	100%	4290	6280	1450	584	13700	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	4	100%	275	459	54.5	26.9	963	--	--
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	4	100%	14800	23600	3900	1260	50100	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	4	100%	75900	116000	23000	8580	249000	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	4	100%	2780	3920	1020	439	8640	--	--
	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	4	100%	35800	54200	11000	4160	117000	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	4	100%	108000	173000	27700	8410	367000	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	4	100%	196	272	72.1	37.4	604	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	4	100%	430	470	233	126	1130	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	4	100%	12.1	7.94	8.63	7.27	24	--	--
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	4	100%	635	754	308	162	1760	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	4	100%	122	162	52	19	364	--	--
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	1	100%	4220		4220	4220	4220	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	4	0%	<9.82	--	<4.9	--	--	4.81	24.7
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	4	100%	271	381	102	40.4	840	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	4	100%	517	566	280	148	1360	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	4	0%	<9.82	--	<4.9	--	--	4.81	24.7
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	4	100%	135	221	30.3	12.7	467	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	4	100%	4070	6630	975	348	14000	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	4	100%	2080	3230	578	238	6920	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	4	100%	4160	6050	1420	589	13200	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	4	100%	18600	26500	6890	2500	58300	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	3	100%	41900	57300	11700	5910	108000	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	4	100%	21.9	29	8.15	5.76	65.4	--	--
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	4	100%	558	883	148	55.5	1880	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	4	100%	15.6	16.8	8.87	4.13	40.6	--	--
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	4	100%	58600	76000	26400	9730	172000	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	4	100%	9400	12400	4040	1640	27900	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	4	100%	11800	13400	6240	2980	31700	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	4	100%	1170	958	887	425	2480	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	4	100%	164	248	50.9	18.2	535	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	1	100%	11800		11800	11800	11800	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	4	100%	128	202	33.8	14.5	431	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	4	100%	2100	2970	773	318	6550	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	4	100%	53800	70500	23600	9150	159000	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	4	0%	<218	--	<250	--	--	33	340
	Aroclor-1221 (PCB-1221)	µg/kg	4	0%	<218	--	<250	--	--	33	340
	Aroclor-1232 (PCB-1232)	µg/kg	4	0%	<218	--	<250	--	--	33	340
	Aroclor-1242 (PCB-1242)	µg/kg	4	0%	<218	--	<250	--	--	33	340
	Aroclor-1248 (PCB-1248)	µg/kg	4	25%	127	47.2	<250	86.5	86.5	170	340
	Aroclor-1254 (PCB-1254)	µg/kg	4	100%	620	658	335	210	1600	--	--
	Aroclor-1260 (PCB-1260)	µg/kg	4	0%	<218	--	<250	--	--	33	340
	Aroclor-1262 (PCB-1262)	µg/kg	4	50%	115	60.7	201	55	71	330	340
	Aroclor-1268 (PCB-1268)	µg/kg	4	0%	<218	--	<250	--	--	33	340
	Total PCB congeners (NOAA 1989)	ng/kg	4	100%	1160000	1410000	559000	266000	3260000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	4	100%	1160000	1410000	559000	266000	3260000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	4	100%	1160000	1410000	559000	266000	3260000	--	--
	Total PCBs (7)	µg/kg	4	100%	641	642	348	270	1600	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	4	100%	1290	969	1090	380	2600	--	--
	Total PCBs (7) (ND*1)	µg/kg	4	100%	1940	1360	1850	465	3600	--	--
	Total PCBs (9)	µg/kg	4	100%	666	623	370	325	1600	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	4	100%	1520	1080	1370	435	2900	--	--
	Total PCBs (9) (ND*1)	µg/kg	4	100%	2340	1630	2300	545	4200	--	--
	Total PCBs congener (209 specified)	ng/kg	4	100%	1180000	1460000	545000	275000	3370000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	4	100%	1180000	1460000	545000	275000	3370000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	4	100%	1180000	1460000	545000	275000	3370000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	4	100%	92	161	14.4	6.12	333	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	4	100%	92	161	14.4	6.12	333	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	4	100%	92	161	14.4	6.13	333	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	4	100%	1.84	2.47	0.759	0.315	5.52	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	4	100%	1.84	2.47	0.759	0.315	5.52	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	4	100%	1.84	2.47	0.759	0.315	5.52	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	4	100%	25	32.3	11.2	4.75	73.1	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	4	100%	25.2	32.4	11.2	4.83	73.5	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	4	100%	25.3	32.6	11.3	4.9	73.9	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	4	100%	105	158	30	18	342	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	4	100%	105	158	30.2	18.1	342	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	4	100%	105	158	30.4	18.2	342	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	4	100%	13.2	4.97	11.9	8.63	20.2	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	4	100%	13.9	5.42	12.6	8.9	21.4	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	4	100%	14.6	5.88	13.3	9.17	22.6	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	4	100%	36	29.7	24.3	15.6	80	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	4	100%	36.4	29.9	24.6	15.7	80.7	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	4	100%	36.8	30.1	24.9	16	81.3	--	--
	Total decachlorobiphenyl	ng/kg	4	100%	737	208	683	570	1010	--	--
	Total dichlorobiphenyl	ng/kg	4	100%	1790	2250	734	530	5160	--	--
	Total heptachlorobiphenyl	ng/kg	4	100%	55900	37000	40000	32400	111000	--	--
	Total hexachlorobiphenyl	ng/kg	4	100%	200000	138000	152000	95900	400000	--	--
	Total monochlorobiphenyl	ng/kg	4	100%	33.9	35.4	17.2	14.3	86.9	--	--
	Total nonachlorobiphenyl	ng/kg	4	100%	2230	751	2160	1510	3090	--	--
	Total octachlorobiphenyl	ng/kg	4	100%	16400	6160	13800	12300	25500	--	--
	Total pentachlorobiphenyl	ng/kg	4	100%	396000	525000	170000	66300	1180000	--	--
	Total tetrachlorobiphenyl	ng/kg	4	100%	443000	672000	137000	50400	1450000	--	--
	Total trichlorobiphenyl	ng/kg	4	100%	68400	87400	30000	14800	199000	--	--
Pesticides	2,4'-DDD	pg/g	4	100%	3060	3080	2470	381	6900	--	--
	2,4'-DDE	pg/g	4	100%	5110	5380	3960	607	11900	--	--
	2,4'-DDT	pg/g	4	50%	49.5	47.6	41.6	51.8	116	29.2	31.5
	4,4'-DDD	pg/g	4	100%	86900	77400	78600	13400	177000	--	--
	4,4'-DDE	pg/g	4	100%	129000	92300	134000	26300	220000	--	--
	4,4'-DDT	pg/g	4	100%	2840	1350	2320	1890	4840	--	--
	Aldrin	pg/g	4	0%	<31.6	--	<30.4	--	--	27.2	38.8
	Dieldrin	pg/g	4	100%	5280	2070	4720	3540	8170	--	--
	Endosulfan I	pg/g	4	0%	<158.2	--	<152	--	--	136	194
	Endosulfan II	pg/g	4	0%	<158.2	--	<152	--	--	136	194
	Endosulfan sulfate	pg/g	4	0%	<158.2	--	<152	--	--	136	194
	Endrin	pg/g	4	0%	<31.6	--	<30.4	--	--	27.2	38.8
	Endrin aldehyde	pg/g	4	0%	<158.2	--	<152	--	--	136	194
	Endrin ketone	pg/g	4	0%	<158.2	--	<152	--	--	136	194
	Heptachlor	pg/g	4	25%	16.1	2.58	<28.2	16.9	16.9	27.2	38.8
	Heptachlor endo-epoxide	pg/g	4	100%	309	204	308	116	503	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Heptachlor epoxide	pg/g	4	100%	652	287	699	295	914	--	--
	Hexachlorobenzene	pg/g	4	100%	51.2	44.3	33.6	20.6	117	--	--
	Methoxychlor	pg/g	4	0%	<31.6	--	<30.4	--	--	27.2	38.8
	Mirex	pg/g	4	75%	43.2	23.8	41	34.6	75.7	38.8	38.8
	Oxychlordane	pg/g	4	100%	1120	539	1110	595	1650	--	--
	Total BHC Compounds	pg/g	4	75%	57	46.8	47.8	28.9	123	38.8	38.8
	Total Chlordane (ND=0)	pg/g	4	100%	16400	7150	15800	9430	24700	--	--
	Total Chlordane (ND=1)	pg/g	4	100%	16400	7150	15800	9480	24700	--	--
	Total Chlordane (ND=1/2)	pg/g	4	100%	16400	7150	15800	9460	24700	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	4	100%	226000	175000	235000	42500	390000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	4	100%	226000	175000	235000	42500	390000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	4	100%	226000	175000	235000	42500	390000	--	--
	Total DDx (2,4) Total Fraction	pg/g	4	100%	8210	8490	6400	1060	19000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	4	100%	8210	8490	6400	1060	19000	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	4	100%	8210	8490	6400	1060	19000	--	--
	Total DDx (4,4) Total Fraction	pg/g	4	100%	218000	167000	230000	41500	370000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	4	100%	218000	167000	230000	41500	370000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	4	100%	218000	167000	230000	41500	370000	--	--
	Total alpha + gamma chlordane	pg/g	4	100%	5190	2150	5000	3050	7700	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	4	100%	5190	2150	5000	3050	7700	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	4	100%	5190	2150	5000	3050	7700	--	--
	alpha-BHC	pg/g	4	25%	22	12.6	<34	40.5	40.5	27.2	38.8
	alpha-Chlordane	pg/g	4	100%	4020	1760	3830	2200	6210	--	--
	beta-BHC	pg/g	4	75%	39	17.8	44.6	28.9	57.4	38.8	38.8
	cis-Nonachlor	pg/g	4	100%	2610	1060	2430	1610	3990	--	--
	delta-BHC	pg/g	3	0%	<33.2	--	<31.5	--	--	29.2	38.8
	gamma-BHC (lindane)	pg/g	4	50%	18	5.55	27.2	12.8	25.2	29.2	38.8
	gamma-Chlordane	pg/g	4	100%	1170	469	1170	694	1650	--	--
	trans-Nonachlor	pg/g	4	100%	6550	2960	6340	3580	9930	--	--
PAHs	1-Methylnaphthalene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	2-Methylnaphthalene	µg/kg	4	25%	6.5	6.6	<6.6	3.1	3.1	6.5	33
	Acenaphthene	µg/kg	4	50%	7.2	6.4	6.4	2.8	6.2	6.6	33
	Acenaphthylene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Anthracene	µg/kg	4	25%	7.2	6.3	<6.6	5.7	5.7	6.6	33
	Benzo(a)anthracene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Benzo(a)pyrene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Benzo(b)fluoranthene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Benzo(e)pyrene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Benzo(g,h,i)perylene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C1-Chrysenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	C1-Fluoranthenes/Pyrenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C1-Fluorenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C1-Naphthalenes	µg/kg	4	25%	7.8	6.2	<7.4	8.2	8.2	6.5	33
	C1-Phenanthrenes/Anthracenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C2-Chrysenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C2-Fluoranthenes/Pyrenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C2-Fluorenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C2-Naphthalenes	µg/kg	4	25%	8	9.4	<6.6	22	22	6.5	6.6
	C2-Phenanthrenes/Anthracenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C3-Chrysenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C3-Fluoranthenes/Pyrenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C3-Fluorenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C3-Naphthalenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C3-Phenanthrenes/Anthracenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C4-Chrysenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C4-Naphthalenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	C4-Phenanthrenes/Anthracenes	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Chrysene	µg/kg	4	25%	6.5	6.7	<6.6	2.8	2.8	6.6	33
	Dibenz(a,h)anthracene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Fluoranthene	µg/kg	4	25%	7.4	6.3	<6.6	6.3	6.3	6.6	33
	Fluorene	µg/kg	4	25%	7.2	6.3	<6.6	5.8	5.8	6.6	33
	Indeno(1,2,3-cd)pyrene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Naphthalene	µg/kg	4	25%	6.7	6.5	<6.6	3.8	3.8	6.6	33
	Perylene	µg/kg	4	0%	<13.2	--	<6.6	--	--	6.5	33
	Phenanthrene	µg/kg	4	25%	7.2	6.3	<6.6	5.7	5.7	6.6	33
	Pyrene	µg/kg	4	50%	7.3	6.3	6.3	3.4	6	6.6	33
	Total Alkylated PAHs	µg/kg	4	50%	9.2	8.9	7.4	8.2	22	6.5	6.6
	Total HMW PAHs	µg/kg	4	50%	9.2	6.9	10	3.4	14	6.6	33
	Total HMW PAHs (ND*0.5)	µg/kg	4	50%	23	16	33	33	39	6.6	33
	Total HMW PAHs (ND*1)	µg/kg	4	50%	36	31	48	63	63	6.6	33
	Total LMW PAHs	µg/kg	4	75%	9.8	7.9	9.9	2.8	17	33	33
	Total LMW PAHs (ND*0.5)	µg/kg	4	75%	23	5.5	27	23	30	33	33
	Total LMW PAHs (ND*1)	µg/kg	4	75%	36	13	43	42	43	33	33
	Total PAH	µg/kg	4	75%	14	12	19	2.8	31	33	33
	Total PAH (ND*0.5)	µg/kg	4	75%	49	22	56	56	68	33	33
	Total PAH (ND*1)	µg/kg	4	75%	85	46	110	110	110	33	33
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	4	0%	<658	--	<655	--	--	650	670
	1,2-Diphenylhydrazine	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2,3,4,6-Tetrachlorophenol	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	2,4,5-Trichlorophenol	µg/kg	4	0%	<658	--	<655	--	--	650	670

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	2,4,6-Trichlorophenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2,4-Dichlorophenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2,4-Dimethylphenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2,4-Dinitrophenol	µg/kg	4	0%	<19760	--	<20000	--	--	19000	20000
	2,4-Dinitrotoluene	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	2,6-Dinitrotoluene	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2-Chloronaphthalene	µg/kg	4	0%	<650	--	<650	--	--	640	660
	2-Chlorophenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2-Methylphenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2-Nitroaniline	µg/kg	4	0%	<658	--	<655	--	--	650	670
	2-Nitrophenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	3,3'-Dichlorobenzidine	µg/kg	4	0%	<6580	--	<6550	--	--	6500	6700
	3-Nitroaniline	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	4,6-Dinitro-2-methylphenol	µg/kg	4	0%	<9860	--	<9850	--	--	9700	10000
	4-Bromophenyl phenyl ether	µg/kg	4	0%	<658	--	<655	--	--	650	670
	4-Chloro-3-methylphenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	4-Chloroaniline	µg/kg	4	0%	<1300	--	<1300	--	--	1300	1300
	4-Chlorophenyl phenyl ether	µg/kg	4	0%	<658	--	<655	--	--	650	670
	4-Methylphenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	4-Nitroaniline	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	4-Nitrophenol	µg/kg	4	0%	<9860	--	<9850	--	--	9700	10000
	Acetophenone	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Atrazine	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Benzaldehyde	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Benzidine	µg/kg	4	0%	<65800	--	<65500	--	--	65000	67000
	Benzoic acid	µg/kg	4	0%	<9860	--	<9850	--	--	9700	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Butyl benzylphthalate (BBP)	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Caprolactam	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Carbazole	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Di-n-butylphthalate (DBP)	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Dibenzofuran	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Diethyl phthalate	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Dimethyl phthalate	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Hexachlorobutadiene	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Hexachlorocyclopentadiene	µg/kg	4	0%	<9860	--	<9850	--	--	9700	10000
	Hexachloroethane	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	Isophorone	µg/kg	4	0%	<658	--	<655	--	--	650	670
	N-Nitrosodi-n-propylamine	µg/kg	4	0%	<658	--	<655	--	--	650	670
	N-Nitrosodiphenylamine	µg/kg	4	0%	<658	--	<655	--	--	650	670

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	Nitrobenzene	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Pentachlorophenol	µg/kg	4	0%	<3360	--	<3350	--	--	3300	3400
	Phenol	µg/kg	4	0%	<658	--	<655	--	--	650	670
	Pyridine	µg/kg	4	0%	<3280	--	<3300	--	--	3200	3300
	bis(2-Chloroethoxy)methane	µg/kg	4	0%	<658	--	<655	--	--	650	670
	bis(2-Chloroethyl)ether	µg/kg	4	0%	<658	--	<655	--	--	650	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	4	0%	<3360	--	<3350	--	--	3300	3400
Butyltins	Dibutyltin	µg/kg	4	0%	<1.3	--	<1.3	--	--	1.3	1.3
	Monobutyltin hydride	µg/kg	4	0%	<20	--	<21	--	--	20	21
	Tetrabutyltin	µg/kg	4	0%	<1.68	--	<1.7	--	--	1.6	1.7
	Tributyl tin	µg/kg	4	0%	<1.48	--	<1.5	--	--	1.4	1.5
Metals	Aluminum	mg/kg	4	100%	56.5	70.7	31.5	5.71	158	--	--
	Antimony	mg/kg	4	0%	<0.196	--	<0.196	--	--	0.192	0.2
	Arsenic	mg/kg	4	100%	0.597	0.0912	0.592	0.49	0.713	--	--
	Barium	mg/kg	4	100%	1.66	0.749	1.68	0.749	2.55	--	--
	Beryllium	mg/kg	4	0%	<0.098	--	<0.098	--	--	0.0962	0.1
	Cadmium	mg/kg	4	0%	<0.098	--	<0.098	--	--	0.0962	0.1
	Calcium	mg/kg	4	100%	15800	2440	15300	13400	19200	--	--
	Chromium	mg/kg	4	75%	0.441	0.41	0.4	0.13	1.03	0.392	0.392
	Cobalt	mg/kg	4	75%	0.0645	0.0364	0.0803	0.031	0.116	0.098	0.098
	Copper	mg/kg	4	100%	4.54	0.51	4.71	3.81	4.95	--	--
	Iron	mg/kg	4	100%	122	112	89.2	31.5	278	--	--
	Lead	mg/kg	4	100%	0.816	0.662	0.585	0.306	1.79	--	--
	Magnesium	mg/kg	4	100%	721	36.9	719	680	768	--	--
	Manganese	mg/kg	4	100%	15.4	5.67	15	9.21	22.3	--	--
	Mercury	ng/g	4	100%	42.9	17.1	37.1	29.7	67.6	--	--
	Methyl mercury	ng/g	4	100%	50.8	6.45	47.9	47.1	60.5	--	--
	Nickel	mg/kg	4	25%	0.254	0.114	<0.396	0.425	0.425	0.392	0.4
	Potassium	mg/kg	4	100%	3640	206	3720	3340	3780	--	--
	Selenium	mg/kg	4	100%	0.541	0.104	0.569	0.392	0.633	--	--
	Silver	mg/kg	4	100%	0.0583	0.0118	0.0575	0.0475	0.0709	--	--
	Sodium	mg/kg	4	100%	2000	107	2020	1870	2100	--	--
	Thallium	mg/kg	4	0%	<0.098	--	<0.098	--	--	0.0962	0.1
	Titanium	mg/kg	4	50%	1.89	1.46	1.96	1.55	4.04	1.96	1.96
	Vanadium	mg/kg	4	100%	0.295	0.184	0.228	0.165	0.56	--	--
	Zinc	mg/kg	4	100%	66.6	6.04	67.5	58.8	72.7	--	--
Miscellaneous	Lipids	%	4	100%	2.91	0.792	2.53	2.5	4.1	--	--
	Moisture	%	4	100%	75.2	1.4	75.4	73.5	76.4	--	--

Table 4-7g
Phase III Tissue Chemistry Summary Statistics: Mummichog (Whole-Body)

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	13	100%	7.95	3.26	7.61	2.89	13.2	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	13	100%	1.26	0.898	1.05	0.434	3.26	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	13	100%	1.22	0.398	1.22	0.58	2	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	13	100%	3.37	4.23	1.81	0.284	13.3	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	13	31%	1.77	1.05	<4.85	0.194	0.333	4.76	4.99
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	13	100%	0.153	0.0749	0.13	0.06	0.315	--	--
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	13	100%	0.719	0.745	0.479	0.208	2.72	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	13	100%	0.24	0.0701	0.241	0.126	0.359	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	13	100%	1.76	1.52	1.13	0.674	5.49	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	13	100%	0.219	0.0905	0.201	0.103	0.389	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	13	77%	0.647	1.03	0.0941	0.0489	0.218	4.85	4.99
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	13	85%	0.813	0.753	0.648	0.204	0.774	4.9	4.93
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	13	92%	2.44	1.27	2.31	0.21	4.98	4.93	4.93
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	13	100%	0.134	0.0572	0.112	0.0828	0.269	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	13	92%	3.39	3.7	2.85	0.232	14.1	4.85	4.85
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	13	100%	23.9	11.9	20.3	3.62	39.5	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	13	100%	0.759	0.144	0.743	0.477	0.94	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	13	100%	28.9	15.3	22.4	5.7	56.1	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	13	100%	29.6	15.3	25.1	5.72	56.1	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	13	100%	30.2	15.5	27.8	5.74	56.1	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	13	100%	26.5	13.6	21.4	4.68	48.2	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	13	100%	27.1	13.7	22.9	4.7	48.2	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	13	100%	27.6	13.9	24.3	4.72	48.9	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	13	100%	25.9	13	21.4	4.48	45.3	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	13	100%	26.4	13.1	22.4	4.5	45.3	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	13	100%	26.9	13.3	23.5	4.52	47.4	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	13	100%	2.69	0.899	3	1.14	4.13	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	13	100%	11.3	9.06	9.31	3.16	35.5	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	13	100%	3.26	1.34	2.83	1.69	6.01	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	13	100%	19.8	15.3	13.8	8.61	56.8	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	13	100%	15	8.72	12.1	6.9	37.8	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	13	100%	65.1	34.3	63.7	29.9	156	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	13	100%	24.8	12.3	21.1	4.05	40.7	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	13	100%	195	132	142	66.8	427	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	13	100%	438	920	50.9	25.3	3290	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	13	100%	143	121	88.8	64.1	504	--	--
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	13	100%	1140	335	1250	668	1660	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	13	100%	164	93.8	125	63.9	365	--	--
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	13	100%	18100	7610	15900	9640	35500	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	13	0%	<13.92	--	<4.98	--	--	4.83	25

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	13	100%	4120	1460	3960	2330	7220	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	13	100%	684	256	595	429	1310	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	13	100%	64.7	14.5	62.2	44.2	89.3	--	--
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	13	100%	68900	22900	64400	42600	119000	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	13	100%	61.6	15.9	63.1	39.5	83.7	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	13	100%	167	83.5	126	70.6	314	--	--
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	13	100%	1300	590	1120	633	2680	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	13	100%	60300	18900	58100	32800	102000	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	13	100%	23.5	16.4	15.7	9.56	60.2	--	--
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	13	100%	317	76.1	328	193	414	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	9	89%	40.5	16.1	38.4	28	59.5	24.4	24.4
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	13	85%	23.6	14.2	24.4	11.2	62.1	24.4	24.6
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	13	100%	1180	478	1080	656	2310	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	13	100%	126	44.8	124	71.3	235	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	13	100%	61.5	17.2	58.3	37.7	97.3	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	13	100%	6710	1340	7020	4600	8690	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	13	100%	68600	17400	73300	43700	109000	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	13	100%	3500	646	3500	2440	4410	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	11	100%	385	106	377	204	534	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	11	100%	11500	2430	11300	7320	14900	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	13	100%	1170	269	1170	737	1660	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	11	100%	1680	318	1580	1140	2080	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	12	100%	17000	4330	17100	10100	23000	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	12	100%	1630	414	1610	918	2120	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	13	100%	2500	469	2520	1740	3320	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	11	100%	861	192	903	529	1110	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	13	31%	2.78	2.03	<1.95	0.814	1.23	1.93	9.99
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	13	100%	7670	3090	6920	4210	16200	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	13	31%	7.76	4.35	<8.9	5.21	10.3	4.83	24.6
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	11	100%	71.2	22.8	76.5	29.3	99.3	--	--
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	11	100%	2020	558	2090	1130	2700	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	13	100%	12	4.72	13	2.05	17.7	--	--
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	11	100%	10500	2620	9850	6710	16400	--	--

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	11	100%	29700	5870	32100	20000	37200	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	11	100%	207	57.5	208	113	306	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	13	100%	42.9	21.3	36.2	16	87.7	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	13	100%	257	111	236	110	479	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	13	100%	51.1	38.2	45.3	15.7	166	--	--
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	13	100%	74000	25400	72500	43500	142000	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	12	100%	2060	1330	1740	980	6060	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	13	100%	524	200	471	282	844	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	13	100%	5170	1080	5210	3150	6650	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	13	100%	4770	1370	4520	2520	7460	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	13	85%	11.4	3.87	12.4	5.44	18.8	24.4	24.6
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	13	100%	1630	1090	1310	722	4690	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	13	77%	35.6	10.9	35.3	18.4	44.5	97.6	98.2
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	13	77%	9.99	3.17	11.3	3.6	13.2	24.4	24.6
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	7	71%	262	179	299	295	444	24.4	24.6
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	13	100%	3030	758	2960	1980	4680	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	11	100%	47.5	10.8	46.4	31.4	66	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	13	100%	2150	464	2150	1350	2930	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	13	0%	<13.92	--	<4.98	--	--	4.83	25
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	13	100%	7240	5650	4640	3160	20300	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	13	100%	10600	5260	9970	5170	25700	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	8	100%	3660	1510	3140	2400	7250	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	13	100%	2180	994	2090	1110	4930	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	10	100%	5810	1490	5710	3530	8460	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	11	100%	577	251	552	293	1220	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	13	100%	1100	517	1130	571	2580	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	2	100%	7950	1530	7950	6870	9030	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	11	100%	4040	1320	3730	2260	6670	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	13	100%	3350	1460	3070	1590	7280	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	13	100%	10000	7910	7160	4780	30200	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	12	100%	32500	16900	30500	14800	80400	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	3	100%	148	44	135	112	197	--	--

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	11	100%	96.9	31.7	91.8	58.4	167	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	11	100%	9690	4550	9280	5240	22100	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	13	100%	44.5	13.1	38.7	31.9	70.3	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	13	46%	8.28	5.38	<17.1	1.95	17.1	4.98	25
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	13	100%	26500	9560	25400	13500	50000	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	13	100%	179	180	118	60.4	737	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	13	100%	408	172	360	221	876	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	11	100%	1600	1130	878	627	3740	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	13	100%	2400	1130	2370	1170	5410	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	13	100%	455	257	418	217	1230	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	13	62%	7.6	4.26	8.09	1.86	8.41	23.8	25
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	13	100%	4420	1880	4040	1780	9440	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	13	100%	1540	711	1510	791	3590	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	13	100%	2490	1120	2270	1420	5780	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	11	100%	589	325	589	102	1410	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	13	100%	6670	2160	6030	3580	12200	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	13	100%	5.75	4.76	3.88	1.88	17.2	--	--
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	13	100%	41000	41300	25900	15900	138000	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	13	100%	852	256	856	486	1460	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	13	100%	2510	577	2440	1410	3480	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	13	100%	4790	1440	4550	2500	8190	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	13	62%	9.95	2.76	10.8	4.65	12.3	23.8	25
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	13	100%	234	102	235	111	502	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	13	100%	2640	865	2590	1470	4650	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	13	100%	257	92.1	240	156	459	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	13	100%	919	235	856	530	1380	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	13	100%	853	215	861	483	1170	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	13	100%	1320	944	1140	483	3930	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	13	100%	2020	1860	1410	834	7170	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	13	100%	12.1	8.25	10.5	4.13	32.6	--	--
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	13	100%	116	113	77.6	41.6	412	--	--
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	13	100%	1090	1100	659	390	3950	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	13	100%	2820	2580	1650	1070	9380	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	13	100%	1640	1320	903	696	4460	--	--

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 3) 4-Monochlorobiphenyl	ng/kg	13	31%	8	6.57	<8.65	8.65	24.5	4.83	24.5
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	13	100%	15200	11800	11300	6780	44200	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	13	100%	5000	4070	2960	1720	14100	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	13	100%	120	101	69.6	35.6	325	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	13	15%	2.85	1.96	<1.99	1.34	1.57	1.93	9.99
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	13	8%	2.95	1.95	<3.21	3.21	3.21	1.93	9.99
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	13	100%	221	152	178	73.4	557	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	13	100%	28	22.8	18.1	9.14	71.2	--	--
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	13	100%	111	79.2	76	40.4	285	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	13	100%	2830	3830	1020	731	14000	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	13	100%	9550	7140	7270	3780	28400	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	13	100%	1230	1090	812	438	4330	--	--
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	13	100%	15500	12100	11500	6630	45900	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	13	100%	1690	1000	1350	640	4020	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	13	100%	59500	41000	46200	26000	161000	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	13	100%	2820	2470	1980	1260	9440	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	13	100%	867	558	676	417	2380	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	13	100%	6810	4670	5430	2640	18300	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	13	100%	53900	38200	44200	22500	146000	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	13	100%	11	8.88	7.92	2.95	34.2	--	--
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	13	100%	5510	3170	4320	2520	12800	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	13	100%	3680	1830	3630	1430	7520	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	13	100%	71000	49800	54400	29700	193000	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	13	100%	196	95	197	91.3	437	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	13	85%	95.1	82.3	65.8	41.4	263	24.4	24.6
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	12	100%	1380	1190	1130	503	4600	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	13	100%	59.4	60.9	30.2	17.8	225	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	13	100%	37.1	27.7	26.1	15.1	112	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/2,4,4',6-Tetrachlorobiphenyl	ng/kg	13	100%	5340	3970	3960	2420	15500	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	13	100%	664	798	211	111	2670	--	--
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	13	100%	10000	9980	6520	3250	34500	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	13	100%	55900	47500	42200	21600	169000	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	13	100%	2360	1640	1870	988	6470	--	--

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	13	100%	27000	22700	20600	10500	82900	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	13	100%	69600	62100	50700	23700	232000	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	12	100%	184	113	170	85.4	481	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	13	100%	546	230	498	315	1070	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	13	100%	43.4	40.9	27.1	12	145	--	--
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	13	100%	660	314	576	376	1420	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	13	100%	196	166	136	67.1	644	--	--
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	7	100%	727	616	447	287	1980	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	13	0%	<13.92	--	<4.98	--	--	4.83	25
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	13	100%	329	142	305	183	689	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	13	100%	1680	1720	782	420	6000	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	13	0%	<13.92	--	<4.98	--	--	4.83	25
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	13	100%	82.1	84.7	49.2	30.2	314	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	13	100%	5650	2830	4640	3100	12400	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	13	100%	2770	1220	2600	1550	5850	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	13	100%	5570	2030	5170	3270	10400	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	13	100%	13100	5880	12200	7020	25800	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	11	100%	33700	13200	31400	18500	60100	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	13	92%	29.1	22.4	23.5	6.87	83.4	24.4	24.4
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	13	100%	507	256	455	208	1070	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	13	100%	114	111	62.3	27.5	340	--	--
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	12	100%	71000	22000	69500	41600	113000	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	13	100%	7370	2500	6580	4120	12800	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	9	100%	12400	3960	12200	7140	18400	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	13	100%	2270	802	2260	1240	3690	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	13	100%	406	145	428	181	627	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	4	100%	20000	2890	21200	15800	22000	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	13	100%	173	78.6	171	76.1	355	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	13	100%	2240	775	2270	1110	3740	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	13	100%	44900	14600	42000	27100	76300	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	13	0%	<182.4	--	<170	--	--	170	330
	Aroclor-1221 (PCB-1221)	µg/kg	13	0%	<182.4	--	<170	--	--	170	330

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Aroclor-1232 (PCB-1232)	µg/kg	13	0%	<182.4	--	<170	--	--	170	330
	Aroclor-1242 (PCB-1242)	µg/kg	13	0%	<182.4	--	<170	--	--	170	330
	Aroclor-1248 (PCB-1248)	µg/kg	13	69%	567	568	460	360	1800	170	170
	Aroclor-1254 (PCB-1254)	µg/kg	13	100%	638	144	610	400	950	--	--
	Aroclor-1260 (PCB-1260)	µg/kg	13	8%	114	83	<170	380	380	170	330
	Aroclor-1262 (PCB-1262)	µg/kg	13	69%	120	30.5	140	76	150	170	330
	Aroclor-1268 (PCB-1268)	µg/kg	13	0%	<182.4	--	<170	--	--	170	330
	Total PCB congeners (NOAA 1989)	ng/kg	13	100%	1240000	518000	1180000	659000	2510000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	13	100%	1240000	518000	1180000	659000	2510000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	13	100%	1240000	518000	1180000	659000	2510000	--	--
	Total PCBs (7)	µg/kg	13	100%	1210	717	1100	400	2800	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	13	100%	1690	710	1500	910	3200	--	--
	Total PCBs (7) (ND*1)	µg/kg	13	100%	2180	728	2000	1400	3600	--	--
	Total PCBs (9)	µg/kg	13	100%	1300	727	1300	480	2900	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	13	100%	1910	738	1800	1100	3400	--	--
	Total PCBs (9) (ND*1)	µg/kg	13	100%	2510	782	2300	1700	3900	--	--
	Total PCBs congener (209 specified)	ng/kg	13	100%	1230000	536000	1190000	660000	2540000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	13	100%	1230000	536000	1190000	660000	2540000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	13	100%	1230000	536000	1190000	660000	2540000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	13	100%	43.4	42.2	31.1	12.2	159	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	13	100%	43.4	42.2	31.1	12.2	159	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	13	100%	43.4	42.2	31.1	12.2	159	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	13	100%	1.15	0.452	1.13	0.653	2.29	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	13	100%	1.15	0.452	1.13	0.653	2.29	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	13	100%	1.15	0.452	1.13	0.654	2.29	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	13	100%	15.3	5.34	14.8	8.83	28.4	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	13	100%	15.5	5.42	15.2	8.9	28.7	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	13	100%	15.7	5.52	15.5	8.97	29.1	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	13	100%	72.3	47.1	65.2	24.3	197	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	13	100%	73	47	65.3	24.3	197	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	13	100%	73.7	46.8	65.3	24.4	197	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	13	100%	27.7	13.7	22.7	5.67	49.3	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	13	100%	28.2	13.8	24.2	5.7	49.3	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	13	100%	28.8	14	25.7	5.72	49.8	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	13	100%	41.1	15.2	38.5	19.1	62.7	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	13	100%	41.9	15.3	39.9	19.2	63.1	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	13	100%	42.6	15.4	41.2	19.3	63.5	--	--
	Total decachlorobiphenyl	ng/kg	13	100%	853	215	861	483	1170	--	--
	Total dichlorobiphenyl	ng/kg	13	100%	5620	6420	2220	1520	23800	--	--

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total heptachlorobiphenyl	ng/kg	13	100%	97300	44900	90100	41300	216000	--	--
	Total hexachlorobiphenyl	ng/kg	13	100%	248000	53900	274000	157000	322000	--	--
	Total monochlorobiphenyl	ng/kg	13	100%	448	931	54.5	27.7	3330	--	--
	Total nonachlorobiphenyl	ng/kg	13	100%	3820	1170	3700	2160	6490	--	--
	Total octachlorobiphenyl	ng/kg	13	100%	24000	8170	23400	12400	45600	--	--
	Total pentachlorobiphenyl	ng/kg	13	100%	350000	126000	341000	189000	616000	--	--
	Total tetrachlorobiphenyl	ng/kg	13	100%	406000	311000	342000	167000	1180000	--	--
	Total trichlorobiphenyl	ng/kg	13	100%	91000	79100	61800	37700	285000	--	--
Pesticides	2,4'-DDD	pg/g	13	100%	13400	11200	8690	6950	48200	--	--
	2,4'-DDE	pg/g	13	100%	18300	13500	12000	4910	51200	--	--
	2,4'-DDT	pg/g	13	100%	226	179	137	64.4	629	--	--
	4,4'-DDD	pg/g	13	100%	80800	59100	58100	34600	255000	--	--
	4,4'-DDE	pg/g	13	100%	134000	49500	113000	86500	251000	--	--
	4,4'-DDT	pg/g	13	100%	3320	2040	2500	892	6930	--	--
	Aldrin	pg/g	13	69%	46.6	84.1	29	10.8	43.6	29	650
	Dieldrin	pg/g	13	100%	8700	2080	8930	5120	11500	--	--
	Endosulfan I	pg/g	13	0%	<430	--	<174	--	--	145	3250
	Endosulfan II	pg/g	13	0%	<430	--	<174	--	--	145	3250
	Endosulfan sulfate	pg/g	13	54%	191	143	177	35.7	448	153	340
	Endrin	pg/g	13	46%	60.6	82.4	<34.8	21	77.3	30.5	650
	Endrin aldehyde	pg/g	13	0%	<480	--	<174	--	--	145	3250
	Endrin ketone	pg/g	13	0%	<480	--	<174	--	--	145	3250
	Heptachlor	pg/g	13	46%	51.2	86.6	<34.8	5.96	89.2	30.5	650
	Heptachlor endo-epoxide	pg/g	13	100%	784	658	623	260	2740	--	--
	Heptachlor epoxide	pg/g	13	100%	1310	570	1360	563	2500	--	--
	Hexachlorobenzene	pg/g	13	100%	43.3	51.8	23.8	12.6	203	--	--
	Methoxychlor	pg/g	13	0%	<96	--	<34.8	--	--	29	650
	Mirex	pg/g	13	100%	210	137	166	78.7	525	--	--
	Oxychlordane	pg/g	13	100%	2420	1260	2360	979	4710	--	--
	Total BHC Compounds	pg/g	13	100%	214	299	111	67.2	1170	--	--
	Total Chlordane (ND=0)	pg/g	13	100%	44000	14600	39900	25700	69000	--	--
	Total Chlordane (ND=1)	pg/g	13	100%	44100	14500	39900	25700	69000	--	--
	Total Chlordane (ND=1/2)	pg/g	13	100%	44000	14600	39900	25700	69000	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	13	100%	250000	118000	210000	150000	510000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	13	100%	250000	118000	210000	150000	510000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	13	100%	250000	118000	210000	150000	510000	--	--
	Total DDx (2,4) Total Fraction	pg/g	13	100%	31900	20200	25000	13000	70000	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	13	100%	31900	20200	25000	13000	70000	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	13	100%	31900	20200	25000	13000	70000	--	--
	Total DDx (4,4) Total Fraction	pg/g	13	100%	218000	97200	190000	130000	440000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	13	100%	218000	97200	190000	130000	440000	--	--

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total DDx (4,4) Total Fraction (ND*1)	pg/g	13	100%	218000	97200	190000	130000	440000	--	--
	Total alpha + gamma chlordane	pg/g	13	100%	17000	8820	13000	6800	33000	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	13	100%	17000	8820	13000	6800	33000	--	--
	Total alpha + gamma chlordane (ND*1)	pg/g	13	100%	17000	8820	13000	6800	33000	--	--
	alpha-BHC	pg/g	13	69%	71.3	88	35.5	34.9	183	33.3	650
	alpha-Chlordane	pg/g	13	100%	12300	7630	9510	3820	25700	--	--
	beta-BHC	pg/g	13	100%	138	232	64.4	41.1	885	--	--
	cis-Nonachlor	pg/g	13	100%	6580	2170	7050	3150	9780	--	--
	delta-BHC	pg/g	11	55%	52.2	93	29	4.95	68.2	29	650
	gamma-BHC (lindane)	pg/g	13	92%	47.7	83.5	24.6	18	33	650	650
	gamma-Chlordane	pg/g	13	100%	4770	1500	4420	2820	7030	--	--
	trans-Nonachlor	pg/g	13	100%	15800	4720	17800	8790	21000	--	--
PAHs	1-Methylnaphthalene	µg/kg	13	8%	4.2	3.5	<6.6	2.7	2.7	6.5	32
	2-Methylnaphthalene	µg/kg	13	38%	4.8	3.6	<6.6	3.1	7.8	6.5	32
	Acenaphthene	µg/kg	13	85%	6.3	3.7	5.2	3.5	11	6.6	32
	Acenaphthylene	µg/kg	13	8%	4.2	3.5	<6.6	2.9	2.9	6.5	32
	Anthracene	µg/kg	13	31%	6.7	7.3	<6.6	2.8	27	6.6	32
	Benzo(a)anthracene	µg/kg	13	31%	5.2	3.8	<6.6	3.5	10	6.6	32
	Benzo(a)pyrene	µg/kg	13	23%	4.7	3.6	<6.6	3.4	7.1	6.5	32
	Benzo(b)fluoranthene	µg/kg	13	23%	4.7	3.6	<6.6	3.7	7.6	6.5	32
	Benzo(e)pyrene	µg/kg	13	23%	4.5	3.5	<6.6	3	5.7	6.5	32
	Benzo(g,h,i)perylene	µg/kg	13	15%	4.3	3.5	<6.6	2.9	3.4	6.5	32
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	13	31%	4.6	3.7	<6.6	2.7	7.6	6.5	32
	C1-Chrysenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C1-Fluoranthenes/Pyrenes	µg/kg	13	8%	4.4	3.5	<6.6	5.5	5.5	6.5	32
	C1-Fluorenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C1-Naphthalenes	µg/kg	13	46%	6.2	4	<6.6	4.6	12	6.6	32
	C1-Phenanthrenes/Anthracenes	µg/kg	13	8%	4.3	3.5	<6.6	3	3	6.5	32
	C2-Chrysenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C2-Fluoranthenes/Pyrenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C2-Fluorenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C2-Naphthalenes	µg/kg	13	38%	5.6	3.8	<6.6	3.7	8.9	6.5	32
	C2-Phenanthrenes/Anthracenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C3-Chrysenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C3-Fluoranthenes/Pyrenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C3-Fluorenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C3-Naphthalenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C3-Phenanthrenes/Anthracenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C4-Chrysenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C4-Naphthalenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	C4-Phenanthrenes/Anthracenes	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Chrysene	µg/kg	13	31%	5.2	3.9	<6.6	3.6	11	6.6	32
	Dibenz(a,h)anthracene	µg/kg	13	0%	<8.6	--	<6.6	--	--	6.5	32
	Fluoranthene	µg/kg	13	69%	9.7	12	6.6	2.7	43	6.6	32
	Fluorene	µg/kg	13	31%	5.9	5.1	<6.6	3.2	17	6.5	32
	Indeno(1,2,3-cd)pyrene	µg/kg	13	15%	6.1	7.2	<6.6	3.4	27	6.5	32
	Naphthalene	µg/kg	13	15%	4.4	3.5	<6.6	4.1	4.4	6.5	32
	Perylene	µg/kg	13	15%	4.2	3.5	<6.6	3	3.1	6.5	32
	Phenanthrene	µg/kg	13	54%	8.5	9.2	6.6	2.7	31	6.5	32
	Pyrene	µg/kg	13	38%	7.5	6.7	<6.6	3.6	23	6.6	32
	Total Alkylated PAHs	µg/kg	13	54%	9.2	6.4	7.7	4.6	21	6.6	32
	Total HMW PAHs	µg/kg	13	69%	24	28	7.1	2.7	87	6.6	32
	Total HMW PAHs (ND*0.5)	µg/kg	13	69%	38	30	33	32	97	6.6	32
	Total HMW PAHs (ND*1)	µg/kg	13	69%	52	37	60	44	110	6.6	32
	Total LMW PAHs	µg/kg	13	85%	21	27	8.7	3.5	85	6.6	32
	Total LMW PAHs (ND*0.5)	µg/kg	13	85%	32	23	25	23	88	6.6	32
	Total LMW PAHs (ND*1)	µg/kg	13	85%	43	22	41	38	91	6.6	32
	Total PAH	µg/kg	13	85%	43	54	20	4.7	170	6.6	32
	Total PAH (ND*0.5)	µg/kg	13	85%	73	51	59	56	190	6.6	32
	Total PAH (ND*1)	µg/kg	13	85%	100	53	110	83	200	6.6	32
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	13	0%	<576	--	<650	--	--	130	670
	1,2-Diphenylhydrazine	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2,3,4,6-Tetrachlorophenol	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	2,4,5-Trichlorophenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2,4,6-Trichlorophenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2,4-Dichlorophenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2,4-Dimethylphenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2,4-Dinitrophenol	µg/kg	13	0%	<17300	--	<20000	--	--	3900	20000
	2,4-Dinitrotoluene	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	2,6-Dinitrotoluene	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2-Chloronaphthalene	µg/kg	13	0%	<570	--	<650	--	--	130	660
	2-Chlorophenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2-Methylphenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2-Nitroaniline	µg/kg	13	0%	<576	--	<650	--	--	130	670
	2-Nitrophenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	3,3'-Dichlorobenzidine	µg/kg	13	0%	<5760	--	<6500	--	--	1300	6700
	3-Nitroaniline	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	4,6-Dinitro-2-methylphenol	µg/kg	13	0%	<8640	--	<9800	--	--	1900	10000
	4-Bromophenyl phenyl ether	µg/kg	13	0%	<576	--	<650	--	--	130	670
	4-Chloro-3-methylphenol	µg/kg	13	0%	<576	--	<650	--	--	130	670

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	4-Chloroaniline	µg/kg	13	0%	<1140	--	<1300	--	--	260	1300
	4-Chlorophenyl phenyl ether	µg/kg	13	0%	<576	--	<650	--	--	130	670
	4-Methylphenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	4-Nitroaniline	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	4-Nitrophenol	µg/kg	13	0%	<8640	--	<9800	--	--	1900	10000
	Acetophenone	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Atrazine	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Benzaldehyde	µg/kg	13	15%	1560	211	<3300	930	1300	3200	3300
	Benzidine	µg/kg	13	0%	<57600	--	<65000	--	--	13000	67000
	Benzoic acid	µg/kg	13	0%	<8640	--	<9800	--	--	1900	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Butyl benzylphthalate (BBP)	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Caprolactam	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Carbazole	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Di-n-butylphthalate (DBP)	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Dibenzofuran	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Diethyl phthalate	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Dimethyl phthalate	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Hexachlorobutadiene	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Hexachlorocyclopentadiene	µg/kg	13	0%	<8640	--	<9800	--	--	1900	10000
	Hexachloroethane	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	Isophorone	µg/kg	13	0%	<576	--	<650	--	--	130	670
	N-Nitrosodi-n-propylamine	µg/kg	13	0%	<576	--	<650	--	--	130	670
	N-Nitrosodiphenylamine	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Nitrobenzene	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Pentachlorophenol	µg/kg	13	0%	<2940	--	<3300	--	--	660	3400
	Phenol	µg/kg	13	0%	<576	--	<650	--	--	130	670
	Pyridine	µg/kg	13	0%	<2880	--	<3300	--	--	650	3300
	bis(2-Chloroethoxy)methane	µg/kg	13	0%	<576	--	<650	--	--	130	670
	bis(2-Chloroethyl)ether	µg/kg	13	0%	<576	--	<650	--	--	130	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	13	0%	<2940	--	<3300	--	--	660	3400
Butyltins	Dibutyltin	µg/kg	13	0%	<1.28	--	<1.3	--	--	1.2	1.3
	Monobutyltin hydride	µg/kg	13	0%	<20	--	<20	--	--	20	21
	Tetrabutyltin	µg/kg	13	0%	<1.68	--	<1.7	--	--	1.6	1.7
	Tributyl tin	µg/kg	13	8%	0.83	0.32	<1.5	1.9	1.9	1.4	1.5
Metals	Aluminum	mg/kg	13	92%	43.7	16.6	40.9	21.6	67.8	20	20
	Antimony	mg/kg	13	0%	<0.197	--	<0.198	--	--	0.192	0.2
	Arsenic	mg/kg	13	100%	0.996	0.465	0.904	0.535	2.36	--	--
	Barium	mg/kg	13	100%	2.96	1.69	2.89	0.465	5.28	--	--
	Beryllium	mg/kg	13	0%	<0.0986	--	<0.099	--	--	0.0962	0.1

Table 4-7h
Phase III Tissue Chemistry Summary Statistics: Striped Killifish (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals (cont.)	Cadmium	mg/kg	13	0%	<0.0986	--	<0.099	--	--	0.0962	0.1
	Calcium	mg/kg	13	100%	16500	7260	16600	1380	34300	--	--
	Chromium	mg/kg	13	92%	0.458	0.264	0.407	0.306	1.24	0.4	0.4
	Cobalt	mg/kg	13	92%	0.0664	0.0218	0.0576	0.0457	0.112	0.1	0.1
	Copper	mg/kg	13	100%	3.58	3.34	2.98	1.7	14.5	--	--
	Iron	mg/kg	13	100%	113	53.5	99.9	5.3	211	--	--
	Lead	mg/kg	13	92%	0.546	0.292	0.485	0.29	1.06	0.2	0.2
	Magnesium	mg/kg	13	100%	613	110	621	464	906	--	--
	Manganese	mg/kg	13	100%	4.95	1.81	4.39	3.13	9.87	--	--
	Mercury	ng/g	13	100%	39.3	21.4	32.3	16.6	98.2	--	--
	Methyl mercury	ng/g	13	100%	42.7	28.6	39.2	11.3	128	--	--
	Nickel	mg/kg	13	46%	0.384	0.248	<0.4	0.42	0.921	0.385	0.4
	Potassium	mg/kg	13	100%	3420	429	3390	2910	4270	--	--
	Selenium	mg/kg	13	100%	0.738	0.102	0.732	0.575	0.975	--	--
	Silver	mg/kg	13	100%	0.0786	0.0877	0.0584	0.0233	0.364	--	--
	Sodium	mg/kg	13	100%	1850	236	1830	1570	2420	--	--
	Thallium	mg/kg	13	0%	<0.0986	--	<0.099	--	--	0.0962	0.1
	Titanium	mg/kg	13	85%	1.75	0.672	1.82	1.14	3.17	1.94	1.98
	Vanadium	mg/kg	13	100%	0.295	0.113	0.255	0.148	0.601	--	--
	Zinc	mg/kg	13	100%	37.8	6.7	37.3	23.5	50.9	--	--
Miscellaneous	Lipids	%	13	100%	3.74	0.676	3.6	2.9	4.9	--	--
	Moisture	%	13	100%	72.5	0.835	72.4	70.9	73.7	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	8	100%	0.745	0.376	0.606	0.309	1.31	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	8	100%	0.152	0.112	0.118	0.0518	0.41	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	8	100%	0.382	0.164	0.311	0.186	0.692	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	8	100%	0.413	0.34	0.34	0.103	1.23	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	8	63%	0.965	1.22	0.11	0.0458	0.127	4.84	4.95
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	75%	0.649	1.11	0.0632	0.0259	0.0807	4.82	4.95
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.319	0.304	0.191	0.0679	0.97	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	0.235	0.0894	0.24	0.111	0.374	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.272	0.177	0.234	0.0705	0.659	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	0.0875	0.0334	0.0864	0.0396	0.136	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.0765	0.0331	0.072	0.0199	0.133	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	8	63%	1.06	1.12	0.323	0.0667	0.325	4.78	4.84
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	8	100%	0.433	0.211	0.384	0.193	0.883	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	0.103	0.0582	0.101	0.0283	0.212	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	8	100%	0.757	0.372	0.685	0.286	1.48	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	8	100%	5.49	5.37	3.02	1.58	16.4	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	8	100%	0.135	0.0395	0.126	0.087	0.216	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	8	100%	6.65	5.84	3.78	2.26	18.6	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	8	100%	7.76	5.21	6.17	3.16	18.6	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	8	100%	8.85	4.79	7.84	3.31	18.6	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	8	100%	6.14	5.69	3.4	1.9	17.7	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	8	100%	7.51	4.9	5.66	3.72	17.7	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	8	100%	8.89	4.4	7.47	4.96	17.7	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	100%	6	5.62	3.3	1.81	17.4	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	8	100%	7.14	4.98	5.53	2.95	17.4	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	8	100%	8.26	4.55	7.37	3.22	17.4	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	8	100%	0.533	0.212	0.472	0.242	0.849	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	8	100%	1.61	1.05	1.28	0.373	3.29	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	8	100%	0.751	0.217	0.734	0.34	1.07	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	8	100%	2.3	1.74	1.94	0.557	6.33	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	8	100%	6.06	5.82	4.02	1.63	19.4	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	8	100%	6.15	3.72	5.51	2.52	14.6	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	8	100%	6.37	5.88	3.78	2.17	18.2	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	8	100%	18.3	10.2	15.4	7.49	34.8	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	8	100%	60.6	79.5	24.5	14.8	241	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	8	88%	47	33.6	43.5	24	111	4.98	4.98
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	8	100%	294	171	265	117	608	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	8	100%	31	28.6	20.1	6.24	91	--	--
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	8	100%	4400	2850	3310	1790	9250	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	8	0%	<12.32	--	<4.95	--	--	4.77	37.9

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	8	100%	1760	797	1510	786	2960	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	8	100%	336	213	262	115	677	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	8	63%	46.8	48.1	36.7	28.8	128	9.54	9.88
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	8	100%	12100	8610	8570	4030	25700	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	8	100%	47.1	17.8	43.2	26.9	83.4	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	8	88%	39.5	21.7	40.6	22.9	74.8	4.98	4.98
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	416	246	384	145	785	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	19700	11700	17100	8140	40900	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	8	63%	7.93	8.48	4.96	2.65	25.9	4.94	31.3
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	8	100%	187	73.1	160	106	326	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	8	100%	21	11.2	18.4	10.2	44.9	--	--
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	8	88%	16.2	12.1	13.3	6.36	37.5	4.98	4.98
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	290	177	234	106	578	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	36.4	19.2	32.3	14.8	60.9	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	7	100%	22.6	10.8	20.1	9.57	39.6	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	8	100%	2160	1330	1710	992	4530	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	8	100%	21600	13100	16800	10100	47800	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	8	100%	1270	595	1140	596	2250	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	8	100%	39.7	30.5	32.9	9.66	96.1	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	8	100%	1790	1320	1370	505	4250	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	8	100%	763	370	644	350	1410	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	8	100%	167	118	142	40.8	388	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	8	100%	5100	2710	4260	2310	10500	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	8	100%	521	359	403	157	1240	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	8	100%	937	544	835	388	1970	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	8	100%	317	217	248	127	732	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	8	0%	<4.94	--	<1.98	--	--	1.91	15.2
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	8	100%	2330	1630	1720	901	5180	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	8	13%	6.41	6.81	<4.97	4.4	4.4	4.77	37.9
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	8	63%	18.4	16.1	10.6	6.2	39.9	9.68	75.8
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	8	100%	547	348	396	244	1170	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	8	25%	6.52	6.81	<4.97	2.07	5.68	4.77	37.9
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	3	100%	3500	1080	3400	2470	4620	--	--

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	8	100%	9250	6350	7100	3250	21000	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	8	100%	121	70.1	91.2	53.8	261	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	8	38%	23	38.3	<4.97	17.8	111	4.77	4.98
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	8	100%	58.1	38.5	44.7	22.4	134	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	8	100%	9.69	7.99	6.57	2.25	26.5	--	--
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	8	100%	23300	14500	18000	11200	53300	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	8	100%	805	502	581	383	1900	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	8	100%	136	129	79.8	39.4	394	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	8	100%	2130	1010	1980	1040	3870	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	8	100%	1350	990	976	551	3100	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	8	63%	7.66	6.62	4.4	2.83	11.1	4.98	37.9
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	8	100%	101	85.2	67.2	39	253	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	8	38%	26.3	27.5	<19.7	7.03	27.1	19.1	152
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	8	50%	6.82	6.72	4.97	1.9	7	4.96	37.9
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	8	100%	190	91.5	162	95.5	348	--	--
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	8	100%	673	520	493	196	1500	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	8	100%	50.5	23.6	45.7	25.6	96.1	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	8	100%	833	391	753	416	1530	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	8	38%	6.02	7.02	<4.95	1.61	2.52	4.94	37.9
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	8	100%	1120	872	734	176	2360	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	8	100%	3290	2070	2630	1510	7420	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	1	100%	815		815	815	815	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	8	100%	755	503	541	301	1720	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	1	100%	915		915	915	915	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	1	100%	168		168	168	168	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	8	100%	204	162	136	79.9	525	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	1	100%	1710		1710	1710	1710	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	3	100%	1050	231	1090	795	1250	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	8	100%	692	509	504	290	1780	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	8	100%	1790	1470	1280	284	4280	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	8	100%	10300	6770	8130	4630	24200	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	1	100%	26.8		26.8	26.8	26.8	--	--

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	1	100%	34.5		34.5	34.5	34.5	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	1	100%	2600		2600	2600	2600	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	8	100%	20.8	13.7	15.9	9.4	51.8	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	8	0%	<12.32	--	<4.95	--	--	4.77	37.9
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	1	100%	7750		7750	7750	7750	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	8	100%	73.5	38.4	71.4	33.7	133	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	8	100%	142	83.6	116	69.5	314	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	8	100%	328	278	209	87.5	904	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	8	100%	763	534	574	342	1830	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	8	100%	156	101	123	69.1	355	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	8	13%	6.51	6.79	<4.97	5.25	5.25	4.77	37.9
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	8	100%	1540	1010	1110	576	3350	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	8	100%	476	365	301	198	1230	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	8	100%	930	639	617	396	2210	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	8	100%	194	139	115	88.3	476	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	8	100%	2690	1740	1760	1100	5880	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	8	88%	4.37	5.38	1.88	1.43	15.9	1.99	1.99
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	8	100%	5120	3870	3560	1160	11400	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	8	100%	387	229	262	195	824	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	8	100%	1450	663	1110	823	2500	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	8	100%	1880	1220	1310	809	4290	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	8	50%	7.53	6.66	5.39	2.05	10.1	4.94	37.9
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	8	100%	70.1	53.5	43.9	29.7	184	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	8	100%	1200	731	774	627	2590	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	8	100%	137	85	86	70.7	296	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	8	100%	582	294	393	318	1090	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	3	100%	354	25.5	354	329	380	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	8	100%	589	508	361	86.3	1440	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	8	100%	1020	726	781	199	1910	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	8	88%	2.61	1.94	1.92	0.951	5.74	1.99	1.99
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	8	100%	27.5	22.3	20.4	4.54	69.1	--	--
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	8	100%	295	185	267	66.5	587	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	8	100%	1010	618	905	258	1930	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	8	100%	168	134	130	40.4	391	--	--

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 3) 4-Monochlorobiphenyl	ng/kg	8	50%	15.6	25.1	4.95	4.2	72.8	4.77	4.96
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	8	100%	3750	2670	2600	1020	7670	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	8	100%	1100	829	734	212	2370	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	8	100%	31	21.2	23.4	6.29	63.4	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	8	0%	<4.94	--	<1.98	--	--	1.91	15.2
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	8	0%	<4.94	--	<1.98	--	--	1.91	15.2
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	8	100%	42.7	27.7	28.4	14.1	91.2	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	8	75%	5.42	3.73	4.15	1.76	10.8	1.99	15.2
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	8	100%	19.2	15.8	11.8	3.67	39.5	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	8	100%	447	392	300	184	1330	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	8	100%	2530	1710	1890	607	5010	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	8	100%	192	177	120	20.1	456	--	--
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	8	100%	1400	1220	1040	168	3470	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	8	100%	195	173	138	25.1	477	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	8	100%	7830	4940	5730	2680	16900	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	8	100%	477	391	367	85.7	1170	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	8	100%	12.9	9.63	9.28	5.45	29	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	8	100%	1070	873	722	208	2330	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	8	100%	9900	6240	7530	3180	19300	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	8	50%	7.63	10.7	4.95	1.22	31.3	4.94	31.3
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	8	100%	668	613	486	83.5	1790	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	8	100%	587	543	381	96.3	1730	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	8	100%	14700	8600	12100	4630	26600	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	8	100%	63.8	59.3	33.8	10.6	156	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	8	88%	25.8	21.3	16.5	10.4	59	4.98	4.98
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	8	100%	1040	804	764	183	2420	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	8	100%	43.7	18.9	47.4	20.4	68.9	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	8	100%	25.3	19.6	21	5	59.3	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	8	100%	932	612	706	266	1900	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	8	100%	67	52.7	45.8	21.1	176	--	--
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	8	100%	1380	938	1060	485	2720	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	8	100%	12800	8940	8840	4340	27500	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	8	100%	747	386	626	293	1250	--	--

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	8	100%	4150	2990	2790	1220	8380	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	8	100%	10500	8200	7000	3170	24100	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	8	100%	102	64.4	85.7	28.5	202	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	8	100%	213	86.3	206	89.1	336	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	8	75%	9.41	12.3	5.73	3.35	39.2	1.99	12.5
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	8	88%	293	164	302	146	517	4.84	4.84
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	8	100%	30.9	21.4	22.8	8.31	68	--	--
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	8	100%	79.6	64.3	60.6	24.4	230	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	8	13%	6.77	6.77	<4.97	7.28	7.28	4.77	37.9
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	8	100%	54.8	44.7	40.1	13.3	146	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	3	100%	338	383	152	84	778	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	8	0%	<12.32	--	<4.95	--	--	4.77	37.9
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	8	75%	8.51	6.89	5.78	2.64	21.3	4.98	31.3
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	8	100%	234	238	162	25.8	725	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	8	88%	35.9	34	23.4	17.4	109	9.95	9.95
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	8	100%	244	216	141	42.4	617	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	8	100%	3290	2080	2420	1400	6750	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	8	100%	6030	4260	4280	2130	13700	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	8	25%	7.62	6.89	<4.97	4.31	12.3	4.77	37.9
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	8	100%	42.3	39.9	27	6.29	112	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	8	75%	13.4	14.2	9.56	5.89	45.3	1.99	12.5
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	8	100%	14800	9760	10700	5800	31600	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	8	100%	1860	1200	1630	552	3860	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	8	100%	3550	1820	2870	1540	6650	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	8	100%	558	411	449	201	1480	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	8	88%	20.4	22.1	11.7	5.55	67.1	4.98	4.98
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	8	100%	5820	4160	3960	1310	12500	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	8	100%	28.3	24.5	21.7	4.93	75.7	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	8	100%	334	237	274	78	758	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	8	100%	13000	7490	9920	6010	26600	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	8	0%	<33.6	--	<34	--	--	33	34
	Aroclor-1221 (PCB-1221)	µg/kg	8	0%	<33.6	--	<34	--	--	33	34
	Aroclor-1232 (PCB-1232)	µg/kg	8	0%	<33.6	--	<34	--	--	33	34
	Aroclor-1242 (PCB-1242)	µg/kg	8	0%	<33.6	--	<34	--	--	33	34
	Aroclor-1248 (PCB-1248)	µg/kg	8	38%	32.3	21.5	<34	50.5	63	33	34

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Aroclor-1254 (PCB-1254)	µg/kg	8	63%	47.2	35.9	34	23	96	34	34
	Aroclor-1260 (PCB-1260)	µg/kg	8	75%	34.9	20.9	33	25	74	33	34
	Aroclor-1262 (PCB-1262)	µg/kg	8	0%	<33.6	--	<34	--	--	33	34
	Aroclor-1268 (PCB-1268)	µg/kg	8	0%	<33.6	--	<34	--	--	33	34
	Total PCB congeners (NOAA 1989)	ng/kg	8	100%	285000	175000	210000	115000	608000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	8	100%	285000	175000	210000	115000	608000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	8	100%	285000	175000	210000	115000	608000	--	--
	Total PCBs (7)	µg/kg	8	100%	89.5	64.1	82	23	190	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	8	100%	179	49.7	180	120	260	--	--
	Total PCBs (7) (ND*1)	µg/kg	8	100%	268	35.9	275	220	320	--	--
	Total PCBs (9)	µg/kg	8	100%	89.5	64.1	82	23	190	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	8	100%	214	49.7	215	160	290	--	--
	Total PCBs (9) (ND*1)	µg/kg	8	100%	338	35.9	345	290	390	--	--
	Total PCBs congener (209 specified)	ng/kg	8	100%	287000	176000	209000	111000	600000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	8	100%	287000	176000	209000	111000	600000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	8	100%	287000	177000	209000	111000	600000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	8	100%	9.15	5.51	7.7	3.09	20.3	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	8	100%	9.38	5.54	7.7	3.34	20.3	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	8	100%	9.61	5.63	7.7	3.59	20.3	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	8	100%	0.333	0.179	0.29	0.135	0.592	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	8	100%	0.334	0.18	0.29	0.136	0.592	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	8	100%	0.335	0.181	0.29	0.138	0.592	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	8	100%	4.5	2.39	3.98	1.83	7.64	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	8	100%	4.67	2.52	4.01	1.91	7.88	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	8	100%	4.83	2.66	4.05	1.99	8.36	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	8	100%	15.8	8.78	14.4	6.85	31.9	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	8	100%	17.1	7.82	16.4	9.49	31.9	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	8	100%	18.5	6.94	18.4	11.7	31.9	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	8	100%	6.48	5.8	3.61	2.07	18.3	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	8	100%	7.85	4.99	6	3.89	18.3	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	8	100%	9.23	4.47	7.63	5.13	18.3	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	100%	10.5	7.22	8.18	4.05	25.1	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	8	100%	11.8	6.34	9.97	5.98	25.1	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	8	100%	13.1	5.57	11.8	7.26	25.1	--	--
	Total decachlorobiphenyl	ng/kg	3	100%	354	25.5	354	329	380	--	--
	Total dichlorobiphenyl	ng/kg	8	100%	786	842	496	258	2780	--	--
	Total heptachlorobiphenyl	ng/kg	8	100%	18500	11400	13200	8170	38300	--	--
	Total hexachlorobiphenyl	ng/kg	8	100%	77700	46300	60500	36500	169000	--	--
	Total monochlorobiphenyl	ng/kg	8	100%	79.2	111	29.1	16.3	330	--	--

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total nonachlorobiphenyl	ng/kg	8	100%	1920	1110	1250	1020	3970	--	--
	Total octachlorobiphenyl	ng/kg	8	100%	9630	6030	6520	4430	21000	--	--
	Total pentachlorobiphenyl	ng/kg	8	100%	89500	56100	67600	34800	188000	--	--
	Total tetrachlorobiphenyl	ng/kg	8	100%	72000	48100	53100	22100	149000	--	--
	Total trichlorobiphenyl	ng/kg	8	100%	16500	12200	11700	3660	35700	--	--
Pesticides	2,4'-DDD	pg/g	8	100%	566	365	483	177	1280	--	--
	2,4'-DDE	pg/g	8	100%	1190	630	982	395	2280	--	--
	2,4'-DDT	pg/g	8	100%	58.9	30.8	64.4	13.7	101	--	--
	4,4'-DDD	pg/g	8	100%	4710	2630	4700	815	8880	--	--
	4,4'-DDE	pg/g	8	100%	17300	8650	19000	3250	28800	--	--
	4,4'-DDT	pg/g	8	100%	482	434	404	71.5	1400	--	--
	Aldrin	pg/g	8	50%	11.8	7.51	20.8	3.78	7.01	34.5	40
	Dieldrin	pg/g	8	100%	723	298	726	253	1180	--	--
	Endosulfan I	pg/g	8	0%	<190.6	--	<192	--	--	172	200
	Endosulfan II	pg/g	7	0%	<190.2	--	<192	--	--	172	200
	Endosulfan sulfate	pg/g	7	0%	<190.2	--	<192	--	--	172	200
	Endrin	pg/g	8	0%	<38.2	--	<38.5	--	--	34.5	40
	Endrin aldehyde	pg/g	8	0%	<190.6	--	<192	--	--	172	200
	Endrin ketone	pg/g	8	13%	89.3	18.6	<192	44.6	44.6	172	200
	Heptachlor	pg/g	8	13%	17.3	5.26	<38.5	4.46	4.46	34.5	40
	Heptachlor endo-epoxide	pg/g	8	75%	193	171	155	70.9	444	38.5	39.2
	Heptachlor epoxide	pg/g	8	100%	153	68	133	80.4	292	--	--
	Hexachlorobenzene	pg/g	8	100%	249	105	212	101	424	--	--
	Methoxychlor	pg/g	8	13%	18.9	1.11	<38.5	17.3	17.3	34.5	40
	Mirex	pg/g	8	100%	75.4	34.6	79.2	21.3	118	--	--
	Oxychlordane	pg/g	8	100%	512	242	466	133	851	--	--
	Total BHC Compounds	pg/g	8	100%	32.8	17.8	31.5	13.4	62.5	--	--
	Total Chlordane (ND=0)	pg/g	8	100%	5920	2600	6040	1110	9220	--	--
	Total Chlordane (ND=1)	pg/g	8	100%	5960	2610	6090	1150	9240	--	--
	Total Chlordane (ND=1/2)	pg/g	8	100%	5940	2610	6070	1130	9230	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	8	100%	24300	12100	27300	4700	39000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	8	100%	24300	12100	27300	4700	39000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	8	100%	24300	12100	27300	4700	39000	--	--
	Total DDx (2,4) Total Fraction	pg/g	8	100%	1810	973	1580	590	3600	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	8	100%	1810	973	1580	590	3600	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	8	100%	1810	973	1580	590	3600	--	--
	Total DDx (4,4) Total Fraction	pg/g	8	100%	22500	11000	25300	4100	36000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	8	100%	22500	11000	25300	4100	36000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	8	100%	22500	11000	25300	4100	36000	--	--
	Total alpha + gamma chlordane	pg/g	8	100%	1790	781	1900	300	2700	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	8	100%	1790	781	1900	300	2700	--	--

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total alpha + gamma chlordane (ND*1)	pg/g	8	100%	1790	781	1900	300	2700	--	--
	alpha-BHC	pg/g	8	88%	15.4	7.25	18.1	6.22	26.6	34.5	34.5
	alpha-Chlordane	pg/g	8	100%	1390	677	1340	217	2320	--	--
	beta-BHC	pg/g	8	75%	14.7	6.04	15.9	5.75	22.3	37	40
	cis-Nonachlor	pg/g	8	100%	920	448	905	155	1590	--	--
	delta-BHC	pg/g	7	0%	<38	--	<38.5	--	--	34.5	40
	gamma-BHC (lindane)	pg/g	8	100%	9.7	3.84	9.38	5.74	16.2	--	--
	gamma-Chlordane	pg/g	8	100%	398	200	424	82	760	--	--
	trans-Nonachlor	pg/g	8	100%	2350	1200	2300	376	4240	--	--
PAHs	1-Methylnaphthalene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	2-Methylnaphthalene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Acenaphthene	µg/kg	8	13%	13	5.2	<32	5.7	5.7	13	33
	Acenaphthylene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Anthracene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Benzo(a)anthracene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Benzo(a)pyrene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Benzo(b)fluoranthene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Benzo(e)pyrene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Benzo(g,h,i)perylene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C1-Chrysenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C1-Fluoranthenes/Pyrenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C1-Fluorenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C1-Naphthalenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C1-Phenanthrenes/Anthracenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C2-Chrysenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C2-Fluoranthenes/Pyrenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C2-Fluorenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C2-Naphthalenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C2-Phenanthrenes/Anthracenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C3-Chrysenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C3-Fluoranthenes/Pyrenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C3-Fluorenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C3-Naphthalenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C3-Phenanthrenes/Anthracenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C4-Chrysenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C4-Naphthalenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	C4-Phenanthrenes/Anthracenes	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Chrysene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Dibenz(a,h)anthracene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Fluoranthene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Fluorene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Indeno(1,2,3-cd)pyrene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Naphthalene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Perylene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Phenanthrene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Pyrene	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Total Alkylated PAHs	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Total HMW PAHs	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Total HMW PAHs (ND*0.5)	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Total HMW PAHs (ND*1)	µg/kg	8	0%	<24	--	<32	--	--	6.7	33
	Total LMW PAHs	µg/kg	8	13%	13	5.2	<32	5.7	5.7	13	33
	Total LMW PAHs (ND*0.5)	µg/kg	8	13%	15	6.3	<32	26	26	13	33
	Total LMW PAHs (ND*1)	µg/kg	8	13%	18	12	<33	46	46	13	33
	Total PAH	µg/kg	8	13%	13	5.2	<32	5.7	5.7	13	33
	Total PAH (ND*0.5)	µg/kg	8	13%	19	17	<33	59	59	13	33
	Total PAH (ND*1)	µg/kg	8	13%	26	34	<33	110	110	13	33
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	8	0%	<664	--	<670	--	--	650	670
	1,2-Diphenylhydrazine	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2,3,4,6-Tetrachlorophenol	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	2,4,5-Trichlorophenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2,4,6-Trichlorophenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2,4-Dichlorophenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2,4-Dimethylphenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2,4-Dinitrophenol	µg/kg	8	0%	<20000	--	<20000	--	--	20000	20000
	2,4-Dinitrotoluene	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	2,6-Dinitrotoluene	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2-Chloronaphthalene	µg/kg	8	0%	<656	--	<660	--	--	650	660
	2-Chlorophenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2-Methylphenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2-Nitroaniline	µg/kg	8	0%	<664	--	<670	--	--	650	670
	2-Nitrophenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	3,3'-Dichlorobenzidine	µg/kg	8	0%	<6640	--	<6700	--	--	6500	6700
	3-Nitroaniline	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	4,6-Dinitro-2-methylphenol	µg/kg	8	0%	<9940	--	<10000	--	--	9800	10000
	4-Bromophenyl phenyl ether	µg/kg	8	0%	<664	--	<670	--	--	650	670
	4-Chloro-3-methylphenol	µg/kg	8	0%	<664	--	<670	--	--	650	670
	4-Chloroaniline	µg/kg	8	0%	<1300	--	<1300	--	--	1300	1300
	4-Chlorophenyl phenyl ether	µg/kg	8	0%	<664	--	<670	--	--	650	670
	4-Methylphenol	µg/kg	8	0%	<664	--	<670	--	--	650	670

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	4-Nitroaniline	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	4-Nitrophenol	µg/kg	8	0%	<9940	--	<10000	--	--	9800	10000
	Acetophenone	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Atrazine	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Benzaldehyde	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Benzidine	µg/kg	8	0%	<66400	--	<67000	--	--	65000	67000
	Benzoic acid	µg/kg	8	0%	<9940	--	<10000	--	--	9800	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Butyl benzylphthalate (BBP)	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Caprolactam	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Carbazole	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Di-n-butylphthalate (DBP)	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Dibenzofuran	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Diethyl phthalate	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Dimethyl phthalate	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Hexachlorobutadiene	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Hexachlorocyclopentadiene	µg/kg	8	0%	<9940	--	<10000	--	--	9800	10000
	Hexachloroethane	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	Isophorone	µg/kg	8	0%	<664	--	<670	--	--	650	670
	N-Nitrosodi-n-propylamine	µg/kg	8	0%	<664	--	<670	--	--	650	670
	N-Nitrosodiphenylamine	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Nitrobenzene	µg/kg	8	0%	<664	--	<670	--	--	650	670
	Pentachlorophenol	µg/kg	8	0%	<3380	--	<3400	--	--	3300	3400
	Phenol	µg/kg	8	38%	451	183	<665	500	800	650	670
	Pyridine	µg/kg	8	0%	<3300	--	<3300	--	--	3300	3300
	bis(2-Chloroethoxy)methane	µg/kg	8	0%	<664	--	<670	--	--	650	670
	bis(2-Chloroethyl)ether	µg/kg	8	0%	<664	--	<670	--	--	650	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	8	0%	<3380	--	<3400	--	--	3300	3400
Butyltins	Dibutyltin	µg/kg	8	0%	<1.28	--	<1.3	--	--	1.2	1.3
	Monobutyltin hydride	µg/kg	8	0%	<20	--	<20	--	--	19	21
	Tetrabutyltin	µg/kg	8	0%	<1.66	--	<1.7	--	--	1.5	1.7
	Tributyl tin	µg/kg	8	63%	2	1.1	2.3	2.2	3.4	1.4	1.5
Metals	Aluminum	mg/kg	8	13%	9.4	0.914	<19.4	7.17	7.17	19	19.8
	Antimony	mg/kg	8	0%	<0.1946	--	<0.196	--	--	0.19	0.198
	Arsenic	mg/kg	8	100%	1.5	0.615	1.6	0.517	2.26	--	--
	Barium	mg/kg	8	100%	0.416	0.173	0.38	0.2	0.757	--	--
	Beryllium	mg/kg	8	0%	<0.0974	--	<0.098	--	--	0.0952	0.099
	Cadmium	mg/kg	8	13%	0.05	0.00386	<0.0971	0.0593	0.0593	0.0952	0.099
	Calcium	mg/kg	8	100%	9960	8070	8080	2730	28500	--	--
	Chromium	mg/kg	8	50%	0.179	0.0391	0.312	0.115	0.242	0.381	0.396

Table 4-7i
Phase III Tissue Chemistry Summary Statistics: Summer Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals (cont.)	Cobalt	mg/kg	8	0%	<0.0974	--	<0.098	--	--	0.0952	0.099
	Copper	mg/kg	8	88%	0.674	0.239	0.707	0.47	0.909	0.392	0.392
	Iron	mg/kg	8	100%	13.3	5.09	13.1	5.13	21.4	--	--
	Lead	mg/kg	8	75%	0.063	0.0228	0.0554	0.0381	0.0687	0.192	0.196
	Magnesium	mg/kg	8	100%	476	143	443	316	799	--	--
	Manganese	mg/kg	8	100%	1.43	0.72	1.25	0.794	3.1	--	--
	Mercury	ng/g	8	100%	88.2	26.2	83.6	52.9	131	--	--
	Methyl mercury	ng/g	8	100%	95.1	27.3	99.5	39	127	--	--
	Nickel	mg/kg	8	25%	0.248	0.142	<0.392	0.212	0.598	0.381	0.396
	Potassium	mg/kg	8	100%	4570	752	4360	3490	5730	--	--
	Selenium	mg/kg	8	100%	0.461	0.0696	0.445	0.402	0.61	--	--
	Silver	mg/kg	8	13%	0.0452	0.00941	<0.0971	0.022	0.022	0.0952	0.099
	Sodium	mg/kg	8	100%	1420	313	1530	960	1730	--	--
	Thallium	mg/kg	8	0%	<0.0974	--	<0.098	--	--	0.0952	0.099
	Titanium	mg/kg	8	75%	0.439	0.334	0.294	0.176	0.361	1.92	1.96
	Vanadium	mg/kg	8	0%	<0.0974	--	<0.098	--	--	0.0952	0.099
	Zinc	mg/kg	8	100%	18.1	5.31	18.8	10.6	27.1	--	--
Miscellaneous	Lipids	%	8	100%	0.918	0.461	0.91	0.39	1.55	--	--
	Moisture	%	8	100%	77.6	1.22	77.6	75.4	79.7	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	10	100%	5.57	4.3	4.79	1.35	16.5	--	--
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	10	100%	1.65	2.19	0.771	0.197	7.24	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	10	100%	0.784	0.468	0.664	0.289	1.97	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	10	100%	1.35	1.09	0.95	0.432	3.91	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	10	70%	0.805	1.13	0.126	0.0439	0.165	4.78	4.96
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	10	80%	0.526	1.01	0.0504	0.0194	0.0858	4.84	4.92
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	10	100%	0.399	0.258	0.3	0.105	0.846	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	10	100%	0.179	0.035	0.191	0.124	0.218	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	10	100%	0.278	0.0892	0.275	0.154	0.457	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	10	100%	0.0641	0.0192	0.0645	0.0391	0.0907	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	10	100%	0.0908	0.0195	0.084	0.063	0.132	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	10	70%	0.865	1.1	0.276	0.0578	0.312	4.77	4.98
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	10	100%	0.3	0.0833	0.289	0.173	0.45	--	--
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	10	100%	0.0954	0.0376	0.083	0.0503	0.156	--	--
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	10	100%	0.621	0.162	0.681	0.305	0.795	--	--
	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	10	100%	5.44	2.5	4.75	2	10.4	--	--
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	10	100%	1.81	0.423	1.9	0.994	2.27	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	10	100%	8.14	2.96	7.77	3.8	13.4	--	--
	Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	10	100%	8.91	2.89	8.72	4.76	13.4	--	--
	Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	10	100%	9.68	3.28	8.94	4.78	15.7	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	10	100%	6.1	2.61	5.47	2.37	11.2	--	--
	Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	10	100%	7.09	2.51	6.69	3.66	11.2	--	--
	Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	10	100%	8.08	2.89	7.92	3.68	13.1	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	10	100%	6.08	2.61	5.44	2.35	11.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	10	100%	6.88	2.56	6.45	3.65	11.2	--	--
	Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	10	100%	7.68	2.99	7.26	3.68	13.1	--	--
	Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	10	100%	1.57	0.916	1.39	0.476	3.78	--	--
	Total heptachlorodibenzofuran (HpCDF)	ng/kg	10	100%	3.24	1.39	2.59	1.95	5.96	--	--
	Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	10	100%	0.973	0.213	0.894	0.749	1.38	--	--
	Total hexachlorodibenzofuran (HxCDF)	ng/kg	10	100%	3.15	0.886	3.36	1.98	4.88	--	--
	Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	10	100%	10.6	10.9	6.08	1.2	37.1	--	--
	Total pentachlorodibenzofuran (PeCDF)	ng/kg	10	100%	7.4	1.93	8.13	4.96	9.71	--	--
	Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	10	100%	6.31	2.81	6.01	2.09	11.3	--	--
	Total tetrachlorodibenzofuran (TCDF)	ng/kg	10	100%	23.8	12.1	23.9	8.55	42.1	--	--
PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	10	100%	48.2	11.3	47.5	27.1	62.4	--	--
	(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	10	100%	44.8	17.6	43.3	17.7	77.1	--	--
	(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	10	100%	80.1	16.4	83.8	57.3	103	--	--
	(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	10	100%	12.1	3.11	12.5	7.66	16.5	--	--
	(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	10	100%	2480	420	2530	1780	3230	--	--
	(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	10	0%	<4.88	--	<4.86	--	--	4.78	4.99

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	10	100%	480	76.4	479	378	592	--	--
	(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	10	100%	200	28.3	208	148	230	--	--
	(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	10	70%	33	20.4	41.3	32.8	56.8	9.65	9.98
	(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	8	100%	7490	1180	7440	5880	9680	--	--
	(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	10	100%	15.6	2.61	15.4	10.7	18.6	--	--
	(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	10	50%	16.5	15.8	13.1	21.3	41.4	4.78	4.99
	(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	10	100%	202	40.6	211	138	280	--	--
	(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	10	100%	9070	1650	9200	6580	12100	--	--
	(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	10	90%	7.55	2.84	8.15	3.83	11.6	4.85	4.85
	(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	10	100%	65.9	10.7	64.5	49.7	81.3	--	--
	(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	10	100%	7.2	1.44	6.92	4.74	9.28	--	--
	(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	10	100%	19.5	4.65	19.2	12.1	27.2	--	--
	(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	10	100%	182	35.2	181	125	231	--	--
	(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	9	100%	19.2	3.38	19.4	13.2	23.2	--	--
	(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	10	100%	13.2	3.24	13.7	6.9	17.7	--	--
	(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	10	100%	1350	242	1350	993	1690	--	--
	(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	10	100%	11500	2010	11600	8350	15100	--	--
	(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	10	100%	298	42.1	291	232	365	--	--
	(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	10	100%	34.8	5.78	34.6	26.6	44.6	--	--
	(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	9	100%	1100	199	1100	844	1470	--	--
	(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	10	100%	206	29.9	201	165	258	--	--
	(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	9	100%	256	43.1	263	194	307	--	--
	(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	10	100%	1750	219	1800	1360	2000	--	--
	(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	10	100%	325	45.2	348	242	362	--	--
	(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	10	100%	482	105	504	342	661	--	--
	(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	10	100%	194	36.4	202	135	257	--	--
	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	10	0%	<1.954	--	<1.95	--	--	1.91	2
	(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	10	100%	1140	184	1140	848	1490	--	--
	(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	9	0%	<4.9	--	<4.87	--	--	4.82	4.99
	(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	9	33%	5.06	0.969	<9.64	3.52	7.28	9.64	9.98
	(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	10	100%	209	20.5	207	176	240	--	--
	(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	10	60%	2.2	0.251	2.22	1.78	2.31	4.78	4.99
	(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	7	100%	1060	89	1080	934	1190	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	10	100%	3220	462	3300	2340	3930	--	--
	(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	10	100%	27.8	5.12	28	17.2	34.5	--	--
	(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	10	100%	50.5	14.2	53.3	26	72.7	--	--
	(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	10	100%	36.5	4.53	37.4	27.5	42.4	--	--
	(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	10	100%	6.93	1.53	7.16	4.83	8.97	--	--
	(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	10	100%	13000	3490	12300	8970	20300	--	--
	(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	10	100%	433	92	432	252	558	--	--
	(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	10	100%	90.7	27.2	87	44.5	132	--	--
	(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	10	100%	1030	178	1060	746	1250	--	--
	(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	10	100%	908	180	945	628	1160	--	--
	(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	10	20%	2.39	0.138	<4.85	2.08	2.2	4.78	4.99
	(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	10	100%	223	53	235	135	307	--	--
	(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	10	0%	<19.54	--	<19.5	--	--	19.1	20
	(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	9	11%	2.33	0.382	<4.87	1.31	1.31	4.82	4.99
	(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	10	100%	80.5	12.9	76.5	66.1	110	--	--
	(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	10	100%	340	54.3	331	260	431	--	--
	(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	9	100%	15.1	3.18	15.7	10	20.6	--	--
	(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	10	100%	450	71.8	461	320	530	--	--
	(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	10	0%	<4.88	--	<4.86	--	--	4.78	4.99
	(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	10	100%	525	107	534	338	722	--	--
	(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	10	100%	2090	540	2020	1370	3280	--	--
	(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	4	100%	765	108	732	676	918	--	--
	(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	10	100%	282	40.1	286	199	348	--	--
	(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	4	100%	677	84.5	664	590	791	--	--
	(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	3	100%	68.2	2.39	68.9	65.5	70.1	--	--
	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	10	100%	123	20.1	124	86.5	165	--	--
	(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	4	100%	697	58.4	713	613	748	--	--
	(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	7	100%	483	51.9	504	378	527	--	--
	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	10	100%	625	100	621	455	832	--	--
	(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	10	100%	786	145	795	487	1030	--	--
	(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	10	100%	6350	1240	6640	4210	8600	--	--
	(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	3	100%	30.1	6.73	27.5	25	37.7	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	4	100%	27	3.81	27	22.5	31.4	--	--
	(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	3	100%	2460	454	2280	2130	2980	--	--
	(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	10	100%	18.6	4.01	18.2	12.9	25.8	--	--
	(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	10	0%	<4.88	--	<4.86	--	--	4.78	4.99
	(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	3	100%	3590	118	3650	3450	3660	--	--
	(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	10	100%	33.9	4.68	34.9	23.9	41.9	--	--
	(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	10	100%	88.2	15.4	90.9	58.3	106	--	--
	(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	10	100%	247	45	248	155	304	--	--
	(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	10	100%	486	122	483	286	702	--	--
	(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	10	100%	97.1	21.5	97.7	61.8	127	--	--
	(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	9	11%	2.34	0.326	<4.87	1.48	1.48	4.82	4.99
	(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	10	100%	1100	263	1140	574	1460	--	--
	(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	10	100%	357	126	342	196	651	--	--
	(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	10	100%	604	137	610	369	780	--	--
	(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	10	100%	112	22.9	116	67.8	140	--	--
	(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	10	100%	1260	277	1270	783	1640	--	--
	(PCB 2) 3-Chlorobiphenyl	ng/kg	10	70%	1.77	1.05	1.89	1.28	4.4	1.93	2
	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	10	100%	3310	990	3240	2010	5830	--	--
	(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	10	100%	204	35.4	204	136	254	--	--
	(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	10	100%	646	87.3	670	476	751	--	--
	(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	10	100%	1220	278	1240	700	1690	--	--
	(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	10	80%	2.76	0.686	3	2.12	4.2	4.82	4.83
	(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	10	100%	57.1	12.8	59.5	31.4	72.8	--	--
	(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	10	100%	970	212	976	553	1260	--	--
	(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	10	100%	87.4	19.7	87.6	55	122	--	--
	(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	8	100%	322	74.6	303	221	454	--	--
	(PCB 209) Decachlorobiphenyl	ng/kg	7	100%	458	139	441	293	700	--	--
	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	10	100%	322	80.3	333	188	444	--	--
	(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	10	100%	507	150	482	303	860	--	--
	(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	10	80%	1.15	0.183	1.21	0.953	1.53	1.93	2
	(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	10	50%	5.98	5.73	5.02	8.04	16.3	1.91	2
	(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	10	100%	165	44.3	166	98.4	260	--	--
	(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	10	100%	456	99.7	462	274	664	--	--
	(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	10	100%	225	36.5	235	147	258	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 3) 4-Monochlorobiphenyl	ng/kg	10	40%	3.61	1.78	<4.88	3.13	6.89	4.78	4.99
	(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	10	100%	2020	490	2020	1160	3070	--	--
	(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	10	100%	783	178	789	485	1170	--	--
	(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	10	100%	11.3	2.27	11.6	8.08	15.3	--	--
	(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	10	80%	2.31	0.939	2.22	1.78	3.92	1.93	1.95
	(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	10	0%	<1.954	--	<1.95	--	--	1.91	2
	(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	10	100%	95.4	30	93	64.6	167	--	--
	(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	10	100%	2.83	0.733	2.69	1.96	4.46	--	--
	(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	10	100%	8.87	2.23	8.72	5.04	11.9	--	--
	(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	10	100%	365	94	360	208	560	--	--
	(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	10	100%	1970	401	2010	1310	2550	--	--
	(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	10	90%	79.6	33	80.5	58	116	9.75	9.75
	(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	10	100%	487	134	488	307	678	--	--
	(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	10	100%	71.2	18.2	75	46.2	94.7	--	--
	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	10	100%	4710	728	4670	3660	6010	--	--
	(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	10	100%	238	66.4	237	130	328	--	--
	(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	10	100%	98	22.4	103	62.6	128	--	--
	(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	10	100%	460	111	470	293	603	--	--
	(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	10	100%	3180	686	3200	2100	4430	--	--
	(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	10	90%	2.25	0.755	2.2	1.19	3.74	4.85	4.85
	(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	10	100%	379	81.4	395	220	491	--	--
	(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	10	100%	435	92.1	457	260	547	--	--
	(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	10	100%	3130	546	3150	1900	3830	--	--
	(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	10	100%	36	8.28	37.3	22.4	44.9	--	--
	(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	10	80%	21	11.6	24	12.4	34.3	4.78	4.87
	(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	10	100%	792	215	745	456	1250	--	--
	(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	10	100%	22.3	4.24	22.9	13.8	27.5	--	--
	(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	10	100%	16.8	3.52	17.6	11.2	21.4	--	--
	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-Tetrachlorobiphenyl	ng/kg	10	100%	482	81.7	475	344	644	--	--
	(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	10	100%	61.9	11.1	63.1	40.6	76.6	--	--
	(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	10	100%	812	222	790	589	1370	--	--
	(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-Tetrachlorobiphenyl	ng/kg	10	100%	7890	1760	7990	5970	11700	--	--
	(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	10	100%	140	27.8	136	87.1	182	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	10	100%	2310	520	2320	1620	3520	--	--
	(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	10	100%	5720	1470	5440	4150	9290	--	--
	(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	10	100%	79.1	19.7	77.6	45.6	113	--	--
	(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	10	100%	56	8.92	56.6	37.8	71.1	--	--
	(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	10	80%	4.91	2.5	5.6	3.38	8.55	1.93	1.94
	(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	10	100%	112	13.7	114	89.7	128	--	--
	(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	10	90%	25.4	10.2	25.9	20.4	41.2	4.87	4.87
	(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	10	100%	235	54.2	236	129	338	--	--
	(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	10	0%	<4.88	--	<4.86	--	--	4.78	4.99
	(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	10	100%	18.2	2.8	19	12.2	21.6	--	--
	(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	8	100%	201	42.3	206	123	248	--	--
	(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	10	10%	2.31	0.405	<4.84	1.16	1.16	4.78	4.99
	(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	10	100%	7.85	2.04	7.86	5.28	11.9	--	--
	(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	10	100%	256	63.4	251	172	352	--	--
	(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	10	100%	101	16.3	102	70.6	127	--	--
	(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	10	100%	611	99.9	621	448	737	--	--
	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	10	100%	1750	298	1750	1300	2340	--	--
	(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/ 2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	10	100%	2970	416	2910	2370	3570	--	--
	(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	10	30%	3.12	1.22	<4.93	3.31	5.51	4.78	4.99
	(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	10	100%	47.3	11	46.3	30.8	66.1	--	--
	(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	10	90%	12	4.81	13.2	7.6	18.3	1.94	1.94
	(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	10	100%	4280	557	4220	3450	5240	--	--
	(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	10	100%	737	138	723	508	953	--	--
	(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	10	100%	1040	122	1020	869	1220	--	--
	(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	10	100%	357	73.9	363	229	460	--	--
	(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	10	100%	29.2	7.67	29.7	19.5	42	--	--
	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	10	100%	2180	403	2090	1520	2760	--	--
	(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	10	100%	23.4	5.74	25.3	13.6	30.9	--	--
	(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	10	100%	228	45.5	237	144	281	--	--
	(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	10	100%	6740	1110	6530	5000	8680	--	--
	Aroclor-1016 (PCB-1016)	µg/kg	10	0%	<33.4	--	<33	--	--	33	34
	Aroclor-1221 (PCB-1221)	µg/kg	10	0%	<33.4	--	<33	--	--	33	34
	Aroclor-1232 (PCB-1232)	µg/kg	10	0%	<33.4	--	<33	--	--	33	34
	Aroclor-1242 (PCB-1242)	µg/kg	10	0%	<33.4	--	<33	--	--	33	34
	Aroclor-1248 (PCB-1248)	µg/kg	10	50%	34.3	19.3	38	42	63.5	33	34

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Aroclor-1254 (PCB-1254)	µg/kg	10	70%	58.4	38.6	55	28	104	33	34
	Aroclor-1260 (PCB-1260)	µg/kg	10	80%	29.5	10.2	33	21	47	33	33
	Aroclor-1262 (PCB-1262)	µg/kg	10	0%	<33.4	--	<33	--	--	33	34
	Aroclor-1268 (PCB-1268)	µg/kg	10	0%	<33.4	--	<33	--	--	33	34
	Total PCB congeners (NOAA 1989)	ng/kg	10	100%	142000	20600	142000	105000	166000	--	--
	Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	10	100%	142000	20600	142000	105000	166000	--	--
	Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	10	100%	142000	20600	142000	105000	166000	--	--
	Total PCBs (7)	µg/kg	10	100%	105	81.6	89	21	205	--	--
	Total PCBs (7) (ND*0.5)	µg/kg	10	100%	191	64.1	175	120	275	--	--
	Total PCBs (7) (ND*1)	µg/kg	10	100%	275	48	260	220	345	--	--
	Total PCBs (9)	µg/kg	10	100%	105	81.6	89	21	205	--	--
	Total PCBs (9) (ND*0.5)	µg/kg	10	100%	222	65.1	205	150	305	--	--
	Total PCBs (9) (ND*1)	µg/kg	10	100%	340	47	325	290	405	--	--
	Total PCBs congener (209 specified)	ng/kg	10	100%	144000	18700	150000	114000	173000	--	--
	Total PCBs congener (209 specified) (ND*0.5)	ng/kg	10	100%	144000	18700	150000	114000	173000	--	--
	Total PCBs congener (209 specified) (ND*1)	ng/kg	10	100%	144000	18700	150000	114000	173000	--	--
	Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	10	100%	14.7	3.22	14.2	9.28	21	--	--
	Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	10	100%	14.7	3.21	14.3	9.28	21	--	--
	Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	10	100%	14.7	3.21	14.4	9.29	21	--	--
	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	10	100%	0.181	0.0438	0.185	0.0935	0.244	--	--
	Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	10	100%	0.181	0.0438	0.186	0.0936	0.244	--	--
	Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	10	100%	0.182	0.044	0.186	0.0937	0.245	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	10	100%	2.16	0.722	2.32	0.418	2.89	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=0.5)	ng/kg	10	100%	2.23	0.722	2.39	0.491	2.96	--	--
	Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	10	100%	2.3	0.722	2.47	0.564	3.03	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	10	100%	22.8	5.76	21.5	14	31.7	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	10	100%	23.6	5.9	22.4	14	34.2	--	--
	Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	10	100%	24.4	6.26	23.2	14.1	36.7	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	10	100%	6.28	2.64	5.67	2.47	11.4	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	10	100%	7.28	2.54	6.88	3.84	11.4	--	--
	Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	10	100%	8.27	2.91	8.08	3.86	13.4	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	10	100%	8.24	3.15	7.8	2.77	13.9	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	10	100%	9.11	3.02	8.61	5.31	14	--	--
	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	10	100%	9.97	3.3	8.82	6.09	16.1	--	--
	Total decachlorobiphenyl	ng/kg	7	100%	458	139	441	293	700	--	--
	Total dichlorobiphenyl	ng/kg	10	100%	740	194	781	447	983	--	--
	Total heptachlorobiphenyl	ng/kg	10	100%	13200	5160	12000	7140	22300	--	--
	Total hexachlorobiphenyl	ng/kg	10	100%	39100	5980	39100	29700	49600	--	--
	Total monochlorobiphenyl	ng/kg	10	100%	51.9	12.2	52.4	28.4	69.3	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PCBs (cont.)	Total nonachlorobiphenyl	ng/kg	10	100%	1320	295	1310	829	1840	--	--
	Total octachlorobiphenyl	ng/kg	10	100%	5560	1120	5780	3330	6850	--	--
	Total pentachlorobiphenyl	ng/kg	10	100%	40200	6560	40900	31600	50200	--	--
	Total tetrachlorobiphenyl	ng/kg	10	100%	34000	6710	33400	24600	48400	--	--
	Total trichlorobiphenyl	ng/kg	10	100%	9700	2320	9430	5900	15100	--	--
Pesticides	2,4'-DDD	pg/g	10	100%	703	437	581	302	1880	--	--
	2,4'-DDE	pg/g	10	100%	1270	496	1210	549	2240	--	--
	2,4'-DDT	pg/g	10	100%	217	209	151	53.4	698	--	--
	4,4'-DDD	pg/g	10	100%	6090	2850	7000	2220	10600	--	--
	4,4'-DDE	pg/g	10	100%	23400	8100	20600	15100	36600	--	--
	4,4'-DDT	pg/g	10	100%	1210	996	773	410	3520	--	--
	Aldrin	pg/g	10	100%	7.6	1.65	7.97	3.8	9.64	--	--
	Dieldrin	pg/g	10	100%	2120	549	2020	1210	3040	--	--
	Endosulfan I	pg/g	10	0%	<187.2	--	<188	--	--	175	198
	Endosulfan II	pg/g	9	0%	<188	--	<192	--	--	175	198
	Endosulfan sulfate	pg/g	10	0%	<187.2	--	<188	--	--	175	198
	Endrin	pg/g	10	30%	18	1.97	<35.9	14	21.2	35.1	38.8
	Endrin aldehyde	pg/g	9	0%	<188.4	--	<192	--	--	179	198
	Endrin ketone	pg/g	10	0%	<187.2	--	<188	--	--	175	198
	Heptachlor	pg/g	10	50%	16.4	3.92	27	8.17	18.3	35.7	39.6
	Heptachlor endo-epoxide	pg/g	10	60%	195	155	261	233	371	38.5	39.6
	Heptachlor epoxide	pg/g	10	100%	549	134	568	269	716	--	--
	Hexachlorobenzene	pg/g	10	100%	856	371	669	413	1360	--	--
	Methoxychlor	pg/g	10	0%	<37.4	--	<37.6	--	--	35.1	39.6
	Mirex	pg/g	9	100%	58.6	11.8	57.8	46.6	81.2	--	--
	Oxychlordane	pg/g	10	100%	243	78.2	229	166	449	--	--
	Total BHC Compounds	pg/g	10	100%	49.8	15	48.6	28	69.6	--	--
	Total Chlordane (ND=0)	pg/g	10	100%	12800	1910	12700	10700	16600	--	--
	Total Chlordane (ND=1)	pg/g	10	100%	12900	1900	12700	10700	16600	--	--
	Total Chlordane (ND=1/2)	pg/g	10	100%	12900	1910	12700	10700	16600	--	--
	Total DDx (2,4 & 4,4) Total Fraction	pg/g	10	100%	32800	10600	31500	21000	45000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	10	100%	32800	10600	31500	21000	45000	--	--
	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	10	100%	32800	10600	31500	21000	45000	--	--
	Total DDx (2,4) Total Fraction	pg/g	10	100%	2180	894	2000	900	3700	--	--
	Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	10	100%	2180	894	2000	900	3700	--	--
	Total DDx (2,4) Total Fraction (ND*1)	pg/g	10	100%	2180	894	2000	900	3700	--	--
	Total DDx (4,4) Total Fraction	pg/g	10	100%	30700	9710	29300	20000	43000	--	--
	Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	10	100%	30700	9710	29300	20000	43000	--	--
	Total DDx (4,4) Total Fraction (ND*1)	pg/g	10	100%	30700	9710	29300	20000	43000	--	--
	Total alpha + gamma chlordane	pg/g	10	100%	6400	962	6700	5000	7900	--	--
	Total alpha + gamma chlordane (ND*0.5)	pg/g	10	100%	6400	962	6700	5000	7900	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Pesticides (cont.)	Total alpha + gamma chlordane (ND*1)	pg/g	10	100%	6400	962	6700	5000	7900	--	--
	alpha-BHC	pg/g	10	100%	23.1	9.79	21.2	13	43	--	--
	alpha-Chlordane	pg/g	10	100%	4640	743	4840	3370	5740	--	--
	beta-BHC	pg/g	10	100%	11.6	1.94	12	7.29	14.4	--	--
	cis-Nonachlor	pg/g	10	100%	1530	249	1520	1170	2010	--	--
	delta-BHC	pg/g	10	0%	<37.4	--	<37.6	--	--	35.1	39.6
	gamma-BHC (lindane)	pg/g	10	90%	17.4	4.87	17.3	8.26	26.7	35.7	35.7
	gamma-Chlordane	pg/g	10	100%	1770	391	1880	1030	2200	--	--
	trans-Nonachlor	pg/g	10	100%	3930	834	3600	3290	5480	--	--
PAHs	1-Methylnaphthalene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	2-Methylnaphthalene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Acenaphthene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Acenaphthylene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Anthracene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Benzo(a)anthracene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Benzo(a)pyrene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Benzo(b)fluoranthene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Benzo(e)pyrene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Benzo(g,h,i)perylene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C1-Chrysenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C1-Fluoranthenes/Pyrenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C1-Fluorenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C1-Naphthalenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C1-Phenanthrenes/Anthracenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C2-Chrysenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C2-Fluoranthenes/Pyrenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C2-Fluorenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C2-Naphthalenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C2-Phenanthrenes/Anthracenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C3-Chrysenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C3-Fluoranthenes/Pyrenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C3-Fluorenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C3-Naphthalenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C3-Phenanthrenes/Anthracenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C4-Chrysenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C4-Naphthalenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	C4-Phenanthrenes/Anthracenes	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Chrysene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Dibenz(a,h)anthracene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Fluoranthene	µg/kg	10	0%	<24	--	<23	--	--	13	33

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
PAHs (cont.)	Fluorene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Indeno(1,2,3-cd)pyrene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Naphthalene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Perylene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Phenanthrene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Pyrene	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total Alkylated PAHs	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total HMW PAHs	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total HMW PAHs (ND*0.5)	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total HMW PAHs (ND*1)	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total LMW PAHs	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total LMW PAHs (ND*0.5)	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total LMW PAHs (ND*1)	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total PAH	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total PAH (ND*0.5)	µg/kg	10	0%	<24	--	<23	--	--	13	33
	Total PAH (ND*1)	µg/kg	10	0%	<24	--	<23	--	--	13	33
Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	10	0%	<660	--	<660	--	--	650	670
	1,2-Diphenylhydrazine	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2,3,4,6-Tetrachlorophenol	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	2,4,5-Trichlorophenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2,4,6-Trichlorophenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2,4-Dichlorophenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2,4-Dimethylphenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2,4-Dinitrophenol	µg/kg	10	0%	<20000	--	<20000	--	--	20000	20000
	2,4-Dinitrotoluene	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	2,6-Dinitrotoluene	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2-Chloronaphthalene	µg/kg	10	0%	<656	--	<655	--	--	650	660
	2-Chlorophenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2-Methylphenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2-Nitroaniline	µg/kg	10	0%	<660	--	<660	--	--	650	670
	2-Nitrophenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	3,3'-Dichlorobenzidine	µg/kg	10	0%	<6600	--	<6600	--	--	6500	6700
	3-Nitroaniline	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	4,6-Dinitro-2-methylphenol	µg/kg	10	0%	<9900	--	<9900	--	--	9800	10000
	4-Bromophenyl phenyl ether	µg/kg	10	0%	<660	--	<660	--	--	650	670
	4-Chloro-3-methylphenol	µg/kg	10	0%	<660	--	<660	--	--	650	670
	4-Chloroaniline	µg/kg	10	0%	<1300	--	<1300	--	--	1300	1300
	4-Chlorophenyl phenyl ether	µg/kg	10	0%	<660	--	<660	--	--	650	670
	4-Methylphenol	µg/kg	10	0%	<660	--	<660	--	--	650	670

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Semivolatiles (cont.)	4-Nitroaniline	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	4-Nitrophenol	µg/kg	10	0%	<9900	--	<9900	--	--	9800	10000
	Acetophenone	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Atrazine	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Benzaldehyde	µg/kg	10	10%	1620	111	<3300	1300	1300	3300	3300
	Benzidine	µg/kg	10	0%	<66000	--	<66000	--	--	65000	67000
	Benzoic acid	µg/kg	10	0%	<9900	--	<9900	--	--	9800	10000
	Biphenyl (1,1-Biphenyl)	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Butyl benzylphthalate (BBP)	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Caprolactam	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Carbazole	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Di-n-butylphthalate (DBP)	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Di-n-octyl phthalate (DnOP)	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Dibenzofuran	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Diethyl phthalate	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Dimethyl phthalate	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Hexachlorobutadiene	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Hexachlorocyclopentadiene	µg/kg	10	0%	<9900	--	<9900	--	--	9800	10000
	Hexachloroethane	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	Isophorone	µg/kg	10	0%	<660	--	<660	--	--	650	670
	N-Nitrosodi-n-propylamine	µg/kg	10	0%	<660	--	<660	--	--	650	670
	N-Nitrosodiphenylamine	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Nitrobenzene	µg/kg	10	0%	<660	--	<660	--	--	650	670
	Pentachlorophenol	µg/kg	10	0%	<3380	--	<3400	--	--	3300	3400
	Phenol	µg/kg	10	30%	375	86.1	<660	400	590	650	670
	Pyridine	µg/kg	10	0%	<3300	--	<3300	--	--	3300	3300
	bis(2-Chloroethoxy)methane	µg/kg	10	0%	<660	--	<660	--	--	650	670
	bis(2-Chloroethyl)ether	µg/kg	10	0%	<660	--	<660	--	--	650	670
	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	10	0%	<3380	--	<3400	--	--	3300	3400
Butyltins	Dibutyltin	µg/kg	10	0%	<1.28	--	<1.3	--	--	1.2	1.3
	Monobutyltin hydride	µg/kg	10	0%	<20	--	<20	--	--	19	21
	Tetrabutyltin	µg/kg	10	0%	<1.68	--	<1.7	--	--	1.6	1.8
	Tributyl tin	µg/kg	10	90%	4.6	2	4.5	2.7	7.2	1.4	1.4
Metals	Aluminum	mg/kg	10	60%	49.8	42.2	43	23.8	113	19	19.8
	Antimony	mg/kg	10	0%	<0.1938	--	<0.194	--	--	0.19	0.198
	Arsenic	mg/kg	10	100%	1.86	0.362	1.85	1.35	2.71	--	--
	Barium	mg/kg	10	100%	0.693	0.332	0.624	0.317	1.27	--	--
	Beryllium	mg/kg	10	0%	<0.097	--	<0.0971	--	--	0.0952	0.099
	Cadmium	mg/kg	10	0%	<0.097	--	<0.0971	--	--	0.0952	0.099
	Calcium	mg/kg	10	100%	8120	2470	8180	3420	11400	--	--
	Chromium	mg/kg	10	100%	0.387	0.143	0.375	0.188	0.638	--	--

Table 4-7j
Phase III Tissue Chemistry Summary Statistics: Winter Flounder (Whole-Body)

Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Metals (cont.)	Cobalt	mg/kg	10	100%	0.103	0.136	0.063	0.0324	0.487	--	--
	Copper	mg/kg	10	100%	1.13	0.337	1.07	0.683	1.73	--	--
	Iron	mg/kg	10	100%	117	39.1	118	41.7	180	--	--
	Lead	mg/kg	10	100%	0.621	0.372	0.485	0.364	1.56	--	--
	Magnesium	mg/kg	10	100%	413	78.4	390	304	509	--	--
	Manganese	mg/kg	10	100%	8.95	2.53	9.18	5.65	13.9	--	--
	Mercury	ng/g	10	100%	49	49.1	35.1	24.9	187	--	--
	Methyl mercury	ng/g	9	100%	31	9.35	28.8	21.3	51.6	--	--
	Nickel	mg/kg	10	80%	0.221	0.042	0.229	0.187	0.32	0.381	0.385
	Potassium	mg/kg	10	100%	3940	502	3830	3250	4910	--	--
	Selenium	mg/kg	10	100%	0.576	0.102	0.573	0.423	0.701	--	--
	Silver	mg/kg	10	30%	0.0407	0.0123	<0.0957	0.022	0.0235	0.0952	0.099
	Sodium	mg/kg	10	100%	1380	159	1300	1250	1660	--	--
	Thallium	mg/kg	10	0%	<0.097	--	<0.0971	--	--	0.0952	0.099
	Titanium	mg/kg	10	90%	2.31	0.716	2.48	1.48	3.24	1.96	1.96
	Vanadium	mg/kg	10	10%	0.0619	0.0426	<0.0971	0.183	0.183	0.0952	0.099
	Zinc	mg/kg	10	100%	24.9	5.41	25.4	18.1	31	--	--
Miscellaneous	Moisture	%	10	100%	79.1	1.51	79	76.6	82.2	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	ng/kg	27	100%	2.06	1	1.64	0.821	3.99	--	--
		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	27	100%	0.349	0.237	0.228	0.0583	0.87	--	--
		1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	27	100%	0.863	0.406	0.825	0.383	2.01	--	--
		1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	27	100%	6.53	5.63	4.1	2.15	26.9	--	--
		1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	27	59%	1.07	1.16	0.192	0.0736	0.224	4.8	4.99
		1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	27	100%	0.502	0.358	0.443	0.181	2.01	--	--
		1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	27	100%	2.82	2.55	1.87	0.676	12.2	--	--
		1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	27	100%	1.34	0.698	1.22	0.348	3.05	--	--
		1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	27	100%	3.96	3.59	3.03	1.5	16.1	--	--
		1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	27	100%	0.271	0.17	0.225	0.0615	0.816	--	--
		1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	27	93%	0.28	0.621	0.0989	0.0638	0.204	4.8	4.92
		1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	27	78%	2.01	0.979	1.94	0.602	5	4.81	5
		1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	27	100%	2.63	1.44	2.75	0.531	5.96	--	--
		2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	27	100%	0.407	0.224	0.355	0.167	1.27	--	--
		2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	27	100%	7.58	3.94	6.3	3.84	21.8	--	--
		2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	27	100%	48.5	47.8	39.3	3.66	203	--	--
		2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	27	100%	8.12	3.2	7.95	3.91	18	--	--
		Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	27	100%	66.8	51.3	62.2	17	223	--	--
		Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	27	100%	67.4	51.5	62.2	19.5	223	--	--
		Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	27	100%	67.9	51.6	62.2	21.2	223	--	--
		Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	27	100%	55.3	49.2	49.4	7	211	--	--
		Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	27	100%	55.9	49.2	51.9	9.3	211	--	--
		Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	27	100%	56.5	49.4	53.7	9.33	211	--	--
		Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	27	100%	54.1	48.6	47	6.47	209	--	--
		Total WHO Dioxin	ng/kg	27	100%	54.7	48.8	49.5	8.79	209	--	--
		Total WHO Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	27	100%	55.3	48.8	51.9	8.81	209	--	--
		Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	27	100%	1.45	0.772	1.23	0.656	4.5	--	--
		Total heptachlorodibenzofuran (HpCDF)	ng/kg	27	100%	19	17.3	12.2	7.51	75	--	--
		Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	27	100%	5.4	2.59	4.89	1.67	15.3	--	--
		Total hexachlorodibenzofuran (HxCDF)	ng/kg	27	100%	37.8	31.7	25.1	17	142	--	--
		Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	27	100%	10.7	5.97	9.3	2.49	35.4	--	--
		Total pentachlorodibenzofuran (PeCDF)	ng/kg	27	100%	104	59.7	81.4	44.2	289	--	--
		Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	27	100%	50.9	50.6	46	4.18	205	--	--
		Total tetrachlorodibenzofuran (TCDF)	ng/kg	27	100%	328	163	270	104	631	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	27	100%	153	133	126	40.2	721	--	--
		(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	27	100%	226	221	168	53.4	1180	--	--
		(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	27	100%	1320	802	1130	437	3760	--	--
		(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	27	100%	236	176	215	42.2	673	--	--
		(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	22	100%	18000	9060	15900	7450	41100	--	--
		(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	27	7%	6.86	6.08	<4.95	10.5	26.5	4.78	24.9
		(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	27	100%	5140	2520	4630	2110	12700	--	--
		(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	27	100%	2050	1050	1690	825	4940	--	--
		(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	27	100%	158	73.1	145	50.3	302	--	--
		(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	21	100%	67000	35900	62700	27400	150000	--	--
		(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	27	100%	86.9	44.3	72.5	36.2	215	--	--
		(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	24	50%	116	148	34.8	44.6	502	4.8	24.9
		(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	27	100%	1350	702	1170	567	3290	--	--
		(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	27	100%	67000	30600	57700	28600	160000	--	--
		(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	27	100%	32.9	19.2	27.2	11.9	93.3	--	--
		(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	27	100%	416	223	365	167	1150	--	--
		(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	27	100%	63	36.8	51.8	23.3	173	--	--
		(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	27	96%	517	294	447	213	1360	24.2	24.2
		(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	27	96%	1220	610	1140	556	2870	4.96	4.96
		(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	9	89%	117	93	99.2	67.8	342	4.96	4.96
		(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	26	100%	93.7	51.6	86.8	29.2	253	--	--
		(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	27	100%	7600	3600	7020	3450	17700	--	--
		(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	27	100%	75800	36400	68800	34600	186000	--	--
		(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	24	100%	3390	1750	2840	1520	8280	--	--
		(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	24	100%	497	296	362	191	1290	--	--
		(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	24	100%	12700	7260	9790	5120	33100	--	--
		(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	27	100%	1530	770	1360	647	4120	--	--
		(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	24	100%	2410	1390	1920	936	6570	--	--
		(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	27	100%	21000	12900	16800	8210	64700	--	--
		(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	27	100%	5030	3060	4000	1850	15300	--	--
		(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	24	100%	3140	1750	2420	1300	7660	--	--
		(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	24	100%	1200	687	898	481	3100	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PCBs (cont.)	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	27	4%	2.41	1.92	<1.97	0.832	0.832	1.91	9.99
		(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	27	100%	9490	5320	7840	3990	26000	--	--
		(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	24	63%	9.02	5.87	8.77	3.96	23.9	4.84	24.9
		(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	24	67%	115	117	88.4	46.5	433	9.65	49.7
		(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	24	100%	2480	1610	1780	929	7300	--	--
		(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	27	93%	18.5	10.8	16.3	7.83	47.1	24	24.9
		(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	17	100%	13600	8380	11800	5290	36700	--	--
		(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	24	100%	42800	24300	33000	17700	113000	--	--
		(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	23	100%	310	222	240	103	1060	--	--
		(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	27	59%	53.6	58.2	34.4	32.8	223	4.8	24.2
		(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	27	100%	260	186	221	86	936	--	--
		(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	27	100%	108	88.4	86.9	27.1	401	--	--
		(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	24	100%	78700	42300	62000	33600	203000	--	--
		(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	24	100%	2120	1520	1710	725	7540	--	--
		(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	27	100%	538	429	553	88.9	2040	--	--
		(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	27	100%	6500	3420	5720	2710	17400	--	--
		(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	24	100%	5550	3130	4200	2420	14400	--	--
		(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	27	4%	6.27	4.76	<4.95	8.53	8.53	4.78	25
		(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	23	100%	3750	2650	2640	926	9780	--	--
		(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	24	4%	21.7	17.9	<19.7	24.7	24.7	19.1	99.9
		(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	19	11%	7.02	6.54	<4.96	7.21	26.6	4.78	24.9
		(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	26	100%	540	273	418	275	1320	--	--
		(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	24	100%	3410	2040	2620	1380	9280	--	--
		(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	18	100%	58.9	33	50.1	24.7	141	--	--
		(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	24	100%	2470	1370	1910	1050	6630	--	--
		(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	27	26%	6.63	4.64	<4.96	3.09	14.1	4.78	25
		(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	27	100%	6960	4080	6480	1960	16600	--	--
		(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	27	100%	13800	8990	11900	5460	44900	--	--
		(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	15	100%	3520	2110	2840	1590	9160	--	--
		(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	24	100%	2870	1960	2240	1100	9410	--	--
		(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	17	100%	9110	7070	6800	3190	30500	--	--
		(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	17	100%	673	384	596	275	1610	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PCBs (cont.)	(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	24	100%	1210	859	929	432	4310	--	--
		(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	16	100%	6280	4230	5190	2550	19600	--	--
		(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	17	100%	4720	3180	3810	1650	14000	--	--
		(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	27	100%	4680	3170	3800	1650	16900	--	--
		(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	27	100%	11600	7270	10500	2760	28800	--	--
		(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	27	100%	40800	26700	33900	16000	131000	--	--
		(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	15	100%	147	87	98.4	59.9	350	--	--
		(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	16	100%	148	103	115	46.4	427	--	--
		(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	16	100%	11400	6710	8590	4780	27900	--	--
		(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	27	100%	81.4	58.1	72.8	31.7	306	--	--
		(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	24	50%	5.36	4.45	4.85	1.54	14.4	4.8	25
		(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	18	100%	33600	22600	26500	12000	101000	--	--
		(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	27	100%	127	81.4	103	46.2	443	--	--
		(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	27	100%	572	379	481	220	1860	--	--
		(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	27	100%	1500	939	1210	459	4820	--	--
		(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	27	100%	3210	2230	2710	1220	11000	--	--
		(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	24	100%	601	436	429	234	1990	--	--
		(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	24	67%	8.06	7.36	7.22	2.02	36	4.78	25
		(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	27	100%	7070	6190	5530	2640	29500	--	--
		(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	27	100%	2500	2160	2000	912	10200	--	--
		(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	27	100%	3860	3250	2910	1440	15200	--	--
		(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	27	100%	698	518	554	247	2530	--	--
		(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	24	100%	10100	7710	7290	3610	33000	--	--
		(PCB 2) 3-Chlorobiphenyl	ng/kg	27	89%	5.85	2.6	5.92	2.79	11.5	1.95	9.7

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PCBs (cont.)	(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	27	100%	32000	18600	24700	10400	81400	--	--
		(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	27	100%	1110	760	903	400	3690	--	--
		(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	27	100%	2950	1650	2540	1170	8780	--	--
		(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	24	100%	7180	5740	5290	2570	24300	--	--
		(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	27	93%	12.6	7.66	11.7	4.86	36.4	4.9	24.2
		(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	27	100%	346	269	279	117	1220	--	--
		(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	27	100%	4480	2760	3650	1560	13300	--	--
		(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	27	100%	441	265	376	156	1350	--	--
		(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	27	100%	1460	903	1090	490	4540	--	--
		(PCB 209) Decachlorobiphenyl	ng/kg	26	100%	1960	1230	1510	632	5640	--	--
		(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	27	100%	4550	2710	3780	1320	9890	--	--
		(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	27	100%	5660	3360	4430	1940	13500	--	--
		(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	27	100%	15.2	7.41	13	4.86	28.7	--	--
		(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	27	52%	68.3	91.2	45	45	380	1.92	9.94
		(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	27	100%	4210	3440	3500	1180	17100	--	--
		(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	27	100%	6590	4560	5280	1830	22900	--	--
		(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	25	100%	1740	949	1490	544	4360	--	--
		(PCB 3) 4-Monochlorobiphenyl	ng/kg	24	29%	7.84	5.58	<8.28	7.67	20	4.78	25
		(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	27	100%	18400	11200	14400	5650	53100	--	--
		(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	27	100%	5560	2940	5190	1670	12200	--	--
		(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	27	100%	243	164	228	77.6	786	--	--
		(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	27	0%	<4.84	--	<1.98	--	--	1.91	9.99
		(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	27	0%	<4.84	--	<1.98	--	--	1.91	9.99
		(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	27	100%	651	556	533	105	2490	--	--
		(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	27	100%	26	14.1	21.7	9.72	55.7	--	--
		(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	27	100%	134	81.2	107	49.8	369	--	--
		(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	27	100%	1940	1520	1510	447	8050	--	--
		(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-	ng/kg	27	100%	22100	11900	20100	7780	54800	--	--
		(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	24	96%	1370	827	1260	539	3100	9.91	9.91
		(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	24	100%	14900	9140	14000	5450	41400	--	--
		(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	27	100%	2150	1220	2020	717	5390	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PCBs (cont.)	(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	27	100%	64000	31800	56500	23400	143000	--	--
		(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	27	100%	4200	2410	3680	1420	9730	--	--
		(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	27	100%	1820	1000	1750	552	4400	--	--
		(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	27	100%	7410	4000	6730	2350	17000	--	--
		(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-	ng/kg	27	100%	51100	24600	45900	18400	122000	--	--
		(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	27	100%	11.4	7.14	8.85	3.48	31.6	--	--
		(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	27	100%	8300	4230	8290	2570	18000	--	--
		(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	27	100%	6510	3780	6370	1790	14600	--	--
		(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	27	100%	70800	33600	60400	25000	166000	--	--
		(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	27	100%	343	243	269	86	965	--	--
		(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	24	79%	253	280	228	84.5	1380	4.86	24.9
		(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	24	100%	14800	8450	13500	5500	40400	--	--
		(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	24	88%	240	186	225	96.7	807	4.86	4.96
		(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	24	100%	279	212	238	79.2	882	--	--
		(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-	ng/kg	27	100%	4900	2570	4380	1770	11400	--	--
		(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	26	100%	507	493	389	116	2640	--	--
		(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	27	100%	6280	3090	5380	2390	15000	--	--
		(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-	ng/kg	27	100%	87800	44100	74100	31300	221000	--	--
		(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	24	100%	2480	1510	2170	960	7470	--	--
		(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	27	100%	22900	11900	20100	8070	55400	--	--
		(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	24	100%	54800	28400	46800	21600	142000	--	--
		(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	27	100%	1420	878	1290	482	4040	--	--
		(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	24	96%	715	487	722	24.2	1980	4.93	4.93
		(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	26	100%	38.9	29.4	30.2	9.78	141	--	--
		(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	24	88%	877	661	865	336	2790	4.86	4.96
		(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	27	81%	190	142	173	96.7	523	4.83	25
		(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	27	100%	2500	1520	2090	926	7220	--	--
		(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	27	0%	<12.1	--	<4.95	--	--	4.78	25
		(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	27	100%	420	218	377	170	1010	--	--
		(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	26	100%	1110	744	925	309	3280	--	--
		(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	27	48%	6.78	4.25	<4.96	2.46	12	4.88	25
		(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	27	96%	101	58.6	82.4	38.8	260	4.93	4.93
		(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	24	100%	4890	2740	3900	1970	11400	--	--
		(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	24	100%	2890	1500	2330	1090	5760	--	--
		(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	27	100%	10300	5750	8210	3840	25400	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PCBs (cont.)	(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	27	100%	13300	6720	11100	5480	31500	--	--
		(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	27	100%	35800	18700	29800	14100	84100	--	--
		(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	27	0%	<12.1	--	<4.95	--	--	4.78	25
		(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	27	100%	632	358	549	220	1580	--	--
		(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	26	100%	75.3	55.8	59.3	17.8	243	--	--
		(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	24	100%	67500	34800	55500	27900	155000	--	--
		(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	27	100%	10600	5720	8780	4140	26100	--	--
		(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	24	100%	12700	7080	10100	5120	31200	--	--
		(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	27	100%	3150	2120	2660	868	9390	--	--
		(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	27	100%	778	476	670	243	2090	--	--
		(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	27	100%	40000	18100	36300	15200	87700	--	--
		(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	27	100%	461	282	410	150	1290	--	--
		(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	27	100%	3310	1920	2740	1200	8640	--	--
		(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	24	100%	47000	24900	38800	19000	118000	--	--
		Aroclor-1016 (PCB-1016)	µg/kg	26	0%	<165.6	--	<170	--	--	33	340
		Aroclor-1221 (PCB-1221)	µg/kg	26	0%	<165.6	--	<170	--	--	33	340
		Aroclor-1232 (PCB-1232)	µg/kg	26	0%	<165.6	--	<170	--	--	33	340
		Aroclor-1242 (PCB-1242)	µg/kg	26	0%	<165.6	--	<170	--	--	33	340
		Aroclor-1248 (PCB-1248)	µg/kg	26	100%	752	422	710	240	2100	--	--
		Aroclor-1254 (PCB-1254)	µg/kg	26	92%	771	424	780	340	2200	170	170
		Aroclor-1260 (PCB-1260)	µg/kg	26	100%	293	166	260	110	1000	--	--
		Aroclor-1262 (PCB-1262)	µg/kg	26	0%	<165.6	--	<170	--	--	33	340
		Aroclor-1268 (PCB-1268)	µg/kg	26	0%	<165.6	--	<170	--	--	33	340
		Total PCB congeners (NOAA 1989)	ng/kg	27	100%	1220000	626000	916000	515000	3170000	--	--
		Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	27	100%	1220000	626000	916000	515000	3170000	--	--
		Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	27	100%	1220000	626000	916000	515000	3170000	--	--
		Total PCBs (7)	µg/kg	26	100%	1820	976	1850	470	5300	--	--
		Total PCBs (7) (ND*0.5)	µg/kg	26	100%	2150	1060	2150	900	6000	--	--
		Total PCBs (7) (ND*1)	µg/kg	26	100%	2510	1140	2500	1100	6700	--	--
		Total PCBs (9)	µg/kg	26	100%	1820	976	1850	470	5300	--	--
		Total PCBs (9) (ND*0.5)	µg/kg	26	100%	2330	1090	2350	1100	6300	--	--
		Total PCBs (9) (ND*1)	µg/kg	26	100%	2840	1220	2850	1200	7300	--	--
		Total PCBs congener (209 specified)	ng/kg	27	100%	1370000	715000	1110000	569000	3530000	--	--
		Total PCBs congener (209 specified) (ND*0.5)	ng/kg	27	100%	1370000	715000	1110000	569000	3530000	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	Pesticides	Total PCBs congener (209 specified) (ND*1)	ng/kg	27	100%	1370000	715000	1110000	569000	3530000	--	--
		Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	27	100%	142	85.2	115	51.8	395	--	--
		Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	27	100%	142	85.2	115	51.8	395	--	--
		Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	27	100%	142	85.2	115	51.8	395	--	--
		Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	27	100%	0.948	0.612	0.887	0.355	3.48	--	--
		Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	27	100%	0.949	0.611	0.887	0.355	3.48	--	--
		Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	27	100%	0.95	0.611	0.887	0.355	3.48	--	--
		Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	27	100%	6.74	7.99	3.33	1.56	41.1	--	--
		Total WHO PCB	ng/kg	27	100%	6.91	7.99	3.67	1.64	41.3	--	--
		Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	27	100%	7.07	7.98	4.04	1.71	41.5	--	--
		Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	27	100%	208	123	186	68.8	608	--	--
		Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	27	100%	209	123	186	71.3	611	--	--
		Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	27	100%	209	123	186	73.7	613	--	--
		Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	27	100%	56.3	49.3	53	7.35	212	--	--
		Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	27	100%	56.9	49.5	54.6	9.82	212	--	--
		Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	27	100%	57.4	49.6	54.6	10.2	212	--	--
		Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	27	100%	60.9	48.5	56.2	8.03	212	--	--
		Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	27	100%	61.6	48.7	56.5	10.6	212	--	--
		Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	27	100%	62.3	48.9	56.9	13.1	213	--	--
		Total decachlorobiphenyl	ng/kg	26	100%	1960	1230	1510	632	5640	--	--
		Total dichlorobiphenyl	ng/kg	27	100%	4090	2800	3030	1150	13300	--	--
		Total heptachlorobiphenyl	ng/kg	27	100%	112000	85700	79900	34900	388000	--	--
		Total hexachlorobiphenyl	ng/kg	27	100%	280000	166000	200000	114000	795000	--	--
		Total monochlorobiphenyl	ng/kg	27	100%	162	134	129	40.2	730	--	--
		Total nonachlorobiphenyl	ng/kg	27	100%	6380	3910	5120	2210	19200	--	--
		Total octachlorobiphenyl	ng/kg	27	100%	33900	28000	22200	13100	123000	--	--
		Total pentachlorobiphenyl	ng/kg	27	100%	385000	204000	294000	170000	973000	--	--
		Total tetrachlorobiphenyl	ng/kg	27	100%	446000	221000	411000	169000	1110000	--	--
		Total trichlorobiphenyl	ng/kg	27	100%	103000	59400	84700	31000	271000	--	--
		2,4'-DDD	pg/g	27	100%	60900	53900	42600	5880	214000	--	--
		2,4'-DDE	pg/g	27	100%	12100	4690	11800	4570	20900	--	--
		2,4'-DDT	pg/g	27	100%	7220	9330	1960	240	39000	--	--
		4,4'-DDD	pg/g	27	100%	160000	118000	124000	19800	492000	--	--
		4,4'-DDE	pg/g	27	100%	153000	60200	151000	70600	275000	--	--
		4,4'-DDT	pg/g	27	100%	24400	27400	9130	1620	109000	--	--
		Aldrin	pg/g	27	96%	77.1	43	67.1	29.1	185	38.5	38.5
		Dieldrin	pg/g	27	100%	14300	6740	13400	5590	28300	--	--
		Endosulfan I	pg/g	26	0%	<316	--	<186	--	--	143	3670
		Endosulfan II	pg/g	27	0%	<181.4	--	<183	--	--	143	200
		Endosulfan sulfate	pg/g	27	30%	154	257	<179	53.1	224	153	2860

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	Pesticides (cont.)	Endrin	pg/g	27	63%	63.1	57.6	48.2	26.9	243	28.6	38.8
		Endrin aldehyde	pg/g	27	0%	<181.4	--	<183	--	--	143	200
		Endrin ketone	pg/g	27	7%	117	121	<183	163	719	153	200
		Heptachlor	pg/g	27	78%	23.5	8.46	23.8	10.4	44	36.7	39.6
		Heptachlor endo-epoxide	pg/g	27	11%	329	1020	<37.7	1200	4620	28.6	40
		Heptachlor epoxide	pg/g	27	100%	3590	2050	3440	1010	8750	--	--
		Hexachlorobenzene	pg/g	27	100%	2240	1320	1950	900	6210	--	--
		Methoxychlor	pg/g	26	0%	<36.4	--	<36.7	--	--	28.6	40
		Mirex	pg/g	27	100%	574	445	364	133	1720	--	--
		Oxychlordane	pg/g	27	100%	5650	2670	5190	2290	12300	--	--
		Total BHC Compounds	pg/g	27	100%	224	179	190	33.8	714	--	--
		Total Chlordane (ND=0)	pg/g	27	100%	114000	49000	116000	45600	212000	--	--
		Total Chlordane (ND=1)	pg/g	27	100%	114000	49100	116000	45600	212000	--	--
		Total Chlordane (ND=1/2)	pg/g	27	100%	114000	49000	116000	45600	212000	--	--
		Total DDx (2,4 & 4,4) Total Fraction	pg/g	27	100%	417000	251000	380000	100000	1100000	--	--
		Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	27	100%	417000	251000	380000	100000	1100000	--	--
		Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	27	100%	417000	251000	380000	100000	1100000	--	--
		Total DDx (2,4) Total Fraction	pg/g	27	100%	80000	65600	59000	11000	270000	--	--
		Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	27	100%	80000	65600	59000	11000	270000	--	--
		Total DDx (2,4) Total Fraction (ND*1)	pg/g	27	100%	80000	65600	59000	11000	270000	--	--
		Total DDx (4,4) Total Fraction	pg/g	27	100%	336000	188000	330000	92000	825000	--	--
		Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	27	100%	336000	188000	330000	92000	825000	--	--
		Total DDx (4,4) Total Fraction (ND*1)	pg/g	27	100%	336000	188000	330000	92000	825000	--	--
		Total alpha + gamma chlordane	pg/g	27	100%	52100	26800	48000	10000	110000	--	--
		Total alpha + gamma chlordane (ND*0.5)	pg/g	27	100%	52100	26800	48000	10000	110000	--	--
		Total alpha + gamma chlordane (ND*1)	pg/g	27	100%	52100	26800	48000	10000	110000	--	--
		alpha-BHC	pg/g	26	96%	129	117	95.1	19.7	439	35.7	35.7
		alpha-Chlordane	pg/g	27	100%	42200	22600	38300	7100	93300	--	--
		beta-BHC	pg/g	27	89%	58.5	44.2	46.6	16.1	184	28.6	38.5
		cis-Nonachlor	pg/g	27	100%	14200	5020	13900	8230	28700	--	--
		delta-BHC	pg/g	27	11%	17.2	3.24	<36	6.67	16.7	28.6	40
		gamma-BHC (lindane)	pg/g	27	96%	43.2	19.2	42.7	17.7	91.2	38.5	38.5
		gamma-Chlordane	pg/g	27	100%	10100	5130	8520	3180	22900	--	--
		trans-Nonachlor	pg/g	27	100%	38200	14300	38600	19400	66100	--	--
	PAHs	1-Methylnaphthalene	µg/kg	27	15%	16	7.6	<33	9	48	13	33
		2-Methylnaphthalene	µg/kg	27	22%	17	14	<33	5.9	87	13	33
		Acenaphthene	µg/kg	27	48%	17	8.8	<33	6.2	52	13	33
		Acenaphthylene	µg/kg	27	4%	14	4.3	<33	19	19	13	33
		Anthracene	µg/kg	27	4%	14	4.2	<33	14	14	13	33
		Benzo(a)anthracene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Benzo(a)pyrene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Benzo(b)fluoranthene	µg/kg	27	0%	<28	--	<33	--	--	13	33

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	PAHs (cont.)	Benzo(e)pyrene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Benzo(g,h,i)perylene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C1-Chrysenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C1-Fluoranthenes/Pyrenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C1-Fluorenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C1-Naphthalenes	µg/kg	27	37%	18	15	<33	6.8	90	13	33
		C1-Phenanthrenes/Anthracenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C2-Chrysenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C2-Fluoranthenes/Pyrenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C2-Fluorenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C2-Naphthalenes	µg/kg	27	63%	21	11	31	8.3	62	33	33
		C2-Phenanthrenes/Anthracenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C3-Chrysenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C3-Fluoranthenes/Pyrenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C3-Fluorenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C3-Naphthalenes	µg/kg	27	56%	19	8.6	33	5.5	42	33	33
		C3-Phenanthrenes/Anthracenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C4-Chrysenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C4-Naphthalenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		C4-Phenanthrenes/Anthracenes	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Chrysene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Dibenz(a,h)anthracene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Fluoranthene	µg/kg	27	26%	14	4.1	<33	8.3	19	13	33
		Fluorene	µg/kg	27	30%	16	6.1	<33	6.6	38	13	33
		Indeno(1,2,3-cd)pyrene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Naphthalene	µg/kg	27	33%	45	69	<33	5.8	340	13	33
		Perylene	µg/kg	27	0%	<28	--	<33	--	--	13	33
		Phenanthrene	µg/kg	27	74%	20	12	20	6.1	62	13	33
		Pyrene	µg/kg	27	4%	14	4.2	<33	13	13	13	33
		Total Alkylated PAHs	µg/kg	27	63%	40	39	33	14	190	33	33
		Total HMW PAHs	µg/kg	27	26%	14	5.3	<33	8.3	32	13	33
		Total HMW PAHs (ND*0.5)	µg/kg	27	26%	46	58	<33	67	160	13	33
		Total HMW PAHs (ND*1)	µg/kg	27	26%	78	120	<33	130	310	13	33
		Total LMW PAHs	µg/kg	27	74%	76	120	47	6.1	610	13	33
		Total LMW PAHs (ND*0.5)	µg/kg	27	74%	120	120	110	45	610	13	33
		Total LMW PAHs (ND*1)	µg/kg	27	74%	160	140	180	71	610	13	33
		Total PAH	µg/kg	27	74%	80	120	47	6.1	640	13	33
		Total PAH (ND*0.5)	µg/kg	27	74%	220	170	280	110	700	13	33
		Total PAH (ND*1)	µg/kg	27	74%	360	250	510	200	750	13	33

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	27	0%	<658	--	<660	--	--	650	670
		1,2-Diphenylhydrazine	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2,3,4,6-Tetrachlorophenol	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		2,4,5-Trichlorophenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2,4,6-Trichlorophenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2,4-Dichlorophenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2,4-Dimethylphenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2,4-Dinitrophenol	µg/kg	27	0%	<19820	--	<20000	--	--	19000	20000
		2,4-Dinitrotoluene	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		2,6-Dinitrotoluene	µg/kg	27	4%	331	12.1	<660	390	390	650	670
		2-Chloronaphthalene	µg/kg	27	0%	<652	--	<650	--	--	640	660
		2-Chlorophenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2-Methylphenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2-Nitroaniline	µg/kg	27	0%	<658	--	<660	--	--	650	670
		2-Nitrophenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		3,3'-Dichlorobenzidine	µg/kg	27	0%	<6580	--	<6600	--	--	6500	6700
		3-Nitroaniline	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		4,6-Dinitro-2-methylphenol	µg/kg	27	0%	<9860	--	<9900	--	--	9700	10000
		4-Bromophenyl phenyl ether	µg/kg	27	0%	<658	--	<660	--	--	650	670
		4-Chloro-3-methylphenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		4-Chloroaniline	µg/kg	27	0%	<1300	--	<1300	--	--	1300	1300
		4-Chlorophenyl phenyl ether	µg/kg	27	0%	<658	--	<660	--	--	650	670
		4-Methylphenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		4-Nitroaniline	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		4-Nitrophenol	µg/kg	27	0%	<9860	--	<9900	--	--	9700	10000
		Acetophenone	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Atrazine	µg/kg	27	4%	1620	106	<3300	1100	1100	3200	3300
		Benzaldehyde	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		Benzidine	µg/kg	27	0%	<65800	--	<66000	--	--	65000	67000
		Benzoic acid	µg/kg	27	0%	<9860	--	<9900	--	--	9700	10000
		Biphenyl (1,1-Biphenyl)	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Butyl benzylphthalate (BBP)	µg/kg	27	4%	1640	21.2	<3300	1600	1600	3200	3300
		Caprolactam	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		Carbazole	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Di-n-butylphthalate (DBP)	µg/kg	27	4%	1640	21.2	<3300	1600	1600	3200	3300
		Di-n-octyl phthalate (DnOP)	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		Dibenzofuran	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Diethyl phthalate	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		Dimethyl phthalate	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		Hexachlorobutadiene	µg/kg	27	0%	<658	--	<660	--	--	650	670

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	Semivolatiles (cont.)	Hexachlorocyclopentadiene	µg/kg	27	0%	<9860	--	<9900	--	--	9700	10000
		Hexachloroethane	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		Isophorone	µg/kg	27	0%	<658	--	<660	--	--	650	670
		N-Nitrosodi-n-propylamine	µg/kg	27	0%	<658	--	<660	--	--	650	670
		N-Nitrosodiphenylamine	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Nitrobenzene	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Pentachlorophenol	µg/kg	27	0%	<3380	--	<3400	--	--	3300	3400
		Phenol	µg/kg	27	0%	<658	--	<660	--	--	650	670
		Pyridine	µg/kg	27	0%	<3280	--	<3300	--	--	3200	3300
		bis(2-Chloroethoxy)methane	µg/kg	27	0%	<658	--	<660	--	--	650	670
		bis(2-Chloroethyl)ether	µg/kg	27	0%	<658	--	<660	--	--	650	670
		bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	27	0%	<3380	--	<3400	--	--	3300	3400
	Butyltins	Dibutyltin	µg/kg	21	0%	<1.28	--	<1.3	--	--	1.2	1.3
		Monobutyltin hydride	µg/kg	21	0%	<20	--	<20	--	--	19	21
		Tetrabutyltin	µg/kg	21	0%	<1.66	--	<1.7	--	--	1.6	1.7
		Tributyl tin	µg/kg	21	71%	2.8	2.1	2.3	1.8	8.6	1.4	1.5
	Metals	Aluminum	mg/kg	27	59%	12.2	7.06	19	5.75	40.1	19	19.8
		Antimony	mg/kg	27	0%	<0.195	--	<0.194	--	--	0.19	0.2
		Arsenic	mg/kg	27	100%	0.499	0.135	0.453	0.326	0.885	--	--
		Barium	mg/kg	27	100%	1.44	0.588	1.4	0.563	3.07	--	--
		Beryllium	mg/kg	27	0%	<0.0976	--	<0.0971	--	--	0.0952	0.1
		Cadmium	mg/kg	27	0%	<0.0976	--	<0.0971	--	--	0.0952	0.1
		Calcium	mg/kg	27	100%	17000	5440	17300	5490	27200	--	--
		Chromium	mg/kg	27	70%	0.342	0.41	0.364	0.0997	2.13	0.385	0.4
		Cobalt	mg/kg	27	48%	0.0368	0.0129	<0.0952	0.0205	0.0311	0.0952	0.1
		Copper	mg/kg	27	100%	15.6	13.1	9.27	2.26	50	--	--
		Iron	mg/kg	27	100%	29.4	10.1	26.8	15.3	49.8	--	--
		Lead	mg/kg	27	93%	0.18	0.0676	0.19	0.0609	0.285	0.19	0.198
		Magnesium	mg/kg	27	100%	555	104	522	373	750	--	--
		Manganese	mg/kg	27	100%	3.18	1.48	3.12	0.899	6.98	--	--
		Mercury	ng/g	27	100%	127	53.7	113	63.9	287	--	--
		Methyl mercury	ng/g	27	100%	148	64.4	130	83.4	338	--	--
		Nickel	mg/kg	27	7%	0.225	0.11	<0.392	0.512	0.685	0.381	0.4
		Potassium	mg/kg	27	100%	3240	415	3200	2560	4340	--	--
		Selenium	mg/kg	27	100%	1.18	0.403	0.943	0.754	2.04	--	--
		Silver	mg/kg	27	100%	0.287	0.224	0.179	0.0591	0.889	--	--
		Sodium	mg/kg	27	100%	1770	226	1710	1460	2250	--	--
		Thallium	mg/kg	27	0%	<0.0976	--	<0.0971	--	--	0.0952	0.1
		Titanium	mg/kg	27	22%	0.851	0.268	<1.94	0.219	1.03	1.9	2
		Vanadium	mg/kg	27	30%	0.0711	0.0455	<0.0971	0.0623	0.215	0.0952	0.1

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Whole-body (cont.)	Metals (cont.)	Zinc	mg/kg	27	100%	26.2	6.2	26.2	16.6	41.8	--	--
	Miscellaneous	Lipids	%	27	100%	2.63	1.34	2.5	0.77	6.8	--	--
		Moisture	%	27	100%	74.8	2.25	75.5	69.7	77.4	--	--
Liver	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ng/kg	11	100%	5.85	2.08	5.55	3.37	8.94	--	--
		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/kg	11	100%	0.417	0.137	0.399	0.247	0.705	--	--
		1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	11	100%	2.94	0.542	3	2.31	3.66	--	--
		1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/kg	11	100%	7.91	3.59	6.4	4.66	16.6	--	--
		1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/kg	11	100%	0.268	0.178	0.226	0.117	0.775	--	--
		1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	11	100%	1.04	0.222	1.04	0.631	1.41	--	--
		1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	11	100%	7.08	3.58	8.31	2.2	12.3	--	--
		1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	11	100%	3.3	0.882	2.98	2.21	4.46	--	--
		1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	11	100%	3.04	0.86	3.1	1.33	4.17	--	--
		1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	11	100%	0.776	0.162	0.785	0.525	0.981	--	--
		1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/kg	11	100%	0.14	0.0403	0.125	0.102	0.226	--	--
		1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	11	55%	2.96	0.923	4.74	1.82	4.74	4.81	4.98
		1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	11	100%	3.11	0.421	3.13	2.44	3.68	--	--
		2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/kg	11	100%	0.887	0.214	0.846	0.606	1.31	--	--
		2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/kg	11	100%	13.8	6.04	13.2	7.35	27.5	--	--
		2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	11	100%	48.4	32	44	9.07	108	--	--
		2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/kg	11	100%	11.1	2.69	11.4	6.67	15.4	--	--
		Total WHO Dioxin TEQ(Bird)(ND=0)	ng/kg	11	100%	76.8	37.9	69.1	30.5	147	--	--
		Total WHO Dioxin TEQ(Bird)(ND=0.5)	ng/kg	11	100%	77.9	37.7	69.1	33	147	--	--
		Total WHO Dioxin TEQ(Bird)(ND=1)	ng/kg	11	100%	79.1	37.8	69.1	35.5	147	--	--
		Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	11	100%	59.6	34.9	54.3	14.7	121	--	--
		Total WHO Dioxin TEQ(Fish)(ND=0.5)	ng/kg	11	100%	60.8	34.9	56.7	17.2	123	--	--
		Total WHO Dioxin TEQ(Fish)(ND=1)	ng/kg	11	100%	61.8	34.8	58.9	19.7	125	--	--
		Total WHO Dioxin	ng/kg	11	100%	57.3	33.9	51.4	13.9	117	--	--
		Total WHO Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	11	100%	58.4	33.7	53.9	16.4	119	--	--
		Total WHO Dioxin	ng/kg	11	100%	59.6	33.8	56.3	18.9	122	--	--
		Total heptachlorodibenzo-p-dioxin (HpCDD)	ng/kg	11	100%	3.93	0.709	3.98	2.91	4.94	--	--
		Total heptachlorodibenzofuran (HpCDF)	ng/kg	11	100%	17.2	6.77	16.9	9.73	31.3	--	--
		Total hexachlorodibenzo-p-dioxin (HxCDD)	ng/kg	11	100%	8.41	1.07	9.06	6.67	9.62	--	--
		Total hexachlorodibenzofuran (HxCDF)	ng/kg	11	100%	40.1	16.8	35.1	23.4	77.3	--	--
		Total pentachlorodibenzo-p-dioxin (PeCDD)	ng/kg	11	100%	18.7	5.5	19.3	8.86	29.5	--	--
		Total pentachlorodibenzofuran (PeCDF)	ng/kg	11	100%	97.4	42.7	83.4	46.6	203	--	--
		Total tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	11	100%	53.5	35	48.5	9.9	111	--	--
		Total tetrachlorodibenzofuran (TCDF)	ng/kg	11	100%	218	102	195	94.4	469	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs	(PCB 1) 2-Chlorobiphenyl	ng/kg	7	100%	343	74	349	244	443	--	--
		(PCB 10) 2,6-Dichlorobiphenyl	ng/kg	11	100%	299	136	255	105	571	--	--
		(PCB 103) 2,2',4,5',6-Pentachlorobiphenyl	ng/kg	11	100%	1690	650	1430	991	2980	--	--
		(PCB 104) 2,2',4,6,6'-Pentachlorobiphenyl	ng/kg	11	100%	205	91.8	173	106	374	--	--
		(PCB 105) 2,3,3',4,4'-Pentachlorobiphenyl	ng/kg	11	100%	22300	5510	21400	15400	34900	--	--
		(PCB 106) 2,3,3',4,5-Pentachlorobiphenyl	ng/kg	11	18%	13	5.74	<24.2	16	27.3	5	24.9
		(PCB 107) 2,3,3',4',5-Pentachlorobiphenyl	ng/kg	11	100%	6760	1670	6640	4480	10700	--	--
		(PCB 108/124) 2,3,3',4,5'-Pentachlorobiphenyl/2,3',4',5,5'-Pentachlorobiphenyl	ng/kg	11	100%	2620	615	2630	1800	3930	--	--
		(PCB 11) 3,3'-Dichlorobiphenyl	ng/kg	11	100%	311	111	287	194	503	--	--
		(PCB 110/115) 2,3,3',4',6-Pentachlorobiphenyl/2,3,4,4',6-Pentachlorobiphenyl	ng/kg	11	100%	84900	32300	81900	46300	145000	--	--
		(PCB 111) 2,3,3',5,5'-Pentachlorobiphenyl	ng/kg	11	100%	118	32.6	117	76.9	197	--	--
		(PCB 112) 2,3,3',5,6-Pentachlorobiphenyl	ng/kg	9	56%	6310	18600	121	121	56000	5	24.7
		(PCB 114) 2,3,4,4',5-Pentachlorobiphenyl	ng/kg	11	100%	1780	549	1660	1090	3130	--	--
		(PCB 118) 2,3',4,4',5-Pentachlorobiphenyl	ng/kg	11	100%	86700	21800	82600	55900	135000	--	--
		(PCB 12/13) 3,4-Dichlorobiphenyl/3,4'-Dichlorobiphenyl	ng/kg	11	100%	48.3	17.6	51.8	22.2	74.8	--	--
		(PCB 120) 2,3',4,5,5'-Pentachlorobiphenyl	ng/kg	11	100%	597	196	582	352	1030	--	--
		(PCB 121) 2,3',4,5',6-Pentachlorobiphenyl	ng/kg	11	100%	78.4	25.6	67.5	51.4	129	--	--
		(PCB 122) 2,3,3',4',5'-Pentachlorobiphenyl	ng/kg	11	91%	595	262	646	383	982	5	5
		(PCB 123) 2',3,4,4',5-Pentachlorobiphenyl	ng/kg	11	91%	1610	690	1760	1250	2910	24.9	24.9
		(PCB 126) 3,3',4,4',5-Pentachlorobiphenyl	ng/kg	10	100%	438	285	374	151	901	--	--
		(PCB 127) 3,3',4,5,5'-Pentachlorobiphenyl	ng/kg	11	100%	130	38	125	78.4	218	--	--
		(PCB 128/166) 2,2',3,3',4,4'-Hexachlorobiphenyl/2,3,4,4',5,6-Hexachlorobiphenyl	ng/kg	11	100%	9320	2850	8990	5680	15300	--	--
		(PCB 129/138/163) Hexachlorobiphenyl	ng/kg	11	100%	100000	27200	99300	61200	154000	--	--
		(PCB 130) 2,2',3,3',4,5'-Hexachlorobiphenyl	ng/kg	7	100%	5080	1080	4920	3640	7000	--	--
		(PCB 131) 2,2',3,3',4,6-Hexachlorobiphenyl	ng/kg	6	100%	730	192	714	440	972	--	--
		(PCB 132) 2,2',3,3',4,6'-Hexachlorobiphenyl	ng/kg	6	100%	18500	4760	17500	12300	24600	--	--
		(PCB 133) 2,2',3,3',5,5'-Hexachlorobiphenyl	ng/kg	11	100%	2290	502	2380	1430	3320	--	--
		(PCB 134) 2,2',3,3',5,6-Hexachlorobiphenyl	ng/kg	7	100%	3750	1000	3700	2220	5200	--	--
		(PCB 135/151) 2,2',3,3',5,6'-Hexachlorobiphenyl/2,2',3,5,5',6-Hexachlorobiphenyl	ng/kg	7	100%	23000	7130	22300	14000	35300	--	--
		(PCB 136) 2,2',3,3',6,6'-Hexachlorobiphenyl	ng/kg	6	100%	5320	1890	4970	3140	8320	--	--
		(PCB 137) 2,2',3,4,4',5-Hexachlorobiphenyl	ng/kg	9	100%	4380	1260	4310	2280	6780	--	--
		(PCB 139/140) 2,2',3,4,4',6-Hexachlorobiphenyl/2,2',3,4,4',6'-Hexachlorobiphenyl	ng/kg	9	100%	1610	482	1590	903	2580	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs (cont.)	(PCB 14) 3,5-Dichlorobiphenyl	ng/kg	11	9%	4.51	1.22	<9.7	0.823	0.823	9.55	9.96
		(PCB 141) 2,2',3,4,5,5'-Hexachlorobiphenyl	ng/kg	11	100%	12600	3200	11900	7550	19500	--	--
		(PCB 142) 2,2',3,4,5,6-Hexachlorobiphenyl	ng/kg	6	67%	18.5	14.2	22.3	9.03	42.7	5	23.9
		(PCB 143) 2,2',3,4,5,6'-Hexachlorobiphenyl	ng/kg	7	29%	53.6	57.1	<49.3	133	140	9.99	49.4
		(PCB 144) 2,2',3,4,5',6-Hexachlorobiphenyl	ng/kg	6	100%	3040	767	3070	2020	3960	--	--
		(PCB 145) 2,2',3,4,6,6'-Hexachlorobiphenyl	ng/kg	6	100%	22	8.55	18.8	13.4	35	--	--
		(PCB 146) 2,2',3,4',5,5'-Hexachlorobiphenyl	ng/kg	5	100%	21400	4280	20600	17600	28400	--	--
		(PCB 147/149) 2,2',3,4',5,6-Hexachlorobiphenyl/2,2',3,4',5',6-Hexachlorobiphenyl	ng/kg	11	100%	54700	15900	54900	32100	85000	--	--
		(PCB 148) 2,2',3,4',5,6'-Hexachlorobiphenyl	ng/kg	6	100%	332	81	330	227	454	--	--
		(PCB 15) 4,4'-Dichlorobiphenyl	ng/kg	8	100%	76.8	52.7	68.5	25.7	177	--	--
		(PCB 150) 2,2',3,4',6,6'-Hexachlorobiphenyl	ng/kg	6	100%	272	56.5	279	187	338	--	--
		(PCB 152) 2,2',3,5,6,6'-Hexachlorobiphenyl	ng/kg	6	100%	86.3	21.8	86.9	56.2	119	--	--
		(PCB 153/168) 2,2',4,4',5,5'-Hexachlorobiphenyl/2,3',4,4',5',6-Hexachlorobiphenyl	ng/kg	11	100%	107000	27800	104000	68400	165000	--	--
		(PCB 154) 2,2',4,4',5,6'-Hexachlorobiphenyl	ng/kg	6	100%	2380	502	2410	1620	3040	--	--
		(PCB 155) 2,2',4,4',6,6'-Hexachlorobiphenyl	ng/kg	11	100%	582	332	526	197	1210	--	--
		(PCB 156/157) 2,3,3',4,4',5-Hexachlorobiphenyl/2,3,3',4,4',5'-Hexachlorobiphenyl	ng/kg	11	100%	8810	2020	8340	5550	13300	--	--
		(PCB 158) 2,3,3',4,4',6-Hexachlorobiphenyl	ng/kg	11	100%	7160	2080	6740	4320	11700	--	--
		(PCB 159) 2,3,3',4,5,5'-Hexachlorobiphenyl	ng/kg	11	27%	50.5	128	<24.2	14.1	435	5	24.9
		(PCB 16) 2,2',3-Trichlorobiphenyl	ng/kg	11	100%	4420	1780	3630	2690	7740	--	--
		(PCB 160) 2,3,3',4,5,6-Hexachlorobiphenyl	ng/kg	11	9%	45	11.7	<97	45.1	45.1	20	99.6
		(PCB 161) 2,3,3',4,5',6-Hexachlorobiphenyl	ng/kg	5	0%	<20.4	--	<24.2	--	--	5	24.7
		(PCB 162) 2,3,3',4',5,5'-Hexachlorobiphenyl	ng/kg	11	100%	652	295	637	221	1220	--	--
		(PCB 164) 2,3,3',4',5',6-Hexachlorobiphenyl	ng/kg	9	100%	4720	1350	4700	2730	7050	--	--
		(PCB 165) 2,3,3',5,5',6-Hexachlorobiphenyl	ng/kg	5	100%	95.6	16.7	91.9	80.6	124	--	--
		(PCB 167) 2,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	11	100%	3560	760	3440	2320	5360	--	--
		(PCB 169) 3,3',4,4',5,5'-Hexachlorobiphenyl	ng/kg	11	27%	17.4	22	<24.2	9.29	83	5	24.9
		(PCB 17) 2,2',4-Trichlorobiphenyl	ng/kg	11	100%	8820	3390	7290	5210	15000	--	--
		(PCB 170) 2,2',3,3',4,4',5-Heptachlorobiphenyl	ng/kg	11	100%	17500	4610	17400	10800	27300	--	--
		(PCB 171/173) 2,2',3,3',4,4',6-Heptachlorobiphenyl/2,2',3,3',4,5,6-Heptachlorobiphenyl	ng/kg	5	100%	6250	1590	5860	4500	8580	--	--
		(PCB 172) 2,2',3,3',4,5,5'-Heptachlorobiphenyl	ng/kg	11	100%	4010	1080	4020	2360	6410	--	--
		(PCB 174) 2,2',3,3',4,5,6'-Heptachlorobiphenyl	ng/kg	5	100%	14600	3530	13000	10500	18800	--	--
		(PCB 175) 2,2',3,3',4,5',6-Heptachlorobiphenyl	ng/kg	2	100%	1150	198	1150	1010	1290	--	--
		(PCB 176) 2,2',3,3',4,6,6'-Heptachlorobiphenyl	ng/kg	11	100%	1660	657	1590	747	2810	--	--
		(PCB 177) 2,2',3,3',4',5,6-Heptachlorobiphenyl	ng/kg	5	100%	9700	1900	8870	7520	12200	--	--
		(PCB 178) 2,2',3,3',5,5',6-Heptachlorobiphenyl	ng/kg	9	100%	7180	2120	7230	3710	10900	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs (cont.)	(PCB 179) 2,2',3,3',5,6,6'-Heptachlorobiphenyl	ng/kg	11	100%	6400	2510	6150	2960	10700	--	--
		(PCB 18/30) 2,2',5-Trichlorobiphenyl/2,4,6-Trichlorobiphenyl	ng/kg	11	100%	14500	5560	12100	8150	24500	--	--
		(PCB 180/193) 2,2',3,4,4',5,5'-Heptachlorobiphenyl/2,3,3',4',5,5',6-Heptachlorobiphenyl	ng/kg	10	100%	56000	15900	56700	33300	87500	--	--
		(PCB 181) 2,2',3,4,4',5,6-Heptachlorobiphenyl	ng/kg	5	100%	261	69	240	191	371	--	--
		(PCB 182) 2,2',3,4,4',5,6'-Heptachlorobiphenyl	ng/kg	5	100%	247	66.6	247	175	350	--	--
		(PCB 183/185) 2,2',3,4,4',5',6-Heptachlorobiphenyl/2,2',3,4,5,5',6-Heptachlorobiphenyl	ng/kg	6	100%	18800	4620	17800	14200	26800	--	--
		(PCB 184) 2,2',3,4,4',6,6'-Heptachlorobiphenyl	ng/kg	11	100%	126	65.8	103	63.2	275	--	--
		(PCB 186) 2,2',3,4,5,6,6'-Heptachlorobiphenyl	ng/kg	11	27%	10.2	3.21	<24.2	7.34	9.21	5	24.9
		(PCB 187) 2,2',3,4',5,5',6-Heptachlorobiphenyl	ng/kg	2	100%	50000	7500	50000	44700	55300	--	--
		(PCB 188) 2,2',3,4',5,6,6'-Heptachlorobiphenyl	ng/kg	11	100%	191	60.8	180	124	329	--	--
		(PCB 189) 2,3,3',4,4',5,5'-Heptachlorobiphenyl	ng/kg	9	100%	846	225	826	480	1300	--	--
		(PCB 19) 2,2',6-Trichlorobiphenyl	ng/kg	11	100%	2060	561	1910	1230	3070	--	--
		(PCB 190) 2,3,3',4,4',5,6-Heptachlorobiphenyl	ng/kg	11	100%	4130	1060	4190	2490	6350	--	--
		(PCB 191) 2,3,3',4,4',5',6-Heptachlorobiphenyl	ng/kg	11	100%	777	206	761	516	1240	--	--
		(PCB 192) 2,3,3',4,5,5',6-Heptachlorobiphenyl	ng/kg	7	43%	13.5	8.19	<23.9	9.09	29	5	24.8
		(PCB 194) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl	ng/kg	11	100%	9610	2350	9290	6530	14700	--	--
		(PCB 195) 2,2',3,3',4,4',5,6-Octachlorobiphenyl	ng/kg	11	100%	3480	918	3470	2240	5380	--	--
		(PCB 196) 2,2',3,3',4,4',5,6'-Octachlorobiphenyl	ng/kg	11	100%	5360	1620	4960	3300	9080	--	--
		(PCB 197/200) 2,2',3,3',4,4',6,6'-Octachlorobiphenyl/2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ng/kg	7	100%	1190	370	1100	812	1790	--	--
		(PCB 198/199) 2,2',3,3',4,5,5',6-Octachlorobiphenyl/2,2',3,3',4,5,5',6'-Octachlorobiphenyl	ng/kg	11	100%	15300	4770	14600	8610	25600	--	--
		(PCB 2) 3-Chlorobiphenyl	ng/kg	11	91%	8.36	3.42	9.07	4.54	15.9	9.96	9.96
		(PCB 20/28) 2,3,3'-Trichlorobiphenyl/2,4,4'-Trichlorobiphenyl	ng/kg	11	100%	42500	13900	37900	29100	68200	--	--
		(PCB 201) 2,2',3,3',4,5',6,6'-Octachlorobiphenyl	ng/kg	11	100%	1760	568	1590	980	2970	--	--
		(PCB 202) 2,2',3,3',5,5',6,6'-Octachlorobiphenyl	ng/kg	11	100%	5930	1130	5850	4280	8520	--	--
		(PCB 203) 2,2',3,4,4',5,5',6-Octachlorobiphenyl	ng/kg	11	100%	10200	3240	9910	5800	17300	--	--
		(PCB 204) 2,2',3,4,4',5,6,6'-Octachlorobiphenyl	ng/kg	11	91%	21.3	11.6	21.3	12.1	46.6	5	5
		(PCB 205) 2,3,3',4,4',5,5',6-Octachlorobiphenyl	ng/kg	11	100%	487	136	505	281	805	--	--
		(PCB 206) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	ng/kg	7	100%	7440	1700	7370	5370	10800	--	--
		(PCB 207) 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	ng/kg	11	100%	698	179	668	462	1120	--	--
		(PCB 208) 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	ng/kg	11	100%	2410	572	2410	1580	3720	--	--
		(PCB 209) Decachlorobiphenyl	ng/kg	11	100%	3180	672	3200	2080	4770	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs (cont.)	(PCB 21/33) 2,3,4-Trichlorobiphenyl/2',3,4-Trichlorobiphenyl	ng/kg	11	100%	5700	1530	5750	3800	8430	--	--
		(PCB 22) 2,3,4'-Trichlorobiphenyl	ng/kg	11	100%	9540	2490	8620	6570	14100	--	--
		(PCB 23) 2,3,5-Trichlorobiphenyl	ng/kg	11	100%	18.7	3.79	19.1	13.6	25	--	--
		(PCB 24) 2,3,6-Trichlorobiphenyl	ng/kg	11	18%	23.6	42.8	<9.7	103	117	2	9.96
		(PCB 25) 2,3',4-Trichlorobiphenyl	ng/kg	11	100%	5580	2440	5630	3000	10300	--	--
		(PCB 26/29) 2,3',5-Trichlorobipheny/2,4,5-Trichlorobiphenyl	ng/kg	11	100%	8240	2750	8500	4860	13500	--	--
		(PCB 27) 2,3',6-Trichlorobiphenyl	ng/kg	11	100%	2190	682	2120	1260	3200	--	--
		(PCB 3) 4-Monochlorobiphenyl	ng/kg	11	100%	17.1	7.33	15.7	7.15	32.1	--	--
		(PCB 31) 2,4',5-Trichlorobiphenyl	ng/kg	11	100%	23300	8070	21600	14400	38900	--	--
		(PCB 32) 2,4',6-Trichlorobiphenyl	ng/kg	11	100%	6830	2050	6570	4380	10500	--	--
		(PCB 34) 2,3',5'-Trichlorobiphenyl	ng/kg	11	100%	321	132	302	193	563	--	--
		(PCB 35) 3,3',4-Trichlorobiphenyl	ng/kg	11	64%	25.9	23.8	9.96	7.74	62.2	9.67	9.96
		(PCB 36) 3,3',5-Trichlorobiphenyl	ng/kg	11	36%	543	782	<9.9	1090	1910	2	9.96
		(PCB 37) 3,4,4'-Trichlorobiphenyl	ng/kg	11	100%	991	356	1160	395	1390	--	--
		(PCB 38) 3,4,5-Trichlorobiphenyl	ng/kg	11	100%	33.3	9.9	29.8	20.4	49.2	--	--
		(PCB 39) 3,4',5-Trichlorobiphenyl	ng/kg	11	100%	195	67.8	186	111	317	--	--
		(PCB 4) 2,2'-Dichlorobiphenyl	ng/kg	11	100%	2750	886	2690	1340	4430	--	--
		(PCB 40/71) 2,2',3,3'-Tetrachlorobiphenyl/2,3',4',6-Tetrachlorobiphenyl	ng/kg	11	100%	26200	10700	24100	15900	46200	--	--
		(PCB 41) 2,2',3,4-Tetrachlorobiphenyl	ng/kg	11	100%	1550	489	1420	1010	2410	--	--
		(PCB 42) 2,2',3,4'-Tetrachlorobiphenyl	ng/kg	11	100%	18300	8010	16600	10700	33800	--	--
		(PCB 43) 2,2',3,5-Tetrachlorobiphenyl	ng/kg	11	100%	2520	1020	2350	1420	4580	--	--
		(PCB 44/47/65) 2,2',3,5'-Tetrachlorobiphenyl/2,2',4,4'-Tetrachlorobiphenyl/2,3,5,6-Tetrachlorobiphenyl	ng/kg	11	100%	72800	30100	65000	43600	130000	--	--
		(PCB 45) 2,2',3,6-Tetrachlorobiphenyl	ng/kg	11	100%	4970	2000	4440	3050	8900	--	--
		(PCB 46) 2,2',3,6'-Tetrachlorobiphenyl	ng/kg	11	100%	2200	800	2030	1260	3600	--	--
		(PCB 48) 2,2',4,5-Tetrachlorobiphenyl	ng/kg	11	100%	8620	3050	7680	5300	14400	--	--
		(PCB 49/69) 2,2',4,5'-Tetrachlorobiphenyl/2,3',4,6-Tetrachlorobiphenyl	ng/kg	11	100%	60700	23500	54500	35300	105000	--	--
		(PCB 5) 2,3-Dichlorobiphenyl	ng/kg	11	91%	16.6	3.95	17	10.2	22.5	24.2	24.2
		(PCB 50/53) 2,2',4,6-Tetrachlorobipheny/2,2',5,6'-Tetrachlorobiphenyl	ng/kg	11	100%	9800	3310	8650	5730	15500	--	--
		(PCB 51) 2,2',4,6'-Tetrachlorobiphenyl	ng/kg	11	100%	6510	2530	5780	3780	11100	--	--
		(PCB 52) 2,2',5,5'-Tetrachlorobiphenyl	ng/kg	11	100%	86700	32200	76900	50500	145000	--	--
		(PCB 54) 2,2',6,6'-Tetrachlorobiphenyl	ng/kg	11	100%	328	126	268	182	609	--	--
		(PCB 55) 2,3,3',4-Tetrachlorobiphenyl	ng/kg	11	73%	144	111	197	54.2	309	5	24.2
		(PCB 56) 2,3,3',4'-Tetrachlorobiphenyl	ng/kg	11	100%	18000	5920	17800	11000	28900	--	--
		(PCB 57) 2,3,3',5-Tetrachlorobiphenyl	ng/kg	11	91%	994	1060	351	235	2800	5	5
		(PCB 58) 2,3,3',5'-Tetrachlorobiphenyl	ng/kg	11	100%	362	133	358	201	619	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs (cont.)	(PCB 59/62/75) 2,3,3',6-Tetrachlorobiphenyl/2,3,4,6-Tetrachlorobiphenyl/ 2,4,4',6-	ng/kg	11	100%	5750	2130	5110	3630	10000	--	--
		(PCB 6) 2,3'-Dichlorobiphenyl	ng/kg	11	100%	848	300	845	428	1460	--	--
		(PCB 60) 2,3,4,4'-Tetrachlorobiphenyl	ng/kg	11	100%	7900	2000	7650	5720	12300	--	--
		(PCB 61/70/74/76) 2,3,4,5-Tetrachlorobiphenyl/2,3',4',5-Tetrachlorobiphenyl/2,4,4',5-Tetrachlorobiphenyl/2,3',4',5'-	ng/kg	11	100%	105000	35400	101000	70300	170000	--	--
		(PCB 63) 2,3,4',5-Tetrachlorobiphenyl	ng/kg	11	100%	3150	922	2960	2190	5210	--	--
		(PCB 64) 2,3,4',6-Tetrachlorobiphenyl	ng/kg	11	100%	27100	11200	24600	16200	48600	--	--
		(PCB 66) 2,3',4,4'-Tetrachlorobiphenyl	ng/kg	11	100%	70200	23400	63100	46000	115000	--	--
		(PCB 67) 2,3',4,5-Tetrachlorobiphenyl	ng/kg	11	100%	1580	606	1400	1010	2750	--	--
		(PCB 68) 2,3',4,5'-Tetrachlorobiphenyl	ng/kg	11	100%	1030	292	1010	697	1640	--	--
		(PCB 7) 2,4-Dichlorobiphenyl	ng/kg	11	100%	72.8	16.2	70.3	42.8	98.9	--	--
		(PCB 72) 2,3',5,5'-Tetrachlorobiphenyl	ng/kg	11	100%	1400	411	1360	950	2240	--	--
		(PCB 73) 2,3',5',6-Tetrachlorobiphenyl	ng/kg	11	55%	121	112	147	147	283	5	24.7
		(PCB 77) 3,3',4,4'-Tetrachlorobiphenyl	ng/kg	11	100%	3080	910	3070	1980	4890	--	--
		(PCB 78) 3,3',4,5-Tetrachlorobiphenyl	ng/kg	11	18%	88.1	175	<24.2	351	518	5	24.9
		(PCB 79) 3,3',4,5'-Tetrachlorobiphenyl	ng/kg	11	100%	510	129	493	346	760	--	--
		(PCB 8) 2,4'-Dichlorobiphenyl	ng/kg	11	100%	2000	420	1970	1300	2640	--	--
		(PCB 80) 3,3',5,5'-Tetrachlorobiphenyl	ng/kg	11	27%	10.7	3.59	<24.2	7.03	15.5	5	24.9
		(PCB 81) 3,4,4',5-Tetrachlorobiphenyl	ng/kg	7	86%	124	72.3	114	85.6	231	24.6	24.6
		(PCB 82) 2,2',3,3',4-Pentachlorobiphenyl	ng/kg	11	100%	5730	2490	5090	2990	10200	--	--
		(PCB 83) 2,2',3,3',5-Pentachlorobiphenyl	ng/kg	11	91%	3120	1490	3040	2040	5620	47.8	47.8
		(PCB 84) 2,2',3,3',6-Pentachlorobiphenyl	ng/kg	11	100%	13000	5130	11400	7080	22300	--	--
		(PCB 85/116/117) 2,2',3,4,4'-PeCB/2,3,4,5,6-PeCB/2,3,4',5,6-PeCB	ng/kg	11	100%	15700	6010	14300	9040	28700	--	--
		(PCB 86/87/97/109/119/125) 2,2',3,4,5-PeCB/2,2',3,4,5'-PeCB/2,2',3',4,5-PeCB/2,3,3',4,6-PeCB/2,3',4,4',6-PeCB/2',3,4,5,6'-PeCB	ng/kg	11	100%	45000	17000	40600	24200	78700	--	--
		(PCB 88) 2,2',3,4,6-Pentachlorobiphenyl	ng/kg	11	18%	18.8	17.6	<24.2	47.9	59.4	5	24.9
		(PCB 89) 2,2',3,4,6'-Pentachlorobiphenyl	ng/kg	11	100%	807	332	710	406	1430	--	--
		(PCB 9) 2,5-Dichlorobiphenyl	ng/kg	11	100%	114	30	110	69.1	160	--	--
		(PCB 90/101/113) 2,2',3,4',5-Pentachlorobiphenyl/2,2',4,5,5'-Pentachlorobiphenyl/2,3,3',5',6-Pentachlorobiphenyl	ng/kg	11	100%	89700	33000	86200	49000	153000	--	--
		(PCB 91) 2,2',3,4',6-Pentachlorobiphenyl	ng/kg	6	100%	10400	2090	10400	7600	13000	--	--
		(PCB 92) 2,2',3,5,5'-Pentachlorobiphenyl	ng/kg	6	100%	21200	5030	19900	15900	28900	--	--
		(PCB 93/100) 2,2',3,5,6-Pentachlorobiphenyl/2,2',4,4',6-Pentachlorobiphenyl	ng/kg	11	100%	3400	1500	2850	1810	6350	--	--
		(PCB 94) 2,2',3,5,6'-Pentachlorobiphenyl	ng/kg	11	100%	898	390	738	516	1600	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs (cont.)	(PCB 95) 2,2',3,5',6-Pentachlorobiphenyl	ng/kg	11	100%	46400	13000	45400	30600	69500	--	--
		(PCB 96) 2,2',3,6,6'-Pentachlorobiphenyl	ng/kg	9	100%	561	292	449	277	1070	--	--
		(PCB 98/102) 2,2',3,4',6'-Pentachlorobiphenyl/2,2',4,5,6'-Pentachlorobiphenyl	ng/kg	11	100%	4330	1850	3650	2460	7910	--	--
		(PCB 99) 2,2',4,4',5-Pentachlorobiphenyl	ng/kg	9	100%	57400	31000	55900	3500	111000	--	--
		Aroclor-1016 (PCB-1016)	µg/kg	4	0%	<170	--	<170	--	--	170	170
		Aroclor-1221 (PCB-1221)	µg/kg	4	0%	<170	--	<170	--	--	170	170
		Aroclor-1232 (PCB-1232)	µg/kg	4	0%	<170	--	<170	--	--	170	170
		Aroclor-1242 (PCB-1242)	µg/kg	4	0%	<170	--	<170	--	--	170	170
		Aroclor-1248 (PCB-1248)	µg/kg	4	100%	450	46.2	450	410	490	--	--
		Aroclor-1254 (PCB-1254)	µg/kg	4	100%	465	26.5	460	440	500	--	--
		Aroclor-1260 (PCB-1260)	µg/kg	4	100%	243	102	235	150	350	--	--
		Aroclor-1262 (PCB-1262)	µg/kg	4	0%	<170	--	<170	--	--	170	170
		Aroclor-1268 (PCB-1268)	µg/kg	4	0%	<170	--	<170	--	--	170	170
		Total PCB congeners (NOAA 1989)	ng/kg	11	100%	1590000	483000	1560000	978000	2570000	--	--
		Total PCB congeners (NOAA 1989) (ND*0.5)	ng/kg	11	100%	1590000	483000	1560000	978000	2570000	--	--
		Total PCB congeners (NOAA 1989) (ND*1)	ng/kg	11	100%	1590000	483000	1560000	978000	2570000	--	--
		Total PCBs (7)	µg/kg	4	100%	1150	173	1150	1000	1300	--	--
		Total PCBs (7) (ND*0.5)	µg/kg	4	100%	1500	183	1500	1300	1700	--	--
		Total PCBs (7) (ND*1)	µg/kg	4	100%	1850	173	1850	1700	2000	--	--
		Total PCBs (9)	µg/kg	4	100%	1150	173	1150	1000	1300	--	--
		Total PCBs (9) (ND*0.5)	µg/kg	4	100%	1680	206	1650	1500	1900	--	--
		Total PCBs (9) (ND*1)	µg/kg	4	100%	2180	206	2150	2000	2400	--	--
		Total PCBs congener (209 specified)	ng/kg	11	100%	1750000	581000	1700000	1010000	2910000	--	--
		Total PCBs congener (209 specified) (ND*0.5)	ng/kg	11	100%	1750000	581000	1700000	1010000	2910000	--	--
		Total PCBs congener (209 specified) (ND*1)	ng/kg	11	100%	1750000	581000	1700000	1010000	2910000	--	--
		Total WHO PCB TEQ(Bird)(ND=0)	ng/kg	11	100%	206	78.4	185	119	364	--	--
		Total WHO PCB TEQ(Bird)(ND=0.5)	ng/kg	11	100%	206	78.5	185	119	364	--	--
		Total WHO PCB TEQ(Bird)(ND=1)	ng/kg	11	100%	206	78.5	185	119	364	--	--
		Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	11	100%	2.97	1.72	2.18	0.745	6.09	--	--
		Total WHO PCB TEQ(Fish)(ND=0.5)	ng/kg	11	100%	2.97	1.72	2.18	0.745	6.09	--	--
		Total WHO PCB TEQ(Fish)(ND=1)	ng/kg	11	100%	2.97	1.72	2.18	0.745	6.09	--	--
		Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	11	100%	44.2	31.1	27.3	3.59	96.5	--	--
		Total WHO PCB	ng/kg	11	100%	44.5	31.1	27.7	3.59	96.9	--	--
		Total WHO PCB TEQ(Human/Mammal)(ND=1)	ng/kg	11	100%	44.7	31.1	28.1	3.59	97.3	--	--
		Total WHO PCB/Dioxin TEQ(Bird)(ND=0)	ng/kg	11	100%	283	113	255	149	511	--	--
		Total WHO PCB/Dioxin TEQ(Bird)(ND=0.5)	ng/kg	11	100%	284	113	258	152	511	--	--
		Total WHO PCB/Dioxin TEQ(Bird)(ND=1)	ng/kg	11	100%	285	113	260	154	511	--	--
		Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	11	100%	62.6	36.3	56.2	15.5	127	--	--
		Total WHO PCB/Dioxin TEQ(Fish)(ND=0.5)	ng/kg	11	100%	63.7	36.1	58.7	18	128	--	--
		Total WHO PCB/Dioxin TEQ(Fish)(ND=1)	ng/kg	11	100%	64.7	36	60.3	20.4	130	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PCBs (cont.)	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	11	100%	102	60.7	79.9	17.5	213	--	--
		Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0.5)	ng/kg	11	100%	103	60.4	82.5	20	213	--	--
		Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=1)	ng/kg	11	100%	104	60.3	85	22.5	214	--	--
		Total decachlorobiphenyl	ng/kg	11	100%	3180	672	3200	2080	4770	--	--
		Total dichlorobiphenyl	ng/kg	11	100%	6520	1740	6250	3540	10000	--	--
		Total heptachlorobiphenyl	ng/kg	11	100%	126000	63200	112000	46000	222000	--	--
		Total hexachlorobiphenyl	ng/kg	11	100%	362000	101000	356000	214000	558000	--	--
		Total monochlorobiphenyl	ng/kg	11	100%	244	192	278	7.15	472	--	--
		Total nonachlorobiphenyl	ng/kg	11	100%	7850	4510	9290	2040	15600	--	--
		Total octachlorobiphenyl	ng/kg	11	100%	52800	14800	52100	32900	86200	--	--
		Total pentachlorobiphenyl	ng/kg	11	100%	509000	178000	463000	269000	868000	--	--
		Total tetrachlorobiphenyl	ng/kg	11	100%	548000	199000	521000	343000	926000	--	--
		Total trichlorobiphenyl	ng/kg	11	100%	136000	44300	135000	88700	221000	--	--
	Pesticides	2,4'-DDD	pg/g	11	100%	76600	55000	55400	14600	180000	--	--
		2,4'-DDE	pg/g	11	100%	20000	11700	17500	6540	52300	--	--
		2,4'-DDT	pg/g	11	100%	3040	2310	2930	364	6340	--	--
		4,4'-DDD	pg/g	11	100%	189000	110000	184000	63300	418000	--	--
		4,4'-DDE	pg/g	11	100%	168000	68300	150000	93300	357000	--	--
		4,4'-DDT	pg/g	11	100%	9550	6990	7720	1360	22200	--	--
		Aldrin	pg/g	11	82%	88.2	54.3	96	37.4	188	38.5	39.2
		Dieldrin	pg/g	11	100%	17100	5220	20700	8200	21700	--	--
		Endosulfan I	pg/g	10	10%	243	459	<196	1550	1550	190	198
		Endosulfan II	pg/g	9	0%	<600	--	<196	--	--	189	3850
		Endosulfan sulfate	pg/g	11	0%	<193.8	--	<194	--	--	189	198
		Endrin	pg/g	11	9%	61.2	109	<39.2	120	120	38.5	755
		Endrin aldehyde	pg/g	11	0%	<193.8	--	<194	--	--	189	198
		Endrin ketone	pg/g	8	13%	126	83	<192	331	331	189	198
		Heptachlor	pg/g	11	18%	19.8	1.17	<38.5	20.4	23.1	37.7	39.6
		Heptachlor endo-epoxide	pg/g	11	0%	<38.8	--	<38.8	--	--	37.7	39.6
		Heptachlor epoxide	pg/g	11	100%	3730	1410	3890	1850	5720	--	--
		Hexachlorobenzene	pg/g	11	100%	2470	628	2380	1580	3520	--	--
		Methoxychlor	pg/g	11	0%	<38.8	--	<38.8	--	--	37.7	39.6
		Mirex	pg/g	11	100%	780	392	665	377	1500	--	--
		Oxychlordane	pg/g	11	100%	6450	2720	6020	3400	12400	--	--
		Total BHC Compounds	pg/g	11	100%	306	160	354	80.2	513	--	--
		Total Chlordane (ND=0)	pg/g	11	100%	84700	27800	93400	46100	138000	--	--
		Total Chlordane (ND=1)	pg/g	11	100%	84800	27800	93500	46200	138000	--	--
		Total Chlordane (ND=1/2)	pg/g	11	100%	84800	27800	93400	46100	138000	--	--
		Total DDx (2,4 & 4,4) Total Fraction	pg/g	11	100%	464000	234000	400000	180000	1000000	--	--
		Total DDx (2,4 & 4,4) Total Fraction (ND*0.5)	pg/g	11	100%	464000	234000	400000	180000	1000000	--	--

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	Pesticides (cont.)	Total DDx (2,4 & 4,4) Total Fraction (ND*1)	pg/g	11	100%	464000	234000	400000	180000	1000000	--	--
		Total DDx (2,4) Total Fraction	pg/g	11	100%	99500	66400	70000	22000	240000	--	--
		Total DDx (2,4) Total Fraction (ND*0.5)	pg/g	11	100%	99500	66400	70000	22000	240000	--	--
		Total DDx (2,4) Total Fraction (ND*1)	pg/g	11	100%	99500	66400	70000	22000	240000	--	--
		Total DDx (4,4) Total Fraction	pg/g	11	100%	369000	178000	330000	160000	800000	--	--
		Total DDx (4,4) Total Fraction (ND*0.5)	pg/g	11	100%	369000	178000	330000	160000	800000	--	--
		Total DDx (4,4) Total Fraction (ND*1)	pg/g	11	100%	369000	178000	330000	160000	800000	--	--
		Total alpha + gamma chlordane	pg/g	11	100%	34000	15600	37000	12000	69000	--	--
		Total alpha + gamma chlordane (ND*0.5)	pg/g	11	100%	34000	15600	37000	12000	69000	--	--
		Total alpha + gamma chlordane (ND*1)	pg/g	11	100%	34000	15600	37000	12000	69000	--	--
		alpha-BHC	pg/g	10	90%	169	115	201	46.5	357	38.5	38.5
		alpha-Chlordane	pg/g	11	100%	27700	13600	29900	7460	57600	--	--
		beta-BHC	pg/g	11	100%	105	38.8	118	50.9	163	--	--
		cis-Nonachlor	pg/g	11	100%	12600	4640	13700	7260	19800	--	--
		delta-BHC	pg/g	9	0%	<364	--	<39.2	--	--	38.5	784
		gamma-BHC (lindane)	pg/g	11	73%	54.4	38.6	39.2	26.5	126	38.5	39.2
		gamma-Chlordane	pg/g	11	100%	6300	2260	6070	3550	10900	--	--
		trans-Nonachlor	pg/g	11	100%	27900	5790	28700	19000	38600	--	--
	PAHs	1-Methylnaphthalene	µg/kg	11	45%	11	4.9	<13	5.5	12	13	33
		2-Methylnaphthalene	µg/kg	11	36%	11	4.8	<13	5.8	13	13	33
		Acenaphthene	µg/kg	11	64%	14	5.4	19	6.9	25	33	33
		Acenaphthylene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Anthracene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Benzo(a)anthracene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Benzo(a)pyrene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Benzo(b)fluoranthene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Benzo(e)pyrene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Benzo(g,h,i)perylene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C1-Chrysenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C1-Fluoranthenes/Pyrenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C1-Fluorenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C1-Naphthalenes	µg/kg	11	18%	12	4.8	<16	8.5	16	13	33
		C1-Phenanthrenes/Anthracenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C2-Chrysenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C2-Fluoranthenes/Pyrenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C2-Fluorenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C2-Naphthalenes	µg/kg	11	73%	17	6.3	16	10	32	33	33
		C2-Phenanthrenes/Anthracenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C3-Chrysenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C3-Fluoranthenes/Pyrenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C3-Fluorenes	µg/kg	11	0%	<20	--	<13	--	--	13	33

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	PAHs (cont.)	C3-Naphthalenes	µg/kg	11	64%	15	5.6	20	6.8	26	33	33
		C3-Phenanthrenes/Anthracenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C4-Chrysenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C4-Naphthalenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		C4-Phenanthrenes/Anthracenes	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Chrysene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Dibenz(a,h)anthracene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Fluoranthene	µg/kg	11	73%	13	4.9	14	5.5	20	13	33
		Fluorene	µg/kg	11	55%	12	4.7	13	6.1	16	13	33
		Indeno(1,2,3-cd)pyrene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Naphthalene	µg/kg	11	9%	11	6.6	<13	26	26	13	33
		Perylene	µg/kg	11	18%	20	26	<13	69	74	13	33
		Phenanthrene	µg/kg	11	64%	15	6.1	20	6.6	29	33	33
		Pyrene	µg/kg	11	0%	<20	--	<13	--	--	13	33
		Total Alkylated PAHs	µg/kg	11	73%	28	18	33	15	74	33	33
		Total HMW PAHs	µg/kg	11	73%	13	4.9	14	5.5	20	13	33
		Total HMW PAHs (ND*0.5)	µg/kg	11	73%	74	54	67	64	170	13	33
		Total HMW PAHs (ND*1)	µg/kg	11	73%	140	110	130	120	320	13	33
		Total LMW PAHs	µg/kg	11	73%	33	22	33	14	83	33	33
		Total LMW PAHs (ND*0.5)	µg/kg	11	73%	58	37	55	46	130	33	33
		Total LMW PAHs (ND*1)	µg/kg	11	73%	82	59	79	74	220	33	33
		Total PAH	µg/kg	11	91%	39	27	33	14	100	33	33
		Total PAH (ND*0.5)	µg/kg	11	91%	170	88	130	110	290	33	33
		Total PAH (ND*1)	µg/kg	11	91%	300	180	210	200	550	33	33
	Semivolatiles	1,2,4,5-Tetrachlorobenzene	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		1,2-Diphenylhydrazine	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2,3,4,6-Tetrachlorophenol	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		2,4,5-Trichlorophenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2,4,6-Trichlorophenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2,4-Dichlorophenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2,4-Dimethylphenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2,4-Dinitrophenol	µg/kg	11	0%	<17800	--	<20000	--	--	3900	30000
		2,4-Dinitrotoluene	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		2,6-Dinitrotoluene	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2-Chloronaphthalene	µg/kg	11	0%	<590	--	<660	--	--	130	990
		2-Chlorophenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2-Methylphenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2-Nitroaniline	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		2-Nitrophenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		3,3'-Dichlorobenzidine	µg/kg	11	0%	<5960	--	<6600	--	--	1300	10000

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	Semivolatiles (cont.)	3-Nitroaniline	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		4,6-Dinitro-2-methylphenol	µg/kg	11	0%	<8920	--	<9900	--	--	2000	15000
		4-Bromophenyl phenyl ether	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		4-Chloro-3-methylphenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		4-Chloroaniline	µg/kg	11	0%	<1174	--	<1300	--	--	260	2000
		4-Chlorophenyl phenyl ether	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		4-Methylphenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		4-Nitroaniline	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		4-Nitrophenol	µg/kg	11	0%	<8920	--	<9900	--	--	2000	15000
		Acetophenone	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Atrazine	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Benzaldehyde	µg/kg	11	55%	1940	552	2900	1300	2900	3200	5000
		Benzidine	µg/kg	11	0%	<47400	--	<66000	--	--	2000	100000
		Benzoic acid	µg/kg	11	0%	<8920	--	<9900	--	--	2000	15000
		Biphenyl (1,1-Biphenyl)	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Butyl benzylphthalate (BBP)	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Caprolactam	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Carbazole	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Di-n-butylphthalate (DBP)	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Di-n-octyl phthalate (DnOP)	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Dibenzofuran	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Diethyl phthalate	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Dimethyl phthalate	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Hexachlorobutadiene	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Hexachlorocyclopentadiene	µg/kg	11	0%	<8920	--	<9900	--	--	2000	15000
		Hexachloroethane	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		Isophorone	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		N-Nitrosodi-n-propylamine	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		N-Nitrosodiphenylamine	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Nitrobenzene	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Pentachlorophenol	µg/kg	11	0%	<3040	--	<3400	--	--	670	5100
		Phenol	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		Pyridine	µg/kg	11	0%	<2960	--	<3300	--	--	650	5000
		bis(2-Chloroethoxy)methane	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		bis(2-Chloroethyl)ether	µg/kg	11	0%	<596	--	<660	--	--	130	1000
		bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	11	0%	<3040	--	<3400	--	--	670	5100
	Metals	Aluminum	mg/kg	10	60%	143	215	71.2	59.9	692	16.4	19
		Antimony	mg/kg	10	0%	<1.722	--	<0.747	--	--	0.164	10
		Arsenic	mg/kg	10	100%	3.07	4.67	1.51	1.05	16.3	--	--
		Barium	mg/kg	10	10%	1.74	2.99	<1.06	1.23	1.23	0.328	20
		Beryllium	mg/kg	10	0%	<0.86	--	<0.374	--	--	0.082	5
		Cadmium	mg/kg	10	60%	0.481	0.721	0.223	0.12	0.245	0.588	5

Table 4-7k
Phase III Tissue Chemistry Summary Statistics: White Perch (Whole-Body and Liver)

Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Frequency of Detection	Arithmetic Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Minimum Non-detect	Maximum Non-detect
Liver (cont.)	Metals (cont.)	Calcium	mg/kg	10	70%	268	292	176	77.8	558	364	2000
		Chromium	mg/kg	10	50%	1.18	1.59	0.715	0.102	5.23	0.367	4
		Cobalt	mg/kg	10	50%	0.428	0.746	0.179	0.0575	0.136	0.222	5
		Copper	mg/kg	10	100%	1940	2130	1300	542	7800	--	--
		Iron	mg/kg	10	100%	150	153	97.6	79.3	580	--	--
		Lead	mg/kg	10	60%	0.818	1.51	0.15	0.0913	0.156	1.05	10
		Magnesium	mg/kg	10	100%	391	289	299	235	1200	--	--
		Manganese	mg/kg	10	80%	2.81	4.12	1.58	1.14	14.2	0.328	0.381
		Mercury	ng/g	10	100%	201	41.5	194	141	282	--	--
		Methyl mercury	ng/g	10	100%	89.2	22.8	83.2	64.1	132	--	--
		Nickel	mg/kg	10	20%	1.73	2.99	<1.5	0.175	0.223	0.377	20
		Potassium	mg/kg	10	100%	6140	5140	4420	3580	20600	--	--
		Selenium	mg/kg	10	100%	51.8	55.4	36.5	15.6	204	--	--
		Silver	mg/kg	10	100%	43.6	42.7	28.8	12	159	--	--
		Sodium	mg/kg	10	100%	1530	1370	1060	770	5350	--	--
		Thallium	mg/kg	10	0%	<0.86	--	<0.374	--	--	0.082	5
		Titanium	mg/kg	10	0%	<17.22	--	<7.47	--	--	1.64	100
		Vanadium	mg/kg	10	90%	0.529	0.695	0.347	0.184	0.376	5	5
		Zinc	mg/kg	10	100%	113	105	83.9	48.8	405	--	--
	Miscellaneous	Lipids	%	11	100%	6.14	1.15	5.8	4.2	8.2	--	--
		Moisture	%	11	100%	70.7	2.77	70.6	65	74.8	--	--

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
BHC = hexachlorocyclohexane
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/g = nanogram per gram
ng/kg = nanogram per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency
Total DDx = sum of DDD, DDE, and DDT
WHO = toxic equivalency
µg/kg = microgram per kilogram
-- = not applicable due to frequency of detection
% = percent

Table 4-8
Lipid Normalization Evaluation of Phase III Tissue Chemistry Data

Group	Species	Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Number of Detects	Frequency of Detection	Raw Data			Lipid Normalized Data		
									Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Bioaccumulation	Polychaete	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	8	8	100%	4.91	5.15	1.0	498	580	1.2
	Polychaete	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	8	8	100%	6.02	5.21	0.9	610	592	1.0
	Polychaete	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	8	100%	5.95	5.16	0.9	602	586	1.0
	Polychaete	Whole body	PCBs	Total PCBs (9)	µg/kg	8	8	100%	62.1	37.6	0.6	6,110	4,190	0.7
	Polychaete	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	8	8	100%	48,300	20,600	0.4	4,730,000	2,160,000	0.5
	Polychaete	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	8	8	100%	0.0614	0.0327	0.5	5.9	2.86	0.5
	Polychaete	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	8	8	100%	0.639	0.474	0.7	60.1	41.9	0.7
	Polychaete	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	8	8	100%	6.08	5.19	0.9	615	591	1.0
	Polychaete	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	8	100%	6.59	5.09	0.8	663	577	0.9
	Polychaete	Whole body	Pesticides	Dieldrin	ng/kg	8	8	100%	1,300	807	0.6	130,000	92,700	0.7
	Polychaete	Whole body	Pesticides	Hexachlorobenzene	ng/kg	8	8	100%	269	174	0.6	26,200	17,900	0.7
	Polychaete	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	8	8	100%	3,050	1,740	0.6	294,000	161,000	0.5
	Polychaete	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	8	8	100%	2,350	1,370	0.6	226,000	124,000	0.5
	Polychaete	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	8	8	100%	914	502	0.5	91,900	54,600	0.6
	Polychaete	Whole body	PAHs	Total HMW PAHs	µg/kg	8	6	75%	20	20.2	1.0	1,850	1,720	0.9
	Polychaete	Whole body	PAHs	Total LMW PAHs	µg/kg	8	0	0%	--	--	--	--	--	--
	Polychaete	Whole body	PAHs	Total PAH	µg/kg	8	6	75%	20	20.2	1.0	1,850	1,720	0.9
Softshell Clam	Softshell Clam	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	18	18	100%	5.18	2.8	0.5	1,870	1,510	0.8
	Softshell Clam	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	18	18	100%	6.37	3.05	0.5	2,320	1,840	0.8
	Softshell Clam	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	18	100%	6.3	3	0.5	2,280	1,790	0.8
	Softshell Clam	Whole body	PCBs	Total PCBs (9)	µg/kg	18	18	100%	68.3	68.1	1.0	23,400	27,400	1.2
	Softshell Clam	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	18	18	100%	102,000	93,400	0.9	34,800,000	38,600,000	1.1
	Softshell Clam	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	18	18	100%	0.102	0.112	1.1	32.4	39.8	1.2
	Softshell Clam	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	18	18	100%	1.28	1.47	1.1	428	556	1.3
	Softshell Clam	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	18	18	100%	6.47	3.04	0.5	2,350	1,850	0.8
	Softshell Clam	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	18	100%	7.59	3.21	0.4	2,710	2,060	0.8
	Softshell Clam	Whole body	Pesticides	Dieldrin	ng/kg	18	18	100%	554	168	0.3	194,000	139,000	0.7
	Softshell Clam	Whole body	Pesticides	Hexachlorobenzene	ng/kg	18	18	100%	234	106	0.5	82,900	64,500	0.8
	Softshell Clam	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	18	18	100%	17,400	15,500	0.9	5,900,000	8,000,000	1.4
	Softshell Clam	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	18	18	100%	12,900	11,300	0.9	4,330,000	5,740,000	1.3
	Softshell Clam	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	18	18	100%	1,930	590	0.3	691,000	524,000	0.8
	Softshell Clam	Whole body	PAHs	Total HMW PAHs	µg/kg	18	18	100%	330	129	0.4	128,000	110,000	0.9
	Softshell Clam	Whole body	PAHs	Total LMW PAHs	µg/kg	18	18	100%	39.9	39.3	1.0	14,500	14,900	1.0
	Softshell Clam	Whole body	PAHs	Total PAH	µg/kg	18	18	100%	368	161	0.4	142,000	121,000	0.9
Blue Crab	Blue Crab	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	37	37	100%	22.5	9.14	0.4	1,270	552	0.4
	Blue Crab	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	37	37	100%	26.4	10.3	0.4	1,480	632	0.4
	Blue Crab	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	37	37	100%	25.9	10	0.4	1,460	619	0.4
	Blue Crab	Whole body	PCBs	Total PCBs (9)	µg/kg	37	29	78%	65.3	31.9	0.5	6,030	4,580	0.8
	Blue Crab	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	37	37	100%	335,000	104,000	0.3	15,400,000	7,290,000	0.5
	Blue Crab	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	37	37	100%	0.804	0.262	0.3	39.3	19.6	0.5
	Blue Crab	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	37	37	100%	10	3.6	0.4	466	248	0.5

Table 4-8
Lipid Normalization Evaluation of Phase III Tissue Chemistry Data

Group	Species	Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Number of Detects	Frequency of Detection	Raw Data			Lipid Normalized Data		
									Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Blue Crab (cont.)	Blue Crab	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	37	37	100%	27.2	10.4	0.4	1,520	646	0.4
	Blue Crab	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	37	37	100%	36	12.6	0.4	1,930	804	0.4
	Blue Crab	Whole body	Pesticides	Dieldrin	ng/kg	36	36	100%	5,220	2,270	0.4	452,000	249,000	0.6
	Blue Crab	Whole body	Pesticides	Hexachlorobenzene	ng/kg	37	37	100%	955	397	0.4	77,800	44,200	0.6
	Blue Crab	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	37	37	100%	104,000	46,300	0.4	7,820,000	5,730,000	0.7
	Blue Crab	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	37	37	100%	103,000	46,200	0.4	7,800,000	5,710,000	0.7
	Blue Crab	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	37	37	100%	1,940	954	0.5	152,000	94,100	0.6
	Blue Crab	Whole body	PAHs	Total HMW PAHs	µg/kg	37	34	92%	31.1	43.3	1.4	3,150	3,340	1.1
	Blue Crab	Whole body	PAHs	Total LMW PAHs	µg/kg	37	35	95%	25.7	61.8	2.4	12,800	61,800	4.8
	Blue Crab	Whole body	PAHs	Total PAH	µg/kg	37	35	95%	53	77.6	1.5	14,000	61,700	4.4
Forage Fish	Atlantic Menhaden	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	2	2	100%	4.33	0.58	0.1	143	133	0.9
	Atlantic Menhaden	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	2	2	100%	6.5	0.948	0.1	190	144	0.8
	Atlantic Menhaden	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	2	2	100%	6.3	0.856	0.1	185	141	0.8
	Atlantic Menhaden	Whole body	PCBs	Total PCBs (9)	µg/kg	2	2	100%	400	99	0.2	11,200	7,560	0.7
	Atlantic Menhaden	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	2	2	100%	533,000	120,000	0.2	15,000,000	10,500,000	0.7
	Atlantic Menhaden	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	2	2	100%	0.46	0.143	0.3	12.4	7.78	0.6
	Atlantic Menhaden	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	2	2	100%	5.52	1.2	0.2	156	110	0.7
	Atlantic Menhaden	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	2	2	100%	6.96	1.09	0.2	202	151	0.7
	Atlantic Menhaden	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	2	2	100%	11.8	2.09	0.2	341	250	0.7
	Atlantic Menhaden	Whole body	Pesticides	Dieldrin	ng/kg	2	2	100%	6,110	3,460	0.6	144,000	54,800	0.4
	Atlantic Menhaden	Whole body	Pesticides	Hexachlorobenzene	ng/kg	2	2	100%	958	569	0.6	22,300	7,790	0.3
	Atlantic Menhaden	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	2	2	100%	223,000	124,000	0.6	5,290,000	2,070,000	0.4
	Atlantic Menhaden	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	2	2	100%	170,000	84,900	0.5	4,170,000	1,880,000	0.5
	Atlantic Menhaden	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	2	2	100%	12,200	5,440	0.4	306,000	154,000	0.5
	Atlantic Menhaden	Whole body	PAHs	Total HMW PAHs	µg/kg	2	2	100%	18	18.4	1.0	806	1,050	1.3
	Atlantic Menhaden	Whole body	PAHs	Total LMW PAHs	µg/kg	2	2	100%	31.3	7.42	0.2	1,070	1,060	1.0
	Atlantic Menhaden	Whole body	PAHs	Total PAH	µg/kg	2	2	100%	49.3	25.8	0.5	1,880	2,120	1.1
	Atlantic Silverside	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	7	7	100%	8.04	2.93	0.4	562	222	0.4
	Atlantic Silverside	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	7	7	100%	8.94	2.99	0.3	626	230	0.4
	Atlantic Silverside	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	7	7	100%	9.02	2.97	0.3	631	228	0.4
	Atlantic Silverside	Whole body	PCBs	Total PCBs (9)	µg/kg	7	6	86%	442	349	0.8	29,500	20,900	0.7
	Atlantic Silverside	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	7	7	100%	684,000	278,000	0.4	46,200,000	14,000,000	0.3
	Atlantic Silverside	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	7	7	100%	0.693	0.473	0.7	46.3	27	0.6
	Atlantic Silverside	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	7	7	100%	8.17	6.43	0.8	546	380	0.7
	Atlantic Silverside	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	7	7	100%	9.64	2.89	0.3	672	221	0.3
	Atlantic Silverside	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	7	7	100%	17.2	6.42	0.4	1,180	382	0.3
	Atlantic Silverside	Whole body	Pesticides	Dieldrin	ng/kg	7	7	100%	2,000	487	0.2	140,000	40,900	0.3
	Atlantic Silverside	Whole body	Pesticides	Hexachlorobenzene	ng/kg	7	7	100%	455	161	0.4	31,700	12,500	0.4
	Atlantic Silverside	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	7	7	100%	147,000	77,300	0.5	10,100,000	5,090,000	0.5
	Atlantic Silverside	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	7	7	100%	134,000	67,600	0.5	9,170,000	4,490,000	0.5
	Atlantic Silverside	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	7	7	100%	3,060	1,020	0.3	213,000	77,400	0.4

Table 4-8
Lipid Normalization Evaluation of Phase III Tissue Chemistry Data

Group	Species	Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Number of Detects	Frequency of Detection	Raw Data			Lipid Normalized Data		
									Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Forage Fish (cont.)	Atlantic Silverside	Whole body	PAHs	Total HMW PAHs	µg/kg	7	3	43%	9.76	7.55	0.8	669	520	0.8
	Atlantic Silverside	Whole body	PAHs	Total LMW PAHs	µg/kg	7	1	14%	7.17	6.38	0.9	466	367	0.8
	Atlantic Silverside	Whole body	PAHs	Total PAH	µg/kg	7	4	57%	9.87	7.44	0.8	676	513	0.8
	Mummichog	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	4	4	100%	9.85	4.7	0.5	369	217	0.6
	Mummichog	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	4	4	100%	11.3	5.77	0.5	423	262	0.6
	Mummichog	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	4	4	100%	11	5.42	0.5	410	248	0.6
	Mummichog	Whole body	PCBs	Total PCBs (9)	µg/kg	4	4	100%	666	623	0.9	20,300	12,500	0.6
	Mummichog	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	4	4	100%	1,180,000	1,460,000	1.2	34,100,000	32,500,000	1.0
	Mummichog	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	4	4	100%	1.84	2.47	1.3	51.9	56.1	1.1
	Mummichog	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	4	4	100%	25	32.3	1.3	715	727	1.0
	Mummichog	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	4	4	100%	13.2	4.97	0.4	475	229	0.5
	Mummichog	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	4	4	100%	36	29.7	0.8	1,130	584	0.5
	Mummichog	Whole body	Pesticides	Dieldrin	ng/kg	4	4	100%	5,280	2,070	0.4	190,000	92,400	0.5
	Mummichog	Whole body	Pesticides	Hexachlorobenzene	ng/kg	4	4	100%	51.2	44.3	0.9	1,910	1,860	1.0
	Mummichog	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	4	4	100%	226,000	175,000	0.8	7,490,000	5,640,000	0.8
	Mummichog	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	4	4	100%	218,000	167,000	0.8	7,260,000	5,430,000	0.7
	Mummichog	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	4	4	100%	5,190	2,150	0.4	183,000	84,900	0.5
	Mummichog	Whole body	PAHs	Total HMW PAHs	µg/kg	4	2	50%	9.24	6.89	0.7	302	202	0.7
	Mummichog	Whole body	PAHs	Total LMW PAHs	µg/kg	4	3	75%	9.75	7.85	0.8	322	257	0.8
	Mummichog	Whole body	PAHs	Total PAH	µg/kg	4	3	75%	14.1	12.4	0.9	493	484	1.0
	Striped Killifish	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	13	13	100%	23.9	11.9	0.5	662	363	0.5
	Striped Killifish	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	13	13	100%	26.5	13.6	0.5	733	414	0.6
	Striped Killifish	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	13	13	100%	25.9	13	0.5	715	396	0.6
	Striped Killifish	Whole body	PCBs	Total PCBs (9)	µg/kg	13	13	100%	1,300	727	0.6	35,500	21,700	0.6
	Striped Killifish	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	13	13	100%	1,230,000	536,000	0.4	33,800,000	14,900,000	0.4
	Striped Killifish	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	13	13	100%	1.15	0.452	0.4	31.6	12.4	0.4
	Striped Killifish	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	13	13	100%	15.3	5.34	0.3	420	150	0.4
	Striped Killifish	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	13	13	100%	27.7	13.7	0.5	765	417	0.5
	Striped Killifish	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	13	13	100%	41.1	15.2	0.4	1,130	457	0.4
	Striped Killifish	Whole body	Pesticides	Dieldrin	ng/kg	13	13	100%	8,700	2,080	0.2	240,000	77,500	0.3
	Striped Killifish	Whole body	Pesticides	Hexachlorobenzene	ng/kg	13	13	100%	43.3	51.8	1.2	1,200	1,490	1.2
	Striped Killifish	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	13	13	100%	250,000	118,000	0.5	7,000,000	3,770,000	0.5
	Striped Killifish	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	13	13	100%	218,000	97,200	0.4	6,080,000	3,130,000	0.5
	Striped Killifish	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	13	13	100%	17,000	8,820	0.5	474,000	267,000	0.6
	Striped Killifish	Whole body	PAHs	Total HMW PAHs	µg/kg	13	9	69%	24.4	28.4	1.2	690	867	1.3
	Striped Killifish	Whole body	PAHs	Total LMW PAHs	µg/kg	13	11	85%	21	27	1.3	585	821	1.4
	Striped Killifish	Whole body	PAHs	Total PAH	µg/kg	13	11	85%	43.1	54.1	1.3	1,210	1,650	1.4
Fish	American Eel	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	18	18	100%	5.57	3.95	0.7	145	71.2	0.5
	American Eel	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	18	18	100%	8.49	4.67	0.6	233	103	0.4
	American Eel	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	18	100%	7.73	4.51	0.6	210	91.4	0.4
	American Eel	Whole body	PCBs	Total PCBs (9)	µg/kg	15	15	100%	461	355	0.8	11,400	6,830	0.6

Table 4-8
Lipid Normalization Evaluation of Phase III Tissue Chemistry Data

Group	Species	Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Number of Detects	Frequency of Detection	Raw Data			Lipid Normalized Data		
									Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Fish (cont.)	American Eel	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	18	18	100%	603,000	315,000	0.5	17,400,000	8,060,000	0.5
	American Eel	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	18	18	100%	0.597	0.575	1.0	17	15.3	0.9
	American Eel	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	18	18	100%	6.32	9.4	1.5	174	245	1.4
	American Eel	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	18	18	100%	9.09	4.89	0.5	250	107	0.4
	American Eel	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18	18	100%	14.1	11.3	0.8	383	265	0.7
	American Eel	Whole body	Pesticides	Dieldrin	ng/kg	18	18	100%	9,760	4,850	0.5	301,000	155,000	0.5
	American Eel	Whole body	Pesticides	Hexachlorobenzene	ng/kg	18	18	100%	3,090	1,250	0.4	101,000	61,500	0.6
	American Eel	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	18	18	100%	256,000	123,000	0.5	9,120,000	7,300,000	0.8
	American Eel	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	18	18	100%	253,000	123,000	0.5	9,000,000	7,210,000	0.8
	American Eel	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	18	18	100%	13,500	7,250	0.5	370,000	211,000	0.6
	American Eel	Whole body	PAHs	Total HMW PAHs	µg/kg	18	7	39%	9.09	5.62	0.6	348	373	1.1
	American Eel	Whole body	PAHs	Total LMW PAHs	µg/kg	18	17	94%	28	31.8	1.1	1,300	2,110	1.6
	American Eel	Whole body	PAHs	Total PAH	µg/kg	18	17	94%	31.8	36.3	1.1	1,440	2,360	1.6
	Summer Flounder	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	8	8	100%	5.49	5.37	1.0	661	484	0.7
	Summer Flounder	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	8	8	100%	6.14	5.69	0.9	749	536	0.7
	Summer Flounder	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	8	100%	6	5.62	0.9	730	526	0.7
	Summer Flounder	Whole body	PCBs	Total PCBs (9)	µg/kg	8	8	100%	89.5	64.1	0.7	9,910	7,680	0.8
	Summer Flounder	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	8	8	100%	287,000	176,000	0.6	41,000,000	35,600,000	0.9
	Summer Flounder	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	8	8	100%	0.333	0.179	0.5	47.4	40	0.8
	Summer Flounder	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	8	8	100%	4.5	2.39	0.5	639	551	0.9
	Summer Flounder	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	8	8	100%	6.48	5.8	0.9	796	563	0.7
	Summer Flounder	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	8	8	100%	10.5	7.22	0.7	1,370	976	0.7
	Summer Flounder	Whole body	Pesticides	Dieldrin	ng/kg	8	8	100%	723	298	0.4	96,300	49,800	0.5
	Summer Flounder	Whole body	Pesticides	Hexachlorobenzene	ng/kg	8	8	100%	249	105	0.4	33,100	16,000	0.5
	Summer Flounder	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	8	8	100%	24,300	12,100	0.5	3,420,000	2,520,000	0.7
	Summer Flounder	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	8	8	100%	22,500	11,000	0.5	3,160,000	2,230,000	0.7
	Summer Flounder	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	8	8	100%	1,790	781	0.4	252,000	149,000	0.6
	Summer Flounder	Whole body	PAHs	Total HMW PAHs	µg/kg	8	0	0%	--	--	--	--	--	--
	Summer Flounder	Whole body	PAHs	Total LMW PAHs	µg/kg	8	1	13%	12.5	5.22	0.4	1,930	1,530	0.8
	Summer Flounder	Whole body	PAHs	Total PAH	µg/kg	8	1	13%	12.5	5.22	0.4	1,930	1,530	0.8
	White Perch	Liver	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	11	11	100%	48.4	32	0.7	852	598	0.7
	White Perch	Liver	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	11	11	100%	59.6	34.9	0.6	1,040	654	0.6
	White Perch	Liver	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	11	11	100%	57.3	33.9	0.6	1000	635	0.6
	White Perch	Liver	PCBs	Total PCBs (9)	µg/kg	4	4	100%	1,150	173	0.2	22,700	3,230	0.1
	White Perch	Liver	PCBs	Total PCBs congener (209 specified)	ng/kg	11	11	100%	1,750,000	581,000	0.3	29,200,000	10,600,000	0.4
	White Perch	Liver	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	11	11	100%	2.97	1.72	0.6	49.7	29.5	0.6
	White Perch	Liver	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	11	11	100%	44.2	31.1	0.7	739	526	0.7
	White Perch	Liver	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	11	11	100%	62.6	36.3	0.6	1,090	679	0.6
	White Perch	Liver	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	11	11	100%	102	60.7	0.6	1,740	1,080	0.6
	White Perch	Liver	Pesticides	Dieldrin	ng/kg	11	11	100%	17,100	5,220	0.3	276,000	68,300	0.2
	White Perch	Liver	Pesticides	Hexachlorobenzene	ng/kg	11	11	100%	2,470	628	0.3	41,700	12,900	0.3

Table 4-8
Lipid Normalization Evaluation of Phase III Tissue Chemistry Data

Group	Species	Tissue Type	Parameter Group	Analyte	Units	Number of Samples	Number of Detects	Frequency of Detection	Raw Data			Lipid Normalized Data		
									Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Fish (cont.)	White Perch	Liver	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	11	11	100%	464,000	234,000	0.5	7,410,000	2,980,000	0.4
	White Perch	Liver	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	11	11	100%	369,000	178,000	0.5	5,930,000	2,280,000	0.4
	White Perch	Liver	Pesticides	Total alpha + gamma chlordane	ng/kg	11	11	100%	34,000	15,600	0.5	562,000	278,000	0.5
	White Perch	Liver	PAHs	Total HMW PAHs	µg/kg	11	8	73%	12.6	4.92	0.4	215	102	0.5
	White Perch	Liver	PAHs	Total LMW PAHs	µg/kg	11	8	73%	33	21.8	0.7	508	247	0.5
	White Perch	Liver	PAHs	Total PAH	µg/kg	11	10	91%	39	27.5	0.7	594	320	0.5
	White Perch	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	27	27	100%	48.5	47.8	1.0	2,090	1,560	0.7
	White Perch	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	27	27	100%	55.3	49.2	0.9	2,400	1,630	0.7
	White Perch	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	27	27	100%	54.1	48.6	0.9	2,340	1,610	0.7
	White Perch	Whole body	PCBs	Total PCBs (9)	µg/kg	26	26	100%	1,820	976	0.5	79,600	46,100	0.6
	White Perch	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	27	27	100%	1,370,000	715,000	0.5	59,000,000	26,800,000	0.5
	White Perch	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	27	27	100%	0.948	0.612	0.6	40.1	18.1	0.5
	White Perch	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	27	27	100%	6.74	7.99	1.2	272	253	0.9
	White Perch	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	27	27	100%	56.3	49.3	0.9	2,440	1,630	0.7
	White Perch	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	27	27	100%	60.9	48.5	0.8	2,610	1,570	0.6
	White Perch	Whole body	Pesticides	Dieldrin	ng/kg	27	27	100%	14,300	6,740	0.5	595,000	200,000	0.3
	White Perch	Whole body	Pesticides	Hexachlorobenzene	ng/kg	27	27	100%	2,240	1,320	0.6	96,600	44,800	0.5
	White Perch	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	27	27	100%	417,000	251,000	0.6	16,900,000	7,980,000	0.5
	White Perch	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	27	27	100%	336,000	188,000	0.6	13,700,000	6,000,000	0.4
	White Perch	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	27	27	100%	52,100	26,800	0.5	2,170,000	928,000	0.4
	White Perch	Whole body	PAHs	Total HMW PAHs	µg/kg	27	7	26%	14.5	5.3	0.4	698	456	0.7
	White Perch	Whole body	PAHs	Total LMW PAHs	µg/kg	27	20	74%	76.2	115	1.5	2,760	2,620	0.9
	White Perch	Whole body	PAHs	Total PAH	µg/kg	27	20	74%	80.5	122	1.5	2,900	2,790	1.0
	Winter Flounder	Whole body	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	10	10	100%	5.44	2.5	0.5	514	172	0.3
	Winter Flounder	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Fish)(ND=0)	ng/kg	10	10	100%	6.1	2.61	0.4	579	178	0.3
	Winter Flounder	Whole body	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	10	10	100%	6.08	2.61	0.4	577	179	0.3
	Winter Flounder	Whole body	PCBs	Total PCBs (9)	µg/kg	10	10	100%	105	81.6	0.8	12,100	11,300	0.9
	Winter Flounder	Whole body	PCBs	Total PCBs congener (209 specified)	ng/kg	10	10	100%	144,000	18,700	0.1	15,000,000	5,630,000	0.4
	Winter Flounder	Whole body	PCBs	Total WHO PCB TEQ(Fish)(ND=0)	ng/kg	10	10	100%	0.181	0.0438	0.2	18.1	5.88	0.3
	Winter Flounder	Whole body	PCBs	Total WHO PCB TEQ(Human/Mammal)(ND=0)	ng/kg	10	10	100%	2.16	0.722	0.3	212	91.1	0.4
	Winter Flounder	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Fish)(ND=0)	ng/kg	10	10	100%	6.28	2.64	0.4	598	180	0.3
	Winter Flounder	Whole body	PCBs	Total WHO PCB/Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	10	10	100%	8.24	3.15	0.4	789	235	0.3
	Winter Flounder	Whole body	Pesticides	Dieldrin	ng/kg	10	10	100%	2,120	549	0.3	222,000	112,000	0.5
	Winter Flounder	Whole body	Pesticides	Hexachlorobenzene	ng/kg	10	10	100%	856	371	0.4	82,800	30,000	0.4
	Winter Flounder	Whole body	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	10	10	100%	32,800	10,600	0.3	3,390,000	1,600,000	0.5
	Winter Flounder	Whole body	Pesticides	Total DDx (4,4) Total Fraction	ng/kg	10	10	100%	30,700	9,710	0.3	3,170,000	1,460,000	0.5
	Winter Flounder	Whole body	Pesticides	Total alpha + gamma chlordane	ng/kg	10	10	100%	6,400	962	0.2	665,000	248,000	0.4
	Winter Flounder	Whole body	PAHs	Total HMW PAHs	µg/kg	10	0	0%	--	--	--	--	--	--
	Winter Flounder	Whole body	PAHs	Total LMW PAHs	µg/kg	10	0	0%	--	--	--	--	--	--
	Winter Flounder	Whole body	PAHs	Total PAH	µg/kg	10	0	0%	--	--	--	--	--	--

Table 4-8
Lipid Normalization Evaluation of Phase III Tissue Chemistry Data

Acronyms and Abbreviations:
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligram per kilogram
ND = nondetect
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picogram per gram
TEQ = toxic equivalency
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
WHO = toxic equivalency
µg/kg = micrograms per kilogram
% = percent
-- = not calculated due to no detected data

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
North Zone				
North	122	122A	Yes	Yes
North	122	122B	Yes	Yes
North	122	122C	Yes	Yes
North	123	123A	Yes	Yes
North	123	123B	Yes	Yes
North	132	132A	Yes	Yes
North	132	132B	Yes	Yes
North	133	133	Yes	Yes
North	136	136	Yes	Yes
North	137	137	--	--
North	138	138	--	--
North	139	139	--	--
North	140	140	Yes	Yes
North	158	158	--	--
North	159	159	--	--
North	160	160	Yes	Yes
North	161	161	Yes	Yes
North	162	162	--	--
North	163	163	--	--
North	164	164	Yes	Yes
North	165	165	--	Yes
North	166	166	--	Yes
North	167	167	--	Yes
North	168	168	--	Yes
North	169	169	--	Yes
North	289	289	--	--
North	290	290	--	--
North	291	291	--	--
North	292	292	--	--
North	293	293	--	--
North	294	294	--	--
North	295	295	--	--
North	300	300	--	--
North	307	307	--	--
North	308	308	--	--
North	309	309	--	--
North	310	310	--	--
North	311	311	--	--
North	312	312	--	--
North	313	313	--	--
North	314	314	--	--

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
North	315	315	--	--
North	316	316	--	--
North	317	317	--	--
North	318	318	--	--
North	319	319	--	--
North	320	320	--	--
North	321	321	--	--
North	322	322	--	--
North	323	323	--	--
North	324	324	--	--
North	325	325	--	--
North	326	326	--	--
North	327	327	--	--
North	328	328	--	--
North	329	329	--	--
North	330	330	--	--
North	331	331	--	--
North	332	332	--	--
North	333	333	--	--
North	334	334	--	--
North	335	335	--	--
North	336	336	--	--
North	337	337	--	--
North	370	370	--	--
North	371	371	--	--
North	372	372	--	Yes
North	373	373	--	--
North	374	374	--	--
North	375	375	--	--
North	376	376	--	--
North	377	377	--	--
North	378	378	--	--
North	379	379	--	--
North	380	380	--	--
North	381	381	--	--
North	382	382	--	--
North	383	383	--	--
North	384	384	--	--
North	385	385	--	--
North	386	386	--	--
North	387	387	--	--
North	388	388	--	--

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
North	389	389	--	--
North	390	390	--	--
North	391	391	--	--
North	392	392	--	--
North	393	393	--	--
North	394	394	--	Yes
North	395	395	--	--
North	396	396	--	--
North	397	397	--	--
North	398	398	--	--
North	399	399	--	--
North	400	400	--	--
North	401	401	--	--
North	402	402	--	Yes
North	403	403	--	--
North	404	404	--	--
North	405	405	--	--
North	406	406	--	--
North	407	407	--	--
North	408	408	--	--
North	409	409	--	--
Southeast Zone				
Southeast	124	124	Yes	Yes
Southeast	125	125	--	Yes
Southeast	127	127A	Yes	Yes
Southeast	127	127B	Yes	Yes
Southeast	141	141	--	--
Southeast	142	142	--	Yes
Southeast	143	143	--	Yes
Southeast	144	144	--	--
Southeast	145	145	--	Yes
Southeast	146	146	--	--
Southeast	156	156	--	--
Southeast	157	157	--	--
Southeast	170	170	--	Yes
Southeast	171	171	--	Yes
Southeast	172	172	--	Yes
Southeast	173	173	--	Yes
Southeast	174	174	--	Yes
Southeast	178	178	--	Yes
Southeast	338	338	--	--
Southeast	339	339	--	--

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
Southeast	340	340	--	--
Southeast	341	341	--	--
Southeast	342	342	--	--
Southeast	343	343	--	--
Southeast	344	344	--	--
Southeast	345	345	--	--
Southeast	346	346	--	--
Southeast	347	347	--	--
Southeast	348	348	--	--
Southeast	349	349	--	--
Southeast	350	350	--	--
Southeast	351	351	--	--
Southeast	352	352	--	--
Southeast	353	353	--	--
Southeast	354	354	--	--
Southeast	355	355	--	--
Southeast	356	356	--	--
Southeast	357	357	--	--
Southeast	358	358	--	--
Southeast	359	359	--	--
Southeast	360	360	--	--
Southeast	361	361	--	--
Southeast	362	362	--	--
Southeast	363	363	--	--
Southeast	364	364	--	--
Southeast	365	365	--	--
Southeast	366	366	--	--
Southeast	367	367	--	--
Southeast	368	368	--	--
Southeast	369	369	--	Yes
Southwest Zone				
Southwest	129	129	Yes	Yes
Southwest	130	130	--	Yes
Southwest	131	131A	--	Yes
Southwest	131	131B	--	Yes
Southwest	134	134	Yes	Yes
Southwest	135	135	--	Yes
Southwest	147	147	--	--
Southwest	148	148	--	--
Southwest	149	149	Yes	Yes
Southwest	150	150	--	--
Southwest	151	151	--	--

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
Southwest	152	152	--	Yes
Southwest	153	153	--	--
Southwest	154	154	--	--
Southwest	155	155	--	Yes
Southwest	175	175	--	Yes
Southwest	176	176	--	--
Southwest	177	177	Yes	Yes
Southwest	179	179	--	--
Southwest	180	180	--	--
Southwest	181	181	--	--
Southwest	182	182	--	--
Southwest	183	183	--	--
Southwest	184	184	--	--
Southwest	185	185	--	--
Southwest	186	186	--	--
Southwest	187	187	--	--
Southwest	188	188	--	--
Southwest	189	189	--	--
Southwest	190	190	--	--
Southwest	191	191	--	--
Southwest	192	192	--	--
Southwest	193	193	--	--
Southwest	194	194	--	--
Southwest	195	195	--	--
Southwest	196	196	--	--
Southwest	197	197	--	--
Southwest	199	199	--	--
Southwest	200	200	--	--
Southwest	201	201	--	--
Southwest	202	202	--	--
Southwest	203	203	--	--
Southwest	204	204	--	--
Southwest	205	205	--	--
Southwest	206	206	--	--
Southwest	207	207	--	--
Southwest	208	208	--	--
Southwest	209	209	--	--

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
Southwest	210	210	--	--
Southwest	211	211	--	--
Southwest	212	212	--	--
Southwest	213	213	--	--
Southwest	214	214	--	--
Southwest	215	215	--	--
Southwest	216	216	--	--
Southwest	217	217	--	--
Southwest	218	218	--	--
Southwest	219	219	--	--
Southwest	220	220	--	--
Southwest	221	221	--	--
Southwest	222	222	--	Yes
Southwest	223	223	--	--
Southwest	224	224	--	--
Southwest	225	225	--	--
Southwest	226	226	--	--
Southwest	227	227	--	--
Southwest	228	228	--	--
Southwest	229	229	--	--
Southwest	230	230	--	--
Southwest	231	231	--	--
Southwest	232	232	--	--
Southwest	233	233	--	--
Southwest	234	234	--	--
Southwest	235	235	--	--
Southwest	236	236	--	--
Southwest	237	237	--	--
Southwest	238	238	--	--
Southwest	239	239	--	--
Southwest	241	241	--	--
Southwest	242	242	--	--
Southwest	243	243	--	--
Southwest	244	244	--	--
Southwest	245	245	--	Yes
Southwest	246	246	--	--
Southwest	247	247	--	--
Southwest	248	248	Yes	Yes
Southwest	249	249	--	--
Southwest	250	250	--	--
Southwest	251	251	--	Yes
Southwest	252	252	--	Yes

Table 4-10
Sediment Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Intertidal Mudflat?	Shoreline?
Other[1]				
	COMP01	COMP01	--	--
--	COMP02	COMP02	--	--
--	COMP03	COMP03	--	--
--	COMP04	COMP04	--	--
--	COMP05	COMP05	--	--
--	COMP06	COMP06	--	--
--	COMP07	COMP07	--	--
--	COMP08	COMP08	--	--
--	COMP09	COMP09	--	--
--	COMP10	COMP10	--	--

Notes:
"--" = Not applicable
[1]Samples collected in regularly dredged deepwater channels

Table 4-11
Tissue Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Tissue Samples Collected											
			Polychaete[a]	Blue Crab	Softshell Clam	American Eel	Atlantic Menhaden	Atlantic Silverside	Mummichog	Striped Killifish	Summer Flounder	White Perch	Winter Flounder	White Perch Liver
North Zone														
North	122	122	--	1	--	--	--	--	--	--	--	--	--	--
North	122	122A	--	--	1	--	--	--	--	1	--	--	--	--
North	122	122B	--	--	1	--	--	--	--	1	--	--	--	--
North	122	122C	--	--	1	--	--	--	1	--	--	--	--	--
North	123	123	--	1	--	--	--	--	--	--	--	--	--	--
North	123	123A	--	--	1	--	--	--	--	1	--	--	--	--
North	123	123B	--	--	1	--	--	--	--	1	--	--	--	--
North	132	132	--	1	--	--	--	--	--	--	--	--	--	--
North	132	132A	--	--	1	--	--	--	--	1	--	--	--	--
North	132	132B	--	--	1	--	--	--	--	1	--	--	--	--
North	133	133	--	1	1	--	--	--	1	--	--	--	--	--
North	136	136	1	--	--	--	--	--	--	--	--	--	--	--
North	138	138	1	--	--	--	--	--	--	--	--	--	--	--
North	160	160	1	--	--	--	--	--	--	--	--	--	--	--
North	161	161	1	--	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR	--	--	--	6	2	1	--	--	2	9	4	3
North	NOR	NOR1	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR2	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR3	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR4	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR5	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR6	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR7	--	1	--	--	--	--	--	--	--	--	--	--
North	NOR	NOR8	--	1	--	--	--	--	--	--	--	--	--	--
Southeast Zone														
Southeast	124	124	--	1	1	--	--	--	--	1	--	--	--	--
Southeast	125	125	--	1	1	--	--	--	--	--	--	--	--	--
Southeast	126	126	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	127	127	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	127	127A	--	--	1	--	--	--	--	1	--	--	--	--
Southeast	127	127B	--	--	1	--	--	--	--	1	--	--	--	--
Southeast	141	141	1	--	--	--	--	--	--	--	--	--	--	--
Southeast	146	146	1	--	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN	--	--	--	6	--	3	--	--	2	9	4	3
Southeast	CEN	CEN1	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN2	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN3	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN4	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN5	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN6	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN7	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	CEN	CEN8	--	1	--	--	--	--	--	--	--	--	--	--
Southeast	SOU	SOU2	--	1	--	--	--	--	--	--	--	--	--	--
Southwest Zone														
Southwest	129	129	--	1	1	--	--	--	1	--	--	--	--	--
Southwest	130	130	--	1	1	--	--	--	--	1	--	--	--	--
Southwest	131	131	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	131	131A	--	--	1	--	--	--	--	1	--	--	--	--
Southwest	131	131B	--	--	1	--	--	--	--	1	--	--	--	--
Southwest	134	134	--	1	1	--	--	--	--	1	--	--	--	--
Southwest	135	135	--	--	1	--	--	--	1	--	--	--	--	--

Table 4-11
Tissue Samples Included in the Risk Assessment

Assessment Zone	Station	Station ID	Tissue Samples Collected											
			Polychaete[a]	Blue Crab	Softshell Clam	American Eel	Atlantic Menhaden	Atlantic Silverside	Mummichog	Striped Killifish	Summer Flounder	White Perch	Winter Flounder	White Perch Liver
Southwest	147	147	1	--	--	--	--	--	--	--	--	--	--	--
Southwest	149	149	1	--	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU	--	--	--	6	--	3	--	--	4	9	2	5
Southwest	SOU	SOU1	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU3	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU4	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU5	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU6	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU7	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU8	--	1	--	--	--	--	--	--	--	--	--	--
Southwest	SOU	SOU9	--	1	--	--	--	--	--	--	--	--	--	--

Notes:
"--" = Tissue sample not collected
[a]=polychaete samples were laboratory-exposed tissue samples, not tissue samples collected from NBSA

Table 4-12
Data Summary for COPECs by BERA Assessment Zone

Analyte Group	Analyte	Units	Zone	Surface Sediment				
				Number of Samples	Number of Detects	Mean of Detects	UCL	UCL Method
Dioxins/ Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	NBSA-Wide	254	254	87.1	137	95% Chebyshev (Mean, Sd) UCL
			North	104	104	118	226	95% Chebyshev (Mean, Sd) UCL
			Southeast	50	50	53.8	84.4	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	76.7	99.1	95% Approximate Gamma UCL
			Maintained Channel	10	10	25.4	36.6	95% Student's-t UCL
PCBs	Total PCBs congener (209 specified)	ng/kg	NBSA-Wide	254	254	480000	669000	95% Chebyshev (Mean, Sd) UCL
			North	104	104	436000	654000	95% H-UCL
			Southeast	50	50	353000	423000	95% Student's-t UCL
			Southwest	90	90	630000	787000	95% Approximate Gamma UCL
			Maintained Channel	10	10	214000	268000	95% Student's-t UCL
Pesticides	Dieldrin	ng/kg	NBSA-Wide	253	240	1830	2700	95% KM (Chebyshev) UCL
			North	104	99	1590	1920	KM H-UCL
			Southeast	49	47	1400	2710	95% KM (Chebyshev) UCL
			Southwest	90	84	2440	4200	KM H-UCL
			Maintained Channel	10	10	1060	1436	95% Student's-t UCL
	Hexachlorobenzene	ng/kg	NBSA-Wide	253	252	2880	4580	95% KM (Chebyshev) UCL
			North	104	103	1720	2660	95% KM (Chebyshev) UCL
			Southeast	49	49	1000	1710	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	5480	15300	95% H-UCL
			Maintained Channel	10	10	658	893	95% Student's-t UCL
	Total Chlordane	ng/kg	NBSA-Wide	253	244	5250	6380	95% KM (Chebyshev) UCL
			North	104	100	4960	5670	95% KM Approximate Gamma UCL
			Southeast	49	46	5440	5920	95% KM (t) UCL
			Southwest	90	88	5500	6510	95% KM Approximate Gamma UCL
			Maintained Channel	10	10	7568	10796	95% Student's-t UCL
	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	NBSA-Wide	254	254	131000	213000	95% Chebyshev (Mean, Sd) UCL
			North	104	104	39200	46800	95% Approximate Gamma UCL
			Southeast	50	50	45300	90800	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	292000	845000	95% H-UCL
			Maintained Channel	10	10	64800	141000	95% Adjusted Gamma UCL

Table 4-12
Data Summary for COPECs by BERA Assessment Zone

Analyte Group	Analyte	Units	Zone	Surface Sediment				
				Number of Samples	Number of Detects	Mean of Detects	UCL	UCL Method
PAHs	Total Alkylated PAHs	µg/kg	NBSA-Wide	254	245	13400	18700	95% KM (Chebyshev) UCL
			North	104	100	9720	13200	95% KM (Chebyshev) UCL
			Southeast	50	48	7350	13600	95% KM (Chebyshev) UCL
			Southwest	90	87	21900	28100	95% KM Approximate Gamma UCL
			Maintained Channel	10	10	4230	5870	95% Student's-t UCL
	Total HMW PAHs	µg/kg	NBSA-Wide	254	252	11000	14300	95% KM (Chebyshev) UCL
			North	104	103	11900	13800	95% KM Approximate Gamma UCL
			Southeast	50	49	8110	13200	95% KM (Chebyshev) UCL
			Southwest	90	90	12000	14800	95% Approximate Gamma UCL
			Maintained Channel	10	10	5440	7680	95% Student's-t UCL
	Total LMW PAHs	µg/kg	NBSA-Wide	254	245	1400	1940	95% KM (Chebyshev) UCL
			North	104	100	1190	1350	95% KM Approximate Gamma UCL
			Southeast	50	48	1200	2330	95% KM (Chebyshev) UCL
			Southwest	90	87	1830	3160	95% KM (Chebyshev) UCL
			Maintained Channel	10	10	708	1010	95% Student's-t UCL
	Total PAH	µg/kg	NBSA-Wide	254	252	12300	16100	95% KM (Chebyshev) UCL
			North	104	103	13100	15200	95% KM Approximate Gamma UCL
			Southeast	50	49	9270	15400	95% KM (Chebyshev) UCL
			Southwest	90	90	13800	17000	95% Approximate Gamma UCL
			Maintained Channel	10	10	6150	8680	95% Student's-t UCL
Metals	Arsenic	mg/kg	NBSA-Wide	254	254	18.3	22.9	95% Chebyshev (Mean, Sd) UCL
			North	104	104	12.6	15.8	95% Chebyshev (Mean, Sd) UCL
			Southeast	50	50	17.3	27.1	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	25.8	29.8	95% Approximate Gamma UCL
			Maintained Channel	10	10	14.2	15.9	95% Student's-t UCL
	Cadmium	mg/kg	NBSA-Wide	254	252	2.08	2.96	95% KM (Chebyshev) UCL
			North	104	104	1.22	1.47	95% H-UCL
			Southeast	50	48	1.09	1.36	KM H-UCL
			Southwest	90	90	3.74	4.64	95% Approximate Gamma UCL
			Maintained Channel	10	10	0.858	1.10	95% Student's-t UCL
	Chromium	mg/kg	NBSA-Wide	254	254	123	139	95% H-UCL
			North	104	104	117	137	95% H-UCL
			Southeast	50	50	104	137	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	145	170	95% Approximate Gamma UCL
			Maintained Channel	10	10	77.1	93.0	95% Student's-t UCL

Table 4-12
Data Summary for COPECs by BERA Assessment Zone

Analyte Group	Analyte	Units	Zone	Surface Sediment				
				Number of Samples	Number of Detects	Mean of Detects	UCL	UCL Method
Metals (cont.)	Copper	mg/kg	NBSA-Wide	254	254	149	191	95% Chebyshev (Mean, Sd) UCL
			North	104	104	96.4	110	95% Approximate Gamma UCL
			Southeast	50	50	112	156	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	237	282	95% Approximate Gamma UCL
			Maintained Channel	10	10	89.2	110	95% Student's-t UCL
	Lead	mg/kg	NBSA-Wide	254	254	166	193	95% H-UCL
			North	104	104	116	137	95% H-UCL
			Southeast	50	50	126	170	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	253	303	95% Approximate Gamma UCL
			Maintained Channel	10	10	98.7	120	95% Student's-t UCL
	Mercury	ng/g	NBSA-Wide	254	254	2350	3130	95% Chebyshev (Mean, Sd) UCL
			North	104	104	1610	1870	95% Approximate Gamma UCL
			Southeast	50	50	1810	2790	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	3630	4440	95% Approximate Gamma UCL
			Maintained Channel	10	10	1310	1730	95% Student's-t UCL
	Methyl mercury	ng/g	NBSA-Wide	254	253	1.11	1.21	95% GROS Approximate Gamma UCL
			North	104	104	0.928	1.05	95% Approximate Gamma UCL
			Southeast	50	49	1.04	1.25	95% KM Approximate Gamma UCL
			Southwest	90	90	1.3	1.54	95% Approximate Gamma UCL
			Maintained Channel	10	10	1.55	2.28	95% Student's-t UCL
	Selenium	mg/kg	NBSA-Wide	253	250	1.03	1.32	95% KM (Chebyshev) UCL
			North	104	103	0.661	0.717	95% GROS Approximate Gamma UCL
			Southeast	50	48	0.791	1.1	95% KM (Chebyshev) UCL
			Southwest	89	89	1.63	1.93	95% Approximate Gamma UCL
			Maintained Channel	10	10	0.662	0.803	95% Student's-t UCL
	Silver	mg/kg	NBSA-Wide	254	253	1.82	2.26	95% KM (Chebyshev) UCL
			North	104	104	1.37	1.59	95% Approximate Gamma UCL
			Southeast	50	49	1.79	1.99	95% KM (t) UCL
			Southwest	90	90	2.39	2.87	95% Approximate Gamma UCL
			Maintained Channel	10	10	1.44	1.75	95% Student's-t UCL
	Zinc	mg/kg	NBSA-Wide	254	254	300	320	95% H-UCL
			North	104	104	205	230	95% Approximate Gamma UCL
			Southeast	50	50	223	284	95% Chebyshev (Mean, Sd) UCL
			Southwest	90	90	462	554	95% H-UCL
			Maintained Channel	10	10	204	242	95% Student's-t UCL

Table 4-12
Data Summary for COPECs by BERA Assessment Zone

Notes:
95% UCLs calculated using ProUCL. Maximum detect reported for datasets with < 6 detects.

Acronyms and Abbreviations:
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
NBSA = Newark Bay Study Area
ng/kg = nanograms per kilogram
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
Total DDx = sum of dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyltrichloroethane
UCL = upper confidence limit
µg/kg = micrograms per kilogram

Table 4-13a
Sediment ANOVA Results

Analyte Group	Analyte	Zone	FOD	Arithmetic Mean	Geometric Mean	Units	p-value	Tukey-Kramer Pairwise Difference[a]
Dioxins/ Furans	2,3,7,8-TCDD	North	104/104 (100%)	118	41.3	ng/kg	**0.045**	A
		Southeast	50/50 (100%)	53.8	26.3	ng/kg		AB
		Southwest	90/90 (100%)	76.7	23.9	ng/kg		B
PCBs	Total PCB congeners	North	104/104 (100%)	436,000	199,000	ng/kg	0.244	--
		Southeast	50/50 (100%)	353,000	184,000	ng/kg		
		Southwest	90/90 (100%)	630,000	266,000	ng/kg		
Pesticides	Dieldrin	North	99/104 (95%)	1,530	729	ng/kg	0.980	--
		Southeast	47/49 (96%)	1,340	752	ng/kg		
		Southwest	84/90 (93%)	2,280	756	ng/kg		
	Hexachlorobenzene	North	103/104 (99%)	1,700	926	ng/kg	**0.007**	AB
		Southeast	49/49 (100%)	1,000	598	ng/kg		B
		Southwest	90/90 (100%)	5,480	1,370	ng/kg		A
	Total Chlordane	North	100/104 (96%)	7,030	3,610	ng/kg	0.862	--
		Southeast	46/49 (94%)	7,470	4,120	ng/kg		
		Southwest	88/90 (98%)	7,610	3,600	ng/kg		
	Total DDx (2,4 & 4,4)	North	104/104 (100%)	39,200	21,400	ng/kg	**<0.0001**	B
		Southeast	50/50 (100%)	45,300	19,900	ng/kg		B
		Southwest	90/90 (100%)	292,000	80,200	ng/kg		A
PAHs	Total Alkylated PAHs	North	100/104 (96%)	9,350	5,210	µg/kg	0.119	--
		Southeast	48/50 (96%)	7,060	3,630	µg/kg		
		Southwest	87/90 (97%)	21,200	6,680	µg/kg		
	Total HMW PAHs	North	103/104 (99%)	11,800	6,870	µg/kg	0.262	--
		Southeast	49/50 (98%)	7,950	4,640	µg/kg		
		Southwest	90/90 (100%)	12,000	5,810	µg/kg		
	Total LMW PAHs	North	100/104 (96%)	1,150	678	µg/kg	0.806	--
		Southeast	48/50 (96%)	1,160	604	µg/kg		
		Southwest	87/90 (97%)	1,780	707	µg/kg		
	Total PAH	North	103/104 (99%)	13,000	7,530	µg/kg	0.309	--
		Southeast	49/50 (98%)	9,080	5,170	µg/kg		
		Southwest	90/90 (100%)	13,800	6,530	µg/kg		
Metals	Arsenic	North	104/104 (100%)	12.6	10.9	mg/kg	**<0.0001**	B
		Southeast	50/50 (100%)	17.3	13.4	mg/kg		B
		Southwest	90/90 (100%)	25.8	18.6	mg/kg		A
	Cadmium	North	104/104 (100%)	1.22	0.747	mg/kg	**<0.0001**	B
		Southeast	48/50 (96%)	1.04	0.801	mg/kg		B
		Southwest	90/90 (100%)	3.74	1.69	mg/kg		A
	Chromium	North	104/104 (100%)	117	83.5	mg/kg	0.542	--
		Southeast	50/50 (100%)	104	86.3	mg/kg		
		Southwest	90/90 (100%)	145	95.5	mg/kg		
	Copper	North	104/104 (100%)	96.4	69.6	mg/kg	**<0.0001**	B
		Southeast	50/50 (100%)	112	86.7	mg/kg		B
		Southwest	90/90 (100%)	237	141	mg/kg		A
	Lead	North	104/104 (100%)	116	76.6	mg/kg	**<0.0001**	B
		Southeast	50/50 (100%)	126	103	mg/kg		AB
		Southwest	90/90 (100%)	253	147	mg/kg		A
	Mercury	North	104/104 (100%)	1,610	1,010	µg/kg	**0.003**	B
		Southeast	50/50 (100%)	1,800	1,230	µg/kg		AB
		Southwest	90/90 (100%)	3,630	1,830	µg/kg		A
	Methyl mercury	North	104/104 (100%)	0.928	0.68	µg/kg	0.489	--
		Southeast	49/50 (98%)	1.02	0.715	µg/kg		
		Southwest	90/90 (100%)	1.3	0.801	µg/kg		

Table 4-13a
Sediment ANOVA Results

Analyte Group	Analyte	Zone	FOD	Arithmetic Mean	Geometric Mean	Units	p-value	Tukey-Kramer Pairwise Difference[a]
Metals (cont.)	Selenium	North	103/104 (99%)	0.657	0.57	mg/kg	**<0.0001**	B
		Southeast	48/50 (96%)	0.767	0.653	mg/kg		B
		Southwest	89/89 (100%)	1.63	1.01	mg/kg		A
	Silver	North	104/104 (100%)	1.37	0.9	mg/kg	**0.017**	B
		Southeast	49/50 (98%)	1.76	1.31	mg/kg		AB
		Southwest	90/90 (100%)	2.39	1.38	mg/kg		A
	Zinc	North	104/104 (100%)	205	161	mg/kg	**<0.0001**	B
		Southeast	50/50 (100%)	223	193	mg/kg		B
		Southwest	90/90 (100%)	462	282	mg/kg		A

Notes:
A parametric ANOVA was conducted comparing concentrations in the BERA assessment zones. Concentration data were natural logarithm transformed for the analysis to meet the assumptions of residual normality and homogeneity of
P-values that are the shaded and bolded are statistically significant at alpha = 0.05 and indicate that there are differences among assessment zones.
Non-detects included at the 1/2 reporting limit.
-- Not statistically significant at alpha = 0.05.
[a] Letters (A, B) are assigned by concentration with letter A representing the highest mean concentration. BERA Assessment zones that do not share a letter are significantly different (alpha = 0.05). Those that share a letter are not

Acronyms and Abbreviations:
ANOVA = analysis of variance
BERA = Baseline Ecological Risk Assessment
FOD = frequency of detection
HMW = high molecular weight
LMW = low molecular weight
mg/kg =milligrams per kilogram
ng/kg = nanograms per kilogram
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldich and dichlorodiphenyltrichloroethane
µg/kg = micrograms per kilogram
% = percent

Table 4-13b
Blue Crab ANOVA Results

Analyte Group	Analyte	Zone	FOD	Arithmetic Mean	Geometric Mean	Units	p-value	Tukey-Kramer Pairwise Difference[a]
Dioxins/ Furans	2,3,7,8-TCDD	North	12/12 (100%)	31	30.3	ng/kg	**<0.0001**	A
		Southeast	13/13 (100%)	22.5	21.6	ng/kg		B
		Southwest	12/12 (100%)	14	13.1	ng/kg		C
PCBs	Total PCB congeners	North	12/12 (100%)	440,000	432,000	ng/kg	**<0.0001**	A
		Southeast	13/13 (100%)	310,000	302,000	ng/kg		B
		Southwest	12/12 (100%)	256,000	251,000	ng/kg		C
Pesticides	Dieldrin	North	11/11 (100%)	6,890	6,350	ng/kg	**0.0006**	A
		Southeast	13/13 (100%)	5,400	5,190	ng/kg		A
		Southwest	12/12 (100%)	3,490	3,280	ng/kg		B
	Hexachlorobenzene	North	12/12 (100%)	1,370	1,340	ng/kg	**<0.0001**	A
		Southeast	13/13 (100%)	829	808	ng/kg		B
		Southwest	12/12 (100%)	672	644	ng/kg		B
	Total Chlordane	North	12/12 (100%)	45,500	42,500	ng/kg	**<0.0001**	A
		Southeast	13/13 (100%)	29,300	29,000	ng/kg		B
		Southwest	12/12 (100%)	22,600	22,100	ng/kg		C
	Total DDx (2,4 & 4,4)	North	12/12 (100%)	94,500	87,700	ng/kg	**0.044**	B
		Southeast	13/13 (100%)	85,700	82,900	ng/kg		B
		Southwest	12/12 (100%)	132,000	121,000	ng/kg		A
PAHs	Total Alkylated PAHs	North	11/12 (92%)	16.7	13.3	ng/kg	0.277	--
		Southeast	11/13 (85%)	18.3	8.75	ng/kg		
		Southwest	10/12 (83%)	9.01	7.78	ng/kg		
	Total HMW PAHs	North	11/12 (92%)	44.4	29.7	ng/kg	**0.035**	A
		Southeast	13/13 (100%)	36.1	18.6	ng/kg		AB
		Southwest	10/12 (83%)	12.5	10.8	ng/kg		B
	Total LMW PAHs	North	11/12 (92%)	23.6	18.4	ng/kg	0.200	--
		Southeast	13/13 (100%)	41.7	13.2	ng/kg		
		Southwest	11/12 (92%)	10.6	9.32	ng/kg		
	Total PAH	North	11/12 (92%)	66.2	45.5	ng/kg	**0.027**	A
		Southeast	13/13 (100%)	74	32.8	ng/kg		AB
		Southwest	11/12 (92%)	17	14.9	ng/kg		B
Metals	Arsenic	North	12/12 (100%)	2.05	2.02	µg/kg	**<0.0001**	B
		Southeast	13/13 (100%)	2.52	2.49	µg/kg		A
		Southwest	12/12 (100%)	2.92	2.89	µg/kg		A
	Cadmium	North	12/12 (100%)	0.259	0.239	µg/kg	0.193	--
		Southeast	13/13 (100%)	0.345	0.32	µg/kg		
		Southwest	12/12 (100%)	0.338	0.306	µg/kg		
	Chromium	North	12/12 (100%)	0.312	0.295	µg/kg	0.05	--
		Southeast	13/13 (100%)	0.237	0.232	µg/kg		
		Southwest	12/12 (100%)	0.241	0.232	µg/kg		
	Copper	North	12/12 (100%)	29.8	29.2	µg/kg	0.585	--
		Southeast	13/13 (100%)	27.4	26.8	µg/kg		
		Southwest	12/12 (100%)	29.6	28.9	µg/kg		
	Lead	North	12/12 (100%)	0.643	0.587	µg/kg	0.319	--
		Southeast	13/13 (100%)	0.477	0.434	µg/kg		
		Southwest	12/12 (100%)	0.89	0.582	µg/kg		
	Mercury	North	12/12 (100%)	137	135	µg/kg	**<0.0001**	A
		Southeast	13/13 (100%)	121	120	µg/kg		A
		Southwest	12/12 (100%)	90.7	88	µg/kg		B
	Methyl mercury	North	11/11 (100%)	131	127	µg/kg	0.601	--
		Southeast	11/11 (100%)	125	117	µg/kg		
		Southwest	12/12 (100%)	116	108	µg/kg		

Table 4-13b
Blue Crab ANOVA Results

Analyte Group	Analyte	Zone	FOD	Arithmetic Mean	Geometric Mean	Units	p-value	Tukey-Kramer Pairwise Difference[a]
Metals (cont.)	Selenium	North	12/12 (100%)	0.977	0.966	µg/kg	**0.022**	A
		Southeast	13/13 (100%)	1.15	1.14	µg/kg		B
		Southwest	12/12 (100%)	1.07	1.07	µg/kg		AB
	Silver	North	12/12 (100%)	0.868	0.847	µg/kg	0.091	--
		Southeast	13/13 (100%)	0.794	0.773	µg/kg		
		Southwest	12/12 (100%)	0.691	0.652	µg/kg		
	Zinc	North	12/12 (100%)	42.1	41.4	µg/kg	0.540	--
		Southeast	13/13 (100%)	38.9	38.4	µg/kg		
		Southwest	12/12 (100%)	40.2	39.9	µg/kg		

Notes:
A parametric ANOVA was conducted comparing concentrations in the BERA assessment zones. Concentration data were natural logarithm transformed for the analysis to meet the assumptions of residual normality and homogeniety of variance.
P-values that are the shaded and bolded are statistically significant at alpha = 0.05 and indicate that there are differences
Non-detects included at the 1/2 reporting limit.
-- Not statistically significant at alpha = 0.05.
[a] Letters (A, B, etc.) are assigned by concentration with letter A representing the highest mean concentration. BERA Assessment zones that do not share a letter are significantly different (alpha = 0.05). Those that share a letter are not

Acronyms and Abbreviations:

ANOVA = analysis of variance
FOD = frequency of detection
HMW = high molecular weight
LMW = low molecular weight
mg/kg =milligrams per kilogram
ng/kg = nanograms per kilogram
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
µg/kg = micrograms per kilogram
% = percent

Table 4-14
Comparison of NBSA Surface Sediment Concentrations to Jamaica Bay Urban Background

Parameter Group	Chemical	Units	Phase III Surface Sediment Concentrations (2014-2016)							Jamaica Bay Background Surface Sediment Concentrations (2008/2013)									Ratio of Means (NBSA:JB)	Percent of NBSA Results that Exceed 95th Percentile of Background[1]
			N	Frequency of Detection	Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	N	Frequency of Detection	Mean	Standard Deviation	Median	Minimum Detect	Maximum Detect	Detection Limit Range for Non-detect Values	95th Percentile		
Dioxins/ Furans	2,3,7,8-TCDD	ng/kg	254	100%	87.1	182	42.8	0.12	1,710	13	100%	1.03	0.872	0.66	0.6	3.5	--	3.5	85	88%
	Total Dioxin TEQ	ng/kg	254	100%	115	201	64.4	0.223	1,810	13	100%	8.34	2.23	7.54	6.86	14.6	--	14.6	14	79%
PCBs	Total Aroclors[2]	µg/kg	254	94%	239	317	140	6.4	2,500	56	7%	--	--	--	2.1	23.2	--	--	--	90%
	Total PCBs congeners	ng/kg	254	100%	480,000	691,000	278,000	2,480	5,030,000	NA										
	Total PCB TEQ	ng/kg	254	99.6%	5.98	11	1.21	0.0002	121	NA										
	Total PCB/Dioxin TEQ	ng/kg	254	100%	121	205	71.1	0.223	1,820	NA										
Pesticides	Dieldrin	ng/kg	253	95%	1740	3510	947	39.4	37,400	56	0%	<1840	--	<1,050	--	--	1,000 - 18,000	--	--	--
	Hexachlorobenzene	ng/kg	253	99.6%	2,870	6,250	1,040	13.2	46,200	56	4%	626	617	<1,000	630	2,300	540 - 9,200	--	4.6	24%
	Total DDx (2,4 & 4,4)	ng/kg	254	100%	131,000	301,000	34,500	120	2,600,000	56	7%	1,880	4,390	<1,100	4,500	27,000	1,000 - 18,000	--	70	61%
	Total Chlordane	ng/kg	254	96%	7,340	6,920	6,210	38.8	39,600	56	5%	2,580	10,600	<1,000	860	63,700	530 - 9,200	--	2.8	0%
PAHs	Total HMW PAHs	µg/kg	254	99.2%	11,000	12,000	7,000	37	100,000	56	70%	430	1,360	85.5	3.3	9,750	12 - 65	1,580	26	88%
	Total LMW PAHs	µg/kg	254	96%	1,400	2,100	790	5.2	17,000	56	54%	44.4	82.8	27.5	1.1	560	12 - 250	215	32	85%
	Total PAH	µg/kg	254	99.2%	12,000	14,000	7,700	37	110,000	56	70%	467	1440	85.5	5.1	10,300	12 - 65	1,800	26	88%
Metals	Arsenic	mg/kg	254	100%	18.3	16.8	13.3	1.18	115	56	100%	6.02	4.6	4.55	0.8	16.9	--	15	3.0	38%
	Cadmium	mg/kg	254	99%	2.06	3.28	0.905	0.0592	24.6	56	75%	0.843	1.93	0.4	0.1	14.2	0.025 - 0.29	2.8	2.4	18%
	Chromium	mg/kg	254	100%	123	117	95.8	3.95	777	56	100%	35.6	26.9	28.8	2.3	104	--	86.3	3.5	57%
	Copper	mg/kg	254	100%	149	152	100	1.5	924	56	96%	40.4	64.5	18.4	0.9	390	0.95 - 0.96	120	3.7	39%
	Lead	mg/kg	254	100%	166	220	111	2.18	2,190	56	100%	45.1	51.9	26.7	2.9	290	--	130	3.7	37%
	Mercury	µg/kg	254	100%	2,350	2,850	1,480	5.11	22,100	56	100%	328	466	220	10	3,200	--	820	7.2	73%
	Methyl mercury	µg/kg	254	99.6%	1.1	1.15	0.833	0.027	11.9	NA										
	Nickel	mg/kg	254	100%	40.9	28.9	37.9	3.83	282	56	93%	12.7	10	10.3	1.7	40	1.9 - 1.9	33.9	3.2	57%
	Selenium	mg/kg	253	98.8%	1.02	1.11	0.704	0.0939	7.58	56	45%	0.69	0.413	<1.7	0.1	1.5	0.025 - 2	1.5	1.5	13%
	Silver	mg/kg	254	99.6%	1.81	1.64	1.46	0.0448	12	56	89%	1.65	1.77	0.91	0.1	5.9	0.025 - 0.48	5.8	1.1	2%
	Zinc	mg/kg	254	100%	300	486	220	8.18	6,810	56	100%	98.3	127	59.5	5.2	670	--	250	3.1	38%

Notes:
One-half the detection limit was substituted for non-detects in calculation of mean and standard deviation. Where the frequency of detection is 0, the mean is reported as <mean detection limit. When frequency of detection is less than 50%, the median is reported as <median detection limit.
[1]NBSA results from Phase III surface sediment samples were compared to the non-parametric 95th percentile of the Jamaica Bay concentration distribution or the maximum detected value for chemicals with a low frequency of detection.
[2]Total Aroclors were reported as 0 when not detected in Jamaica Bay data. No detection limit was reported therefore summary statistics were not estimated.
TEQ is based on the World Health Organization Mammalian toxicity equivalence factors.

Jamaica Bay data set consists of data collected by the USEPA from 28 stations in the Jamaica Bay estuary in 2008 and 2013. 2,3,7,8-TCDD and other dioxin and furan congeners were only analyzed in 2013 on a subset of 13 samples. Source: https://www.waterqualitydata.us/

Acronyms and Abbreviations:
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
N = Number of samples analyzed
NA = Not analyzed in Jamaica Bay data set
NBSA = Newark Bay Study Area
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = Tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency quotient as defined by the World Health Organization for mammalian species
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
µg/kg = micrograms per kilogram
% = percent
-- Statistic not calculated due to detection frequency

Table 4-15
Mass and Fractional Weights of Thirty-four Individual Blue Crab Specimens in the NBSA

Station	Unique ID	Tissue Type	Tissue Mass (grams)	Fractional Weight
129	1	Hepatopancreas	7	0.22
129	1	Carcass	6.1	0.19
129	1	Muscle	18.4	0.58
129	2	Hepatopancreas	8.4	0.20
129	2	Carcass	6.2	0.14
129	2	Muscle	28.3	0.66
129	3	Hepatopancreas	20.3	0.31
129	3	Carcass	11.1	0.17
129	3	Muscle	33.4	0.52
129	4	Hepatopancreas	10.3	0.29
129	4	Carcass	6	0.17
129	4	Muscle	19.5	0.54
129	5	Hepatopancreas	12.5	0.16
129	5	Carcass	22.5	0.29
129	5	Muscle	41.9	0.54
129	6	Hepatopancreas	7.6	0.21
129	6	Carcass	8.9	0.25
129	6	Muscle	19.6	0.54
129	7	Hepatopancreas	6	0.17
129	7	Carcass	11.6	0.32
129	7	Muscle	18.2	0.51
129	8	Hepatopancreas	6.4	0.18
129	8	Carcass	10.2	0.29
129	8	Muscle	18.9	0.53
129	9	Hepatopancreas	6.7	0.17
129	9	Carcass	12.2	0.32
129	9	Muscle	19.4	0.51
129	10	Hepatopancreas	7.3	0.15
129	10	Carcass	20.6	0.43
129	10	Muscle	20.2	0.42
129	11	Hepatopancreas	4.9	0.11
129	11	Carcass	10.3	0.24
129	11	Muscle	27.5	0.64
129	12	Hepatopancreas	5.2	0.17
129	12	Carcass	7.1	0.23
129	12	Muscle	19	0.61
129a	13	Hepatopancreas	1.5	0.05
129a	13	Carcass	11.1	0.37
129a	13	Muscle	17.3	0.58
129a	14	Hepatopancreas	8.5	0.18
129a	14	Carcass	7.7	0.17
129a	14	Muscle	30.2	0.65

Table 4-15
Mass and Fractional Weights of Thirty-four Individual Blue Crab Specimens in the NBSA

Station	Unique ID	Tissue Type	Tissue Mass (grams)	Fractional Weight
129a	15	Hepatopancreas	4.2	0.11
129a	15	Carcass	7.4	0.20
129a	15	Muscle	25.8	0.69
129a	16	Hepatopancreas	9.1	0.25
129a	16	Carcass	11.1	0.31
129a	16	Muscle	15.5	0.43
129a	17	Hepatopancreas	5.6	0.09
129a	17	Carcass	11.4	0.18
129a	17	Muscle	47.1	0.73
129a	18	Hepatopancreas	12.7	0.20
129a	18	Carcass	11.6	0.19
129a	18	Muscle	38.4	0.61
129a	19	Hepatopancreas	13	0.29
129a	19	Carcass	8	0.18
129a	19	Muscle	24.4	0.54
129a	20	Hepatopancreas	14.1	0.18
129a	20	Carcass	14.7	0.19
129a	20	Muscle	50	0.63
129a	21	Hepatopancreas	6.3	0.16
129a	21	Carcass	14.5	0.36
129a	21	Muscle	19	0.48
129a	22	Hepatopancreas	5	0.08
129a	22	Carcass	14.1	0.22
129a	22	Muscle	45.1	0.70
129a	23	Hepatopancreas	13.1	0.15
129a	23	Carcass	23.5	0.27
129a	23	Muscle	51.5	0.58
129a	24	Hepatopancreas	10.3	0.27
129a	24	Carcass	8.9	0.24
129a	24	Muscle	18.5	0.49
129a	25	Hepatopancreas	6.3	0.17
129a	25	Carcass	12.3	0.33
129a	25	Muscle	19	0.51
129a	26	Hepatopancreas	15.2	0.34
129a	26	Carcass	13.8	0.31
129a	26	Muscle	16	0.36
129a	27	Hepatopancreas	4.4	0.15
129a	27	Carcass	14.3	0.48
129a	27	Muscle	11.2	0.37
129a	28	Hepatopancreas	7.4	0.21
129a	28	Carcass	9.1	0.26
129a	28	Muscle	19.1	0.54

Table 4-15
Mass and Fractional Weights of Thirty-four Individual Blue Crab Specimens in the NBSA

Station	Unique ID	Tissue Type	Tissue Mass (grams)	Fractional Weight
129a	29	Hepatopancreas	4.7	0.12
129a	29	Carcass	10.7	0.26
129a	29	Muscle	25	0.62
131	30	Hepatopancreas	5.4	0.29
131	30	Carcass	8.3	0.44
131	30	Muscle	5	0.27
131	31	Hepatopancreas	4.5	0.15
131	31	Carcass	13.7	0.46
131	31	Muscle	11.3	0.38
131	32	Hepatopancreas	8	0.17
131	32	Carcass	10.2	0.21
131	32	Muscle	30.1	0.62
131	33	Hepatopancreas	12	0.27
131	33	Carcass	12.8	0.29
131	33	Muscle	19.3	0.44
131	34	Hepatopancreas	8.7	0.33
131	34	Carcass	9.1	0.34
131	34	Muscle	8.9	0.33
Average		**Hepatopancreas**		**0.27**
		Carcass		**0.19**
		Muscle		**0.54**

Notes:
Mass data were recorded in field data sheets presented in Appendix E of the Environmental Sample Collection Report (Normandeau 2017).

Reference:
Normandeau. 2017. Final Newark Bay Study Area Environmental Sample Collection Report. June.

Table 4-16
Historical Datasets for Newark Bay

Sample Type	Program	Usability	Reference
Sediment	1993/1994 REMAP	Level 3	USEPA 1998
	1998 REMAP	Level 3	USEPA 2003
	1998 to 2001 Contaminant Assessment and Reduction Program (CARP)	Level 2	NYSDEC 2003
	1999 to 2006 Honeywell Sediment Investigations	Level 3	Parsons and ENVIRON 2004; ENVIRON 2005, 2006
	2000-2006 National Coastal Assessment	Level 3	https://www.waterqualitydata.us/
	2003 REMAP	Level 3	https://archive.epa.gov/emap/archive-emap/web/html/nynj03.html
	2005 PSE&G West End Supplemental Remedial Investigation	Level 3	PSE&G 2006
	2005 USEPA High Resolution Coring Program	Level 3	USEPA 2005
	2007 to 2008 USEPA High Resolution/Low Resolution Supplemental Sediment Sampling Program	Level 3	USEPA 2008
	2008 CPG Low Resolution Coring Program	Level 3	AECOM 2010
	2008 USACE Stratified Sampling Project	Level 2	USACE 2010
	2008 REMAP	Level 3	https://www.waterqualitydata.us/
	2012 CPG Low Resolution Coring Supplemental Sampling Program	Level 3	AECOM 2012
	2013 REMAP	Level 3	https://www.waterqualitydata.us/
	2013 Post-Hurricane Sandy Sampling Program	Level 3	USGS 2015
Fish	1980s NJDEP Fish Sampling	--	NJDEP 1982, 1983, 1985
	1980s Brown et al. and Rappe et al.	--	Brown et al. (1994), Rappe et al. (1991)
	CARP	Level 2	NYSDEC 2004a, 2004b, 2004c, 2005, 2006
	Additional Studies	--	Cooper and Buchanan 2007; Bugel 2010, 2011; Gale et al. 2000
Blue Crab	CARP	Level 2	NYSDEC 2004a, 2004b, 2004c, 2005, 2006
	New Jersey Routine Monitoring Program for Toxics in Fish	--	Horwitz et al. 2007
Birds	Contamination Assessment & Reduction Project	--	Parsons 2003

Acronyms and Abbreviations:
-- Usability not evaluated.
AOC = Administrative Order on Consent
CARP = Contaminant Assessment and Reduction Program
CPG = Cooperating Parties Group
NBSA = Newark Bay Study Area
NJDEP = New Jersey Department of Environmental Protection

Table 4-16
Historical Datasets for Newark Bay

Acronyms and Abbreviations (cont.):
NYSDEC = New York State Department of Environmental Conservation
PSE&G = Public Service Enterprise Group
REMAP = Regional Estuarine and Monitoring Program
RI = Remedial Investigation
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency
USGS = U.S. Geological Survey

References:
AECOM. 2010. Lower Passaic River Study Area, Quality Assurance Project Plan. Periodic Bathymetric Surveys. May 2010, Revision 2. Prepared for Lower Passaic River Cooperating Parties Group, Newark, NJ. Prepared by AECOM, Chelmsford, MA.
AECOM. 2012. Lower Passaic River Study Area, Quality Assurance Project Plan. Low Resolution Coring Supplemental Sampling Program. June 2012, Revision 3. Prepared for Lower Passaic River Cooperating Parties Group, Newark, NJ. Prepared by AECOM, Chelmsford, MA.
Brown R.P., K.R. Cooper, A. Cristini, C. Rappe, and P.A. Berrqvist. 1994. Polychlorinated dibenzo-p-dioxins and dibenzofurans in *Mya Arenaria* in the Newark/Raritan Bay estuary. *Environ Toxicol Chem* 13(3):523-528.
Bugel S.M., L.A. White, and K.R. Cooper. 2010. Impaired reproductive health of killifish (*Fundulus heteroclitus*) inhabiting Newark Bay, NJ, a chronically contaminated estuary. *Aquat Toxicol* 96:182-193.
Bugel, S.M., L.A. White, and K.R. Cooper. 2011. Decreased vitellogenin inducibility and 17ß-estradiol levels correlated with reduced egg production in killifish *(Fundulus heteroclitus*) from Newark Bay, New Jersey. *Aquat Toxicol* 105:1-12.
Cooper K.R. and G.A. Buchanan. 2007. Final Report - Integrated Biomarkers for Assessing the Exposure and Effects of Endocrine Disrupters and Other Contaminants on Marine/Estuarine Fish (Second Year Grant Number SR03-038).
ENVIRON. 2005. SA7 Offshore Sediment Investigation Report. Honeywell Study Area 7; Jersey City, New Jersey.
ENVIRON. 2006. Revised Sediment Investigation Report. Honeywell Study Area 7; Jersey City, New Jersey.
Gale, R.W., E.R. Long, T.R. Schwartz, and D.E. Tillitt. 2000. Evaluation of planar halogenated and polycyclic aromatic hydrocarbons in estuarine sediments using ethoxyresorufin-o-deethylase induction of H4IIE Cells. *Environ Toxicol Chem* 19(5):1348-1359.
Horwitz, R. J., P. Overbeck, J. Ashley, D. Velinsky and L. Zadoudeh. 2006. Final Report: Monitoring Program for Chemical Contaminants in Fish from the State of New Jersey. Contract SR04-073. ANS Report No. 06-04F. 77pp.
NJDEP 1982. Belton, T.J., B.E. Ruppel, and K. Lockwood. PCB's (Aroclor 1254) in Fish Tissues Throughout the State of New Jersey: A Comprehensive Survey. Trenton, NJ. Office of Cancer and Toxic Substances Research.
NJDEP. 1983. PCBs in Selected Finfish Caught Within New Jersey Waters 1981-1982 (With Limited Chlordane Data). Office of Science and Research.
NJDEP. 1985. A Study of Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) Contamination in Select Finfish, Crustaceans and Sediments of New Jersey Waterways. Office of Science and Research.
NYSDEC. 2003. Contamination Assessment and Reduction Project (CARP): Water. Final Report. Bureau of Water Assessment and Management, Division of Water.
NYSDEC. 2004a. Polychlorinated Biphenyls (PCBs) in Fish Fish Species from the New York-New Jersey Harbor Estuary. Division of Fish, Wildlife and Marine Resources.

Table 4-16
Historical Datasets for Newark Bay

References (cont.):

NYSDEC. 2004b. Dioxins and Furans in Five Fish Species, Blue Crabs, Invertebrates and Zooplankton from the New York-New Jersey Harbor Estuary. Division of Fish, Wildlife and Marine Resources.

NYSDEC. 2004c. Fish Tissue Contaminant Level Data. Hudson River, New York Harbor, Long Island Sound. Divison of Fish, Wildlife and Marine Resources.

NYSDEC. 2005. Organochlorine Pesticides in Five Fish Species, Blue Crabs, Invertebrates and Zooplankton from the New York-New Jersey Harbor Division of Fish, Wildlife and Marine Resources.

NYSDEC. 2006. Polynuclear Aromatic Hydrocarbons (PAHs) in Five Fish Species, Blue Crabs, Invertebrates and Zooplankton from the New York-New Jersey Harbor Estuary. Division of Fish, Wildlife and Marine Resources.

Parsons, K.C. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. Contract No. C003858. Submitted to New York State Department of Environmental Conservation, Division of Fish Wildlife and Marine Resources.

Parsons and ENVIRON. 2004. Offshore Investigation Results Summary Report. October 2003 to January 2004 Activities. Study Area 7; Jesrey City, New Jersey.

PSE&G. 2006. Final Supplemental Remedial Investigation Report - Sediment Investigation, Former West End Gas Works, Jersey City, New Jersey.

Rappe C., P.A. Bergqvist, L.O. Kjeller, and S. Swanson. 1991. Levels of patterns of PCDD and PCDF contamination in fish, crabs, and lobsters from Newark Bay and the New York Bight. *Chemosphere* 22(3-4):239-266.

USACE. 2010. Stratified Sampling Project Summary Report and Evaluation of Data. New York District.

USEPA. 1998. Sediment Quality of the NY/NJ Harbor System. EPA/902/R-98/001. U.S. Environmental Protection Agency, Regional Environmental Monitoring and Assessment Program (REMAP), Edison, NJ.

USEPA. 2003. Sediment Quality of the NY/NJ Harbor System: A 5-year Revisit (1993/1994–1998). EPA/902-R-03-002. U.S. Environmental Protection Agency, Region II, Edison, NJ.

USEPA. 2005. Contaminated Sediment Remediation Guidance for Hazardous Waste Sites. EPA-540-R-05-012. OSWER 9355.0-85.

USEPA. 2008. Supplemental Sediment Program Narrative. Prepared by Malcolm Pirnie, Inc.

USGS. 2015. Estuarine Bed-Sediment-Quality Data Collected in New Jersey and New York after Hurricane Sandy, 2013. Data Series 905. Reston, Virginia.

Table 4-17
Summary of Historical Fish and Crab Concentrations for Selected Chemicals in the NBSA

Species	Tissue Type	Chemical	Units	N	Number of Detects	Mean	Standard Deviation	Median	Minimum	Maximum
Zooplankton	>64 Microns	2,3,7,8-TCDD	ng/kg	7	7	74.5	81.5	34.5	18.9	251
		Total PCB congeners	µg/kg	5	5	958	218	1,010	658	1,250
		Total DDx (2,4 & 4,4)	µg/kg	5	5	158	34.2	168	113	201
		Mercury	µg/kg	8	8	617	475	550	142	1270
Sevenspine Bay Shrimp	Whole body	2,3,7,8-TCDD	ng/kg	6	6	12.5	4.39	11.1	9.06	20.9
		Total PCB congeners	µg/kg	6	6	177	62.1	189	104	252
		Total DDx (2,4 & 4,4)	µg/kg	6	6	25.1	7.58	25.9	16.2	36.3
		Mercury	µg/kg	6	6	40	5.01	39.7	32.5	47.9
	Whole body - Depurated	2,3,7,8-TCDD	ng/kg	5	5	8.82	2.47	9.3	4.7	11.1
		Total PCB congeners	µg/kg	5	5	166	71	206	60.4	222
		Total DDx (2,4 & 4,4)	µg/kg	5	5	24.3	10.2	26.9	9.16	33.9
		Mercury	µg/kg	5	5	28.9	8.37	28	21.2	42.8
Ribbed Mussel	Whole body - Soft Parts	2,3,7,8-TCDD	ng/kg	24	24	15.3	6.65	14.2	7.86	34.3
		Total PCB congeners	µg/kg	24	24	362	191	325	172	953
		Total DDx (2,4 & 4,4)	µg/kg	24	24	103	52	87.7	48.5	243
		Mercury	µg/kg	24	24	36.7	11.9	38.4	13.5	64.6
Blue crab	Hepatopancreas	2,3,7,8-TCDD	ng/kg	6	6	145	64.5	119	72.2	247
		Total PCB congeners	µg/kg	6	6	3,360	1,640	2,680	2,100	6,300
		Total DDx (2,4 & 4,4)	µg/kg	6	6	601	410	515	276	1,400
		Mercury	µg/kg	6	6	78.4	24.1	77.4	50.9	108
	Muscle	2,3,7,8-TCDD	ng/kg	6	6	7.07	2.73	6.48	4.58	12
		Total PCB congeners	µg/kg	6	6	112	58.6	96.6	57	215
		Total DDx (2,4 & 4,4)	µg/kg	6	6	36.2	19	28.8	20.9	72.3
		Mercury	µg/kg	6	6	205	41.9	204	141	253
	All Edible Tissue	2,3,7,8-TCDD	ng/kg	6	6	51	17.1	51.3	22.7	74.8
		Total PCB congeners	µg/kg	10	10	561	271	517	136	1,040
		Total DDx (2,4 & 4,4)	µg/kg	10	10	126	55.6	149	39.8	195
		Mercury	µg/kg	10	10	109	50.8	108	41.3	185
Mummichog	Whole body	2,3,7,8-TCDD	ng/kg	6	6	21.9	18.3	18.2	5.07	57.4
		Total PCB congeners	µg/kg	3	3	807	411	686	471	1,260
		Total DDx (2,4 & 4,4)	µg/kg	3	3	179	100	121	120	294
		Mercury	µg/kg	6	6	63.3	35.5	60.9	20.2	127
American eel	Whole body minus head and viscera	2,3,7,8-TCDD	ng/kg	2	2	31.5	20.8	31.5	16.8	46.2
		Total PCB congeners	µg/kg	2	2	2,550	2,130	2,550	1,050	4,050
		Total DDx (2,4 & 4,4)	µg/kg	2	2	669	235	669	503	835
		Mercury	µg/kg	2	2	351	220	351	195	506

Table 4-17
Summary of Historical Fish and Crab Concentrations for Selected Chemicals in the NBSA

Species	Tissue Type	Chemical	Units	N	Number of Detects	Mean	Standard Deviation	Median	Minimum	Maximum
Striped bass	Fillet	2,3,7,8-TCDD	ng/kg	7	7	20.5	27.9	2.09	0.518	65.9
		Total PCB congeners	µg/kg	10	10	1,410	1,020	1,510	126	2,780
		Total DDx (2,4 & 4,4)	µg/kg	10	10	189	141	169	19.5	384
		Mercury	µg/kg	10	10	297	344	191	138	1,270
	Liver	2,3,7,8-TCDD	ng/kg	1	1	283	--	--	--	--
		Total PCB congeners	µg/kg	1	1	4,160	--	--	--	--
		Total DDx (2,4 & 4,4)	µg/kg	1	1	612	--	--	--	--
		Mercury	µg/kg	1	1	2220	--	--	--	--
White perch	Fillet	2,3,7,8-TCDD	ng/kg	1	1	290		290	290	290
		Total PCB congeners	µg/kg	5	5	4,400	816	4,390	3,280	5,470
		Total DDx (2,4 & 4,4)	µg/kg	5	5	365	94.9	400	235	481
		Mercury	µg/kg	5	5	341	20.5	342	309	361
	Whole body	2,3,7,8-TCDD	ng/kg	1	1	354	--	--	--	--
		Total PCB congeners	µg/kg	1	1	4,040	--	--	--	--
		Total DDx (2,4 & 4,4)	µg/kg	1	1	436	--	--	--	--
		Mercury	µg/kg	1	1	400	--	--	--	--
	Whole body minus head and viscera	2,3,7,8-TCDD	ng/kg	16	16	182	113	213	9.94	317
		Total PCB congeners	µg/kg	16	16	2,830	1,510	2,280	711	6,450
		Total DDx (2,4 & 4,4)	µg/kg	16	16	443	322	323	62.6	1,070
		Mercury	µg/kg	26	26	303	87.6	313	136	489

Notes:
Data were collected by NYSDEC in 1999 and 2000 under the CARP program. See Table 4-14 for references.
Concentrations are reported on a wet weight basis.

Acronyms and Abbreviations:
-- = not relevant for sample size of 1
CARP = Contamination Assessment and Reduction Program
N = sample size
ng/kg = nanogram per kilogram
NYSDEC = New York State Department of Environmental Conservation
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyltrichloroethane
µg/kg = microgram per kilogram

Table 5-1
Surface Water Assessment Results

Group	Chemical	Fraction	Units	NJDEP Saline Surface Water Quality Criteria[a]		Aquatic Life Screening Guidelines for Marine Water (except where noted)			Summary Statistics Surface Water Sampling 2011-2013							Number of Exceedances of Aquatic Life Criteria/Guideline	
				Acute	Chronic	Acute	Chronic	Source	Number of Samples	Number of Detected	Frequency of Detection	Mean	Standard Deviation	Minimum Detected	Maximum Detected	Acute	Chronic
Dioxins/Furans	2,3,7,8-TCDD	Total	pg/L	--	--	10,000	10	NOAA (FW)	233	84	36%	1.42	0.99	0.22	7.98	0	0
PCBs	Total PCB Congeners (209)	Total	ng/L	--	30				233	233	100%	6.54	2.96	2.2	20.4	--	0
Pesticides	Aldrin	Total	ng/L	1300	--		17	NOAA (FW)	157	25	16%	0.15	0.18	0.01	0.6	0	0
	Dieldrin	Total	ng/L	710	1.9				158	153	97%	0.33	0.21	0.1	2.1	0	**1**
	4,4'-DDD[c]	Total	ng/L	130	1	3600	360	NOAA	158	135	85%	0.41	0.41	0.17	3.9	0	0
	4,4'-DDE[c]	Total	ng/L	130	1	14,000	1400	NOAA	157	120	76%	0.43	0.48	0.17	3.9	0	0
	4,4'-DDT	Total	ng/L	130	1				157	75	48%	0.14	0.13	0.05	0.64	0	0
	Total DDx (4,4')[c]	Total	ng/L	130	1				157	143	91%	0.85	0.92	0.17	8.1	0	**38**
	alpha-Chlordane	Total	ng/L	90[b]	4[b]				158	156	99%	0.2	0.1	0.05	0.53	0	0
	beta-Chlordane	Total	ng/L	90[b]	4[b]				158	143	91%	0.16	0.09	0.06	0.56	0	0
	beta-Endosulfan	Total	ng/L	34	8.7				157	10	6%	0.26	0.17	0.07	0.96	0	0
	Endrin	Total	ng/L	37	2.3				157	31	20%	0.21	0.24	0.02	2.3	0	0
	Heptachlor	Total	ng/L	53	3.6				157	53	34%	0.09	0.17	0.0034	1.1	0	0
	Heptachlor epoxide	Total	ng/L	53	3.6				158	143	91%	0.14	0.1	0.03	0.67	0	0
	Methoxychlor	Total	ng/L	--	30				157	38	24%	0.18	0.17	0.02	0.43	--	0
	gamma-BHC (Lindane)	Total	ng/L	160	--		80	NOAA (FW)	158	119	75%	0.08	0.1	0.02	1.1	0	0
	Oxychlordane	Total	ng/L	90[b]	4[b]				157	13	8%	0.2	0.18	0.01	0.03	0	0
	cis-Nonachlor	Total	ng/L	90[b]	4[b]				157	84	54%	0.12	0.13	0.02	0.16	0	0
	trans-Nonachlor	Total	ng/L	90[b]	4[b]				158	142	90%	0.09	0.06	0.02	0.33	0	0
PAHs	Total HMW PAHs	Total	ng/L	--	--	300,000	--	NOAA	157	157	100%	135	177	17.16	1689.8	0	--
	Total LMW PAHs	Total	ng/L	--	--	300,000	--	NOAA	157	157	100%	59	76	2.72	660.04	0	--
	Total PAHs	Total	ng/L	--	--	300,000	--	NOAA	157	157	100%	194	221	20.9	1963.7	0	--
Metals	Arsenic	Dissolved	µg/L	69	36				158	158	100%	1.15	0.24	0.67	1.65	0	0
	Arsenic	Total	µg/L	69	36				158	158	100%	1.28	0.28	0.73	2.3	0	0
	Cadmium	Dissolved	µg/L	40	8.8				274	273	100%	0.05	0.01	0.01	0.1	0	0
	Cadmium	Total	µg/L	40	8.8				274	274	100%	0.07	0.02	0.03	0.23	0	0
	Chromium	Dissolved	µg/L	--	--	--	--	--	158	156	99%	0.37	0.28	0.11	2.7	--	--
	Chromium	Total	µg/L	--	--	--	--	--	158	158	100%	1.17	0.81	0.43	5.61	--	--
	Chromium, Hexavalent	Dissolved	µg/L	1100	50				119	54	45%	0.30	0.32	0.04	0.83	0	0
	Cobalt	Dissolved	µg/L	--	--	1500	1	NOAA	158	158	100%	0.11	0.04	0.04	0.3	0	0
	Cobalt	Total	µg/L	--	--	1500	1	NOAA	158	158	100%	0.19	0.08	0.1	0.55	0	0
	Copper	Dissolved	µg/L	7.9	5.6				274	274	100%	1.77	0.47	0.83	4.48	0	0
	Copper	Total	µg/L	7.9	5.6				274	274	100%	2.92	1.32	1.29	13.1	**4**	**8**
	Lead	Dissolved	µg/L	210	24				274	274	100%	0.27	0.34	0.04	3.85	0	0
	Lead	Total	µg/L	210	24				274	274	100%	1.81	1.52	0.53	12	0	0
	Mercury	Dissolved	ng/L	1800	940				274	248	91%	3.25	5.12	0.25	53.5	0	0
	Mercury	Total	ng/L	1800	940				274	274	100%	21.4	23.4	0.38	296	0	0
	Nickel	Dissolved	µg/L	64	22				158	158	100%	1.14	0.31	0.62	1.92	0	0
	Nickel	Total	µg/L	64	22				158	158	100%	1.45	0.5	0.85	5.05	0	0
	Selenium	Dissolved	µg/L	290	71				158	12	8%	0.95	0.19	0.2	0.6	0	0
	Selenium	Total	µg/L	290	71				158	25	16%	0.91	0.27	0.2	2.1	0	0
	Silver	Dissolved	µg/L	1.9	--				158	93	59%	0.014	0.01	0.003	0.06	0	--
	Silver	Total	µg/L	1.9	--				158	139	88%	0.033	0.07	0.004	0.84	0	--
	Thallium	Dissolved	µg/L	--	--	2130	17	NOAA	158	62	39%	0.02	0.01	0.01	0.02	0	0
	Thallium	Total	µg/L	--	--	2130	17	NOAA	158	77	49%	0.02	0.01	0.01	0.05	0	0
	Vanadium	Dissolved	µg/L	--	--	280	50	NOAA	158	131	83%	2.91	0.86	1.4	6.2	0	0
	Vanadium	Total	µg/L	--	--	280	50	NOAA	158	137	87%	3.47	1.16	1.7	8.4	0	0
	Zinc	Dissolved	µg/L	90	81				158	158	100%	6.32	1.88	2.2	13.9	0	0
	Zinc	Total	µg/L	90	81				158	158	100%	8.53	3.18	3.56	28.9	0	0
Semivolatiles	Bis(2-ethylhexyl) phthalate	Total	µg/L	--	--	400	300	NOAA	157	5	3%	1.96	0.12	1.8	2.7	0	0

Table 5-1
Surface Water Assessment Results

Notes:

[a] 7:9B Surface Water Quality Standards for aquatic life, October 17, 2016. If no criteria were available, surface water screening guidelines were used for comparison.

[b] Criterion shown is for chlordane (CAS Number 57-74-9).

[c] Criterion shown is for 4,4'-DDT.

Copper aquatic life criteria are site specific for Newark Bay.

Metals aquatic life criteria are based on dissolved concentrations.

1/2 Detection Limit substituted for non-detects in summary statistics.

Acronyms and Abbreviations:

-- - No water quality criteria available
FW = Fresh Water. Fresh water values were used when values for saline waters were not available.
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
ng/L = nanograms per liter
NJDEP = New Jersey Department of Environmental Protection
NOAA = National Oceanic and Atmospheric Administration.
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/L = picograms per liter
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of DDD, DDE, and DDT
µg/L = micrograms per liter

Table 6-1
Scoring Methods for the Sediment Quality Triad Data

Category	Metric	Weight	Scoring
BIC	Abundance (per m^2)	0.167	0 = Within reference envelope (≥5th percentile and <95th percentile of the Jamaica Bay reference dataset) 1 = Outside reference envelope
	Richness	0.167	0 = Within reference envelope (≥5th percentile of Jamaica Bay reference dataset) 1 = Outside reference envelope
	Shannon-Weiner diversity index	0.167	
	Pielou's evenness index	0.167	
	Swartz's dominance index	0.167	
	NY/NJ Harbor B-IBI score	0.167	0 = unimpacted (B-IBI≥3) 0.5 = slightly impacted (2≤B-IBI<3) 1 = impacted (B-IBI<2)
Toxicity	10-day survival	0.25	0 = control-normalized survival ≥80% and/or not significantly different from control 0.5 = control-normalized survival <80% and ≥60% and significantly different from control 1 = control-normalized survival <60% and significantly different from control
	28-day survival	0.25	
	Growth rate	0.25	0 = control-normalized survival ≥70% and/or not significantly different from control 0.5 = control-normalized survival <70% and ≥50% and significantly different from control 1 = control-normalized survival <50% and significantly different from control
	Reproduction	0.25	
Sediment Chemistry	Sediment Concentration	0.5	0 = ≤T20/ERL/TEL 0.5 = >T20/ERL/TEL and ≤ T50/ERM/PEL 1 = >T50/ERM/PEL or ERM Quotient >1
	Porewater Concentration	0.5	0 = <chronic water quality criteria 0.5 = >chronic water quality criteria and/or the SumTU exceeds 1 1 = >acute water quality criteria

Note:
The ERM quotient is the sum of each of 25 chemical concentrations divided by the ERM as suggested in Long et al. 2006.

Acronyms and Abbreviations:

< = less than
> = greater than
≤ = less than or equal to
≥ = greater than or equal to
% = percent
BIC = Benthic Invertebrate Community
B-IBI = Benthic Index of Biotic Integrity
ERL = effect range-low
ERM =effect range-median
m^2 = square meters
NY/NJ = New York/New Jersey
PEL = Probable Effect Level
SumTU = sum of toxic units as defined in USEPA guidance (2005) for metals and (2017) for PAHs.
TEL = threshold effect level
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are predicted to be toxic (e.g., 50% of the samples).
USEPA = U.S. Environmental Protection Agency

References:

Long, E.R., C.G. Ingersoll and D.D. MacDonald. 2006. Calculation and uses of mean sediment quality guideline quotients: A critical review. *Environ Sci Technol* 40:1726-1736.

USEPA. 2005. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver and Zinc). EPA-600-R-02-011. Office of Research and Development. Washington, DC 20460.

USEPA 2017. Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Non-ionic Organic Contaminants. EPA/600/R. Office of Research and Development. Washington, DC, USA.

Table 6-2
Benthic Invertebrate Community Scores

Geographic Area	Station	Total Taxa (Richness)		Total Mean Density (no./m²)		Shannon Wiener Diversity Index		Pielou's Evenness		Swartz's Dominance		Overall B-IBI		Total BIC Score (Maximum = 1)
		Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	
Jamaica Bay Reference (N=59)	**Mean**	**19**		**14165**		**1.55**		**0.60**		**3.4**				
	5th Percentile[a]	**5**		**660-60,675**		**0.71**		**0.38**		**1**		**NA**		
North	**136**	22	0	6,363	0	2.2	0	0.71	0	6	0	3.8	0	**0**
	137	21	0	7,739	0	2.1	0	0.69	0	4	0	3.4	0	**0**
	138	20	0	5,985	0	2.4	0	0.80	0	5	0	3.4	0	**0**
	139	22	0	6,232	0	2.2	0	0.71	0	5	0	3.4	0	**0**
	140	22	0	6,826	0	2.1	0	0.68	0	4	0	3.4	0	**0**
	158	46	0	10,756	0	2.1	0	0.55	0	4	0	3	0	**0**
	159	23	0	1,974	0	2.3	0	0.73	0	6	0	3.4	0	**0**
	160	16	0	3,167	0	2.2	0	0.79	0	6	0	3	0	**0**
	161	18	0	2,667	0	1.5	0	0.52	0	3	0	2.6	0.5	**0.08**
	162	15	0	1,406	0	2.1	0	0.78	0	5	0	2.2	0.5	**0.08**
	163	21	0	2,899	0	2.0	0	0.66	0	4	0	4.2	0	**0**
	164	21	0	11,101	0	1.8	0	0.59	0	3	0	2.6	0.5	**0.08**
	165	22	0	9,725	0	2.4	0	0.78	0	6	0	3.8	0	**0**
Central	**141**	19	0	3,870	0	2.1	0	0.71	0	5	0	3	0	**0**
	142	29	0	11,237	0	2.0	0	0.59	0	4	0	3.4	0	**0**
	143	25	0	5,870	0	2.3	0	0.71	0	5	0	3.8	0	**0**
	144	11	0	710	0	2.1	0	0.88	0	5	0	2.2	0.5	**0.08**
	145	28	0	8,870	0	2.1	0	0.63	0	5	0	3	0	**0**
	156	16	0	1,812	0	2.2	0	0.79	0	5	0	3	0	**0**
	157	19	0	1,218	0	2.4	0	0.82	0	8	0	3	0	**0**
South	**146**	42	0	2,788	0	2.7	0	0.72	0	8	0	3.8	0	**0**
	147	14	0	2,116	0	1.9	0	0.72	0	5	0	2.2	0.5	**0.08**
	148	8	0	**406**	1	1.5	0	0.72	0	3	0	1.8	1	**0.33**
	149	15	0	7,019	0	1.8	0	0.66	0	3	0	3.4	0	**0**
	150	23	0	2,276	0	2.6	0	0.83	0	7	0	3.4	0	**0**
	151	22	0	1,667	0	2.2	0	0.71	0	5	0	2.6	0.5	**0.08**
	152	43	0	7,186	0	2.2	0	0.58	0	5	0	3.4	0	**0**
	153	42	0	5,595	0	2.7	0	0.72	0	8	0	4.2	0	**0**
	154	33	0	1,301	0	3.0	0	0.86	0	12	0	2.6	0.5	**0.08**
	155	20	0	2,340	0	1.9	0	0.63	0	4	0	2.6	0.5	**0.08**
Averages	**All**	23	0	4771	0.03	2.2	0	0.71	0	5.3	0	3.1	0.2	0.03
	North	22	0	5911	0	2.1	0	0.69	0	4.7	0	3.2	0.1	0.02
	Central	21	0	4798	0.00	2.2	0	0.73	0	5.3	0	3.1	0.1	0.01
	South	26	0	3269	0.10	2.3	0	0.72	0	6.0	0	3.0	0.3	0.07

Table 6-2
Benthic Invertebrate Community Scores

Notes:
[a] Both 5th and 95th percentile shown for density. Shading and bolding indicates the NBSA value is less than the 5th percentile of the Jamaica Bay reference dataset. For density, shading and bolding indicates the NBSA value is either less than 5th percentile or greater than the 95th percentile of the Jamaica Bay reference dataset.
The total BIC score is the weighted sum of the six SQT scores with each metric having equal weight (0.167).

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
BIC = Benthic Invertebrate Community
N = number
NA = not applicable. B-IBI is scored according to the categories in the original reference (Weisberg et al. 1998): 0 = unimpacted (B-IBI>3); 0.5 = slightly impacted (2<B-IBI<3); 1 = impacted (B-IBI<2).
NBSA = Newark Bay Study Area
no./m² = number of organisms per square meter
SQT = sediment quality triad

Reference:
Weisberg, S.B., J.A. Ranasinghe, J.S. O'Connor, and D.A. Adams. 1998. A Benthic Index of Biotic Integrity (B-IBI) for the New York/New Jersey Harbor. Appendix C in Adams, D.A., J.S. O'Connor, and S.B. Weisberg. 1998. Sediment Quality of the NY/NJ Harbor System. EPA/902-R-98-001. United States Environmental Protection Agency, Region 2, Edison, NJ.

Table 6-3
Comparison of Benthic Invertebrate Community Metrics to Jamaica Bay Reference

Geographic Area	Number	Total Mean Density (no./m²)	Number of Taxa	Shannon Wiener Diversity Index	Pielou's Evenness	Swartz's Dominance
Jamaica Bay Reference	59	14165	19	1.6	0.60	3.4
NBSA (All)	30	4771	23	2.2	0.71	5.3
NBSA (North)	13	5911	22	2.1	0.69	4.7
NBSA (Central)	7	4798	21	2.2	0.73	5.3
NBSA (South)	10	3269	26	2.3	0.72	6.0
Kruskal-Wallis p-value for two sample comparison.			0.058	<0.0001	0.0009	<0.0001
Kruskal-Wallis p-value comparison by geographic area.			0.267	<0.0001	0.0093	0.0002

Notes:
The comparison by geographic area compares the means/medians of each NBSA geographic areas to that of the Jamaica Bay reference in a one-way analysis.
The two sample comparison compares the means/medians of all NBSA samples to that of the Jamaica Bay reference.
Mean density was not compared.

Acronyms and Abbreviations:
NBSA = Newark Bay Study Area
no./m^2 = number per square meter

Table 6-4
Sediment Toxicity Scores

Geographic Area	Station	10 Day Mean Percent Survival		28 Day Mean Percent Survival		Growth Rate (mg/Organism/Day)		Mean Reproduction (Young per Surviving Adult)		Total Sediment Toxicity Score (Maximum = 1)
		Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	
Laboratory Control (a)		**90 (72)**		**81 (65)**		**0.044 (0.031)**		**1.97 (1.38)**		
North	**136**	92	0	63	0	0.028	0	**0.69**	0	**0**
	137	96	0	75	0	0.029	0.5	**0.28**	1	**0.38**
	138	89	0	**46**	0	**0.017**	1	**0.33**	1	**0.50**
	139	92	0	92	0	0.033	0	**0.56**	1	**0.25**
	140	81	0	79	0	0.032	0	**0.77**	0	**0**
	158	93	0	**39**	1	**0.01**	1	**0**	1	**0.75**
	159	90	0	62	0	0.029	0	**0.67**	0	**0**
	160	90	0	**0**	1	--	1	--	1	**0.75**
	161	95	0	96	0	0.034	0	**0.71**	0	**0**
	162	92	0	86	0	0.037	0	**0.95**	0	**0**
	163	94	0	69	0	0.031	0	**1.02**	0	**0**
	164	96	0	84	0	**0.021**	1	**0.83**	0	**0.25**
	165	95	0	88	0	0.028	0.5	**0.68**	1	**0.38**
Central	**141**	92	0	67	0	0.036	0	**0.8**	0	**0**
	142	98	0	53	0	0.05	0	1.93	0	**0**
	143	90	0	**30**	1	**0.012**	1	**0.21**	1	**0.75**
	144	93	0	65	0	**0.021**	1	**1.13**	0	**0.25**
	145	97	0	59	0	0.04	0	**0.58**	0	**0**
	156	96	0	86	0	0.035	0	**0.79**	0	**0**
	157	92	0	80	0	**0.024**	0.5	**0.94**	0	**0.13**
South	**146**	83	0	84	0	0.029	0.5	**0.6**	1	**0.38**
	147	90	0	79	0	0.035	0	**0.28**	1	**0.25**
	148	97	0	92	0	0.032	0	**0.84**	0	**0**
	149	98	0	63	0	**0.02**	1	**0.64**	0	**0.25**
	150	89	0	73	0	0.03	0	**0.67**	1	**0.25**
	151	**37.5**	1	**0**	1	--	1	--	1	**1**
	152	97	0	86	0	**0.025**	0.5	**0.37**	1	**0.38**
	153	98	0	83	0	0.037	0	**0.73**	0	**0**
	154	**39**	1	**9**	1	**0.0025**	1	**0.48**	1	**1**
	155	95	0	70	0	0.035	0	**0.6**	0	**0**
Averages	**All**	89	0.07	65	0.17	0.028	0.38	0.68	0.43	0.26
	North	92	0	68	0.15	0.027	0.38	0.62	0.46	0.25
	Central	94	0	63	0.14	0.031	0.36	0.91	0.14	0.16
	South	82	0.20	64	0.20	0.027	0.40	0.58	0.60	0.35

Notes:
The total sediment toxicity score is the weighted sum of the four SQT scores with each endpoint having equal weight (0.25).
Shaded cells indicate values that are significantly different than the control (p=0.05).
Bolded cells indicate value is less than control minus the minimum detectable difference (MDD) for the endpoint (seeTable A-2-1 in Attachment A-2 for MDDs).
Field duplicate results at Stations 151 and 154 were averaged with the parent sample results.
Value in parentheses is 80% of the laboratory control for survival or 70% of the laboratory control for growth or reproduction.

Acronyms and Abbreviations:
-- = Growth rate or reproduction not calculable for samples with no surviving organisms.
SQT = Sediment Quality Triad
mg = milligrams

Table 6-5
Comparison of 10-Day Amphipod Survival to Jamaica Bay Reference

Geographic Area	Number	Survival as a Percent of Control Survival
Jamaica Bay Reference	59	95%
NBSA (All)	30	99%
NBSA (North)	13	102%
NBSA (Central)	7	104%
NBSA (South)	10	92%
Kruskal-Wallis p-value for two sample comparison.		<0.0001
Kruskal-Wallis p-value comparison by geographic area.		<0.0001

Notes:
The comparison by geographic area compares the means/medians of each NBSA geographic areas to that of the Jamaica Bay reference in a one-way analysis.
The two sample comparison compares the means/medians of all NBSA samples to that of the Jamaica Bay reference.

Acronyms and Abbreviations:
NBSA = Newark Bay Study Area
% = percent

Table 6-6
Exceedances of Sediment Quality Guidelines

Parameter Group	Chemical Name	Number of Exceedances in 30 SQT Samples					Number of Exceedance in 30 SQT Samples that Exceed Maximum of:	
		T20	T50	T80	ERL	ERM	T20, ERL, or TEL	T50, ERM, or PEL
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	--	--	--	--	30	26
PCBs	Total PCBs (sum of Aroclors)	29	6	0	30	15	29	6
	Total PCBs (sum of 209 congeners)	30	18	1	30	24	30	18
Pesticides	4,4-DDD	30	8	0	--	--	30	8
	4,4-DDE	30	3	0	30	12	30	3
	4,4-DDT	10	3	1	--	--	10	3
	Dieldrin	21	3	0	--	0	21	3
	Total DDx (2,4 & 4,4) Total Fraction	--	--	--	30	14	30	14
	Total alpha + gamma chlordane[a]	--	--	--	--	--	25	21
	Total Chlordane[ab]	--	--	--	--	--	28	25
	gamma-BHC (lindane)	--	--	--	--	--	0	0
	Total BHC Compounds[c]	--	--	--	--	--	7	2
PAHs	1-Methylnaphthalene	21	1	0	--	--	21	1
	2-Methylnaphthalene	24	0	0	3	0	3	0
	Acenaphthene	23	4	1	24	1	23	1
	Acenaphthylene	29	12	0	27	1	27	1
	Anthracene	29	7	1	23	2	23	2
	Benzo(a)anthracene	30	17	1	25	5	25	5
	Benzo(a)pyrene	30	22	1	24	7	24	7
	Benzo(b)fluoranthene	29	9	0	--	--	29	9
	Benzo(g,h,i)perylene	29	12	0	--	--	29	12
	Benzo(k)fluoranthene	30	16	1	--	--	30	16
	C1-Phenanthrenes/Anthracenes	29	26	9	--	--	29	26
	C2-Naphthalenes	29	19	1	--	--	29	19
	Chrysene	30	15	1	23	1	23	1
	Dibenz(a,h)anthracene	30	19	1	27	9	27	9
	Fluoranthene	30	13	1	20	2	20	2
	Fluorene	23	4	0	23	1	23	1
	Indeno(1,2,3-cd)pyrene	29	13	1	--	--	29	13
	Naphthalene	26	1	0	3	0	3	0
	Perylene	29	6	0	--	--	29	6
	Phenanthrene	29	7	2	18	3	18	3
	Pyrene	30	18	1	22	4	22	4
	Total HMW PAHs	--	--	--	29	10	29	10
	Total LMW PAHs	--	--	--	21	3	21	3
	Total PAH	--	--	--	24	1	24	1
Semivolatiles	Biphenyl (1,1-Biphenyl)	3	0	0	--	--	3	0
	bis(2-Ethylhexyl)phthalate (DEHP)	--	--	--	--	--	25	3
Metals	Antimony	15	5	0	--	--	15	5
	Arsenic	26	5	1	24	0	24	0
	Cadmium	29	11	2	13	2	13	2
	Chromium	27	5	0	19	1	19	1
	Copper	30	18	3	29	3	29	3
	Lead	30	19	3	29	5	29	5
	Mercury	30	29	15	30	24	30	24
	Nickel	30	9	0	25	7	25	7
	Silver	30	23	0	24	2	24	2
	Zinc	29	14	1	23	5	23	5

Table 6-6
Exceedances of Sediment Quality Guidelines

Notes:

[a]Compared TEL/PEL for chlordane (CAS Number 57-74-9).

[b]Total Chlordane is the sum of alpha-Chlordane, gamma-Chlordane, Heptachlor, Heptachlor epoxide, Heptachlor endo-epoxide, cis-Nonachlor, trans-Nonachlor, and Oxychlordane.

[c]Total BHC Compounds is the sum of alpha-BHC, beta-BHC, delta-BHC, and gamma-BHC (lindane). Counts are based on a comparison to the TEL/PEL for gamma-BHC (lindane).

Acronyms and Abbreviations:

BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
ERL = effect range-low
ERM =effect range-median
HMW = high molecular weight
LMW = low molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEL = Probable Effect Level
SQT = sediment quality triad
TEL = threshold effect level
Total DDx = sum of DDE, DDD, and DDT
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).
% = percent
-- = not available

Table 6-7
Exceedances of Water Quality Criteria and Screening Values in Porewater

Parameter Group	Chemical	Number of Detects in 30 Porewater Samples[a]	Number of Exceedances of in 30 Porewater Samples	
			Acute	Chronic
Dioxins/Furans	2,3,7,8-TCDD	30	0	0
PCBs	**Total PCBs (209 congeners)**	30	--	**3**
Pesticides	Aldrin	20	0	--
	Dieldrin	30	0	0
	cis-Nonachlor[b]	29	0	0
	trans-Nonachlor[b]	30	0	0
	Endosulfan I	6	0	0
	Endosulfan II	0	Not Detected	
	Endosulfan sulfate	0	Not Detected	
	Endrin	0	Not Detected	
	Heptachlor	26	0	0
	Heptachlor epoxide	13	0	0
	Hexachlorobenzene	30	0	0
	Methoxychlor	0	Not Detected	
	Mirex	16	--	0
	Total DDx (4,4)[c]	30	0	**14**
	Total alpha + gamma chlordane[b]	30	0	0
	gamma-BHC (lindane)	0	Not Detected	
PAHs	Individual PAHs and Totals	30	0	0
Metals	**Arsenic**	9	**1**	**3**
	Cadmium	0	Not Detected	
	Chromium	26	0	0
	Copper	5	**1**	**2**
	Lead	6	0	0
	Mercury	29	0	0
	Nickel	0	Not Detected	
	Selenium	10	0	0
	Silver	0	Not Detected	
	Zinc	3	**3**	**3**

Notes:
Chemicals and exceedance counts in **BOLD** indicate at least one exceedance was observed.
[a]Only 29 samples were analyzed for metals due to a broken dialysis bag at station 155.
[b]Compared to published criterion for chlordane (CAS Number 57-74-9).
[c]Compared to published criterion for 4,4'-dichlorodiphenyltrichloroethane (CAS Number 50-29-3).

Acronyms and Abbreviations:
BHC = benzene hexachloride
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
-- = criteria not available

Table 6-8
Sediment and Porewater Chemistry Scores

Geographic Area	Station	Sediment Chemistry				Porewater Chemistry					Total Sediment/ Porewater Chemistry Score (Maximum = 1)
		Number of Compounds that Exceed Maximum of:		ERM Quotient	Sediment SQT Score	Number of Compounds that Exceed WQC:		Sum of Toxic Units (Metals) >1	Sum of Toxic Units (PAHs) >1	Porewater SQT Score	
		T20, ERL or TEL	T50, ERM or PEL			Chronic	Acute				
North	**136**	39	5	12	1	0	0	No	No	0	**0.5**
	137	41	12	12	1	0	0	No	No	0	**0.5**
	138	40	15	20	1	1	0	No	No	0.5	**0.75**
	139	39	16	19	1	0	0	Yes	No	0.5	**0.75**
	140	29	3	6.6	1	1	0	No	No	0.5	**0.75**
	158	32	10	9.4	1	0	0	No	No	0	**0.5**
	159	37	17	17	1	1	1	Yes	No	1	**1**
	160	40	11	21	1	2	0	No	No	0.5	**0.75**
	161	42	10	16	1	0	0	No	No	0	**0.5**
	162	40	14	16	1	0	0	No	No	0	**0.5**
	163	36	4	10	1	1	0	Yes	No	0.5	**0.75**
	164	23	4	7.6	1	0	0	No	No	0	**0.5**
	165	40	9	14	1	0	0	No	No	0	**0.5**
Central	**141**	25	4	10	1	1	1	Yes	No	1	**1**
	142	31	1	5.1	1	0	0	No	No	0	**0.5**
	143	42	13	21	1	2	0	No	No	0.5	**0.75**
	144	39	6	15	1	1	0	No	No	0.5	**0.75**
	145	29	6	8.9	1	1	0	No	No	0.5	**0.75**
	156	36	5	9.5	1	0	0	No	No	0	**0.5**
	157	38	7	13	1	0	0	No	No	0	**0.5**

Table 6-8
Sediment and Porewater Chemistry Scores

Geographic Area	Station	Sediment Chemistry				Porewater Chemistry					Total Sediment/ Porewater Chemistry Score (Maximum = 1)
		Number of Compounds that Exceed Maximum of:		ERM Quotient	Sediment SQT Score	Number of Compounds that Exceed WQC:		Sum of Toxic Units (Metals) >1	Sum of Toxic Units (PAHs) >1	Porewater SQT Score	
		T20, ERL or TEL	T50, ERM or PEL			Chronic	Acute				
South	**146**	20	1	5.5	1	1	0	No	No	0.5	**0.75**
	147	42	14	18	1	2	1	Yes	No	1	**1**
	148	43	26	33	1	1	0	No	No	0.5	**0.75**
	149	36	13	20	1	1	0	No	No	0.5	**0.75**
	150	41	27	62	1	2	1	Yes	No	1	**1**
	151	42	24	67	1	3	1	No	No	1	**1**
	152	42	16	22	1	1	0	No	No	0.5	**0.75**
	153	23	1	6.7	1	0	0	No	No	0	**0.5**
	154	39	17	39	1	2	0	No	Yes	0.5	**0.75**
	155	8	0	3.3	1	1	0	No	No	0.5	**0.75**

Acronyms and Abbreviations:

ERL = effect range-low
ERM =effect range-median
PEL = probable effect level
SQT = sediment quality triad
TEL = threshold effect level
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).
WQC = water quality criteria
> = greater than
% = percent

Table 6-9
Sediment Quality Triad Scoring Summary

Geographic Area	Station	SQT Category Scores (Maximum = 1)			Total SQT Score (Maximum = 3)	Degree of Impact[a]
		Total BIC Score	Total Sediment Toxicity Score	Total Sediment Chemistry Score		
North	136	0	0	**0.5**	0.50	No Impact
	137	0	**0.38**	**0.5**	0.88	Low Impact
	138	0	**0.50**	**0.75**	1.25	Low Impact
	139	0	**0.25**	**0.75**	1.00	Low Impact
	140	0	0	**0.75**	0.75	No Impact
	158	0	**0.75**	**0.5**	1.25	Low Impact
	159	0	0	**1**	1.00	Low Impact
	160	0	**0.75**	**0.75**	1.50	Low Impact
	161	**0.08**	0	**0.5**	0.58	No Impact
	162	**0.08**	0	**0.5**	0.58	No Impact
	163	0	0	**0.75**	0.75	No Impact
	164	**0.08**	**0.25**	**0.5**	0.83	Low Impact
	165	0	**0.38**	**0.5**	0.88	Low Impact
Central	141	0	0	**1**	1.00	Low Impact
	142	0	0	**0.5**	0.50	No Impact
	143	0	**0.75**	**0.75**	1.50	Low Impact
	144	**0.08**	**0.25**	**0.75**	1.08	Low Impact
	145	0	0	**0.75**	0.75	No Impact
	156	0	0	**0.5**	0.50	No Impact
	157	0	**0.13**	**0.5**	0.63	No Impact
South	146	0	**0.38**	**0.75**	1.13	Low Impact
	147	**0.08**	**0.25**	**1**	1.33	Low Impact
	148	**0.33**	0	**0.75**	1.08	Low Impact
	149	0	**0.25**	**0.75**	1.00	Low Impact
	150	0	**0.25**	**1**	1.25	Low Impact
	151	**0.08**	**1**	**1**	2.08	**Medium Impact**
	152	0	**0.38**	**0.75**	1.13	Low Impact
	153	0	0	**0.5**	0.50	No Impact
	154	**0.08**	**1**	**0.75**	1.83	**Medium Impact**
	155	**0.08**	0	**0.75**	0.83	Low Impact

Notes:
Non-zero cells shaded and bolded.

[a] Impact categories are defined by total scores as follows: no impact ≤0.75; low impact >0.75 and ≤1.5; medium impact = >1.5 and <2.25; and high impact = >2.25.

Acronyms and Abbreviations:
BIC = Benthic Invertebrate Community
SQT = sediment quality triad
< = less than
> = greater than

Table 6-10
Chemicals with Maximum or Second Largest Concentrations at Locations 151 or 154

Parameter Group	Chemical	Sediment	Porewater
Dioxins/Furans	2,3,7,8-TCDD and 15 (sediment) or 16 (porewater) other 2,3,7,8 substituted dioxin/furan congeners[a]	X	X
PCBs	Total Congeners and 134 (sediment) or 136 (porewater) individual congeners	X	X
	Total and Three Individual Aroclors	X	--
Pesticides	Total DDx and 4 (sediment) or 3 (porewater) individual isomers	X	X
	Dieldrin	X	X
	Hexachlorobenzene	X	X
	Total alpha + gamma chlordane	X	
	gamma chlordane	X	X
	alpha-BHC	X	
	cis-Nonachlor	X	X
PAHs	2-Methylnaphthalene		X
	Acenaphthylene		X
	Anthracene		X
	Benzo(a)anthracene		X
	Chrysene		X
	Fluoranthene		X
	Pyrene		X
	C1-Chrysenes		X
	C1-Fluoranthenes/Pyrenes		X
	C1-Fluorenes	X	
	C1-Phenanthrenes/Anthracenes		X
	C2-Chrysenes		X
	C2-Fluoranthenes/Pyrenes		X
	C2-Fluorenes	X	X
	C2-Phenanthrenes/Anthracenes	X	X
	C3-Chrysenes	X	X
	C3-Fluoranthenes/Pyrenes	X	X
	C3-Fluorenes	X	X
	C3-Naphthalenes	X	
	C3-Phenanthrenes/Anthracenes	X	X
	C4-Chrysenes	X	X
	C4-Naphthalenes	X	X
	C4-Phenanthrenes/Anthracenes	X	X
	Total Alkylated PAHs	X	X
	Total LMW PAHs		X
	Total HMW PAHs		X
	Total PAHs		X
Petroleum Hydrocarbons	Total and 10 Individual Petroleum Hydrocarbons	X	--
Semivolatiles	bis(2-Ethylhexyl)phthalate	X	--
AVS-SEM	Acid volatile sulfide	X	--
	Cadmium	X	--
	Lead	X	--
	Nickel	X	--
	Zinc	X	--

Table 6-10
Chemicals with Maximum or Second Largest Concentrations at Locations 151 or 154

Parameter Group	Chemical	Sediment	Porewater
Metals	Antimony	X	
	Arsenic	X	X
	Barium	X	X
	Cadmium	X	ND
	Chromium	X	
	Copper	X	
	Lead	X	
	Mercury	X	X
	Methyl mercury	X	X
	Selenium	X	
	Silver	X	ND
	Thallium	X	ND
	Titanium	X	
	Vanadium	X	
	Zinc	X	
Inorganics	Cyanide (total)	X	--
	Phosphorus	X	--
	Sulfide	X	
Herbicides	2,4,5-T	X	--

Notes:
[a]Only the 17 2,3,7,8-substituted dioxin and furan congeners were analyzed.

Acronyms and Abbreviations:
AVS-SEM = acid-volatile sulfide and simultaneously extracted metals
BHC = hexachlorocyclohexane
HMW = high molecular weight
LMW = low molecular weight
ND = not detected in porewater
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx (2,4 and 4,4) = sum of six isomers of dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene , and dichlorodiphenyltrichloroethane
-- Not analyzed in porewater

Table 6-11
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10 day survival	28 day survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness	Swartz's Dominance	NY/NJ B-IBI
Dioxins/ Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	30	100%	**-0.47**	-0.12	**-0.35**	-0.17	-0.29	-0.20	0.09	0.29	0.07	-0.15
PCBs	Total PCBs congener (209 specified)	30	100%	**-0.32**	-0.16	**-0.44**	-0.17	**-0.37**	**-0.45**	0.14	0.46	0.20	**-0.35**
	Total PCBs (sum of 9 Aroclors)	30	100%	**-0.54**	**-0.42**	**-0.57**	**-0.52**	0.09	-0.17	0.31	0.23	0.32	-0.02
Pesticides	Dieldrin	30	100%	-0.27	-0.29	**-0.31**	**-0.38**	-0.22	-0.10	0.02	0.14	0.04	-0.05
	Hexachlorobenzene	30	100%	**-0.46**	-0.23	**-0.50**	**-0.53**	-0.08	0.08	0.04	0.06	-0.08	-0.09
	Total DDx (2,4 & 4,4)	30	100%	**-0.30**	-0.12	**-0.50**	**-0.45**	-0.16	-0.19	0.07	0.16	0.04	-0.14
	Total DDx (4,4)	30	100%	**-0.30**	-0.13	**-0.52**	**-0.42**	-0.19	-0.21	0.05	0.17	0.01	-0.17
	Total alpha + gamma chlordane	30	100%	-0.27	-0.17	**-0.32**	-0.23	-0.20	0.04	0.07	0.07	0.03	0.10
PAHs	Total Alkylated PAHs	30	100%	**-0.33**	-0.12	**-0.34**	**-0.36**	0.05	**-0.33**	0.22	0.33	0.18	-0.28
	Total HMW PAHs	30	100%	-0.20	0.12	-0.26	-0.25	-0.03	-0.20	0.18	0.24	0.07	-0.10
	Total LMW PAHs	30	100%	-0.25	0.00	-0.29	**-0.33**	-0.08	-0.28	0.19	0.31	0.13	-0.17
	Total PAH	30	100%	-0.22	0.09	-0.28	-0.27	-0.04	-0.21	0.18	0.25	0.09	-0.11
Semivolatiles	4-Methylphenol	27	63%	0.07	-0.12	-0.27	-0.24	-0.08	0.00	-0.17	-0.17	-0.25	-0.13
	Acetophenone	29	55%	0.00	0.36	-0.06	0.01	**-0.37**	0.06	-0.15	0.05	-0.22	-0.10
	Carbazole	26	42%	0.22	-0.08	0.06	0.20	-0.09	0.01	-0.10	-0.02	-0.20	0.13
	Dibenzofuran	26	38%	0.28	-0.07	0.11	0.19	-0.09	0.04	-0.12	-0.05	-0.18	0.12
	bis(2-Ethylhexyl)phthalate (DEHP)	29	90%	-0.22	-0.14	-0.20	-0.08	**-0.40**	-0.19	-0.13	0.27	-0.04	-0.25
Total Petroleum Hydrocarbons (C9-C40)		30	100%	-0.05	0.19	-0.15	0.04	-0.20	-0.19	-0.07	0.21	-0.04	-0.20
Metals	Antimony	30	100%	0.01	-0.17	-0.15	-0.05	-0.10	-0.26	-0.11	0.02	-0.03	-0.19
	Arsenic	30	100%	-0.23	-0.02	-0.29	-0.18	-0.21	**-0.43**	0.16	0.35	0.17	-0.20
	Barium	30	100%	-0.16	-0.12	-0.19	-0.14	-0.25	**-0.62**	-0.01	0.22	0.09	-0.23
	Beryllium	30	100%	-0.11	0.06	-0.03	0.10	**-0.59**	**-0.62**	-0.14	0.36	0.04	**-0.31**
	Cadmium	30	100%	**-0.37**	-0.29	**-0.51**	-0.28	**-0.35**	**-0.36**	0.03	0.34	0.09	-0.24
	Chromium	30	100%	**-0.35**	**-0.31**	**-0.40**	-0.18	**-0.36**	**-0.37**	0.07	0.40	0.10	-0.12
	Cobalt	30	100%	-0.11	0.10	0.00	0.13	**-0.55**	**-0.59**	-0.11	0.34	0.07	-0.21
	Copper	30	100%	-0.26	-0.17	**-0.41**	-0.28	-0.28	**-0.39**	0.08	0.31	0.15	-0.21
	Lead	30	100%	-0.15	-0.16	**-0.35**	-0.19	**-0.33**	**-0.40**	-0.03	0.27	0.08	-0.24
	Mercury	30	100%	**-0.30**	-0.23	**-0.65**	**-0.37**	-0.26	-0.21	0.15	0.34	0.11	-0.20
	Methyl mercury	30	100%	-0.05	0.02	**-0.33**	-0.18	**-0.34**	-0.25	-0.20	0.07	-0.16	**-0.33**
	Nickel	30	100%	-0.16	-0.02	-0.04	0.05	**-0.40**	**-0.62**	0.11	0.47	0.31	-0.13
	Selenium	30	100%	-0.24	-0.11	**-0.35**	-0.12	**-0.31**	**-0.44**	0.05	0.29	0.08	-0.20
	Silver	30	100%	**-0.33**	-0.17	**-0.39**	-0.13	**-0.39**	**-0.48**	0.09	0.47	0.18	-0.26
	Thallium	30	100%	-0.05	0.07	-0.01	0.03	**-0.38**	**-0.55**	-0.03	0.26	0.08	-0.21
	Titanium	30	100%	-0.20	0.14	0.02	0.16	**-0.51**	**-0.67**	-0.01	0.43	0.14	**-0.32**
	Vanadium	30	100%	-0.23	0.05	-0.07	0.13	**-0.40**	**-0.68**	0.05	0.44	0.15	-0.22
	Zinc	30	100%	-0.20	-0.16	**-0.34**	-0.18	**-0.36**	**-0.41**	-0.03	0.28	0.07	-0.23

Table 6-11
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10 day survival	28 day survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness	Swartz's Dominance	NY/NJ B-IBI
AVS-SEM	Acid volatile sulfide	30	93%	-0.20	-0.18	**-0.38**	-0.09	-0.23	**-0.52**	0.06	0.30	0.16	-0.15
	Cadmium	30	100%	**-0.36**	-0.29	**-0.43**	-0.28	-0.18	**-0.34**	0.03	0.24	0.12	-0.21
	Copper	30	100%	-0.11	-0.01	-0.28	-0.22	**-0.30**	-0.27	-0.01	0.29	0.06	-0.19
	Lead	30	100%	-0.16	**-0.31**	**-0.39**	-0.30	-0.16	-0.27	0.00	0.17	0.10	-0.19
	Nickel	30	100%	-0.14	-0.28	-0.06	0.06	-0.12	-0.20	0.09	0.24	0.15	0.13
	Zinc	30	100%	-0.19	-0.29	**-0.35**	-0.26	-0.14	-0.28	-0.03	0.14	0.05	-0.18
Grain Size	Percent Fines	30	100%	-0.12	0.13	-0.14	0.20	**-0.48**	**-0.31**	0.17	0.46	0.20	-0.05
Total Organic Carbon		30	100%	-0.09	-0.05	**-0.34**	**-0.31**	0.05	0.07	0.20	0.08	0.08	0.24

Notes:
1/2 reporting limit substituted for non-detects.
Shading indicates strength of association as determined by the Spearman correlation coefficient.
Spearman correlation coefficients less than -0.3 are statistically significant and shown in bold.
See Table A-19 (Appendix A) for Spearman coefficients for the complete list of analyzed chemicals.

Acronyms and Abbreviations:
AVS = acid volatile sulfide
HMW = high molecular weight
LMW = low molecular weight
N = number
NY/NJ B-IBI = New York/New Jersey Harbor Benthic Index of Biotic Integrity
no/m^2 = number per square meter
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SEM = simultaneously extracted metals
TCDD = Tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
% = percent

Shading
1
0.5
0
-0.5
-1

Table 6-12
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10 day survival	28 day survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness	Swartz's Dominance	NY/NJ B-IBI
Dioxins/ PCBs	2,3,7,8-TCDD	30	100%	**-0.54**	-0.28	**-0.40**	-0.27	-0.21	-0.07	-0.03	0.20	-0.01	**-0.35**
	Total PCBs congener (209)	30	100%	**-0.48**	-0.29	**-0.40**	**-0.40**	-0.14	**-0.34**	0.13	0.33	0.17	-0.29
Pesticides	Aldrin	30	67%	0.17	0.17	0.11	-0.03	0.00	0.48	-0.18	**-0.33**	-0.13	0.26
	Dieldrin	30	100%	-0.19	**-0.38**	-0.26	**-0.38**	-0.08	0.18	-0.21	-0.17	-0.23	-0.14
	Heptachlor	30	87%	0.11	0.30	0.30	0.28	-0.19	-0.12	-0.09	0.02	0.04	0.11
	Heptachlor epoxide	30	43%	0.23	0.33	0.25	0.40	-0.02	0.42	**-0.31**	**-0.39**	**-0.34**	0.14
	Hexachlorobenzene	30	100%	**-0.36**	**-0.37**	-0.22	**-0.34**	0.06	0.12	-0.17	-0.22	-0.24	-0.24
	Mirex	28	57%	0.11	0.30	0.01	0.19	0.00	0.37	-0.03	-0.21	-0.07	0.26
	Total DDx (2,4 & 4,4)	30	100%	**-0.31**	-0.18	**-0.35**	**-0.44**	0.11	**-0.30**	0.16	0.11	0.17	-0.21
	Total DDx (4,4)	30	100%	**-0.32**	-0.17	**-0.36**	**-0.42**	0.11	-0.30	0.14	0.09	0.14	-0.19
	Total alpha + gamma chlordane	30	100%	-0.10	-0.19	-0.22	-0.10	0.11	0.37	-0.06	-0.30	-0.14	0.19
	cis-Nonachlor	30	97%	-0.16	-0.13	-0.29	-0.11	-0.15	0.08	-0.10	-0.04	-0.07	-0.08
	trans-Nonachlor	30	100%	0.10	0.04	0.00	0.17	0.09	0.49	-0.15	**-0.36**	-0.19	0.35
PAHs	Total Alkylated PAHs	30	100%	-0.24	**-0.42**	-0.21	**-0.36**	0.16	-0.12	-0.12	-0.09	-0.11	-0.24
	Total HMW PAHs	30	100%	**-0.34**	**-0.51**	**-0.41**	**-0.52**	0.19	0.01	0.02	-0.03	-0.04	-0.06
	Total LMW PAHs	30	50%	-0.18	**-0.53**	**-0.34**	**-0.42**	0.28	-0.02	0.25	0.05	0.34	-0.08
	Total PAH	30	100%	**-0.31**	**-0.60**	**-0.40**	**-0.47**	0.20	0.02	0.00	-0.01	-0.02	-0.13
Metals	Arsenic	29	31%	-0.06	-0.25	-0.17	-0.29	0.10	0.02	0.19	0.00	0.10	0.22
	Barium	29	100%	-0.14	-0.10	-0.07	0.04	-0.21	**-0.48**	-0.18	0.17	-0.11	**-0.61**
	Chromium	29	90%	0.08	0.36	0.28	0.23	**-0.35**	-0.21	**-0.33**	-0.01	-0.23	-0.23
	Mercury	30	97%	-0.13	-0.12	-0.10	-0.03	0.23	0.26	0.16	-0.04	0.11	0.28
	Methyl mercury	30	100%	-0.04	0.04	-0.02	-0.05	0.18	0.14	0.04	-0.09	-0.01	0.00
	Selenium	29	34%	**-0.33**	-0.03	-0.16	**-0.39**	0.03	-0.28	0.14	0.19	0.11	-0.08
	Titanium	28	71%	0.08	0.41	0.30	0.37	-0.21	-0.14	-0.16	0.03	0.00	0.05
	Vanadium	29	83%	0.12	0.35	0.47	0.28	0.00	-0.11	**-0.35**	-0.22	**-0.32**	-0.21
Miscellaneous	Dissolved organic carbon	29	100%	0.19	0.04	0.12	0.09	-0.21	-0.02	-0.02	0.00	-0.07	0.22
	Sulfide	30	100%	-0.07	**-0.39**	-0.29	**-0.36**	0.25	0.23	0.21	-0.03	0.16	0.22

Notes:
1/2 reporting limit substituted for non-detects.
Shading indicates strength of association as determined by the Spearman correlation coefficient.
Spearman correlation coefficients less than -0.3 are statistically significant and shown in bold.
See Table A-20 (Appendix A) for Spearman coefficients for the complete list of analyzed chemicals.

Acronyms and Abbreviations:
HMW = high molecular weight
LMW = low molecular weight
N = number
no/m^2 = number per square meter
NY/NJ B-IBI = New York/New Jersey Harbor Benthic Index of Biotic Integrity
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = Tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
% = percent

Shading
1
0.5
0
-0.5
-1

Table 6-13
List of Potential Contaminants of Concern to the Benthic Invertebrate Community

Parameter Group	Chemical or Chemical Group	Sediment			Porewater		
		Exceed SQG	Negative Correlation with Toxicity Endpoints	Negative Correlation with BIC Metrics	Exceed WQC or Surface Water Guideline	Negative Correlation with Toxicity Endpoints	Negative Correlation with BIC Metrics
Dioxins/Furans	2,3,7,8-TCDD and other congeners	X	X	X		X	X
PCBs	Aroclors and Congeners	X	X	X	X	X	X
Pesticides	Total DDx	X	X		X	X	
	Dieldrin	X	X			X	
	Chlordanes	X	X			X	
	Hexachlorobenzene	--	X			X	
PAHs	Total and individual PAHs	X[a]	X		X[b]	X	X
Semivolatile	bis(2-Ethylhexyl)phthalate	X		X	Not Analyzed		
Metals	Antimony	X			--		
	Arsenic	X		X	X	X	
	Cadmium	X	X	X	Not Detected in Porewater		
	Chromium	X	X	X			X
	Copper	X	X		X		
	Lead	X	X	X			
	Mercury	X	X	X			
	Nickel	X		X	Not Detected in Porewater		
	Silver	X	X	X	Not Detected in Porewater		
	Zinc	X	X	X	X		

Notes:
Negative correlation defined as having a Spearman correlation coefficient < -0.3.
[a]$\sum ESBTU_{FCV}$ also exceeds 1 (see Table A-14, Appendix A).
[b]Sum of Toxic Units for PAH mixtures exceeds 1 (see Table A-14, Appendix A).

Acronyms and Abbreviations:
-- No guideline or criteria available.
BIC = Benthic Invertebrate Community
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SQG = Sediment Quality Guidelines shown in Table A-8.
TCDD = Tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
WQC = water quality criteria.

Table 6-14
Models for Growth, Reproduction and BIC Metrics vs. Sediment Principal Components

Modeled Endpoint	Significant Model Parameters[a]	Model Form	R^2 (Linear Models Only)	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
10-day Mortality	PC1	Probit	--	<0.0001	PC1 was significantly and positively associated with mortality. PC2, PC3, TOC, and percent fines were not significant.
28-day Mortality	PC1, PC2	Gompertz	--	PC1 (0.002), PC2 (0.012)	PC1 and PC2 were significantly and positively associated with mortality. PC3, TOC, and percent fines were not significant.
Growth	PC1	Linear	0.18	0.023	PC1 was significantly and negatively correlated with growth. PC2, PC3, TOC, and percent fines were not significant.
Reproduction	None	Linear	--	--	PC1, PC2, PC3, TOC, and percent fines were not significant.
Density	PC1	Linear	0.16	0.029	PC1 is significantly and negatively correlated with density. PC2 and PC3 have a positive correlation with density that is not significant. Percent fines has a negative correlation with density that is not significant. Shear stress has no relationship with density.
Number of Taxa	Percent fines	Linear	0.29	0.002	Percent fines is negatively correlated with number of taxa. PC1, PC2, PC3, and shear stress were not significant.
Shannon-Weiner Diversity Index	None	Linear	--	--	PC1, PC2, PC3, percent fines, and shear stress were not significant.
Pielou's Evenness	PC1	Linear	0.13	0.047	PC1 is positively correlated with evenness, a spurious result since elevated chemistry is not expected to result in an increase in evenness. Percent fines is positively correlated with evenness. When the two parameters are combined, PC1 is not significant. PC2, PC3, and shear stress were not significant.
	Percent fines	Linear	0.26	0.0036	
NY/NJ B-IBI	None	Linear	--	--	PC1, PC2, PC3, percent fines, and shear stress were not significant.
Percent Tolerant	None	Linear	--	--	PC1, PC2, PC3, percent fines, and shear stress were not significant.
Percent Sensitive	None	Linear	--	--	PC1, PC2, PC3, percent fines, and shear stress were not significant.

Notes:

[a]Parameters PC1, PC2, PC3, and percent fines were tested for all toxicity and BIC endpoints. TOC was tested in toxicity endpoint models only. Shear stress was tested in BIC models only as it might be expected to reflect habitat characteristics.
All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10 day mortality and 0.19 for 28 day mortality.
Full details of model fitting and graphs of fitted models are provided in Appendix A.

Acronyms and Abbreviations:

-- = not applicable
B-IBI = Benthic Index of Biotic Integrity
BIC = Benthic Invertebrate Community
NY/NJ = New York/New Jersey
PC = principal component
R^2 = Coefficient of determination, only shown for significant linear regression models.
TOC = total organic carbon

Table 6-15
Models for Toxicity Endpoints vs. Sediment Factors

Modeled Endpoint	Significant Model Parameters[a]	Model Form	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
10-day Mortality	Factor 1, Factor 3	Probit	Factor 1 (0.0069); Factor 3 (.075)	Factors 1 and 3 were significantly and positively associated with mortality. Factor 2 was also positively associated with mortality but not significantly (p=0.061).
28-day Mortality	Factor 1, Factor 2	Gompertz	Factor 1 (0.010); Factor 2 (.011)	Factors 1 and 2 were significantly and positively associated with mortality. Factor 3 was not significant.
Growth	None	Linear	--	Factors 1 and 2 were negatively associated with growth but not significantly.
Reproduction	None	Linear	--	No factors were significant.

Notes:

[a]Parameters Factor1, Factor2, and Factor3, were tested for each toxicity endpoint.

All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10 day mortality and 0.19 for 28 day mortality.

Full details of model fitting and graphs of fitted models are provided in Appendix A.

Acronyms and Abbreviations:

-- = not applicable, no significant models or parameters.

Table 6-16
Models for Toxicity Endpoints vs. Porewater Chemistry

Modeled Endpoint	Significant Model Parameters	Model Form	R^2 (Linear Models Only)	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
10-day Mortality	PC1	Probit	--	0.0005	PC1 was significantly and positively associated with mortality. PC2 and PC3 were not significant.
28-day Mortality	PC1	Probit	--	<0.0001	PC1 was significantly and positively associated with mortality. PC2 and PC3 were not significant.
Growth	PC1	Linear	0.24	0.005	PC1 was significantly and negatively correlated with growth. PC2 and PC3 were not significant.
Reproduction	None	Linear	--	--	PC1, PC2, and PC3 were not significant.
10-day Mortality	Factor 1	Probit	--	<0.0001	Factors 1 and 2 were significantly and positively associated with mortality when modeled separately. Combining the factors in one model resulted in unstable parameter estimates. Factor 3 was not significant.
	Factor 2	Probit	--	0.0092	
28-day Mortality	Factor 1, Factor 2, Factor 3	Probit	--	Factor 1 (0.0011); Factor 2 (0.0003); Factor 3 (0.028)	Factors 1, 2, and 3 were significantly and positively associated with mortality.
Growth	Factor 2	Linear	0.17	0.027	Factors 1 and 2 were negatively associated with growth. Factor 2 is significant alone. Factor 1 was not significant alone (p=0.183), however, when added to the model with factor 2 it is almost significant (p=0.06) and improves the adjusted R^2 value. Factor 3 is not significant.
	Factor 1, Factor 2	Linear	0.28	Factor 1(0.06); Factor 2 (0.011)	
Reproduction	None	Linear	--	--	No factors were significant.

Notes:
All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10 day mortality and 0.19 for 28 day mortality.
Full details of model fitting and graphs of fitted models are provided in Appendix A.

Acronyms and Abbreviations:
PC = principal component
R^2 = Coefficient of determination, only shown for significant linear regression models.
-- = not applicable

Table 6-17
Summary Lines of Evidence from SQT Evaluation

Category	Line of Evidence	Findings	Summary
BIC	Comparison to Jamaica Bay Reference	The benthic invertebrate community compares favorably to the Jamaica Bay reference data set. Most metrics are within the reference envelope. Hypothesis testing indicates that NBSA metrics are similar or greater than Jamaica Bay reference.	There is no evidence that chemical concentrations are impacting the BIC composition in the NBSA.
	NY/NJ B-IBI	One station, 148, located along the southern shoreline had a B-IBI suggesting impact (Figure 2-4). Eight others were scored as slightly impacted. Twenty-one were scored as not impacted.	
	Dose Response Modeling	Most BIC metrics were not associated with sediment chemistry. Number of taxa was most correlated with grain size. Density was negatively correlated with sediment chemistry however this metric can increase or decrease with degradation. BIC metrics were not associated with porewater chemistry.	
Acute Toxicity	Comparison to Control	Two of 30 SQT stations exhibited acute toxicity, 151 and 154 located along the southwestern shoreline (Figure 6-2).	Areas of elevated chemical concentrations likely to cause acute toxicity in the NBSA are of limited areal extent (Figure 6-6). Multiple chemicals are associated with acute toxicity: metals, pesticides, PCBs, PAHs and dioxins/furans. Mean amphipod survival as a percent of control in the NBSA is comparable to that of Jamaica Bay.
	Comparison to Jamaica Bay Reference	Average survival as a percent of control was comparable to reference.	
	Spearman Correlation	Multiple chemicals are elevated in sediment and porewater at stations 151 and 154. Acute toxicity is correlated with multiple chemicals in sediment and porewater: metals, pesticides, PCBs, PAHs and dioxins/furans.	
	Dose Response Modeling: PCA	Elevated chemical concentrations in sediment and porewater were significant predictors of acute toxicity. Areas of predicted acute toxicity are of limited extent. A total of 21 (8.2% of all Phase III samples) samples were predicted to have survival less than 80% of control survival in the NBSA, three in the north geographic area and 18 in the south geographic area (Figure 6-6).	
	Dose Response Modeling: FA	Factor analysis demonstrated that multiple chemicals in sediment and porewater are associated with acute toxicity: metals, pesticides, PCBs, PAHs and 2,3,7,8-TCDD.	

Table 6-17
Summary Lines of Evidence from SQT Evaluation

Category	Line of Evidence	Findings	Summary
Chronic Toxicity	Comparison to Control	Six of 30 SQT stations exhibited 28-day survival significantly different than control, two in the north, two in the central, and two in the south geographic areas (Figure 6-2). A total of 11 stations had 28-day survival less than 80% of control although only 5 of these were significantly different than control due to replicate variability. Six stations had 28-day survival less than control minus the minimum detectable difference (MDD). The MDD was 33%. Growth and reproductive endpoints were significantly different than control at 18 and 13 stations respectively.	Chronic toxicity endpoints are associated with chemical concentrations but there is more unexplained variability in the chronic endpoints. Model-predicted chronic toxicity is also of limited extent in the NBSA (Figure 6-8). Multiple chemicals are associated with chronic toxicity: metals, pesticides, PCBs, PAHs and dioxins/furans.
	Spearman Correlation	Multiple chemicals in sediment and porewater are correlated with chronic toxicity endpoints: metals, pesticides, PCBs, PAHs and dioxins/furans.	
	Dose Response Modeling: PCA	Elevated chemical concentrations in sediment and porewater were significant predictors of 28-day survival although there is significant variability in this endpoint. A total of 45 (17.7% of all Phase III samples) samples were predicted to have 28-day survival less than 80% of control in the NBSA, 11 in the north, five in the central, and 29 in the south geographic areas (Figure 6-8). Areas of predicted chronic toxicity in the north and south are similarly located as those where acute toxicity is predicted. Chemical concentrations in sediment and porewater were also significant predictors of growth but there was considerable unexplained variability in this endpoint.	
	Dose Response Modeling: FA	Factor analysis demonstrated that multiple chemicals in sediment and porewater are associated with chronic toxicity: metals, pesticides, PCBs, PAHs and 2,3,7,8-TCDD.	

Table 6-17
Summary Lines of Evidence from SQT Evaluation

Category	Line of Evidence	Findings	Summary
Sediment Chemistry	Comparisons to Sediment Quality Guidelines	Among the 30 SQT samples, there was a high frequency of exceedances (up to 100%) of threshold (i.e., T20, ERL, and PEL) sediment quality guidelines for all chemical groups: metals, pesticides, PCBs, PAHs and 2,3,7,8-TCDD (Table 6-6). Exceedances of median values (i.e., T50, ERM, PEL) were less frequent but also observed in all these chemical groups (Table 6-6). Fifteen samples exceeded the T80 value for mercury. These screening level guidelines were not predictive of toxicity in the NBSA and therefore provided little information about risks to benthic invertebrates	Sediment quality guidelines were exceeded for most chemicals although these guidelines were not predictive of toxicity in the NBSA and therefore provided little information about risks to benthic invertebrates. Water quality criteria were exceeded for arsenic, copper, zinc, total PCBs and total DDx. The sum of toxic units for metals and/or PAHs in porewater exceeded 1 at some stations.
	Comparisons to Equilibrium Partitioning Sediment Benchmarks	$\sum$SEM-AVS (µmol/g) rarely exceeded 0 and $\sum$SEM-AVS)/f_{OC} (µmol/g-oc) was less than 130 at all SQT stations indicating that toxicity is not expected due to divalent metals. For PAHs, $\sum ESBTU_{FCV}$ exceeds 1 at seven SQT stations indicating the potential for toxicity due to PAHs.	
Porewater Chemistry	Comparisons to Water Quality Criteria and Guidelines	Acute water quality criteria were exceeded in five porewater samples: one for arsenic (station 151), one for copper (station 147) and three for zinc (stations 141, 150, and 159). A total of 20 porewater samples had one or more exceedances of chronic water quality criteria that included the following chemicals: arsenic, copper, zinc, total PCBs, and total DDx. No other criteria or guidelines were exceeded in porewater.	
	Equilibrium Partitioning Toxic Units	The sum of toxic units for divalent metals exceeded 1 at six stations indicating the potential of toxicity due to divalent metals in porewater. Of the divalent metals, only copper, lead and zinc were detected. The sum of toxic units for PAHs exceeded 1 at station 154 and was very close to 1 at station 151, indicating the potential for toxicity due to PAHs in porewater.	
SQT Scoring		Two of 30 SQT stations (i.e. 151 and 154) are classified as medium impact. Depending on the scoring method 11 to 19 stations are classified as low impact with the remainder (i.e. 9 to 17 depending on the scoring method) classified as no impact.	Most SQT stations are classified as low or no impact.

Table 6-17
Summary Lines of Evidence from SQT Evaluation

Acronyms and Abbreviations:

foc = fraction of organic carbon
AVS = acid volatile sulfide
BIC = Benthic Invertebrate Community
B-IBI = Benthic Index of Biotic Integrity
ERL = effect range-low
ERM = effect range-median
NBSA = Newark Bay Study Area
NY/NJ = New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCA = Principal Component Analysis
PCB = polychlorinated biphenyl
PEL = Probable Effect Level
SEM = simultaneously extracted metals
SQT - Sediment Quality Triad
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are predicted to be toxic (e.g., 50% of the samples).
$\sum$ = sum of
$\sum ESBTU_{FCV}$ = Equilibrium Partitioning Benchmark Toxic Units for PAHs
µmol/g = micromoles per gram
µmol/g-oc = micromoles per gram of organic carbon
% = percent

Table 6-18
TRVs Selected for Benthic Invertebrate Tissue Assessment

Constituent	Units	Benthic Invertebrates - Tissue TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg, ww	0.0003[a]	0.003	Crayfish; survival (Ashley et al. 1996)		0.00000015	0.0000013	Eastern oyster; reproduction (Wintermeyer and Cooper 2003)
Polychlorinated Biphenyls								
Total PCBs	mg/kg, ww	0.052[a]	0.52	10 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.0064	0.017	reproduction eastern oyster (Chu et al 2000; 2003)
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg, ww	0.011[a]	0.11	6 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.06	0.13	Pink shrimp; mortality (Nimmo et al. 1970)
Total DDx (2,4 & 4,4) Alternative TRV	mg/kg, ww	0.001[a]	0.01	An alternative distribution (beta general) was selected to derive an alternative 5th percentile LOAEL TRV (10 µg/kg ww) as a conservative SSD-derived estimate. An alternative NOAEL (1.0 µg/kg ww) was extrapolated from the alternative 5th percentile LOAEL TRV using an uncertainty factor of 10.		--	--	--
Dieldrin	mg/kg, ww	0.008[a]	0.08	Pink shrimp; survival (Parrish et al. 1973)		0.0016	0.008	Pink shrimp; survival (Parrish et al. 1973)
Total Chlordane	mg/kg, ww	0.71	1.7	Pink shrimp; mortality (Parrish et al. 1976)	X	--	--	--
Hexachlorobenzene	mg/kg, ww	10.6	15.8	Amphipod; mortality (Nebeker et al. 1989)	X	--	--	--
Polycyclic Aromatic Hydrocarbons								
Total LMW PAH	mg/kg, ww	11[a]	111	Amphipod; mortality (Lee et al. 2002; fluorene study)		0.078	0.78	Polychaete worm; reproduction (Emery and Dillon 1996)
Total HMW PAH	mg/kg, ww	8.1	22.2	Amphipod; growth and reproduction (Schuler et al. 2007; fluoranthene study)		0.066	0.66	Blue mussel; reproduction (Eertman et al. 1995)
Inorganics								
Arsenic	mg/kg, ww	0.064[a]	0.64	7 species; survival and growth. SSD-derived 5th percentile value. (Windward 2019)		--	--	--
Cadmium	mg/kg, ww	0.024[a]	0.24	29 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		--	--	--
Chromium	mg/kg, ww	1.5	3.5	Amphipod; survival and growth (Norwood et al. 2007)		--	--	--
Copper	mg/kg, ww	--	--	--		5	12	Baltic clam; survival (Absil et al. 1996)
Lead	mg/kg, ww	4[a]	40	Amphipod; survival (Spehar et al. 1978)		0.52	2.6	Amphipod (Hyallela); survival (Borgmann and Norwood 1999)
Mercury/Methylmercury	mg/kg, ww	0.048	0.095	Whole body copepod; reproduction (Hook and Fisher 2002)		0.048	0.095	Whole body copepod; reproduction (Hook and Fisher 2002)
Nickel	mg/kg, ww	0.1[a]	1.1	Amphipod; survival (Borgmann et al. 2001)				
Selenium	mg/kg, ww	0.05	0.51	Midge; growth (Malchow et al. 1995)		--	--	--
Silver	mg/kg, ww	0.49	0.59	Water flea; growth and reproduction (Naddy et al. 2007)		--	--	--
Zinc	mg/kg, ww	5.1[a]	51	Crustaceans; survival (Muyssen et al. 2006		--	--	--

Table 6-18
TRVs Selected for Benthic Invertebrate Tissue Assessment

Notes:
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
"--" = not available
BERA = baseline ecological risk assessment
FFS = focused feasibility study
HMW = high molecular weight
LMW = low molecular weight
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
Absil, M.C.P., M. Berntssen, and L. Gerringa. 1996. The influence of sediment, food and organic ligands on the uptake of copper by sediment-dwelling bivalves. *Aquat Toxicol* 34:13-29.
Ashley, C.M., M.G. Simpson, D.M. Holdich, and D.R. Bell. 1996. 2,3,7,8-tetrachloro-dibenzo-p-dioxin is a potent toxin and induces cytochrome P450 in the crayfish, *Pacifastacus leniusculus*. *Aquat Toxicol* 35:157-69.
Borgmann, U., R. Neron, and W.P. Norwood. 2001. Quantification of bioavailable nickel in sediments and toxic thresholds to *Hyalella azteca*. *Environ Pollut* 111:189-198
Chu, F-LE, P. Soudant, and R.C. Hale. 2003. Relationship between PCB accumulation and reproductive output in conditioned oysters *Crassostrea virginica* fed a contaminated algal diet. *Aquat Toxicol* 65:293-307.
Chu, F-LE, P. Soudant, L.A. Cruz-Rodriguez, and R.C. Hale. 2000. PCB uptake and accumulation by oysters (*Crassostrea virginica*) exposed via a contaminated algal diet. *Mar Environ Res* 50:217-221.
Eertman, R.H.M., C.L. Groenink, B. Sandee, H. Hummel, and A.C Small. 1995. Response of the blue mussel *Mytilus edulis* L. following exposure to PAHs or contaminated sediment. *Mar Environ Res* 39:169-173.
Emery, V.L. and T.M. Dillon. 1996. Chronic toxicity of phenanthrene to the marine polychaete worm, *Nereis* (*Neanthes*) *arenaceodentata*. *Bull Environ Contam Toxicol* 56(2):265-270.
Hansen, D.J., P.R. Parrish, and J. Forester. 1974. Aroclor 1016: Toxicity to and uptake by estuarine animals. *Environ Res* 7:363-373.
Hook, S.E. and N.S. Fisher. 2002. Relating the reproductive toxicity of five ingested metals in calanoid copepods with sulfur affinity. *Mar Environ Res* 53:161-174.
Lee J-H, Landrum P.F., and C-H Koh. 2002. Toxicokinetics and time-dependent PAH toxicity in the amphipod *Hyalella azteca*. *Environ Sci Technol* 36:3124-3130.
Malchow, D.E., A.W. Knight, and K.J. Maier. 1995. Bioaccumulation and toxicity of selenium in *Chironomus decorus* larvae fed a diet of seleniferous *Selenastrum capricornutum*. *Arch Environ Contam Toxicol* 29:104-109
Muyssen B.T.A., K.A.C. De Schamphelaere, and C.R. Janssen. 2006. Mechanisms of chronic waterborne Zn toxicity in *Daphnia magna*. *Aquat Toxicol* 77:393-401.
Naddy, R.B., J.W. Gorsuch, A.B. Rehner, G.R. McNerney, R.A. Bell, and J.R. Kramer. 2007. Chronic toxicity of silver nitrate to *Ceriodaphnia dubia* and *Daphnia magna*, and potential mitigating factors. *Aquat Toxicol* 84(2):I-X.
Nebeker, A.V., W.L. Griffis, C.M. Wise, E. Hopkins, and J.A. Barbitta. 1989. Survival, reproduction and bioconcentration in invertebrates and fish exposed to hexachlorobenzene. *Environ Toxicol Chem* 8:601-11.
Nimmo, D.R., A.J. Wilson Jr., and R.R. Blackman. 1970. Localization of DDT in the body organs of pink and white shrimp. *Bull Environ Contam Toxicol* 5(4):333-341.
Norwood, W.P., U. Borgmann, and D.G. Dixon. 2007. Chronic toxicity of arsenic, cobalt, chromium and manganese to *Hyalella azteca* in relation to exposure and bioaccumulation. *Environ Pollut* 147:262-272.
Parrish, P.R., J.A. Couch, J. Forester, J.M. Patrick, Jr., and G.H. Cook. 1973. Dieldrin: Effects on Several Estuarine Organisms. Contrib. No. 178 Gulf Breeze Environ. Res. Lab. In: Proceeding of the 27th Ann. Conf. of the Southeastern Assoc. of Game and Fish Commissioners.
Parrish, P.R., S.C. Schimmel, D.J. Hansen, J.M. Patrick, Jr., and J. Forester. 1976. Chlordane: effects on several estuarine organisms. *J Toxicol Environ Health* 1:485-494.
Schuler L.J., P.F. Landrum, and M.J. Lydy. 2007. Response spectrum of pentachlorobenzene and fluoranthene for *Chironomus tentans* and *Hyalella azteca*. *Environ Toxicol Chem* 26(6):1248-1257.
Sofyan A., G. Rosita, D. Price, and W.J. Birge. 2007. Cadmium uptake by *Ceriodaphnia dubia* from different exposures: relevance to body burden and toxicity. *Environ Toxicol Chem* 26(3):470-477.
Spehar R.L., R.L. Anderson, and J.T. Fiandt. 1978. Toxicity and bioaccumulation of cadmium and lead in aquatic invertebrates. *Environ Pollut* 15:195-208.
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.
Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June.
Wintermyer M.L. and K.R. Cooper. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica* Gmelin) tissues and the effects on egg fertilization and development. *J Shellfish Res* 22(3):737-746

Table 6-19a
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Benthic Invertebrate Tissue - HQs (NBSA-wide)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	0.04	0.004	**75**	**9**	0.08	0.008	**167**	**19**	0.02	0.002	**44**	**5**
Polychlorinated Biphenyls													
Total PCBs	unitless	**1**	0.1	**10**	**4**	**7**	0.7	**57**	**21**	**3**	0.3	**22**	**8**
Pesticides													
Total DDx (2,4 & 4,4)	unitless	0.4	0.04	0.07	0.03	**11**	**1**	**2**	0.9	**2**	0.2	0.4	0.2
Total DDx (2,4 & 4,4) Alternative TRV	unitless	**4**	0.4	NC	NC	**117**	**12**	NC	NC	**26**	**3**	NC	NC
Dieldrin	unitless	0.3	0.03	**1**	0.3	0.7	0.07	**4**	0.7	0.08	0.008	0.4	0.08
Total Chlordane	unitless	0.003	0.001	NC	NC	0.05	0.02	NC	NC	0.005	0.002	NC	NC
Hexachlorobenzene	unitless	0.00004	0.00002	NC	NC	0.0001	0.00007	NC	NC	0.00003	0.00002	NC	NC
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH	unitless	0.006	0.002	0.8	0.08	0.005	0.002	0.6	0.06	0.05	0.02	**6**	0.6
Total LMW PAH	unitless	0.001	0.0001	0.2	0.02	0.006	0.0006	0.9	0.09	0.005	0.0005	0.8	0.08
Inorganics													
Arsenic	unitless	**43**	**4**	NC	NC	**41**	**4**	NC	NC	**92**	**9**	NC	NC
Cadmium	unitless	**4**	0.4	NC	NC	**15**	**1**	NC	NC	**9**	0.9	NC	NC
Chromium	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC	**3**	**1**	NC	NC
Copper	unitless	NC	NC	0.4	0.2	NC	NC	**6**	**3**	NC	NC	**3**	**1**
Lead	unitless	0.2	0.02	**1**	0.3	0.3	0.03	**2**	0.5	**7**	0.7	**56**	**11**
Mercury	unitless	0.6	0.3	0.6	0.3	**3**	**1**	**3**	**1**	**4**	**2**	**4**	**2**
Methylmercury	unitless	0.08	0.04	0.08	0.04	**3**	**1**	**3**	**1**	0.9	0.4	0.9	0.4
Nickel	unitless	**5**	0.5	NC	NC	**3**	0.3	NC	NC	**28**	**3**	NC	NC
Selenium	unitless	**7**	0.7	NC	NC	**22**	**2**	NC	NC	**19**	**2**	NC	NC
Silver	unitless	0.08	0.06	NC	NC	**2**	**1**	NC	NC	0.9	0.7	NC	NC
Zinc	unitless	**7**	0.7	NC	NC	**8**	0.8	NC	NC	**9**	0.9	NC	NC

Table 6-19a
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 6-19b
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (North Zone)

Constituent	Units	Benthic Invertebrate Tissue - HQs (North Zone)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	--	--	--	--	0.1	0.01	**232**	**27**	0.03	0.003	**61**	**7**
Polychlorinated Biphenyls													
Total PCBs	unitless	--	--	--	--	**9**	0.9	**76**	**28**	**2**	0.2	**15**	**6**
Pesticides													
Total DDx (2,4 & 4,4)	unitless	--	--	--	--	**10**	**1**	**2**	0.9	0.9	0.09	0.2	0.08
Total DDx (2,4 & 4,4) Alternative TRV	unitless	--	--	--	--	**114**	**11**	NC	NC	**10**	**1**	NC	NC
Dieldrin	unitless	--	--	--	--	**1**	0.1	**5**	**1**	0.07	0.007	0.3	0.07
Total Chlordane	unitless	--	--	--	--	0.08	0.03	NC	NC	0.005	0.002	NC	NC
Hexachlorobenzene	unitless	--	--	--	--	0.0001	0.0001	NC	NC	0.00002	0.00001	NC	NC
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH	unitless	--	--	--	--	0.01	0.004	**1**	0.1	0.05	0.02	**6**	0.6
Total LMW PAH	unitless	--	--	--	--	0.003	0.000	0.4	0.04	0.004	0.000	0.5	0.05
Inorganics													
Arsenic	unitless	--	--	--	--	**34**	**3**	NC	NC	**103**	**10**	NC	NC
Cadmium	unitless	--	--	--	--	**14**	**1**	NC	NC	**9**	0.9	NC	NC
Chromium	unitless	--	--	--	--	0.3	0.1	NC	NC	**3**	**1**	NC	NC
Copper	unitless	--	--	--	--	NC	NC	**7**	**3**	NC	NC	**2**	0.8
Lead	unitless	--	--	--	--	0.2	0.02	**2**	0.3	**5**	0.5	**40**	**8**
Mercury	unitless	--	--	--	--	**3**	**2**	**3**	**2**	**5**	**3**	**5**	**3**
Methylmercury	unitless	--	--	--	--	**3**	**2**	**3**	**2**	0.9	0.5	0.9	0.5
Nickel	unitless	--	--	--	--	**5**	0.5	NC	NC	**31**	**3**	NC	NC
Selenium	unitless	--	--	--	--	**21**	**2**	NC	NC	**21**	**2**	NC	NC
Silver	unitless	--	--	--	--	**2**	**2**	NC	NC	0.9	0.8	NC	NC
Zinc	unitless	--	--	--	--	**9**	0.9	NC	NC	**6**	0.6	NC	NC

Table 6-19b
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (North Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Polychaete worms only examined NBSA-wide

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 6-19c

Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (Southeast Zone)

Constituent	Units	Benthic Invertebrate Tissue - HQs (Southeast Zone)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	--	--	--	--	0.09	0.01	**170**	**20**	0.03	0.003	**64**	**7**
Polychlorinated Biphenyls													
Total PCBs	unitless	--	--	--	--	**7**	0.7	**54**	**20**	**2**	0.2	**13**	**5**
Pesticides													
Total DDx (2,4 & 4,4)	unitless	--	--	--	--	**9**	0.9	**2**	0.7	**1**	0.1	0.2	0.09
Total DDx (2,4 & 4,4) Alternative TRV	unitless	--	--	--	--	**97**	**10**	NC	NC	**12**	**1**	NC	NC
Dieldrin	unitless	--	--	--	--	0.8	0.08	**4**	0.8	0.09	0.01	0.5	0.09
Total Chlordane	unitless	--	--	--	--	0.04	0.02	NC	NC	0.01	0.002	NC	NC
Hexachlorobenzene	unitless	--	--	--	--	0.0001	0.0001	NC	NC	0.0000	0.00002	NC	NC
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH	unitless	--	--	--	--	0.01	0.005	**2**	0.2	0.03	0.01	**4**	0.4
Total LMW PAH	unitless	--	--	--	--	0.02	0.002	**2**	0.2	0.003	0.0003	0.4	0.04
Inorganics													
Arsenic	unitless	--	--	--	--	**43**	**4**	NC	NC	**45**	**4**	NC	NC
Cadmium	unitless	--	--	--	--	**17**	**2**	NC	NC	**11**	**1**	NC	NC
Chromium	unitless	--	--	--	--	0.2	0.07	NC	NC	**5**	**2**	NC	NC
Copper	unitless	--	--	--	--	NC	NC	**6**	**3**	NC	NC	**3**	**1**
Lead	unitless	--	--	--	--	0.2	0.02	**1**	0.2	**3**	0.3	**21**	**4**
Mercury	unitless	--	--	--	--	**3**	**1**	**3**	**1**	**2**	**1**	**2**	**1**
Methylmercury	unitless	--	--	--	--	**3**	**2**	**3**	**2**	**1**	0.5	**1**	0.5
Nickel	unitless	--	--	--	--	**3**	0.3	NC	NC	**26**	**2**	NC	NC
Selenium	unitless	--	--	--	--	**24**	**2**	NC	NC	**18**	**2**	NC	NC
Silver	unitless	--	--	--	--	**2**	**2**	NC	NC	**2**	**1**	NC	NC
Zinc	unitless	--	--	--	--	**8**	0.8	NC	NC	**6**	0.6	NC	NC

Table 6-19c

Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (Southeast Zone)

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Polychaete worms only examined NBSA-wide

Acronyms and Abbreviations:

-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 6-19d
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (Southwest Zone)

Constituent	Units	Benthic Invertebrate Tissue - HQs (Southwest Zone)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	--	--	--	--	0.05	0.005	**109**	**13**	0.02	0.002	**38**	**4**
Polychlorinated Biphenyls													
Total PCBs	unitless	--	--	--	--	**5**	0.5	**44**	**17**	**5**	0.5	**44**	**17**
Pesticides													
Total DDx (2,4 & 4,4)	unitless	--	--	--	--	**15**	**1**	**3**	**1**	**4**	0.4	0.8	0.4
Total DDx (2,4 & 4,4) Alternative TRV	unitless	--	--	--	--	**163**	**16**	NC	NC	**46**	**5**	NC	NC
Dieldrin	unitless	--	--	--	--	0.5	0.05	**3**	0.5	0.1	0.01	0.5	0.1
Total Chlordane	unitless	--	--	--	--	0.04	0.01	NC	NC	0.006	0.003	NC	NC
Hexachlorobenzene	unitless	--	--	--	--	0.00008	0.00005	NC	NC	0.00004	0.00003	NC	NC
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH	unitless	--	--	--	--	0.002	0.0007	0.2	0.02	0.06	0.02	**8**	0.8
Total LMW PAH	unitless	--	--	--	--	0.001	0.0001	0.2	0.02	0.01	0.001	**1**	0.1
Inorganics													
Arsenic	unitless	--	--	--	--	**49**	**5**	NC	NC	**139**	**14**	NC	NC
Cadmium	unitless	--	--	--	--	**17**	**2**	NC	NC	**14**	**1**	NC	NC
Chromium	unitless	--	--	--	--	0.2	0.08	NC	NC	**4**	**2**	NC	NC
Copper	unitless	--	--	--	--	NC	NC	**7**	**3**	NC	NC	**4**	**2**
Lead	unitless	--	--	--	--	0.4	0.04	**3**	0.5	**24**	**2**	**182**	**36**
Mercury	unitless	--	--	--	--	**2**	**1**	**2**	**1**	**4**	**2**	**4**	**2**
Methylmercury	unitless	--	--	--	--	**3**	**1**	**3**	**1**	**1**	0.5	**1**	0.5
Nickel	unitless	--	--	--	--	**3**	0.3	NC	NC	**50**	**5**	NC	NC
Selenium	unitless	--	--	--	--	**23**	**2**	NC	NC	**19**	**2**	NC	NC
Silver	unitless	--	--	--	--	**2**	**1**	NC	NC	0.7	0.6	NC	NC
Zinc	unitless	--	--	--	--	**8**	0.8	NC	NC	**27**	**3**	NC	NC

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Polychaete worms only examined NBSA-wide

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 6-22
Weight of Evidence Risk Summary for Benthic Invertebrates

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Principal HQs→	Primary Evaluation[c]: NBSA Maximum LOAEL HQ[b]	LPR FFS Maximum LOAEL HQ[b]	Site-Specific Toxicity Measures	Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Assessment Endpoint: Survival, growth, and/or reproduction of benthic invertebrates											
Benthic Invertebrate Communities	see Table 6-17 for Sediment Quality Triad risk conclusions									Localized risk per SQT	
Polychaete Worm	2,3,7,8-TCDD	Tissue	Tissue	HQ < 1	**9 [NBSA-wide]**	No effect on growth or survival (Iannuzzi et al. 2008)	see SQT analysis for benthic communities	SQT	see Table 6-17	Localized risk per SQT	
Polychaete Worm	Total PCBs	Tissue	Tissue	HQ < 1	**4 [NBSA-wide]**	No effect on growth or survival (Iannuzzi et al. 2008)	see SQT analysis for benthic communities	SQT	see Table 6-17	Localized risk per SQT	
Polychaete Worm	Arsenic	Tissue	Tissue	**4 [NBSA-wide]**	NC	No effect on growth or survival (Iannuzzi et al. 2008)	see SQT analysis for benthic communities	SQT	see Table 6-17	Localized risk per SQT	
Softshell Clam	2,3,7,8-TCDD	Tissue	Tissue	HQ < 1	**7 [NBSA-wide, N, SE, SW]**	Reduced reproductive success in oysters (Wintermyer and Cooper 2003)	--	Tissue HQs	• LPR FFS HQs ≥ 1 • LPR FFS TRVs based on bivalve data • NBSA TRVs based on non-bivalve data • Site-specific toxicity data indicate potential impairment	Risk Possible	Yes
Softshell Clam	Total PCBs	Tissue	Tissue	HQ < 1	**17 [NBSA-wide, N, SE, SW]**	Reduced reproductive success in oysters (Wintermyer and Cooper 2003)	--	Tissue HQs	• LPR FFS HQs ≥ 1 • High magnitude of the HQs ≥ 1 • LPR FFS TRVs based on bivalve data • Site-specific toxicity data indicate potential impairment	Risk Possible	Yes
Softshell Clam	Total DDx	Tissue	Tissue	**5 [NBSA-wide, N, SE, SW][d]**	HQ < 1	--	--	Tissue HQs	• NBSA and LPR FFS HQs < 1 • Alternate NBSA HQs ≥ 1 • Low magnitude of HQs > 1 (≤ 5)	Unlikely	No
Softshell Clam	Total HMW PAH	Tissue	Tissue	**2 [NBSA-wide}**	**2 [NBSA-wide}**	--	--	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Softshell Clam	Arsenic	Tissue	Tissue	**14 [NBSA-wide, N, SE, SW]**	NC	--	--	Tissue HQs	• NBSA HQs ≥ 1 • High magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Possible	Yes
Softshell Clam	Cadmium	Tissue	Tissue	**1 [SE, SW]**	NC		--	Tissue HQs	• NBSA HQs ≥ 1 in some scenarios • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Softshell Clam	Chromium	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	NC	--	--	Tissue HQs	• NBSA HQs ≥ 1 • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Softshell Clam	Copper	Tissue	Tissue	NC	**2 [NBSA-wide, SE, SW]**	--	--	Tissue HQs	• LPR FFS HQs ≥ 1 • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Softshell Clam	Lead	Tissue	Tissue	**2 [SW]**	**36 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in some scenarios • High magnitude of the LPR FFS HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Possible	Yes
Softshell Clam	Mercury	Tissue	Tissue	**3 [NBSA-wide, N, SE, SW]**	**3 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Softshell Clam	Nickel	Tissue	Tissue	**5 [NBSA-wide, N, SE, SW]**	NC	--	--	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	Yes
Softshell Clam	Selenium	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	NC	--	Sediment selenium < background	Background	• Selenium likely related to background conditions • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Softshell Clam	Silver	Tissue	Tissue	**1 [SE]**	NC	--	Sediment silver < background	Background	• Silver likely related to background conditions • HQs < 1 for most scenarios • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Softshell Clam	Zinc	Tissue	Tissue	**3 [SW]**	NC	--	--	Tissue HQs	• HQs < 1 for most scenarios • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No

Table 6-22
Weight of Evidence Risk Summary for Benthic Invertebrates

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Lines of Evidence: HQ LOE: Principal HQs→	Lines of Evidence: HQ LOE: Primary Evaluation[c]: NBSA Maximum LOAEL HQ[b]	Lines of Evidence: HQ LOE: Primary Evaluation[c]: LPR FFS Maximum LOAEL HQ[b]	Lines of Evidence: Site-Specific Toxicity Measures	Lines of Evidence: Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Blue Crab	2,3,7,8-TCDD	Tissue	Tissue	HQ < 1	**27 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• LPR FFS HQs ≥ 1 • High magnitude of the HQs ≥ 1 • LPR FFS TRVs based on bivalve data and considered uncertain for crabs	Possible	Yes
Blue Crab	Total PCBs	Tissue	Tissue	HQ < 1	**28 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• LPR FFS HQs ≥ 1 • High magnitude of the HQs ≥ 1 • LPR FFS TRVs based on bivalve data and considered uncertain for crabs	Possible	Yes
Blue Crab	Total DDx (2,4 & 4,4)	Tissue	Tissue	**16 [NBSA-wide, N, SE, SW][d]**	**1 [SW]**	--	--	Tissue HQs	• Alternate NBSA HQs ≥ 1 • High magnitude of HQs > 1 • NBSA and LPR FFS HQs ≤ 1	Possible	Yes
Blue Crab	Dieldrin	Tissue	Tissue	HQ < 1	**1 [N]**	--	--	Tissue HQs	• HQs < 1 for most scenarios • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Blue Crab	Arsenic	Tissue	Tissue	**5 [NBSA-wide, N, SE, SW]**	NC	--	--	Tissue HQs	• NBSA HQs ≥ 1 • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Blue Crab	Cadmium	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	NC	--	--	Tissue HQs	• NBSA HQs ≥ 1 • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Blue Crab	Copper	Tissue	Tissue	NC	**3 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Blue Crab	Mercury	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	**2 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Blue Crab	Methylmercury	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	**2 [NBSA-wide, N, SE, SW]**	--	--	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Blue Crab	Selenium	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	NC	--	Sediment selenium < background	Background	• Selenium likely related to background conditions • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No
Blue Crab	Silver	Tissue	Tissue	**2 [NBSA-wide, N, SE, SW]**	NC	--	Sediment silver < background	Background	• Silver likely related to background conditions • Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Unlikely	No

Notes:
[a] Preliminary COCs are identified as COPECs/receptors with a LOAEL HQ greater than or equal to 1 for any exposure areas or evaluation scenarios.
[b] Maximum LOAEL HQs for all receptor/COPEC combinations with LOAEL HQs ≥ 1; all exposure areas with LOAEL HQs ≥ 1 are presented in brackets.
[c] Sensitivity analyses (See Section 6.4) did not change the magnitude of the HQs.
[d] Based on alternate total DDx TRV.

Abbreviations:
"--" = not applicable
BERA = Baseline Ecological Risk Assessment
COPEC = constituent of potential ecological concern
FFS = focused feasibility study
HQ = hazard quotient
LOAEL = lowest observed adverse effect limit
LOE = line of evidence
LPR = Lower Passaic River
NC = not calculated
NBSA = Newark Bay Study Area
PCB = polychlorinated biphenyl
SQT = sediment quality triad
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
Iannuzzi, T.J., T.N. Armstrong, E.R. Long, J. Iannuzzi, and D.F. Ludwig. 2008. Sediment quality triad assessment of an industrialized estuary of the northeastern USA. *Environ Monit Assess* 139:257-275.
Wintermyer, M.L., and K.R. Cooper. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica* Gmelin) tissues and the effects on egg fertilization and development. *J Shellfish Res* 22(3):737-746.

Table 7-5
TRVs for Fish Tissue Assessment

Constituent	Units	Fish - Tissue TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total Dioxin/Furan TEQ Fish	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total Dioxin/Furan TEQ Fish Alternative TRV	mg/kg, ww	0.0000023	0.000023	As an alternative, a 5th percentile LOAEL based on the beta general distribution (2.3E-05 mg/kg ww)—which most accurately predicts the lowest LOAEL but has a relatively poor visual and statistical fit to the empirical data (when compared with the other distributions noted above)—was selected as a conservative SSD-derived estimate. The alternative NOAEL TRV (2.3E-06 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10.		--	--	--
Polychlorinated Biphenyls								
Total PCBs	mg/kg, ww	0.38[a]	3.8	11 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.17	0.53	Atlantic salmon smolt seawater preference; behavior (Lerner et al. 2007)
Total PCB TEQ Fish	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total PCB TEQ Fish Alternative TRV	mg/kg, ww	0.0000023	0.000023	As an alternative, a 5th percentile LOAEL based on the beta general distribution (2.3E-05 mg/kg ww)—which most accurately predicts the lowest LOAEL but has a relatively poor visual and statistical fit to the empirical data (when compared with the other distributions noted above)—was selected as a conservative SSD-derived estimate. The alternative NOAEL TRV (2.3E-06 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10.		--	--	--
Total Dioxin/Furan/PCB TEQ Fish	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	mg/kg, ww	0.0000023	0.000023	As an alternative, a 5th percentile LOAEL based on the beta general distribution (2.3E-05 mg/kg ww)—which most accurately predicts the lowest LOAEL but has a relatively poor visual and statistical fit to the empirical data (when compared with the other distributions noted above)—was selected as a conservative SSD-derived estimate. The alternative NOAEL TRV (2.3E-06 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10.		--	--	--
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg, ww	0.052[a]	0.52	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.078	0.39	9 species; growth, survival, reproduction, and behavior (Beckvar et al. 2005)
Dieldrin	mg/kg, ww	0.12	0.2	Rainbow trout; survival (Shubat and Curtis 1986)		0.008	0.04	Rainbow trout; survival (Shubat and Curtis 1986)
Total Chlordane	mg/kg, ww	1.66[a]	16.6	Pinfish; mortality (Parrish et al. 1976)	X	--	--	--
Hexachlorobenzene	mg/kg, ww	468	Not derived	Fathead minnow; mortality (Schuytema et al. 1990)	X	--	--	--

Table 7-5
TRVs for Fish Tissue Assessment

Constituent	Units	Fish - Tissue TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Inorganics								
Arsenic	mg/kg, ww	1.3	2.5	Rainbow trout; growth (Erickson et al. 2011)		--	--	--
Chromium	mg/kg, ww	1.28	1.3	Chinook salmon; mortality (Farag et al. 2006)	X	--	--	--
Copper	mg/kg, ww	3.92	4.48	Rainbow trout; mortality (Mount et al. 1994)	X	0.32	1.5	Striped mullet; survival (Zyadah and Abdel-Baky 2000)
Lead	mg/kg, ww	2.5	4.0	Brook trout; growth (Holcombe et al. 1976)		0.4[a]	4.0	Brook trout; reproduction (Holcombe et al. 1976)
Mercury/Methylmercury	mg/kg, ww	0.035[a]	0.35	12 species; survival, growth, reproduction, and behavior. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.052	0.26	7 species; growth, survival, reproduction, and behavior (Beckvar et al. 2005)
Selenium	mg/kg, ww	N/A[b]	1.6	Bluegill, sunfish, fathead minnow; reproduction (Coyle et al. 1993; Hermanutz et al. 1992; Ogle and Knight 1989)		--	--	--
Silver	mg/kg, ww	0.11	0.24	Rainbow trout; growth (Guadagnolo et al. 2001)		--	--	--
Zinc	mg/kg, ww	287	403	Guppy; growth (Pearson 1981)		--	--	--

Notes
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.
[b] No NOAEL was selected because LOAEL based on ED10 value for the most sensitive species evaluated, below which adverse effects are not expected.

Acronyms and Abbreviations:
"--" = not available
BERA = baseline ecological risk assessment
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
N/A = Not applicable; no NOAEL was selected because LOAEL based on ED10 value for the most sensitive species evaluated, below which adverse effects are not expected
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
Beckvar, N., T.M. Dillon, and L.B. Read. 2005. Approaches for linking whole-body fish tissue residues of mercury or DDT to biological effects thresholds. *Environ Toxicol Chem* 24(8):2094-2105.
Couillard, C.M., B. Legare, A. Bernier, and Z. Dionne. 2011. Embryonic exposure to environmentally relevant concentrations of PCB126 affects prey capture ability of *Fundulus heteroclitus* larvae. *Mar Environ Res* 71(4).
Coyle J.J., D.R. Buckler, C.G. Ingersoll, J.F. Fairchild, and T.W. May. 1993. Effect of dietary selenium on the reproductive success of bluegills (Lepomis macrochirus). Environ Toxicol Chem 12:551-565.
Erickson, R.J., D.R. Mount, T.L. Highland, J.R. Hockett, and C.T. Jenson. 2011. The relative importance of waterborne and dietborne arsenic exposure on survival and growth of juvenile rainbow trout. Aquat Toxicol 104:108-115.
Farag, A.M., T. May, G.D. Marty, M.D.L. Easton, D.D. Harper, E.E. Little, and L. Cleveland. 2006. The effect of chronic chromium exposure on the health of Chinook salmon (Oncorhynchus tsawytscha). Aquat Toxicol 76:246-257.
Fisk A.T. A.L. Yarechewski, D.A. Metner, R.E. Evans, W.L. Lockhart, and D.C.G.Muir. 1997. Accumulation, depuration and hepatic mixed-function oxidase enzyme induction in juvenile rainbow trout and lake whitefish exposed to dietary 2,3,7,8-tetrachlorodibenzo-*p*-dioxin. *Aquat Toxicol* 37:201-220.
Guadagnolo, C.M., C.J. Brauner, and C.M. Wood. 2001. Chronic effects of silver exposure on ion levels, survival, and silver distribution within developing rainbow trout (*Oncorhynchus mykiss*) embryos. *Environ Toxicol Chem* 20(3):553-560.
Hansen D.J., P.R. Parrish, J.L. Lowe, A.J. Wilson, Jr, and P.D. Wilson. 1971. Chronic toxicity, uptake, and retention of Aroclor 1254 in two estuarine fishes. *Bull Environ Contam Toxicol* 6:113-119.
Hermanutz R.O., K.N. Allen, T.H. Roush, and S.F. Hedtke. 1992. Effects of elevated selenium concentrations on bluegills (*Lepomis macrochirus*) in outdoor experimnetal streams. *Environ Toxicol Chem* 11:217-224.
Holcombe, G.W., D.A. Benoit, E.N. Leonard, and J.M. McKim. 1976. Long-term effects of lead exposure on three generations of brook trout (*Salvelinus fontinalis*). *J Fish Res Bd Can* 33:1731-1741.
Lerner, D.T., B.T. Bjornsson, and S.D. McCormick, 2007. Effects of aqueous exposure to polychlorinated biphenyls (Aroclor 1254) on physiology and behavior of smolt development of Atlantic salmon. *Aquat Toxicol* 81:329-336.
Mount, D.R., A.K. Barth, T.D. Garrison, K.A. Barten, and J.R. Hockett. 1994. Dietary and waterborne exposure of rainbow trout (*Oncorhynchus mykiss*) to copper, cadmium, lead and zinc using a live diet. *Environ Toxicol Chem* 13(12):2031-41.
Ogle R.S. and A.W. Knight. 1989. Effects of elevated foodborne selenium on growth and reproduction of the fathead minnow (*Pimephales promelas*). *Arch Environ Contam Toxicol* 18:795-803.
Parrish, P.R., S.C. Schimmel, D.J. Hansen, J.M. Patrick, Jr., and J. Forester. 1976. Chlordane: effects on several estuarine organisms. *J Toxicol Environ Health* 1:485-494.
Pierson K.B. 1981. Effects of chronic zinc exposure on the growth, sexual maturity, reproduction, and bioaccumulation of the guppy, *Poecilia reticulata*. *Can J Fish Aquat Sci* 38:23-31
Schuytema, G.S., D.F. Krawczyk, W.L. Griffis, A.V. Nebeker, and M.L. Robideaux. 1990. Hexachlorobenzene uptake by fathead minnows and macroinvertebrates in recirculating sediment/water systems. *Arch Environ Contam Toxicol* 19:1-9.
Shubat, P.J. and L.R. Curtis. 1986. Ration and toxicant preexposure influence dieldrin accumulation by rainbow trout (*Salmo gairdneri*). *Environ Toxicol Chem* 5:69-77.
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.
Webber H.M. and T.A. Haines. 2003. Mercury effects on predator avoidance behavior of a forage fish, golden shiner (*Notemigonus crysoleucas*). *Environ Toxicol Chem* 22(7):1556-1561
Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June
Zyadah, M.A. and T.E. Abdel-Baky. 2000. Toxicity and bioaccumulation of copper, zinc, and cadmium in some aquatic organisms. *Bull Environ Contam Toxicol* 64:740-747.

Table 7-7a
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Atlantic Menhaden				Atlantic Silverside				Combined Mummichog & Killifish				American Eel			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans																	
2,3,7,8-TCDD	unitless	0.4	0.04	**5**	**3**	0.8	0.08	**11**	**6**	**2**	0.2	**29**	**14**	0.6	0.06	**8**	**4**
Total Dioxin/Furan TEQ Fish	unitless	0.6	0.06	**8**	**4**	0.9	0.09	**13**	**6**	**2**	0.2	**32**	**16**	0.9	0.09	**12**	**6**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**5**	0.5	NC	NC	**13**	**1**	NC	NC	**5**	0.5	NC	NC
Polychlorinated Biphenyls																	
Total PCBs	unitless	**2**	0.2	**4**	**1**	**2**	0.2	**5**	**2**	**4**	0.4	**10**	**3**	**2**	0.2	**4**	**1**
Total PCB TEQ Fish	unitless	0.05	0.005	0.6	0.3	0.09	0.009	**1**	0.6	0.1	0.01	**2**	**1**	0.08	0.008	**1**	0.5
Total PCB TEQ Fish Alternative TRV	unitless	0.2	0.02	NC	NC	0.5	0.05	NC	NC	0.8	0.08	NC	NC	0.4	0.04	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	0.6	0.06	**9**	**4**	**1**	0.1	**13**	**7**	**3**	0.3	**34**	**17**	0.9	0.09	**12**	**6**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**5**	0.5	NC	NC	**13**	**1**	NC	NC	**5**	0.5	NC	NC
Pesticides																	
Total DDx (2,4 & 4,4)	unitless	**6**	0.6	**4**	0.8	**4**	0.4	**3**	0.5	**6**	0.6	**4**	0.8	**6**	0.6	**4**	0.8
Dieldrin	unitless	0.07	0.04	**1**	0.2	0.02	0.01	0.3	0.1	0.07	0.04	**1**	0.2	0.1	0.06	**1**	0.3
Total Chlordane	unitless	0.02	0.002	NC	NC	0.01	0.001	NC	NC	0.03	0.003	NC	NC	0.04	0.004	NC	NC
Hexachlorobenzene	unitless	0.000003	NC	NC	NC	0.000001	NC	NC	NC	0.0000002	NC	NC	NC	0.000008	NC	NC	NC
Inorganics																	
Arsenic	unitless	0.9	0.5	NC	NC	0.5	0.3	NC	NC	0.8	0.4	NC	NC	0.7	0.4	NC	NC
Chromium	unitless	0.3	0.3	NC	NC	0.2	0.2	NC	NC	0.5	0.5	NC	NC	0.3	0.3	NC	NC
Copper	unitless	0.3	0.2	**3**	0.7	0.3	0.2	**3**	0.7	**1**	**1**	**16**	**3**	0.3	0.2	**3**	0.7
Lead	unitless	0.2	0.1	**1**	0.1	0.1	0.1	0.9	0.1	0.3	0.2	**2**	0.2	0.1	0.08	0.8	0.08
Mercury	unitless	**2**	0.2	**1**	0.2	**2**	0.2	**1**	0.3	**1**	0.1	0.9	0.2	**6**	0.6	**4**	0.8
Methylmercury	unitless	**3**	0.3	**2**	0.4	**4**	0.4	**3**	0.5	**2**	0.2	**1**	0.2	**7**	0.7	**5**	0.9
Selenium	unitless	NC	0.3	NC	NC	NC	0.3	NC	NC	NC	0.5	NC	NC	NC	0.6	NC	NC
Silver	unitless	0.9	0.4	NC	NC	0.2	0.09	NC	NC	**1**	0.6	NC	NC	0.3	0.1	NC	NC
Zinc	unitless	0.06	0.05	NC	NC	0.1	0.1	NC	NC	0.2	0.1	NC	NC	0.1	0.08	NC	NC

Table 7-7a
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Combined Summer/Winter Flounder				White Perch				White Perch Liver			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	0.6	0.06	**8**	**4**	**6**	0.6	**78**	**39**	**5**	0.5	**74**	**37**
Total Dioxin/Furan TEQ Fish	unitless	0.7	0.07	**9**	**4**	**6**	0.6	**80**	**40**	**7**	0.7	**88**	**44**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**31**	**3**	NC	NC	**34**	**3**	NC	NC
Polychlorinated Biphenyls													
Total PCBs	unitless	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**	**5**	0.5	**12**	**4**
Total PCB TEQ Fish	unitless	0.03	0.003	0.3	0.2	0.1	0.01	**1**	0.6	0.3	0.03	**4**	**2**
Total PCB TEQ Fish Alternative TRV	unitless	0.1	0.01	NC	NC	0.5	0.05	NC	NC	**2**	0.2	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	0.7	0.07	**9**	**4**	**6**	0.6	**81**	**40**	**7**	0.7	**93**	**46**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**4**	0.4	NC	NC	**32**	**3**	NC	NC	**36**	**4**	NC	NC
Pesticides													
Total DDx (2,4 & 4,4)	unitless	0.7	0.07	0.4	0.09	**10**	**1**	**6**	**1**	**11**	**1**	**8**	**2**
Dieldrin	unitless	0.02	0.009	0.2	0.05	0.1	0.08	**2**	0.4	0.2	0.1	**2**	0.5
Total Chlordane	unitless	0.007	0.0007	NC	NC	0.08	0.008	NC	NC	0.06	0.006	NC	NC
Hexachlorobenzene	unitless	0.000002	NC	NC	NC	0.000006	NC	NC	NC	0.000006	NC	NC	NC
Inorganics													
Arsenic	unitless	**1**	0.8	NC	NC	0.4	0.2	NC	NC	**7**	**4**	NC	NC
Chromium	unitless	0.3	0.3	NC	NC	0.4	0.4	NC	NC	**4**	**4**	NC	NC
Copper	unitless	0.3	0.2	**3**	0.7	**5**	**5**	**67**	**14**	**924**	**808**	**11319**	**2415**
Lead	unitless	0.2	0.1	**1**	0.1	0.08	0.05	0.5	0.05	0.06	0.04	0.4	0.04
Mercury	unitless	**2**	0.2	**2**	0.3	**4**	0.4	**3**	0.6	**6**	0.6	**4**	0.9
Methylmercury	unitless	**3**	0.3	**2**	0.3	**5**	0.5	**3**	0.7	**3**	0.3	**2**	0.4
Selenium	unitless	NC	0.4	NC	NC	NC	0.8	NC	NC	NC	**59**	NC	NC
Silver	unitless	0.2	0.1	NC	NC	**3**	**2**	NC	NC	**713**	**327**	NC	NC
Zinc	unitless	0.09	0.06	NC	NC	0.1	0.07	NC	NC	0.6	0.4	NC	NC

Table 7-7a
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-7b
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (North Zone)

Constituent	Units	Fish Tissue - HQs (North Zone)											
		Combined Summer/Winter Flounder				White Perch				White Perch Liver			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	**1**	0.1	**14**	**7**	**10**	**1**	**139**	**69**	**9**	0.9	**121**	**60**
Total Dioxin/Furan TEQ Fish	unitless	**1**	0.1	**15**	**7**	**11**	**1**	**148**	**73**	**10**	**1**	**136**	**67**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**6**	0.6	NC	NC	**57**	**6**	NC	NC	**53**	**5**	NC	NC
Polychlorinated Biphenyls													
Total PCBs	unitless	**2**	0.2	**4**	**1**	**6**	0.6	**13**	**4**	**8**	0.8	**17**	**5**
Total PCB TEQ Fish	unitless	0.04	0.004	0.5	0.3	0.2	0.02	**2**	**1**	0.5	0.05	**7**	**3**
Total PCB TEQ Fish Alternative TRV	unitless	0.2	0.02	NC	NC	0.9	0.09	NC	NC	**3**	0.3	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	**1**	0.1	**15**	**8**	**14**	**1**	**182**	**90**	**11**	**1**	**143**	**71**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**6**	0.6	NC	NC	**71**	**7**	NC	NC	**55**	**6**	NC	NC
Pesticides													
Total DDx (2,4 & 4,4)	unitless	0.8	0.08	0.5	0.1	**9**	0.9	**6**	**1**	**8**	0.8	**5**	**1**
Dieldrin	unitless	0.02	0.01	0.3	0.06	0.1	0.08	**2**	0.4	0.2	0.1	**3**	0.5
Total Chlordane	unitless	0.009	0.0009	NC	NC	0.1	0.01	NC	NC	0.08	0.008	NC	NC
Hexachlorobenzene	unitless	0.000004	NC	NC	NC	0.000008	NC	NC	NC	0.000008	NC	NC	NC
Inorganics													
Arsenic	unitless	**1**	0.7	NC	NC	0.3	0.2	NC	NC	**1**	0.5	NC	NC
Chromium	unitless	0.5	0.5	NC	NC	**1**	**1**	NC	NC	0.1	0.1	NC	NC
Copper	unitless	0.4	0.3	**5**	**1**	**6**	**6**	**79**	**17**	**252**	**220**	**3084**	**658**
Lead	unitless	0.4	0.3	**3**	0.3	0.1	0.06	0.6	0.06	0.05	0.03	0.3	0.03
Mercury	unitless	**3**	0.3	**2**	0.4	**5**	0.5	**3**	0.6	**8**	0.8	**5**	**1**
Methylmercury	unitless	**4**	0.4	**2**	0.5	**7**	0.7	**4**	0.9	**4**	0.4	**3**	0.5
Selenium	unitless	NC	0.4	NC	NC	NC	0.8	NC	NC	NC	**20**	NC	NC
Silver	unitless	0.2	0.1	NC	NC	**4**	**2**	NC	NC	**207**	**95**	NC	NC
Zinc	unitless	0.1	0.08	NC	NC	0.1	0.08	NC	NC	0.3	0.2	NC	NC

Table 7-7b
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (North Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-7c
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (Southeast Zone)

Constituent	Units	Fish Tissue - HQs (Southeast Zone)											
		Combined Summer/Winter Flounder				White Perch				White Perch Liver			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	0.6	0.06	**9**	**4**	**5**	0.5	**65**	**32**	**5**	0.5	**64**	**32**
Total Dioxin/Furan TEQ Fish	unitless	0.7	0.07	**9**	**5**	**6**	0.6	**74**	**37**	**6**	0.6	**76**	**37**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**4**	0.4	NC	NC	**29**	**3**	NC	NC	**29**	**3**	NC	NC
Polychlorinated Biphenyls													
Total PCBs	unitless	0.5	0.05	**1**	0.3	**4**	0.4	**8**	**3**	**5**	0.5	**10**	**3**
Total PCB TEQ Fish	unitless	0.02	0.002	0.3	0.1	0.08	0.008	**1**	0.5	0.2	0.02	**2**	**1**
Total PCB TEQ Fish Alternative TRV	unitless	0.1	0.01	NC	NC	0.4	0.04	NC	NC	0.9	0.09	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	0.7	0.07	**10**	**5**	**6**	0.6	**75**	**37**	**6**	0.6	**78**	**39**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**4**	0.4	NC	NC	**29**	**3**	NC	NC	**30**	**3**	NC	NC
Pesticides													
Total DDx (2,4 & 4,4)	unitless	0.7	0.07	0.5	0.1	**8**	0.8	**5**	**1**	**7**	0.7	**5**	0.9
Dieldrin	unitless	0.02	0.01	0.2	0.05	0.1	0.07	**2**	0.3	0.1	0.07	**2**	0.3
Total Chlordane	unitless	0.008	0.0008	NC	NC	0.07	0.007	NC	NC	0.04	0.004	NC	NC
Hexachlorobenzene	unitless	0.000001	NC	NC	NC	0.000006	NC	NC	NC	0.000006	NC	NC	NC
Inorganics													
Arsenic	unitless	**2**	0.9	NC	NC	0.4	0.2	NC	NC	**1**	0.5	NC	NC
Chromium	unitless	0.4	0.4	NC	NC	0.4	0.4	NC	NC	0.09	0.09	NC	NC
Copper	unitless	0.3	0.2	**3**	0.7	**3**	**3**	**37**	**8**	**255**	**223**	**3125**	**667**
Lead	unitless	0.2	0.1	**1**	0.1	0.1	0.06	0.6	0.06	0.06	0.04	0.4	0.04
Mercury	unitless	**3**	0.3	**2**	0.5	**4**	0.4	**3**	0.6	**6**	0.6	**4**	0.8
Methylmercury	unitless	**3**	0.3	**2**	0.4	**5**	0.5	**3**	0.6	**3**	0.3	**2**	0.4
Selenium	unitless	NC	0.4	NC	NC	NC	0.7	NC	NC	NC	**16**	NC	NC
Silver	unitless	0.2	0.1	NC	NC	**2**	**1**	NC	NC	**207**	**95**	NC	NC
Zinc	unitless	0.09	0.07	NC	NC	0.1	0.08	NC	NC	0.2	0.2	NC	NC

Table 7-7c
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (Southeast Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
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PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-7d
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (Southwest Zone)

Constituent	Units	Fish Tissue - HQs (Southwest Zone)											
		Combined Summer/Winter Flounder				White Perch				White Perch Liver			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	0.3	0.03	**4**	**2**	**2**	0.2	**32**	**16**	**5**	0.5	**64**	**32**
Total Dioxin/Furan TEQ Fish	unitless	0.3	0.03	**4**	**2**	**3**	0.3	**41**	**20**	**6**	0.6	**83**	**41**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**2**	0.2	NC	NC	**16**	**2**	NC	NC	**32**	**3**	NC	NC
Polychlorinated Biphenyls													
Total PCBs	unitless	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**	**5**	0.5	**12**	**4**
Total PCB TEQ Fish	unitless	0.03	0.003	0.4	0.2	0.09	0.009	**1**	0.6	0.4	0.04	**5**	**2**
Total PCB TEQ Fish Alternative TRV	unitless	0.2	0.02	NC	NC	0.5	0.05	NC	NC	**2**	0.2	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	0.3	0.03	**5**	**2**	**3**	0.3	**42**	**21**	**6**	0.6	**87**	**43**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**2**	0.2	NC	NC	**16**	**2**	NC	NC	**34**	**3**	NC	NC
Pesticides													
Total DDx (2,4 & 4,4)	unitless	0.8	0.08	0.5	0.1	**16**	**2**	**10**	**2**	**19**	**2**	**13**	**3**
Dieldrin	unitless	0.02	0.01	0.3	0.05	0.2	0.1	**3**	0.6	0.2	0.1	**3**	0.5
Total Chlordane	unitless	0.007	0.0007	NC	NC	0.08	0.008	NC	NC	0.07	0.007	NC	NC
Hexachlorobenzene	unitless	0.000001	NC	NC	NC	0.000005	NC	NC	NC	0.000006	NC	NC	NC
Inorganics													
Arsenic	unitless	**2**	0.9	NC	NC	0.5	0.3	NC	NC	**13**	**7**	NC	NC
Chromium	unitless	0.3	0.3	NC	NC	0.6	0.6	NC	NC	**4**	**4**	NC	NC
Copper	unitless	0.2	0.2	**3**	0.6	**9**	**8**	**108**	**23**	**1990**	**1741**	**24375**	**5200**
Lead	unitless	0.1	0.09	0.9	0.09	0.06	0.04	0.4	0.04	0.06	0.04	0.4	0.04
Mercury	unitless	**3**	0.3	**2**	0.4	**5**	0.5	**3**	0.7	**7**	0.7	**5**	0.9
Methylmercury	unitless	**3**	0.3	**2**	0.4	**4**	0.4	**3**	0.6	**3**	0.3	**2**	0.4
Selenium	unitless	NC	0.4	NC	NC	NC	**1**	NC	NC	NC	**128**	NC	NC
Silver	unitless	0.2	0.09	NC	NC	**6**	**3**	NC	NC	**1445**	**663**	NC	NC
Zinc	unitless	0.08	0.06	NC	NC	0.08	0.06	NC	NC	**1**	**1**	NC	NC

Table 7-7d
Calculated Tissue HQs for Fish Receptors with NBSA- and LPR FFS-Selected TRVs (Southwest Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-10
Exposure Parameters for Representative Fish Receptors

Receptor Species	Guild	Body Weight[a] (kg)	Food Ingestion		Incidental Sediment Ingestion			Diet Composition			Site Use	
			FIR[b] (kg/day, dw)	Source	SI[c] (percent)	SIR[d] (kg/day, dw)	Source	Reported	Source	Proposed NBSA BERA Diet	SUF (unitless)	Source
Mummichog	Forage fish	0.0033	0.00047	Arnot and Gobas (2004)	10	0.0000095	No empirical data available; based on feeding habits and best professional judgment	benthic invertebrates	Abraham (1985)	100% worm	1.0	Usually found within 110 meters of shorelines along intertidal marshes and mudflats (Abraham 1985).
Summer/winter flounder	Benthic omnivore	0.35	0.025	Arnot and Gobas (2004)	15	0.00076	No empirical data available; based on feeding habits and best professional judgment	benthic invertebrates, crustaceans, fish	Packer et al. (1999)	25% worm, 25% blue crab, 25% softshell clam, 25% fish (≤ 30 cm)	0.67	Strong seasonal inshore-offshore migration. Adults found in shallow coastal and estuarine waters during warmer months, and remain offshore during colder months. NBSA sampling data indicate white perch are only present in NBSA March through October (Packer et al. 1999).
White perch	Pelagic invertivore	0.13	0.010	Arnot and Gobas (2004)	5.0	0.00010	No empirical data available; based on feeding habits and best professional judgment	benthic invertebrates, fish	Bath and O'Connor (1985); Weis (2005)	40% worm, 20% blue crab, 20% softshell clam, 20% fish (≤ 15 cm)	0.67	Spawn in spring as water temperatures rise, adults migrate upstream into cooler freshwater. Northern populations spawn late March to early April (Stanley and Danie 1983). Overwintering occurs in deeper brackish or estuarine waters throughout bays with soft substrates (Setzler-Hamilton 1991). NBSA sampling data indicate white perch are only present in NBSA October to May.
American eel < 50 cm	Pelagic piscivore migratory	0.12	0.0098	Arnot and Gobas (2004)	5.0	0.000098	Wenner and Musick (1975)	benthic invertebrates, crustaceans, fish	Ogden (1970)	40% worm, 20% blue crab, 20% softshell clam, 20% fish (≤ 15 cm)	1.0	Spawning occurs in Sargasso Sea, juvenile eels migrate into coastal waters with some moving into freshwater streams, but some remaining in coastal estuaries and bays until maturity (Atlantic States Marine Commission 2000; 2009). NBSA sampling data indicate American eel are present in NBSA year-round.
American eel ≥ 50 cm	Pelagic piscivore migratory	0.40	0.028	Arnot and Gobas (2004)	5.0	0.00028	Wenner and Musick (1975)	benthic invertebrates, crustaceans, fish	Ogden (1970)	20% worm, 20% blue crab, 20% softshell clam, 40% fish (≤ 30 cm)	1.0	Spawning occurs in Sargasso Sea, juvenile eels migrate into coastal waters with some moving into freshwater streams, but some remaining in coastal estuaries and bays until maturity (Atlantic States Marine Commission 2000; 2009). NBSA sampling data indicate American eel are present in NBSA year-round.

Table 7-10
Exposure Parameters for Representative Fish Receptors

Notes:

[a] Body weight for each species was based on average of all body weights for that species collected during 2014 - 2016 fish sampling events.

[b] FIR (kg/day, ww) is a function of body weight based on the following equation: FIR = (0.022 x $BW^{0.85}$) x $exp^{(0.06 \times T)}$, where T = 17.0ºC based on monthly average temperatures in Newark Bay between 2004 and 2016 (USEPA 2018) and body weight is in kg.

[c] SI is the percentage of the dry diet that is incidentally ingested sediment.

[d] SIR converted to dry weight assuming 80% moisture in diet.

Acronyms and Abbreviations:

% = percent
BERA = baseline ecological risk assessment
BW = body weight
cm = centimeter
FIR = food ingestion rate
kg = kilograms
kg/day, dw = kilograms dry weight per day
kg/day, ww = kilog
NBSA = Newark Bay Study Area
SI = sediment ingestion
SIR = sediment ingestion rate
SUF = site use factor
USEPA = U.S. Environmental Protection Agency

References:

Abraham, B.J. 1985. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Mummichog and Striped Killifish. Biological Report 82-4 (11.40). Coastal Ecology Group, U.S. Army Corps of Engineers, Vicksburg, MS and National Wetlands Research Center, U.S. Fish and Wildlife Service, Slidell, LA.

Arnot, J.A. and F.A.P.C Gobas. 2004. A food web bioaccumulation model for organic chemicals in aquatic ecosystems. *Environ Toxicol Chem* 23:2343-2355.

Atlantic States Marine Fisheries Commission. 2000. Interstate Fishery Management Plan for the American Eel. Fishery Management Report No. 36. April 2000.

Atlantic States Marine Fisheries Commission. 2009. Atlantic Coast Diadromous Fish Habitat: A Review of Utilization, Threats, Recommendations for Conservation and Research Needs. Habitat Management Series #9. January 2009.

Bath D.W. and J.M. O'Connor. 1985. Food preferences of white perch in the Hudson River estuary. *NY Fish Game J* 32(1):63-70.

Ogden, J.C. 1970. Relative abundance, food habits, and age of the American eel, *Anguilla rostrata* (LeSueur), in certain New Jersey streams. *Trans Am Fish Soc* 1:54-59.

Packer, D.B., S.J. Greisbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Summer flounder, *Paralichthys dentatus*, Life history and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-151. September 1999.

Setzler-Hamilton, E.M. and L.W. Hall Jr. 1991. Striped bass *Morone saxatilis*. In: Funderburk, S.L., et al. (eds.). Habitat Requirements for Chesapeake Bay Living Resources, 2nd Ed. Living Resources Subcommittee, Chesapeake Bay Program, Annapolis.

Stanley, J.G. and D.S. Danie. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic). White Perch. U.S. Fish and Wildlife Service, Division of Biological Services, FWS/OBS-82/11.7. U.S. Army Corps of Engineers, Tl

USEPA. 2018. Water temperature data for the Newark Bay Study Area. STORET database [online]. US Environmental Protection Agency, Washington, DC. Available from: http://www.epa.gov/storet/dbtop.html.

Weis, J.S. 2005. Diet and food web support of the white perch, *Morone americana*, in the Hackensack meadowlands of New Jersey. *Environ Biol Fish* 74:109-113

Wenner, C.A. and J.A. Musick. 1975. Food habits and seasonal abundance of the American eel, Anguilla rostrata, from the Lower Chesapeake Bay. *Chesap Sci* 16(1):62-66.

Table 7-11
TRVs for Fish Dietary Assessment

Constituent[a,b]	Units	Fish - Dietary TRVs		TRVs Developed Specifically for NBSA BERA	Source
		NOAEL	LOAEL		
PAHs					
Total PAH	mg/kg bw/day	6.2	18		Chinook salmon (anadromous); growth (Meador et al. 2006)
Inorganics					
Arsenic	mg/kg bw/day	0.52	1.9	X	Striped bass (marine/anad; growth; Blazer et al. 1997)
Cadmium	mg/kg bw/day	0.001[c]	0.01		Rockfish (marine); growth (Kim et al. 2004); Kang et al. 2005)
Chromium	mg/kg bw/day	0.19	Not derived		Grey mullet (marine); growth (Walsh et al. 1994)
Copper	mg/kg bw/day	1	2		Rockfish (marine); growth (Kang et al. 2005)
Lead	mg/kg bw/day	12.6	Not derived	X	Rainbow trout (freshwater); growth (Mount et al. 1994)
Mercury/Methylmercury	mg/kg bw/day	0.00056[c]	0.0056		10 species; growth, reproduction, mortality, and behavior (Windward 2019)
Nickel	mg/kg bw/day	0.14[c]	1.4		Indian carp (freshwater); growth (Javed 2013)
Selenium	mg/kg bw/day	0.011[c]	0.11		7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)
Silver	mg/kg bw/day	70	Not derived	X	Rainbow trout (freshwater; growth; Galvez and Wood 1999)
Zinc	mg/kg bw/day	19	38		Rainbow trout (freshwater); growth (Takeda and Shimma 1977)

Notes:
[a] Risk for fish evaluated for metals and PAHs only.
[b] The revised LPR FFS (USEPA 2014) for the lower eight miles of the Lower Passaic River did not include a fish dietary assessment.
[c] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg bw/day = milligrams per kilogram body weight per day
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

Table 7-11
TRVs for Fish Dietary Assessment

References

Blazer, V.S., J.W. Fournie, and B.A. Weeks-Perkins. 1997. Macrophage Aggregates: Biomarker for Immune Function in Fishes? In: Dwyer F.J., T.R. Doane, M.L. Hinman, Eds., Environmental Toxicology and Risk Assessment: Modeling and Risk Assessment. Vol 6. STP 1317. American Society for Testing and Materials, Philadelphia, PA, pp. 360-375.

Galvez, F. and C.M. Wood. 1999. Physiological effects of dietary silver sulfide exposure in rainbow trout. *Environ Toxicol Chem* 18(1):84-88.

Hamilton, S.J., K.J. Buhl, N.L. Faerber, R.H. Wiedmeyer, and F.A. Bullard. 1990. Toxicity of organic selenium in the diet to chinook salmon. *Environ Toxicol Chem* 9:347-358.

Hilton, J.W. and W.J. Bettger. 1988. Dietary vanadium toxicity in juvenile rainbow trout: a preliminary study. *Aquat Toxicol* 12:63-71.

Javed, M. 2013. Chronic effects of nickel and cobalt on fish growth. *Int J Agric Biol* 15:575-579.

Kang, J-C, S-G. Kim, and S-W. Jang. 2005. Growth and hematological changes of rockfish, *Sebastes schlegeli* (Hilgendorf) exposed to dietary Cu and Cd. *J World Aquacult Soc* 36(2):188-195.

Kim, S-G, D-K. Park, S-W. Jang, J-S. Lee, S-S. Kim, and M-H. Chung. 2008. Effects of dietary benzo(a)pyrene on growth and hematological parameters in juvenile rockfish, *Sebastes schlegeli* (Hilgendorf). *Bull Environ Contam Toxicol* 81:470-474.

Kim, S-G, J-W. Kim, and J-C. Kang. 2004. Effect of dietary cadmium on growth and haematological parameters of juvenile rockfish, *Sebastes schlegeli* (Hilgendorf). *Aquacult Res* 35:80-86.

Matta, M.B., J. Linse, C. Cairncross, L. Francendese, and R.M. Kocan. 2001. Reproductive and transgenerational effects of methylmercury or Aroclor 1268 on *Fundulus heteroclitus* . *Environ Toxicol Chem* 20(2):327-335.

Meador, J.P., F.C. Sommers, G.M. Ylitalo, and C.A. Sloan. 2006. Altered growth and related physiological responses in juvenile chinook salmon (*Oncorhynchus tshawytscha*) from dietary exposure to polycyclic aromatic hydrocarbons (PAHs). *Can J Fish Aquat Sci* 63:2364-2376.

Mount, D.R., A.K. Barth, T.D. Garrison, K.A. Barten, and J.R. Hockett. 1994. Dietary and waterborne exposure of rainbow trout (*Oncorhynchus mykiss*) to copper, cadmium, lead and zinc using a live diet. *Environ Toxicol Chem* 13(12):2031-41.

Takeda H. and Y. Shimma. 1977. Effects of toxic amounts of dietary zinc on the growth and body components of rainbow trout at two levels of calcium. *Bull Freshw Fish Res* 27:103-109.

Walsh, A.R., J. O'Halloran, and A.M. Gower. 1994. Some effects of elevated levels of chromium (III) in sediments to the mullet *Chelon labrosus* (R). *Ecotox Environ Safety* 27:168-176.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June

Table 7-12a
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide)

Constituent	Units	Fish Dietary HQs (NBSA-wide)											
		NBSA-wide Mudflats				NBSA-wide				NBSA-wide			
		Mummichog				Summer/Winter Flounder				White Perch			
		Forage Fish				Benthic Omnivore				Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs													
Total PAH	unitless	0.003	0.0009	NC	NC	0.002	0.0006	NC	NC	0.001	0.0004	NC	NC
Inorganics													
Arsenic	unitless	0.8	0.2	NC	NC	0.3	0.08	NC	NC	0.3	0.09	NC	NC
Cadmium	unitless	**14**	**1**	NC	NC	**10**	**1**	NC	NC	**10**	**1**	NC	NC
Chromium	unitless	0.7	NC	NC	NC	0.5	NC	NC	NC	0.4	NC	NC	NC
Copper	unitless	0.4	0.2	NC	NC	0.7	0.4	NC	NC	0.6	0.3	NC	NC
Lead	unitless	0.02	NC	NC	NC	0.03	NC	NC	NC	0.03	NC	NC	NC
Mercury	unitless	**9**	0.9	NC	NC	**10**	**1**	NC	NC	**9**	0.9	NC	NC
Methylmercury	unitless	**1**	0.1	NC	NC	**6**	0.6	NC	NC	**5**	0.5	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.4	0.04	NC	NC	0.4	0.04	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**4**	0.4	NC	NC	**4**	0.4	NC	NC
Silver	unitless	0.00008	NC	NC	NC	0.0003	NC	NC	NC	0.0002	NC	NC	NC
Zinc	unitless	0.3	0.1	NC	NC	0.1	0.05	NC	NC	0.1	0.06	NC	NC

Table 7-12a
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide)

Constituent	Units	Fish Dietary HQs (NBSA-wide)							
		NBSA-wide				NBSA-wide			
		American Eel <50 cm				American Eel ≥50 cm			
		Pelagic Piscovore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs									
Total PAH	unitless	0.002	0.0007	NC	NC	0.002	0.0006	NC	NC
Inorganics									
Arsenic	unitless	0.5	0.1	NC	NC	0.4	0.1	NC	NC
Cadmium	unitless	**15**	**1**	NC	NC	**12**	**1**	NC	NC
Chromium	unitless	0.6	NC	NC	NC	0.5	NC	NC	NC
Copper	unitless	0.9	0.4	NC	NC	0.9	0.5	NC	NC
Lead	unitless	0.04	NC	NC	NC	0.04	NC	NC	NC
Mercury	unitless	**13**	**1**	NC	NC	**13**	**1**	NC	NC
Methylmercury	unitless	**8**	0.8	NC	NC	**10**	**1**	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.4	0.04	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0003	NC	NC	NC	0.0003	NC	NC	NC
Zinc	unitless	0.2	0.09	NC	NC	0.1	0.07	NC	NC

Table 7-12a
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
EPC = exposure point concentration
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-12b
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone)

Constituent	Units	Fish Dietary HQs (North Zone)											
		North Zone Mudflats				North Zone				North Zone			
		Mummichog				Summer/Winter Flounder				White Perch			
		Forage Fish				Benthic Omnivore				Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs													
Total PAH	unitless	0.002	0.0005	NC	NC	0.002	0.0007	NC	NC	0.001	0.0005	NC	NC
Inorganics													
Arsenic	unitless	0.8	0.2	NC	NC	0.3	0.08	NC	NC	0.3	0.09	NC	NC
Cadmium	unitless	**14**	**1**	NC	NC	**9**	0.9	NC	NC	**10**	**1**	NC	NC
Chromium	unitless	0.6	NC	NC	NC	0.5	NC	NC	NC	0.4	NC	NC	NC
Copper	unitless	0.3	0.2	NC	NC	0.7	0.3	NC	NC	0.6	0.3	NC	NC
Lead	unitless	0.01	NC	NC	NC	0.02	NC	NC	NC	0.02	NC	NC	NC
Mercury	unitless	**9**	0.9	NC	NC	**12**	**1**	NC	NC	**10**	**1**	NC	NC
Methylmercury	unitless	**1**	0.1	NC	NC	**7**	0.7	NC	NC	**6**	0.6	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.4	0.04	NC	NC	0.4	0.04	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**4**	0.4	NC	NC	**4**	0.4	NC	NC
Silver	unitless	0.00008	NC	NC	NC	0.0003	NC	NC	NC	0.0003	NC	NC	NC
Zinc	unitless	0.3	0.1	NC	NC	0.1	0.05	NC	NC	0.1	0.06	NC	NC

Table 7-12b
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone)

Constituent	Units	Fish Dietary HQs (North Zone)							
		North Zone				North Zone			
		American Eel <50 cm				American Eel ≥50 cm			
		Pelagic Piscovore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs									
Total PAH	unitless	0.002	0.0007	NC	NC	0.002	0.0007	NC	NC
Inorganics									
Arsenic	unitless	0.5	0.1	NC	NC	0.4	0.1	NC	NC
Cadmium	unitless	**14**	**1**	NC	NC	**12**	**1**	NC	NC
Chromium	unitless	0.6	NC	NC	NC	0.5	NC	NC	NC
Copper	unitless	0.9	0.4	NC	NC	0.9	0.4	NC	NC
Lead	unitless	0.03	NC	NC	NC	0.03	NC	NC	NC
Mercury	unitless	**16**	**2**	NC	NC	**16**	**2**	NC	NC
Methylmercury	unitless	**9**	0.9	NC	NC	**12**	**1**	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.5	0.05	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0004	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.2	0.08	NC	NC	0.1	0.07	NC	NC

Table 7-12b
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA. 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-12c
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone)

Constituent	Units	Fish Dietary HQs (Southeast Zone)											
		Southeast Zone Mudflats				Southeast Zone				Southeast Zone			
		Mummichog				Summer/Winter Flounder				White Perch			
		Forage Fish				Benthic Omnivore				Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs													
Total PAH	unitless	0.002	0.0006	NC	NC	0.002	0.0006	NC	NC	0.001	0.0004	NC	NC
Inorganics													
Arsenic	unitless	0.8	0.2	NC	NC	0.2	0.06	NC	NC	0.3	0.07	NC	NC
Cadmium	unitless	**14**	**1**	NC	NC	**11**	**1**	NC	NC	**11**	**1**	NC	NC
Chromium	unitless	0.7	NC	NC	NC	0.7	NC	NC	NC	0.6	NC	NC	NC
Copper	unitless	0.3	0.2	NC	NC	0.7	0.3	NC	NC	0.6	0.3	NC	NC
Lead	unitless	0.01	NC	NC	NC	0.01	NC	NC	NC	0.01	NC	NC	NC
Mercury	unitless	**9**	0.9	NC	NC	**9**	0.9	NC	NC	**8**	0.8	NC	NC
Methylmercury	unitless	**1**	0.1	NC	NC	**7**	0.7	NC	NC	**6**	0.6	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.4	0.04	NC	NC	0.4	0.04	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**4**	0.4	NC	NC	**4**	0.4	NC	NC
Silver	unitless	0.00008	NC	NC	NC	0.0003	NC	NC	NC	0.0003	NC	NC	NC
Zinc	unitless	0.3	0.1	NC	NC	0.09	0.05	NC	NC	0.1	0.05	NC	NC

Table 7-12c
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone)

Constituent	Units	Fish Dietary HQs (Southeast Zone)							
		Southeast Zone				Southeast Zone			
		American Eel <50 cm				American Eel ≥50 cm			
		Pelagic Piscovore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs									
Total PAH	unitless	0.002	0.0006	NC	NC	0.001	0.0005	NC	NC
Inorganics									
Arsenic	unitless	0.4	0.1	NC	NC	0.3	0.08	NC	NC
Cadmium	unitless	**16**	**2**	NC	NC	**14**	**1**	NC	NC
Chromium	unitless	0.9	NC	NC	NC	0.7	NC	NC	NC
Copper	unitless	0.9	0.4	NC	NC	0.9	0.4	NC	NC
Lead	unitless	0.02	NC	NC	NC	0.01	NC	NC	NC
Mercury	unitless	**12**	**1**	NC	NC	**12**	**1**	NC	NC
Methylmercury	unitless	**10**	**1**	NC	NC	**11**	**1**	NC	NC
Nickel	unitless	0.5	0.05	NC	NC	0.4	0.04	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0004	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.2	0.08	NC	NC	0.1	0.06	NC	NC

Table 7-12c
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
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LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-12d
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone)

Constituent	Units	Fish Dietary HQs (Southwest Zone)											
		Southwest Zone Mudflats				Southwest Zone				Southwest Zone			
		Mummichog				Summer/Winter Flounder				White Perch			
		Forage Fish				Benthic Omnivore				Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs													
Total PAH	unitless	0.005	0.002	NC	NC	0.002	0.0007	NC	NC	0.002	0.0006	NC	NC
Inorganics													
Arsenic	unitless	0.8	0.2	NC	NC	0.4	0.1	NC	NC	0.4	0.1	NC	NC
Cadmium	unitless	**17**	**2**	NC	NC	**12**	**1**	NC	NC	**12**	**1**	NC	NC
Chromium	unitless	0.9	NC	NC	NC	0.6	NC	NC	NC	0.5	NC	NC	NC
Copper	unitless	0.4	0.2	NC	NC	**1**	0.5	NC	NC	0.7	0.3	NC	NC
Lead	unitless	0.06	NC	NC	NC	0.1	NC	NC	NC	0.09	NC	NC	NC
Mercury	unitless	**11**	**1**	NC	NC	**11**	**1**	NC	NC	**8**	0.8	NC	NC
Methylmercury	unitless	**1**	0.1	NC	NC	**6**	0.6	NC	NC	**5**	0.5	NC	NC
Nickel	unitless	0.8	0.08	NC	NC	0.6	0.06	NC	NC	0.6	0.06	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**4**	0.4	NC	NC	**4**	0.4	NC	NC
Silver	unitless	0.0001	NC	NC	NC	0.0003	NC	NC	NC	0.0002	NC	NC	NC
Zinc	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC	0.2	0.09	NC	NC

Table 7-12d
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone)

Constituent	Units	Fish Dietary HQs (Southwest Zone)							
		Southwest Zone				Southwest Zone			
		American Eel <50 cm				American Eel ≥50 cm			
		Pelagic Piscovore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
PAHs									
Total PAH	unitless	0.003	0.0009	NC	NC	0.002	0.0007	NC	NC
Inorganics									
Arsenic	unitless	0.6	0.2	NC	NC	0.5	0.1	NC	NC
Cadmium	unitless	**18**	**2**	NC	NC	**15**	**1**	NC	NC
Chromium	unitless	0.7	NC	NC	NC	0.6	NC	NC	NC
Copper	unitless	**1**	0.5	NC	NC	**1**	0.7	NC	NC
Lead	unitless	0.1	NC	NC	NC	0.1	NC	NC	NC
Mercury	unitless	**12**	**1**	NC	NC	**14**	**1**	NC	NC
Methylmercury	unitless	**8**	0.8	NC	NC	**10**	**1**	NC	NC
Nickel	unitless	0.9	0.09	NC	NC	0.7	0.07	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**6**	0.6	NC	NC
Silver	unitless	0.0003	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.3	0.1	NC	NC	0.2	0.1	NC	NC

Table 7-12d
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
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LMW = low molecular weight
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NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-14
TRVs for Fish Egg Tissue Assessment

Constituent	Units	Fish - Egg TRVs						
		NBSA BERA TRV			TRVs Developed for NBSA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg, ww	0.0000072	0.000086	10 species; survival, growth, reproduction and behavior. SSD-derived 5th percentile value. (Steevens et al. 2005)		0.0000072	0.000086	SSD (Steevens et al. 2005)
Total Dioxin/Furan TEQ Fish	mg/kg, ww	0.0000072	0.000086	10 species; survival, growth, reproduction and behavior. SSD-derived 5th percentile value. (Steevens et al. 2005)		0.0000072	0.000086	SSD (Steevens et al. 2005)
Polychlorinated Biphenyls								
Total PCBs	mg/kg, ww	0.0258[a]	0.258	Common barbel; reproduction (Hugla and Thome 1999)		--	--	--
Total PCB TEQ Fish	mg/kg, ww	0.0000072	0.000086	10 species; survival, growth, reproduction and behavior. SSD-derived 5th percentile value. (Steevens et al. 2005)		0.0000072	0.000086	SSD (Steevens et al. 2005)
Total Dioxin/Furan/PCB TEQ Fish	mg/kg, ww	0.0000072	0.000086	10 species; survival, growth, reproduction and behavior. SSD-derived 5th percentile value. (Steevens et al. 2005)		0.0000072	0.000086	SSD (Steevens et al. 2005)
Inorganics								
Mercury/Methylmercury	mg/kg, ww	0.006[a]	0.06	Catfish; reproduction (Birge et al. 1979)		0.006	0.06	Catfish; reproduction (Birge et al 1979)

Notes
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
-- = not available
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
TRV = toxicity reference value

References:
Birge, W.J, J.A. Black, A.G. Westerman, and J.E. Hudson. 1979. The Effects of Mercury on Reproduction of Fish and Amphibians. In: Nriagu J.O., Ed., The Biogeochemistry of Mercury in the Environment. Elsevier/North-Holland Biomedica
Hugla, J.L. and J.P. Thome. 1999. Effects of polychlorinated biphenyls on liver ultrastructure, hepatic monooxygenases, and reproductive success in the barbel. *Ecotox Environ Saf* 42:265-273.
Steevens, J.A, M.R. Reiss, and A.V. Pawlisz. 2005. A methodology for deriving tissue residue benchmarks for aquatic biota: a case study for fish exposed to 2,3,7,8-tetrachlorodibenzo-*p* -dioxin and equivalents. *Integr Environ Assess Manag*
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-15
Calculated Tissue HQs for Fish Eggs with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Fish Egg Tissue - HQs (NBSA-Wide)							
		Combined Mummichog Killifish							
		CF = 0.6213 (PCBs/Dioxins); CF = 0.101 (Methylmercury)				CF = 1 (all constituents)			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	**2**	0.2	**2**	0.2	**3**	0.3	**3**	0.3
Total Dioxin/Furan TEQ Fish	unitless	**2**	0.2	**2**	0.2	**4**	0.3	**4**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	**33**	**3**	--	--	**54**	**5**	--	--
Total PCB TEQ Fish	unitless	0.1	0.01	0.1	0.01	0.2	0.02	0.2	0.02
Total Dioxin/Furan/PCB TEQ Fish	unitless	**4**	0.3	**4**	0.3	**4**	0.3	**4**	0.3
Inorganics									
Mercury	unitless	0.8	0.08	0.8	0.08	**8**	0.8	**8**	0.8
Methylmercury	unitless	**1**	0.1	1.0	0.10	**10**	**1**	**10**	**1**

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.
The relationship between lipid-normalized organic chemicals (PCBs, dioxins/furans) in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): EPCegg,lipid = 0.6213 x EPCadult,lipid. The conversion factor (0.6213) between egg and adult lipid-normalized tissue concentrations is from Niimi (1983). A CF = 1.0 was also evaluated.

The UCL lipid value used in the Lower Passaic River Study Area BERA (Windward 2019) mummichog eggs (3.3%) was used to convert lipid-normalized egg concentrations from the above equation to wet weight egg concentrations for comparison to fish egg TRVs.

The relationship between mercury/methylmercury in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): EPCegg,ww = 0.101 x EPCadult,ww. The conversion factor (0.101) between egg and adult tissue concentrations is from Niimi (1983). A CF = 1.0 was also evaluated.

Acronyms and Abbreviations:

-- = not calculated
CF = conversion factor
EPC = exposure point concentration
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
TRV = toxicity reference value
UCL = upper confidence limit
ww = wet weight

Table 7-15
Calculated Tissue HQs for Fish Eggs with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

References:

Niimi, A.J. 1983. Biological and toxicological effects of environmental contaminants in fish and their eggs. *Can J Fish Aquat Sci* 40:306-312.

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June.

Table 7-17
Summary of Fish Pathology Assessment Findings

Species	Scientific Name	Animal ID#	Body Weight (g)	Gonad Weight (g)	GSI	Sex	Capture Date	Necropsy Date	Gross Finding
American Eel	*Anguilla rostrata*	NBO3WAEN016	340	0.22	0.06%	M	10/9/2014	10/9/2014	-
American Eel	*Anguilla rostrata*	NBO3WAEN017	27.9	UD	NA	NR	10/9/2014	10/9/2014	Swim bladder: nematode parasites
American Eel	*Anguilla rostrata*	NBO3WAEN024	273	0.35	0.13%	M	10/10/2014	10/10/2014	-
American Eel	*Anguilla rostrata*	NBO3WAEN025	472	3.51	0.82%	F	10/10/2014	10/10/2014	Heart: pale nodule
Bay Anchovy	*Anchoa mitchilli*	NBO3WBAC001-01	4.6	0.01	0.22%	M	10/9/2014	10/9/2014	-
Bay Anchovy	*Anchoa mitchilli*	NBO3WBAC001-02	3	0.02	0.67%	M	10/9/2014	10/9/2014	Skin of dorsum and head: anchor worms
Bay Anchovy	*Anchoa mitchilli*	NBO3WBAC001-03	2.4	0.01	0.42%	M	10/9/2014	10/9/2014	Skin of dorsum and head: anchor worms
Bay Anchovy	*Anchoa mitchilli*	NBO3WBAC001-04	3	0.01	0.33%	M	10/9/2014	10/9/2014	-
Bay Anchovy	*Anchoa mitchilli*	NBO3WBAC001-05	2.7	0.01	0.37%	M	10/9/2014	10/9/2014	-
Black Sea Bass	*Centropristis striata*	BS01	5.3	UD	NA	NR	10/8/2014	10/8/2014	-
Black Sea Bass	*Centropristis striata*	BS02	6.6	UD	NA	NR	10/9/2014	10/9/2014	-
Black Sea Bass	*Centropristis striata*	BS03	8.2	UD	NA	NR	10/9/2014	10/9/2014	-
Blueback Herring	*Alosa aestivalis*	BB01	2.6	UD	NA	NR	10/10/2014	10/10/2014	-
Bluefish	*Pomatomus saltatrix*	NBO3FBLC002	25.2	0.02	0.08%	TI	10/9/2014	10/9/2014	-
Bluefish	*Pomatomus saltatrix*	NBO3FBLS003-01	111.4	0.04	0.04%	M	10/10/2014	10/10/2014	Branchial cavity: isopod parasite ("sea louse")
Bluefish	*Pomatomus saltatrix*	NBO3FBLS003-02	27.9	UD	NA	NR	10/10/2014	10/10/2014	-
Bluefish	*Pomatomus saltatrix*	NBO3FBLS003-03	94.4	0.31	0.33%	F	10/10/2014	10/10/2014	Right ovary: enlarged and discolored
Bluefish	*Pomatomus saltatrix*	NBO3FBLS003-04	30.3	0.04	0.13%	TI	10/10/2014	10/10/2014	-
Butterfish	*Peprilus triacanthus*	BF01	25.6	UD	NA	NR	10/9/2014	10/9/2014	-
Butterfish	*Peprilus triacanthus*	BF02	67.8	UD	NA	NR	10/9/2014	10/9/2014	-
Gizzard Shad	*Dorosoma cepedianum*	GS01	22.3	0.01	0.04%	M	10/7/2014	10/7/2014	-
Spotted Hake	*Urophycis regia*	NBO3WHAN019	158	1.11	0.70%	F	10/9/2014	10/9/2014	-
Spotted Hake	*Urophycis regia*	HA01	103.3	0.68	0.66%	F	10/6/2014	10/6/2014	-
Hog Choker	*Trinectes maculatus*	HC01	53.2	0.01	0.02%	TI	10/6/2014	10/6/2014	-
Hog Choker	*Trinectes maculatus*	HC02	36.4	0.4	1.10%	F	10/6/2014	10/6/2014	-
Hog Choker	*Trinectes maculatus*	HC03	65.8	1.08	1.64%	F	10/7/2014	10/7/2014	-
Hog Choker	*Trinectes maculatus*	HC04	35.5	0.6	1.69%	F	10/7/2014	10/7/2014	-
Menhaden	*Brevoortia tyrannus*	NBO3WMES008-01	4.1	UD	NA	NR	10/10/2014	10/10/2014	-
Menhaden	*Brevoortia tyrannus*	NBO3WMES008-02	10.9	UD	NA	NR	10/10/2014	10/10/2014	-
Menhaden	*Brevoortia tyrannus*	NBO3WMES008-03	5.2	UD	NA	NR	10/10/2014	10/10/2014	-
Menhaden	*Brevoortia tyrannus*	NBO3WMES008-04	4.7	UD	NA	NR	10/10/2014	10/10/2014	-
Moonfish	*Selene setapinnis*	MF01	2.5	UD	NA	NR	10/7/2014	10/7/2014	-
Moonfish	*Selene setapinnis*	MF02	3.1	UD	NA	NR	10/9/2014	10/9/2014	-
Moonfish	*Selene setapinnis*	MF03	7.2	UD	NA	NR	10/9/2014	10/9/2014	-
Moonfish	*Selene setapinnis*	MF04	6.4	UD	NA	NR	10/9/2014	10/9/2014	-
Moonfish	*Selene setapinnis*	MF05	3.5	UD	NA	NR	10/9/2014	10/9/2014	-
Mummichog	*Fundulus heteroclitus*	NBO3WMU131A-01	1.5	UD	NA	NR	10/10/2014	10/10/2014	-
Mummichog	*Fundulus heteroclitus*	NBO3WMU131A-02	0.6	UD	NA	NR	10/10/2014	10/10/2014	
Mummichog	*Fundulus heteroclitus*	NBO3WMUN015-01	7.6	0.12	1.58%	M	10/9/2014	10/9/2014	-
Mummichog	*Fundulus heteroclitus*	NBO3WMUN015-02	3.3	0.02	0.61%	F	10/9/2014	10/9/2014	-
Mummichog	*Fundulus heteroclitus*	NBO3WMUN015-03	13.2	UD	NA	NR	10/9/2014	10/9/2014	-
Naked Goby	*Gobiosoma bosc*	NG01	0.7	UD	NA	NR	10/8/2014	10/8/2014	-
Northern Kingfish	*Menticirrhus saxatilis*	NK01	4.3	UD	NA	NR	10/6/2014	10/6/2014	-
Northern Kingfish	*Menticirrhus saxatilis*	NK02	14	UD	NA	NR	10/8/2014	10/8/2014	-
Northern Kingfish	*Menticirrhus saxatilis*	NK03	5.8	0.01	0.17%	TI	10/8/2014	10/8/2014	-

Table 7-17
Summary of Fish Pathology Assessment Findings

Species	Scientific Name	Animal ID#	Body Weight (g)	Gonad Weight (g)	GSI	Sex	Capture Date	Necropsy Date	Gross Finding
Northern Kingfish	*Menticirrhus saxatilis*	NK04	57.5	0.11	0.19%	M	10/9/2014	10/9/2014	-
Northern Kingfish	*Menticirrhus saxatilis*	NK05	39.6	0.1	0.25%	M	10/9/2014	10/9/2014	-
Oyster Toadfish	*Opsanus tau*	OT01	181.2	UD	NA	NR	10/7/2014	10/7/2014	-
Oyster Toadfish	*Opsanus tau*	OT02	166.6	1.06	0.64%	M	10/7/2014	10/7/2014	-
Oyster Toadfish	*Opsanus tau*	OT03	148	7.94	5.36%	F	10/7/2014	10/7/2014	-
Oyster Toadfish	*Opsanus tau*	OT04	77.7	6.76	8.70%	F	10/7/2014	10/7/2014	-
Oyster Toadfish	*Opsanus tau*	OT05	185.7	14.89	8.02%	F	10/7/2014	10/7/2014	-
Scup	*Stenotomus chrysops*	SC01	7.6	0.01	0.13%	TI	10/6/2014	10/6/2014	-
Scup	*Stenotomus chrysops*	SC02	10.9	0.01	0.09%	TI	10/9/2014	10/9/2014	-
Scup	*Stenotomus chrysops*	SC03	12.5	0.01	0.08%	TI	10/9/2014	10/9/2014	-
Scup	*Stenotomus chrysops*	SC04	13.6	UD	NA	NR	10/9/2014	10/9/2014	-
Scup	*Stenotomus chrysops*	SC05	10.6	UD	NA	NR	10/9/2014	10/9/2014	-
Scup	*Stenotomus chrysops*	SC06	15.3	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC07	17	0.01	0.06%	TI	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC08	17.7	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC09	17.5	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC10	21.3	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC11	19	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC12	15.3	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC13	17.2	0.01	0.06%	TI	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC14	16	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC15	13.2	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC16	12.5	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC17	17.7	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC18	14.6	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC19	14.4	UD	NA	NR	10/9/2014	10/10/2014	-
Scup	*Stenotomus chrysops*	SC20	17.1	UD	NA	NR	10/9/2014	10/10/2014	-
Silver Perch	*Bairdiella chrysoura*	SP01	10.3	0.02	0.19%	TI	10/7/2014	10/7/2014	-
Silver Perch	*Bairdiella chrysoura*	SP02	9.9	0.04	0.40%	TI	10/7/2014	10/7/2014	-
Silver Perch	*Bairdiella chrysoura*	SP03	9.1	0.02	0.22%	TI	10/7/2014	10/7/2014	-
Silverside	*Menidia menidia*	NBO3WASN014-01	6.1	0.04	0.66%	M	10/9/2014	10/9/2014	-
Silverside	*Menidia menidia*	NBO3WASN014-02	6.9	0.03	0.43%	M	10/9/2014	10/9/2014	-
Silverside	*Menidia menidia*	NBO3WASN014-03	4.7	UD	NA	NR	10/9/2014	10/9/2014	-
Silverside	*Menidia menidia*	NBO3WASN014-04	5.4	UD	NA	NR	10/9/2014	10/9/2014	-
Silverside	*Menidia menidia*	NBO3WASN014-05	3.4	UD	NA	NR	10/9/2014	10/9/2014	-
Smallmouth Flounder	*Etropus microstomus*	SM01	1.4	UD	NA	NR	10/8/2014	10/8/2014	-
Smallmouth Flounder	*Etropus microstomus*	SM02	1.1	UD	NA	NR	10/8/2014	10/8/2014	-
Smallmouth Flounder	*Etropus microstomus*	SM03	1.9	UD	NA	NR	10/8/2014	10/8/2014	-
Striped Bass	*Morone saxatilis*	SB01	208	0.66	0.32%	M	10/7/2014	10/7/2014	-
Striped Bass	*Morone saxatilis*	SB02	189	0.87	0.46%	F	10/8/2014	10/8/2014	-
Striped Bass	*Morone saxatilis*	SB03	218	0.12	0.06%	M	10/8/2014	10/8/2014	-
Striped Bass	*Morone saxatilis*	SB04	318	0.85	0.27%	M	10/9/2014	10/10/2014	-
Striped Bass	*Morone saxatilis*	SB05	40	UD	NA	NR	10/10/2014	10/10/2014	-
Striped Killifish	*Fundulus majalis*	NBO3WSK130-01	7.7	0.08	1.04%	M	10/10/2014	10/10/2014	-
Striped Killifish	*Fundulus majalis*	NBO3WSK130-02	6.9	0.09	1.30%	F	10/10/2014	10/10/2014	-

Table 7-17
Summary of Fish Pathology Assessment Findings

Species	Scientific Name	Animal ID#	Body Weight (g)	Gonad Weight (g)	GSI	Sex	Capture Date	Necropsy Date	Gross Finding
Striped Killifish	*Fundulus majalis*	NBO3WSK130-03	5.9	0.06	1.02%	F	10/10/2014	10/10/2014	-
Striped Killifish	*Fundulus majalis*	NBO3WSK130-04	6.7	0.08	1.19%	F	10/10/2014	10/10/2014	-
Striped Killifish	*Fundulus majalis*	NBO3WSK130-05	7.3	0.08	1.10%	F	10/10/2014	10/10/2014	-
Striped Sea Robin	*Prionotus evolans*	SR01	17.4	UD	NA	NR	10/7/2014	10/7/2014	-
Striped Sea Robin	*Prionotus evolans*	SR02	15.6	UD	NA	NR	10/7/2014	10/7/2014	-
Striped Sea Robin	*Prionotus evolans*	SR03	28.2	0.03	0.10%	TI	10/8/2014	10/8/2014	-
Striped Sea Robin	*Prionotus evolans*	SR04	34.3	0.05	0.15%	TI	10/8/2014	10/8/2014	-
Striped Sea Robin	*Prionotus evolans*	SR05	22.4	0.02	0.09%	TI	10/8/2014	10/8/2014	-
Summer Flounder	*Paralichthys dentatus*	NBO3WSFC004	94.1	0.07	0.07%	TI	10/9/2014	10/9/2014	-
Summer Flounder	*Paralichthys dentatus*	NBO3WSFC005	50.7	0.02	0.04%	TI	10/9/2014	10/9/2014	-
Summer Flounder	*Paralichthys dentatus*	NBO3WSFC003	145.8	0.16	0.11%	TI	10/9/2014	10/9/2014	-
Summer Flounder	*Paralichthys dentatus*	NBO3WSFN018	50.3	0.02	0.04%	TI	10/9/2014	10/9/2014	-
Summer Flounder	*Paralichthys dentatus*	NBO3WSFS001	60.7	0.07	0.12%	TI	10/9/2014	10/9/2014	-
Summer Flounder	*Paralichthys dentatus*	NBO3WSFS002	370	1.13	0.31%	F	10/9/2014	10/9/2014	-
Summer Flounder	*Paralichthys dentatus*	SF01	33.1	0.01	0.03%	TI	10/6/2014	10/6/2014	-
Summer Flounder	*Paralichthys dentatus*	SF02	82.3	0.01	0.01%	TI	10/6/2014	10/6/2014	-
Summer Flounder	*Paralichthys dentatus*	SF03	37.9	0.01	0.03%	TI	10/6/2014	10/6/2014	-
Weakfish	*Cynoscion regalis*	WE01	17.6	0.03	0.17%	TI	10/6/2014	10/6/2014	-
Weakfish	*Cynoscion regalis*	WE02	21.8	0.05	0.23%	TI	10/6/2014	10/6/2014	-
Weakfish	*Cynoscion regalis*	WE03	46.7	0.02	0.04%	TI	10/6/2014	10/6/2014	Heart: 1mm pale nodule
Weakfish	*Cynoscion regalis*	WE04	22.7	0.03	0.13%	TI	10/6/2014	10/6/2014	Tail Fin: erosion
Weakfish	*Cynoscion regalis*	WE05	21.3	0.05	0.23%	TI	10/6/2014	10/6/2014	Skin of caudal peduncle: erosion
White Mullet	*Mugil curema*	WM01	29.6	UD	NA	NR	10/10/2014	10/10/2014	-
White Mullet	*Mugil curema*	WM02	26	UD	NA	NR	10/10/2014	10/10/2014	Ventral skin: anchor worm
White Mullet	*Mugil curema*	WM03	46.8	0.04	0.09%	TI	10/10/2014	10/10/2014	-
White Mullet	*Mugil curema*	WM04	23.9	0.05	0.21%	TI	10/10/2014	10/10/2014	Tail Fin: erosion
White Mullet	*Mugil curema*	WM05	14.7	UD	NA	NR	10/10/2014	10/10/2014	-
Windowpane Flounder	*Scophthalmus aquosus*	NBO3WWWN020	37	0.14	0.38%	F	10/9/2014	10/9/2014	-
Windowpane Flounder	*Scophthalmus aquosus*	NBO3WWWN021	28.3	UD	NA	NR	10/9/2014	10/9/2014	-
Windowpane Flounder	*Scophthalmus aquosus*	NBO3WWWN022	22.1	0.03	0.14%	M	10/9/2014	10/9/2014	-
Windowpane Flounder	*Scophthalmus aquosus*	NBO3WWWN023	6.5	UD	NA	NR	10/9/2014	10/9/2014	-
Windowpane Flounder	*Scophthalmus aquosus*	WW01	32.7	UD	NA	NR	10/6/2014	10/6/2014	-
Atlantic Tomcod	*Microgadus tomcod*	AT01	6	0.05	0.83%	TI	7/27/2015	7/27/2015	-
Atlantic Tomcod	*Microgadus tomcod*	AT02	9	UD	NA	NR	7/27/2015	7/27/2015	-
Atlantic Tomcod	*Microgadus tomcod*	AT03	8	0.04	0.50%	TI	7/27/2015	7/27/2015	-
Atlantic Tomcod	*Microgadus tomcod*	AT04	8	0.04	0.50%	TI	7/27/2015	7/27/2015	-
Atlantic Tomcod	*Microgadus tomcod*	AT05	5	UD	NA	NR	7/27/2015	7/27/2015	Dermal ulcer left trunk
Northern Pufferfish	*Sphoeroides maculatus*	PU01	146	1.82	1.25%	F	7/27/2015	7/27/2015	-
Spotted Hake	*Urophycis regia*	HA03	32	0.10	0.31%	TI	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF10	218	0.57	0.26%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF11	168	0.34	0.20%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF12	155	0.38	0.25%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF13	264	0.21	0.08%	M	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF14	134	0.30	0.22%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF15	208	0.41	0.20%	F	7/27/2015	7/27/2015	-

Table 7-17
Summary of Fish Pathology Assessment Findings

Species	Scientific Name	Animal ID#	Body Weight (g)	Gonad Weight (g)	GSI	Sex	Capture Date	Necropsy Date	Gross Finding
Summer Flounder	*Paralichthys dentatus*	SF16	263	0.84	0.32%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF17	308	0.97	0.31%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF18	273	1.15	0.42%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF19	168	0.55	0.33%	F	7/27/2015	7/27/2015	-
Summer Flounder	*Paralichthys dentatus*	SF20	192	0.55	0.29%	F	7/27/2015	7/27/2015	-
Winter Flounder	*Pseudopleuronectes americanus*	WF01	52	UD	NA	NR	7/27/2015	7/27/2015	-
Winter Flounder	*Pseudopleuronectes americanus*	WF02	39	UD	NA	NR	7/27/2015	7/27/2015	-
Winter Flounder	*Pseudopleuronectes americanus*	WF03	29	UD	NA	NR	7/27/2015	7/27/2015	-
Winter Flounder	*Pseudopleuronectes americanus*	WF04	41	UD	NA	NR	7/27/2015	7/27/2015	-
Winter Flounder	*Pseudopleuronectes americanus*	WF05	51	UD	NA	NR	7/27/2015	7/27/2015	-

Acronyms and Abbreviations:
- = no findings
% = percent
g = grams
GSI = gonadosomatic index
M = male
F = female
UD = undetermined
NA = not applicable
NR = gonad tissue not recovered
TI = gonad tissue too immature for gender determination

Table 7-24
Weight of Evidence Risk Summary for Fish

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Principal HQs→	Primary Evaluation: NBSA: Maximum LOAEL HQ[b]	Primary Evaluation: LPR FFS: Maximum LOAEL HQ[b]	Sensitivity Analyses[c]: NBSA: Maximum LOAEL HQ[b]	Sensitivity Analyses[c]: LPR FFS: Maximum LOAEL HQ[b]	Site-Specific Toxicity Measures	Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Assessment Endpoint: Survival, growth, and/or reproduction of fish													
Mummichog/Killifish	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	WB, Egg	WB	**2 [NBSA-wide, N][d]**	**24 [NBSA-wide, N, SE, SW]**	**2 [NBSA-wide, N][d]**	**24 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations; Newark Bay mummichog exhibited signs of endocrine disruption (Bugel et al 2010)	--	Tissue HQs	• LPR FFS WB tissue HQs > 10 • Alternate NBSA WB tissue HQs > 1 • NBSA WB tissue HQs < 1 • Egg HQs < 1 • Site-specific toxicity data indicate no unacceptable risk	Possible	Yes
Mummichog/Killifish	Total PCB TEQ Fish	WB, Egg	WB	HQ < 1	**3 [NBSA-wide, SW]**	HQ < 1	**3 [NBSA-wide, SW]**	Fish pathology does not indicate unhealthy fish populations; Newark Bay mummichog exhibited signs of endocrine disruption (Bugel et al 2010)	--	Tissue HQs	• Tissue LOAEL HQs < 1 for most scenarios • Egg HQs < 1 • Low magnitude of the HQs ≥ 1 • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
Mummichog/Killifish	Total PCBs	WB, Egg	WB	HQ < 1	**6 [NBSA-wide, N, SE, SW]**	HQ < 1	**6 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations; Newark Bay mummichog exhibited signs of endocrine disruption (Bugel et al 2010)	--	Tissue HQs	• LOAEL HQs < 1 for NBSA and alternate NBSA TRVs • Egg HQs < 1 • Low magnitude of the HQs ≥ 1, except possibly for SW zone • Site-specific toxicity data indicate no unacceptable risk	Possible (SW zone); Unlikely (NBSA-wide, SE, SW)	Yes
Mummichog/Killifish	Total DDx (2,4 & 4,4)	WB	WB	HQ < 1	**1 [SW]**	HQ < 1	**1 [SW]**	Fish pathology does not indicate unhealthy fish populations; Newark Bay mummichog exhibited signs of endocrine disruption (Bugel et al 2010)	--	Tissue HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 in SW zone • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
Mummichog/Killifish	Cadmium	WB, Dietary	WB	ND in tissue	ND in tissue	NA	NA	Fish pathology does not indicate unhealthy fish populations	Tissue cadmium not detected	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
Mummichog/Killifish	Copper	WB, Dietary	Dietary	HQ < 1	NC	NA	NA	Fish pathology does not indicate unhealthy fish populations	Tissue copper ≤ background	Background	• Tissue copper < background • Dietary HQs < 1 • Low magnitude of tissue HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
Mummichog/Killifish	Mercury	WB, Dietary, Egg	WB	HQ < 1	HQ < 1	NA	NA	Fish pathology does not indicate unhealthy fish populations	--	WB	• WB Tissue HQs < 1 • Dietary HQs < 1 in most scenarios • Low magnitude of dietary HQs 1 ≥ 1 in SW zone • Egg LOAEL HQs < 1 • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
Mummichog/Killifish	Methylmercury	WB, Dietary, Egg	WB	HQ < 1	HQ < 1	NA	NA	Fish pathology does not indicate unhealthy fish populations	--	WB	• WB Tissue HQs < 1 • Dietary HQs < 1 • Egg LOAEL HQs = 1 using conservative CF • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
Mummichog/Killifish	Silver	WB, Dietary	WB/Dietary	**1 [N]**	NC	NA	NA	Fish pathology does not indicate unhealthy fish populations	Sediment silver < background	Background	• Tissue LOAEL HQs < 1 in most scenarios • Silver < background in sediment • Low magnitude of tissue HQs ≥ 1 in N zone • Dietary LOAEL HQs < 1 • Low confidence in both tissue and dietary TRVs • Site-specific toxicity data indicate no unacceptable risk	Unlikely	No
American Eel	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	WB	WB	HQ < 1	**9 [NBSA-wide, N, SE, SW]**	HQ < 1	**9 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• LPR FFS WB tissue HQs approaching 10 • NBSA WB tissue HQs < 1 • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
American Eel	Total PCB TEQ Fish	WB	WB	HQ < 1	**1 [N]**	HQ < 1	**1 [N]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB tissue LOAEL HQs < 1 in most scenarios • Low magnitude of the LOAEL HQ ≥ 1 in the N zone • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 7-24
Weight of Evidence Risk Summary for Fish

Receptor	Preliminary COC[a]	Lines of Evidence								Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
		HQ LOE						Site-Specific Toxicity Measures	Other				
				Primary Evaluation		Sensitivity Analyses[c]							
				NBSA	LPR FFS	NBSA	LPR FFS						
		Available HQs	Principal HQs→	Maximum LOAEL HQ[b]	Maximum LOAEL HQ[b]	Maximum LOAEL HQ[b]	Maximum LOAEL HQ[b]						
American Eel	Total PCBs	WB	WB	HQ < 1	**2 [NBSA-wide, N, SE, SW]**	HQ < 1	**2 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• NBSA WB tissue HQs < 1 • Low magnitude of the WB tissue HQs ≥ 1 based on LPR FFS TRVs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Total DDx (2,4 & 4,4)	WB	WB	HQ < 1	**1 [SW]**	HQ < 1	**1 [SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB tissue LOAEL HQs < 1 for most scenarios • Low magnitude of tissue HQs ≥ 1 in SW zone • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Cadmium	WB, Dietary	WB	ND in tissue	ND in tissue	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Tissue cadmium not detected; Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 2 [NBSA-wide, N, SE, SW] • Diet assumptions overestimate dietary exposure • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Copper	WB, Dietary	Dietary	HQ < 1	NC	HQ < 1	NC	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Dietary HQs	• Dietary HQs < 1 for all scenarios • Low magnitude of tissue HQs ≥ 1 in SW zone • Site-specific toxicity data indicate no unacceptable risk • Diet assumptions overestimate dietary exposure • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Mercury	WB, Dietary	WB	HQ < 1	**1 [N]**	NA[e]	NA[e]	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Tissue LOAEL HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in N zone • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 2 [NBSA-wide, N, SE, SW] • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Methylmercury	WB, Dietary	WB	**1 [N]**	**1 [N, SW]**	NA[e]	NA[e]	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Tissue LOAEL HQs < 1 in NBSA-wide area • Dietary LOAEL HQs do not exceed 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 1 [NBSA-wide, N, SE, SW] • Low magnitude of tissue HQs ≥ 1 in N and SW zone • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Selenium	WB, Dietary	WB	**1 [SE]**	NC	NA[e]	NA[e]	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Selenium < background in sediment • Tissue LOAEL HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in SE zone • Dietary HQs < 1 • Dietary sensitivity analysis: all HQs <1 • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikley	No
Summer/Winter Flounder	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	WB	WB	HQ < 1	**8 [NBSA-wide, N, SE, SW]**	HQ < 1	**8 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• LPR FFS WB tissue HQs approaching 10 • NBSA WB tissue HQs < 1 • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
Summer/Winter Flounder	Total PCBs	WB	WB	HQ < 1	**1 [N]**	HQ < 1	**1 [N]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of the HQs ≥ 1 in the N zone • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 7-24
Weight of Evidence Risk Summary for Fish

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Principal HQs→	Primary Evaluation: NBSA: Maximum LOAEL HQ[b]	Primary Evaluation: LPR FFS: Maximum LOAEL HQ[b]	Sensitivity Analyses[c]: NBSA: Maximum LOAEL HQ[b]	Sensitivity Analyses[c]: LPR FFS: Maximum LOAEL HQ[b]	Site-Specific Toxicity Measures	Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Summer/Winter Flounder	Cadmium	WB, Dietary	WB	ND in tissue	ND in tissue	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Tissue cadmium not detected; 'Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: Maximum LOAEL HQ = 2 [NBSA-wide, N, SE, SW] • Dietary HQs in SW zone calculated using clam MDC • Diet assumptions overestimate dietary exposure • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Copper	WB, Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	NC	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Dietary HQs	• Dietary HQs < 1 • WB tissue HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in N zone • Site-specific toxicity data indicate no unacceptable risk • Diet assumptions overestimate dietary exposure • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Mercury	WB, Dietary	WB	HQ < 1	HQ < 1	NA[e]	NA[e]	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 2 [NBSA-wide, N, SE, SW] • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Methylmercury	WB, Dietary	WB	HQ < 1	HQ < 1	NA[e]	NA[e]	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 1 [N, SE] • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	WB, liver	WB	**7 [NBSA-wide, N, SE, SW][d]**	**90 [NBSA-wide, N, SE, SW]**	**7 [NBSA-wide, N, SE, SW][d]**	**90 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB tissue LOAEL HQs ≥ 1 for most scenarios • WB tissue LPR FFS LOAEL HQs > 10 for all scenarios • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
White Perch	Total PCB TEQ	WB, liver	WB	HQ < 1	**1 [N]**	HQ < 1	**1 [N]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB tissue LOAEL HQs < 1 in most scenarios • Low magnitude of the WB tissue HQs ≥ 1 in the N zone • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Total PCBs	WB, liver	WB	HQ < 1	**4 [NBSA-wide, N, SE, SW]**	HQ < 1	**4 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• NBSA WB tissue LOAEL HQs < 1 • Low magnitude of the tissue LOAEL HQ ≥ 1 using LPR FFS TRVs • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Total DDx (2,4 & 4,4)	WB	WB	**2 [NBSA, SW]**	**2 [NBSA-wide, N, SE, SW]**	**2 [NBSA, SW}**	**2 [NBSA-wide, N, SE, SW]**	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB tissue LOAEL HQs > 1 in most cases • Low magnitude of the tissue LOAEL HQ ≥ 1 • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
White Perch	Arsenic	WB, liver, dietary	WB	HQ < 1	NC	NA[e]	NA	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB Tissue and dietary HQs < 1 • Dietary sensitivity analysis: all LOAEL HQs < 1 • Low magnitude of the liver HQs ≥ 1 • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 7-24
Weight of Evidence Risk Summary for Fish

Receptor	Preliminary COC[a]	Lines of Evidence								Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
		HQ LOE						Site-Specific Toxicity Measures	Other				
				Primary Evaluation		Sensitivity Analyses[c]							
				NBSA	LPR FFS	NBSA	LPR FFS						
		Available HQs	Principal HQs→	Maximum LOAEL HQ[b]	Maximum LOAEL HQ[b]	Maximum LOAEL HQ[b]	Maximum LOAEL HQ[b]						
White Perch	Cadmium	WB, dietary	WB	ND in tissue	ND in tissue	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 2 [NBSA-wide, N, SE, SW] • Diet assumptions overestimate dietary exposure • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Chromium	WB, liver, dietary	WB	**1 [N]**	NC	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB tissue HQs < 1 in most scenarios • Dietary LOAEL HQs < 1 • Dietary sensitivity analysis: all LOAEL HQs<1 • Tissue and dietary TRVs conservative • Low magnitude of the liver LOAEL HQs ≥ 1 • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Copper	WB, Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	HQ < 1	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Dietary HQs	• Dietary HQs < 1 • Dietary sensitivity analysis: all LOAEL HQs <1 • Low confidence in the tissue and dietary TRVs • Diet assumptions overestimate dietary exposure • WB tissue LOAEL HQs > 1 • WB concentrations assumed to be similar to background based on forage fish tissue residues • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Uncertain	Uncertain
White Perch	Mercury	WB, liver, dietary	WB	HQ < 1	HQ < 1	NA[e]	NA[e]	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• WB Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Dietary sensitivity analysis: maximum LOAEL HQ = 2 [NBSA-wide, N, SE, SW] • Liver HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Selenium	WB, liver, dietary	WB	**1 [SW]**	NC	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Sediment selenium < background; Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Background	• Selenium related to background conditions • Tissue and dietary LOAEL HQs < 1 for most scenarios • Dietary sensitivity analysis: all LOAEL HQs<1 • Low magnitude of tissue LOAEL HQs ≥ 1 • Liver HQs ≥ 1 based on unbounded NOAEL • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Silver	WB, liver, dietary	WB	**3 [NBSA-wide, N, SE, SW]**	NC	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Sediment silver < background; Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Background	• Silver related to background conditions • Dietary LOAEL HQs < 1 • Dietary sensitivity analysis: all LOAEL HQs<1 • Low magnitude of the WB tissue LOAEL HQs ≥1 • Liver HQs ≥ 1 based on unbounded NOAEL • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Zinc	WB, liver, dietary	WB	HQ < 1	NC	NA[e]	NC	Fish pathology does not indicate unhealthy fish populations	Adult fish abundance and diversity similar to or greater than other regional locations in NY/NJ Harbors	Tissue HQs	• All tissue and dietary LOAEL HQs < 1 • Dietary sensitivity analysis: all LOAEL HQs<1 • Liver HQs ≥ 1 based on unbounded NOAEL • Liver HQs superseded by WB tissue HQs • Site-specific toxicity data indicate no unacceptable risk • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 7-24
Weight of Evidence Risk Summary for Fish

Notes:
[a] Preliminary COCs are identified as COPECs/receptors with a LOAEL HQ greater than or equal to 1 for any exposure areas or evaluation scenarios.
[b] Maximum LOAEL HQs for all receptor/COPEC combinations with LOAEL HQs ≥ 1; all exposure areas with LOAEL HQs ≥ 1 are presented in brackets.
[c] All relevant sensitivity analyses for the principal HQ type presented. See Section 7.6.
[d] Maximum HQs based on alternate NBSA TRV.
[e] Sensitivity analysis for dietary HQ conducted; magnitude of LOAEL HQs are summarized in the Summary of LOE column.

Abbreviations:
"--" = not applicable
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
FFS = focused feasibility study
HQ = hazard quotient
LOAEL = lowest observed adverse effect limit
LOE = line of evidence
LPR = Lower Passaic River
MDC = maximum detected concentration
N = north
NBSA = Newark Bay Study Area
NC = not calculated
NE = line of evidence not evaluated
NJ/NY = New Jersey/New York
NOAEL = no observed adverse effect limit
PCB = polychlorinated biphenyl
SQT = sediment quality triad
SUF = site use factor
SW = southwest
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
UCL = 95 percent upper confidence limit
WB = whole-body

References:
Bugel S.M., L.A. White, and K.R. Cooper. 2010. Impaired reproductive health of killifish (*Fundulus heteroclitus*) inhabiting Newark Bay, NJ, a chronically contaminated estuary. *Aquat Tox* 96:182-193.
Iannuzzi, T.J., T.N. Armstrong, E.R. Long, J. Iannuzzi, and D.F. Ludwig. 2008. Sediment quality triad assessment of an industrialized estuary of the northeastern USA. *Environ Monit Assess* 139:257-275.
Parsons, K.C. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. Contract No. C003858. Submitted to NYSDEC February 28.
Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June.
Wintermeyer, M.L., and K.R. Cooper. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica* Gmelin) tissues and the effects on egg fertilization and development. *J Shellfish Res* 22(3):737-746.

Table 8-1
Exposure Parameters for Representative Avian Receptors

Receptor Species	Guild	Body Weight[a] (kg)	Food Ingestion FIR (kg/day, dw)	Food Ingestion Source	Incidental Sediment Ingestion SI[b] (percent)	Incidental Sediment Ingestion SIR[c] (kg/day, dw)	Incidental Sediment Ingestion Source	Diet Composition Reported	Diet Composition Source	Diet Composition Proposed NBSA BERA Diet	Site Use SUF (unitless)	Site Use Source
Spotted sandpiper	Benthivore/ sediment-probing	0.043	0.034	Nagy (2001); Charadriiformes (equation 40)	18[d]	0.0012	Beyer et al. (1994)	Benthic invertebrates	USEPA (1993)	100% worm	0.50	Spotted sandpiper is migratory and is expected in Newark Bay only during the breeding season (Reed et al. 2013).
Great blue heron	Subtidal piscivore	2.3	0.41[e]	Kushlan (1978); cited in USEPA (1993)	1.0	0.00081	No empirical data available; based on feeding habits and best professional judgment.	Invertebrates, mollusks, fish	USEPA (1993)	10% clam, 10% blue crab, 80% fish (≤ 15 cm)	1.0	Great blue heron is expected in Newark Bay year-round (Vennesland and Butler 2011)
Double-crested cormorant	Pelagic piscivore	2.3	0.53	Nagy (2001); marine birds (equation 53)	0.0	0.00	No empirical data available; based on feeding habits and best professional judgment.	Mollusks, clams, fish	Dorr et al. (2014)	100% fish (≤ 15 cm)	1.0	Double-crested cormorant is expected in Newark Bay year-round (Dorr et al. 2014)
Lesser scaup	Omnivore	0.82	0.14	Nagy (2001); omnivorous birds (equation 62)	4.7	0.0013	Beyer et al. (2008)	Aquatic plants and invertebrates, crustaceans, fish	USEPA (1993)	25% worm, 25% clam, 25% blue crab, 25% fish (≤ 15 cm)	0.50	Lesser scaup breeds in the boreal forests of northern North America and is expected in Newark Bay only during the winter or non-breeding season (Anteau et al. 2014)

Notes:
[a] Average of male and female adult body weights reported by USEPA (1993) for all species except cormorant; cormorant selected from CalEcotox (1999).
[b] Percentage of the dry diet that is incidentally ingested sediment.
[c] Converted to dry weight assuming 80% moisture in diet.
[d] Based on the average of SIRs measured for four sandpiper species (stilt sandpiper [*Calidris himantopus*] [17%], semipalmated sandpiper [*Calidris pusilla*] [30%], least sandpiper [*Calidris minutilla*] [7.3%], and western sandpiper [*Calidris mauri*] [18%]).
[e] FIR (g/day, ww) = $10^{0.966\log(BW)-0.64}$ and body weight is in grams.

Acronyms and Abbreviations:
BERA = baseline ecological risk assessment
BW = body weight
FIR = food ingestion rate
g/day, ww = grams wet weight per day
kg = kilograms
kg/day, dw = kilograms dry weight per day
NBSA = Newark Bay Study Area
SI = sediment ingestion
SIR = sediment ingestion rate
SUF = site use factor
USEPA = U.S. Environmental Protection Agency
% = percent

References:
Anteau, M.J., J-M. DeVink, D.N. Koons, J.E. Austin, C.M. Custer, and A.D. Afton. 2014. Lesser Scaup (*Aythya affinis*). In: Rodewald, P.G. Ed., The Birds of North America. Ithaca Cornell Lab of Ornithology. https://birdsna.org/Species-Account/bna/species/lessca DOI: 10.2173/bna.338.
Beyer, W. N., M.C. Perry, and P.C. Osenton. 2008. Sediment ingestion rates in waterfowl (Anatidae) and their use in environmental risk assessment. *Integ Environ Assess Manag* 4(2):246-251.
Beyer, W.N., E. Conner, and S. Gerould. 1994. Estimates of soil ingestion by wildlife. *J Wildl Manag* 58:375-382.
CalEcotox. 1999. Species Exposure Factor Report: Double-crested Cormorant (*Phalacrocorax auritus*). http://oehha.ca.gov/media/downloads/ecotoxicology/report/phalaef.pdf.
Dorr, B.S., J.J. Hatch, and D.V. Weseloh. 2014. Double-crested Cormorant (*Phalacrocorax auritus*). In: Rodewald, P.G., Ed., The Birds of North America. Ithaca Cornell Lab of Ornithology. https://birdsna.org/Species-Account/bna/species/doccor. DOI: 10.2173/bna.441.
Kushlan, J.A. 1978. Feeding Ecology of Wading Birds. In: Sprunt A., J. Oge, and S. Winckler Eds., Wading Birds, Research Report No. 7. National Audubon Society, New York, NY, pp. 249-297.
Nagy, K.A. 2001. Food Requirements of Wild Animals: Predictive Equations for Free-living Mammals, Reptiles, and Birds. Nutrition Abstracts and Reviews, Series B 71, 21R-31R.
Reed, J.M, L.W. Oring, and E.M. Gray. 2013. Spotted Sandpiper (*Actitis macularius*). In: Rodewald, P.G., Ed. The Birds of North America. Ithaca Cornell Lab of Ornithology. https://birdsna.org/Species-Account/bna/species/sposan DOI: 10.2173/bna.289.
USEPA. 1993. Wildlife Exposure Factors Handbook. EPA/600/R-93/187a. Office of Research and Development, US Environmental Protection Agency, Washington, DC.
Vennesland, R.G. and R.W. Butler. 2011. Great Blue Heron (*Ardea herodias*). In: Rodewald, P.G., Ed., The Birds of North America. Ithaca Cornell Lab of Ornithology. https://birdsna.org/Species-Account/bna/species/grbher3 DOI: 10.2173/bna.25.

Table 8-2
TRVs for Bird Dietary Assessment

Constituent	Units	Bird - Dietary TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg bw/day	0.000014	1.4E-04	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Total TEQ Bird	mg/kg bw/day	0.000014	0.00014	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Polychlorinated Biphenyls								
Total PCBs	mg/kg bw/day	0.14[a]	1.4	Ringed turtle-dove; reproduction (Peakall et al. 1972; Peakall and Peakall 1973)		0.4	0.5	Chicken; reproduction (Chapman 2003)
Total PCB TEQ Bird	mg/kg bw/day	0.000014	0.00014	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Total PCB Dioxin TEQ Bird	mg/kg bw/day	0.000014	0.00014	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg bw/day	0.025[a]	0.25	10 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.009	0.027	Brown pelican; reproduction (Anderson et al. 1975)
Dieldrin	mg/kg bw/day	0.08	0.12	Quail; reproduction and mortality (DeWitt 1956)	X	0.054	0.18	Helmeted guinea fowl; survival (Wiese et al. 1969)
Total Chlordane	mg/kg bw/day	2[a]	20	Bobwhite: mortality (Hill et al. 1976; Heath et al. 1972)	X	--	--	--
Hexachlorobenzene	mg/kg bw/day	1.1	5	Japanese quail; mortality (Vos et al. 1971)	X	--	--	--
Polycyclic Aromatic Hydrocarbons								
Total HMW PAH	mg/kg bw/day	--	--	--		0.048	0.48	Pigeon; reproduction (Hough el al. 1993)
Total LMW PAH	mg/kg bw/day	--	--	--		0.67	6.7	Red-winged blackbird; survival (Schafer et al. 1983)
Total PAH	mg/kg bw/day	40	Not derived	Mallard; growth (Patton and Dieter 1980)		--	--	--
Inorganics								
Arsenic	mg/kg bw/day	10	40	Mallard; reproduction (Stanley et al. 1994)	X	--	--	--
Cadmium	mg/kg bw/day	0.4[a]	4	Japanese quail; growth (Richardson et al. 1974)		--	--	--
Chromium	mg/kg bw/day	10.5[a]	105	Chicken; survival and growth (Chung et al. 1985)		--	--	--
Copper	mg/kg bw/day	1.9[a]	19	Chicken; growth (Jensen and Maurice 1978)		2.3	4.7	Wild turkey; growth (Kashani et al. 1986)
Lead	mg/kg bw/day	5.5	28	Japanese quail; growth (Morgan et al. 1975)		0.19	1.9	Japanese quail; reproduction (Edens and Garlich 1983)
Mercury/Methylmercury	mg/kg bw/day	0.0096[a]	0.096	6 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward 2019)		0.013	0.026	Mallard; reproduction (Heinz 1974, 1976, 1979)
Nickel	mg/kg bw/day	15	33	Chicken; growth (Weber and Reid 1968)		--	--	--
Selenium	mg/kg bw/day	0.42	0.82	Mallard; reproduction (Heinz et al. 1989)		--	--	--
Silver	mg/kg bw/day	9.86[a]	98.6	Mallard; mortality (Van Vleet 1977 as cited in USEPA 2006)	X	--	--	--
Zinc	mg/kg bw/day	82	124	Chicken; growth (Roberson and Schaible 1960)		--	--	--

Table 8-2
TRVs for Bird Dietary Assessment

Notes:
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:

BERA = baseline ecological risk assessment
COPEC = constituent of potential ecological concern
FFS = focused feasibility study
HMW = high molecular weight
LMW = low molecular weight
LPR = Lower Passaic River
LPRSA = Lower Passaic River Study Area
LOAEL = lowest observed adverse effects level
mg/kg bw/day = milligrams per kilogram of body weight per day
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency
-- = not available

References

Anderson, D.W., R.W. Risebrough, L.A. Woods Jr., L.R. DeWeese, and W.G. Edgecomb. 1975. Brown pelicans: improved reproduction off the southern California coast. *Science* 190:806-808.
Chapman, J. 2003. Memorandum Dated March 6, 2003: Toxicity Reference Values (TRVs) for Mammals and Birds Based on Selected Aroclors. Ecologist, US Environmental Protection Agency Region 5, Chicago, IL.
Chung, K.H., Y.O. Sukgrand, and M.H. Kang. 1985. The toxicity of chromium and its interaction with manganese and molybdenum in chicks. *Kor J Anim Sci* 27(6):391-395.
Davison, K.L. and J.L. Sell. 1974. DDT thins shells of eggs from mallard ducks maintained on ad libitum or controlled-feeding regimens. *Arch Environ Contam Toxicol* 2(3):222-232.
Edens, F.W. and J.D. Garlich. 1983. Lead-induced egg production decrease in leghorn and Japanese quail hens. *Poult Sci* 62:1757-1763.
Heath, R., G., J.W. Spann, E.F. Hill, and J.F. Kreitzer. 1972. Comparative Dietary Toxicity of Pesticides to Birds. Special Scientific Report. Wildl. No.152. 57p.
Heinz, G.H. 1974. Effects of low dietary levels of methyl mercury on mallard reproduction. *Bull Environ Contam Toxicol* 11(4):386-392.
Heinz, G.H. 1976. Methylmercury: second-generation reproductive and behavioral effects on mallard ducks. *J Wildl Manag* 40(4):710-715
Heinz, G.H. 1979. Methylmercury: reproductive and behavioral effects on three generations of mallard ducks. *J Wildl Manag* 43(2):394-401.
Heinz, G.H., D.J. Hoffman, and L.G. Gold. 1989. Impaired reproduction of mallards fed an organic form of selenium. *J Wildl Manag* 53(2):418-428.
Hill, E.F., R.G. Heath, and J.D. Williams. 1976. Effect of dieldrin and Aroclor 1242 on Japanese quail eggshell thickness. *Bull Environ Contam Toxicol* 16(4): 445-453.
Hough, J.L., M.B. Baird, G.T. Sfeir, C.S. Pacini, D. Darrow, and C. Wheelock. 1993. Benzo(a)pyrene enhances atherosclerosis in white carneau and show racer pigeons. *Arterioscler Thromb* 13:1721-1727.
Jensen, L.S. and D.V. Maurice. 1978. Effect of methionine on copper-induced growth depression and gizzard erosion. *Poult Sci* 57:1530-1532.
Kashani, A.B., H. Samie, R.J. Emerick, and C.W. Carlson. 1986. Effect of copper with three levels of sulfur containing amino acids in diets for turkeys. *Poult Sci* 65:1754-1759.
Nosek, J.A., J.R. Sullivan, T.E. Amundson, S.R. Craven, L.M. Miller, A.G. Fitzpatrick, M.E. Cook, and R.E. Peterson, 1992b. Embryotoxicity of 2,3,7,8 tetrachlorodibenzo-p-dioxin in ring-necked pheasants. *Environ Contam Toxicol* 12:1215-1222.
Nosek, J.A., S.R. Craven, J.R. Sullivan, S.S. Hurley, and R.E. Peterson. 1992a. Toxicity and reproductive effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin in ring-necked pheasant hens. *J Toxicol Environ Health* 35:187-198.
Patton, J.F. and M.P. Dieter. 1980. Effects of petroleum hydrocarbons on hepatic function in the duck. *Comp Biochem Physiol* 65C:33-36.
Peakall, D.B. and M.L. Peakall. 1973. Effect of a polychlorinated biphenyl on the reproduction of artificially and naturally incubated dove eggs. *J Appl Ecol* 10:863-868.
Peakall, D.B., J.L. Lincer, and S.E. Bloom. 1972. Embryonic mortality and chromosomal alterations caused by Aroclor 1254 in ring doves. *Environ Health Perspect* 1:103-104
Richardson, M.E., M.R.S. Fox, and B.E. Bry, Jr. 1974. Pathological changes produced in Japanese quail by ingestion of cadmium. *J Nutr* 104:323-338.
Roberson RH, Schaible PJ. 1960. The tolerance of growing chicks for high levels of different forms of zinc. *Poult Sci* 39:893-895.
Schafer, E.W., Jr, W.A. Bowles, Jr, and J. Hurlbut. 1983. The acute oral toxicity, repellency, and hazard potential of 998 chemicals to one or more species of wild and domestic birds. *Arch Environ Contam Toxicol* 12:355-382.
USEPA. 2006. Ecological Soil Screening Levels for Silver. Interim Final. OSWER Directive 9285.7-77. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington. Available from: https://rais.ornl.gov/documen
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual
Van Vleet, John F. 1977. Protection by various nutritional supplements against lesions of selenium-vitamin E deficiency induced in ducklings fed tellurium or silver. *Am J Vet Res* 38(9): 1393-8.
Vos, J.G., H.L. Van der Maas, A. Musch, and E. Pam. 1971. Toxicity of hexachlorobenzene in Japanese quail with spcial reference to porphyria, liver damage, reproduction, and tissue residues. *Toxicol App Pharmacol* 18: 944-957.
Weber, C.W. and B.L. Reid. 1968. Nickel toxicity in growing chicks. *J Anim Sci* 95:612-616.
Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June
Wiese, I.H., N.C.J. Basson, J.H. Van Der Vyver, and J.H. Van Der Merwe. 1969. Toxicology and Dynamics of Dieldrin in the Crowned Guinea-fowl, *Numida meleagris* (L). *Phytophylactica* 1(3-4):161-175.

Table 8-3a
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Spotted Sandpiper Benthivore/Sediment-probing				Great Blue Heron Subtidal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.3	0.03	**2**	0.2	0.3	0.03	**1**	0.1
Total Dioxin/Furan TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.4	0.04	**2**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.4	0.3
Total PCB TEQ Bird	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.8	0.08	**4**	0.4	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.09	0.009	0.2	0.08	**1**	0.1	**4**	**1**
Dieldrin	unitless	0.01	0.008	0.02	0.005	0.02	0.01	0.02	0.007
Total Chlordane	unitless	0.0005	0.00005	NC	NC	0.004	0.0004	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00004	NC	NC	0.0002	0.00004	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	**2**	0.2	NC	NC	0.2	0.02
Total LMW PAH	unitless	NC	NC	0.03	0.003	NC	NC	0.01	0.001
Total PAH	unitless	0.002	NC	NC	NC	0.0004	NC	NC	NC
Inorganics									
Arsenic	unitless	0.1	0.03	NC	NC	0.03	0.008	NC	NC
Cadmium	unitless	0.1	0.01	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.7	0.07	0.6	0.3	0.7	0.07	0.6	0.3
Lead	unitless	0.4	0.08	**12**	**1**	0.1	0.02	**3**	0.3
Mercury	unitless	**2**	0.2	**1**	0.7	**2**	0.2	**1**	0.6
Methylmercury	unitless	0.2	0.02	0.1	0.06	**2**	0.2	**1**	0.6
Nickel	unitless	0.02	0.01	NC	NC	0.007	0.003	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.002	0.0002	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.2	0.2	NC	NC	0.09	0.06	NC	NC

Table 8-3a
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Double-crested Cormorant				Lesser Scaup			
		Pelagic Piscivore				Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.4	0.04	**2**	0.2	0.1	0.01	0.5	0.05
Total Dioxin/Furan TEQ Bird	unitless	0.5	0.05	**3**	0.3	0.1	0.01	0.7	0.07
Polychlorinated Biphenyls									
Total PCBs	unitless	**2**	0.2	0.6	0.5	0.3	0.03	0.09	0.07
Total PCB TEQ Bird	unitless	**2**	0.2	**8**	0.8	0.3	0.03	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**6**	**2**	0.3	0.03	0.9	0.3
Dieldrin	unitless	0.02	0.02	0.04	0.01	0.005	0.003	0.007	0.002
Total Chlordane	unitless	0.006	0.0006	NC	NC	0.001	0.0001	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00005	NC	NC	0.00006	0.00001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.1	0.01	NC	NC	0.2	0.02
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.006	0.0006
Total PAH	unitless	0.0003	NC	NC	NC	0.0003	NC	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.006	NC	NC	0.03	0.007	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.04	0.004	NC	NC
Chromium	unitless	0.009	0.0009	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.4	0.04	0.4	0.2	0.6	0.06	0.5	0.2
Lead	unitless	0.02	0.005	0.7	0.07	0.1	0.02	**4**	0.4
Mercury	unitless	**2**	0.2	**1**	0.6	0.9	0.09	0.7	0.3
Methylmercury	unitless	**2**	0.2	**2**	0.8	0.6	0.06	0.4	0.2
Nickel	unitless	0.005	0.002	NC	NC	0.006	0.003	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC
Silver	unitless	0.002	0.0002	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.1	0.08	NC	NC	0.04	0.03	NC	NC

Table 8-3a
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LMW = low molecular weight
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 8-3b
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Constituent	Units	North Zone Mudflats Benthivore/Sediment-probing Spotted Sandpiper				North Zone Mudflats Subtidal Piscivore Great Blue Heron			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.3	0.03	**2**	0.2	0.5	0.05	**2**	0.2
Total Dioxin/Furan TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.5	0.4
Total PCB TEQ Bird	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.8	0.08	**4**	0.4	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.08	0.008	0.2	0.08	**2**	0.2	**4**	**1**
Dieldrin	unitless	0.01	0.007	0.02	0.005	0.02	0.01	0.03	0.008
Total Chlordane	unitless	0.0005	0.00005	NC	NC	0.005	0.0005	NC	NC
Hexachlorobenzene	unitless	0.0001	0.00003	NC	NC	0.0004	0.00008	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.8	0.08	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.02	0.002
Total PAH	unitless	0.001	NC	NC	NC	0.0005	NC	NC	NC
Inorganics									
Arsenic	unitless	0.1	0.03	NC	NC	0.03	0.008	NC	NC
Cadmium	unitless	0.1	0.01	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.6	0.06	0.5	0.2	0.8	0.08	0.7	0.3
Lead	unitless	0.1	0.02	**3**	0.3	0.09	0.02	**3**	0.3
Mercury	unitless	**2**	0.2	**1**	0.6	**2**	0.2	**1**	0.6
Methylmercury	unitless	0.2	0.02	0.1	0.06	**2**	0.2	**1**	0.7
Nickel	unitless	0.02	0.009	NC	NC	0.008	0.004	NC	NC
Selenium	unitless	0.3	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.002	0.0002	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.2	0.1	NC	NC	0.09	0.06	NC	NC

Table 8-3b
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Constituent	Units	North Zone Pelagic Piscivore Double-crested Cormorant NBSA TRV-based HQ NOAEL	LOAEL	LPR FFS TRV-based HQ NOAEL	LOAEL	North Zone Omnivore Lesser Scaup NBSA TRV-based HQ NOAEL	LOAEL	LPR FFS TRV-based HQ NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.6	0.06	**3**	0.3	0.1	0.01	0.7	0.07
Total Dioxin/Furan TEQ Bird	unitless	0.8	0.08	**4**	0.4	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs	unitless	**2**	0.2	0.7	0.6	0.3	0.03	0.1	0.08
Total PCB TEQ Bird	unitless	**2**	0.2	**9**	0.9	0.4	0.04	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**3**	0.3
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**7**	**2**	0.3	0.03	**1**	0.3
Dieldrin	unitless	0.03	0.02	0.04	0.01	0.006	0.004	0.008	0.002
Total Chlordane	unitless	0.007	0.0007	NC	NC	0.001	0.0001	NC	NC
Hexachlorobenzene	unitless	0.0005	0.0001	NC	NC	0.00009	0.00002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.1	0.01	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.03	0.003	NC	NC	0.006	0.0006
Total PAH	unitless	0.0005	NC	NC	NC	0.0004	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.007	NC	NC	0.03	0.007	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.04	0.004	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.6	0.06	0.5	0.3	0.6	0.06	0.5	0.2
Lead	unitless	0.03	0.007	**1**	0.1	0.09	0.02	**3**	0.3
Mercury	unitless	**2**	0.2	**1**	0.6	**1**	0.1	0.8	0.4
Methylmercury	unitless	**3**	0.3	**2**	0.9	0.7	0.07	0.5	0.3
Nickel	unitless	0.006	0.003	NC	NC	0.007	0.003	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC
Silver	unitless	0.003	0.0003	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.1	0.08	NC	NC	0.04	0.03	NC	NC

Table 8-3b
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 8-3c
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Constituent	Units	Southeast Zone Mudflats Benthivore/Sediment-probing Spotted Sandpiper				Southeast Zone Mudflats Subtidal Piscivore Great Blue Heron			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.3	0.03	**2**	0.2	0.3	0.03	**1**	0.1
Total Dioxin/Furan TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.4	0.04	**2**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	0.2	0.02	0.07	0.05	0.9	0.09	0.3	0.2
Total PCB TEQ Bird	unitless	0.7	0.07	**3**	0.3	**1**	0.1	**5**	0.5
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.9	0.09	**4**	0.4	**1**	0.1	**7**	0.7
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.08	0.008	0.2	0.08	**1**	0.1	**3**	**1**
Dieldrin	unitless	0.01	0.008	0.02	0.005	0.02	0.01	0.02	0.007
Total Chlordane	unitless	0.0005	0.00005	NC	NC	0.004	0.0004	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00003	NC	NC	0.0002	0.00003	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	**1**	0.1	NC	NC	0.2	0.02
Total LMW PAH	unitless	NC	NC	0.02	0.002	NC	NC	0.008	0.0008
Total PAH	unitless	0.001	NC	NC	NC	0.0003	NC	NC	NC
Inorganics									
Arsenic	unitless	0.1	0.03	NC	NC	0.03	0.007	NC	NC
Cadmium	unitless	0.1	0.01	NC	NC	0.07	0.007	NC	NC
Chromium	unitless	0.07	0.007	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.6	0.06	0.5	0.2	0.6	0.06	0.5	0.3
Lead	unitless	0.1	0.02	**3**	0.3	0.05	0.009	**1**	0.1
Mercury	unitless	**2**	0.2	**1**	0.7	**2**	0.2	**1**	0.7
Methylmercury	unitless	0.2	0.02	0.1	0.06	**2**	0.2	**1**	0.7
Nickel	unitless	0.02	0.009	NC	NC	0.007	0.003	NC	NC
Selenium	unitless	0.3	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.002	0.0002	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.2	0.1	NC	NC	0.08	0.05	NC	NC

Table 8-3c
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Constituent	Units	Southeast Zone Pelagic Piscivore Double-crested Cormorant				Southeast Zone Omnivore Lesser Scaup			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.4	0.04	**2**	0.2	0.1	0.01	0.5	0.05
Total Dioxin/Furan TEQ Bird	unitless	0.5	0.05	**2**	0.2	0.1	0.01	0.7	0.07
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	0.1	0.5	0.4	0.2	0.02	0.07	0.06
Total PCB TEQ Bird	unitless	**1**	0.1	**7**	0.7	0.3	0.03	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**10**	**1**	0.4	0.04	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**4**	**1**	0.2	0.02	0.7	0.2
Dieldrin	unitless	0.02	0.02	0.04	0.01	0.005	0.003	0.007	0.002
Total Chlordane	unitless	0.006	0.0006	NC	NC	0.0009	0.00009	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00005	NC	NC	0.00005	0.00001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.09	0.009	NC	NC	0.2	0.02
Total LMW PAH	unitless	NC	NC	0.005	0.0005	NC	NC	0.007	0.0007
Total PAH	unitless	0.0001	NC	NC	NC	0.0003	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.008	NC	NC	0.02	0.005	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.05	0.005	NC	NC
Chromium	unitless	0.007	0.0007	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.3	0.03	0.3	0.1	0.6	0.06	0.5	0.2
Lead	unitless	0.02	0.003	0.5	0.05	0.05	0.01	**1**	0.1
Mercury	unitless	**2**	0.2	**2**	0.8	0.8	0.08	0.6	0.3
Methylmercury	unitless	**3**	0.3	**2**	**1**	0.7	0.07	0.5	0.3
Nickel	unitless	0.006	0.003	NC	NC	0.006	0.003	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC
Silver	unitless	0.002	0.0002	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.1	0.06	NC	NC	0.04	0.03	NC	NC

Table 8-3c
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value

References:

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 8-3d
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Constituent	Units	Southwest Zone Mudflats Benthivore/Sediment-probing Spotted Sandpiper				Southwest Zone Mudflats Subtidal Piscivore Great Blue Heron			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.4	0.04	**2**	0.2	0.2	0.02	0.8	0.08
Total Dioxin/Furan TEQ Bird	unitless	0.5	0.05	**2**	0.2	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs	unitless	0.2	0.02	0.08	0.06	**2**	0.2	0.7	0.6
Total PCB TEQ Bird	unitless	0.7	0.07	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**9**	0.9
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.3	0.1	**2**	0.2	**6**	**2**
Dieldrin	unitless	0.01	0.008	0.02	0.005	0.01	0.007	0.02	0.005
Total Chlordane	unitless	0.0005	0.00005	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00004	NC	NC	0.00008	0.00002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	**4**	0.4	NC	NC	0.5	0.05
Total LMW PAH	unitless	NC	NC	0.07	0.007	NC	NC	0.02	0.002
Total PAH	unitless	0.006	NC	NC	NC	0.0009	NC	NC	NC
Inorganics									
Arsenic	unitless	0.1	0.04	NC	NC	0.04	0.01	NC	NC
Cadmium	unitless	0.2	0.02	NC	NC	0.07	0.007	NC	NC
Chromium	unitless	0.09	0.009	NC	NC	0.02	0.002	NC	NC
Copper	unitless	**1**	0.1	0.9	0.4	0.7	0.07	0.6	0.3
Lead	unitless	**1**	0.2	**31**	**3**	0.3	0.06	**9**	0.9
Mercury	unitless	**3**	0.3	**2**	**1**	**1**	0.1	0.9	0.4
Methylmercury	unitless	0.2	0.02	0.1	0.06	**1**	0.1	**1**	0.5
Nickel	unitless	0.04	0.02	NC	NC	0.01	0.007	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.003	0.0003	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.4	0.3	NC	NC	0.1	0.09	NC	NC

Table 8-3d
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Constituent	Units	Southwest Zone Pelagic Piscivore Double-crested Cormorant NBSA TRV-based HQ NOAEL	Southwest Zone Pelagic Piscivore Double-crested Cormorant NBSA TRV-based HQ LOAEL	Southwest Zone Pelagic Piscivore Double-crested Cormorant LPR FFS TRV-based HQ NOAEL	Southwest Zone Pelagic Piscivore Double-crested Cormorant LPR FFS TRV-based HQ LOAEL	Southwest Zone Omnivore Lesser Scaup NBSA TRV-based HQ NOAEL	Southwest Zone Omnivore Lesser Scaup NBSA TRV-based HQ LOAEL	Southwest Zone Omnivore Lesser Scaup LPR FFS TRV-based HQ NOAEL	Southwest Zone Omnivore Lesser Scaup LPR FFS TRV-based HQ LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.2	0.02	**1**	0.1	0.07	0.007	0.4	0.04
Total Dioxin/Furan TEQ Bird	unitless	0.3	0.03	**1**	0.1	0.1	0.01	0.5	0.05
Polychlorinated Biphenyls									
Total PCBs	unitless	**3**	0.3	**1**	0.9	0.4	0.04	0.1	0.1
Total PCB TEQ Bird	unitless	**3**	0.3	**13**	**1**	0.4	0.04	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird	unitless	**3**	0.3	**13**	**1**	0.5	0.05	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**3**	0.3	**10**	**3**	0.5	0.05	**1**	0.5
Dieldrin	unitless	0.02	0.01	0.02	0.007	0.003	0.002	0.005	0.001
Total Chlordane	unitless	0.003	0.0003	NC	NC	0.0006	0.00006	NC	NC
Hexachlorobenzene	unitless	0.0001	0.00002	NC	NC	0.00004	0.000009	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.4	0.04	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.03	0.003	NC	NC	0.007	0.0007
Total PAH	unitless	0.001	NC	NC	NC	0.0005	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.007	NC	NC	0.03	0.009	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.05	0.005	NC	NC
Chromium	unitless	0.008	0.0008	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.4	0.04	0.3	0.1	0.7	0.07	0.6	0.3
Lead	unitless	0.03	0.006	0.8	0.08	0.4	0.08	**11**	**1**
Mercury	unitless	**1**	0.1	0.8	0.4	0.8	0.08	0.6	0.3
Methylmercury	unitless	**2**	0.2	**1**	0.6	0.6	0.06	0.4	0.2
Nickel	unitless	0.01	0.006	NC	NC	0.01	0.004	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC
Silver	unitless	0.001	0.0001	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.1	0.1	NC	NC	0.07	0.05	NC	NC

Table 8-3d
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 8-5
TRVs for Bird Egg Tissue Assessment

Constituent	Units	Bird - Egg TRVs					
		NBSA BERA TRV			LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source	NOAEL	LOAEL	Source
Dioxins/Furans							
2,3,7,8-TCDD	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Total Dioxin/Furan TEQ Bird	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Polychlorinated Biphenyls							
Total PCBs	mg/kg, ww	1.6[a]	16	Ringed turtle dove; reproduction (Peakall et al. 1972); Peakall and Peakall 1973)	0.7	1.3	Chicken; reproduction (Chapman 2003)
Total PCB TEQ Bird	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Total Dioxin/Furan/PCB TEQ Bird	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Pesticides							
Total DDx (2,4 & 4,4)	mg/kg, ww	0.41[a]	4.1	7 species; reproduction. SSD-derived 5th percentile value. (Windward 2019)	0.5	3	Brown pelican; reproduction (Blus 1984)
Dieldrin	mg/kg, ww	0.3[a]	3	Pheasant; reproduction (Genelly and Rudd 1956)	0.2	8.1	Barn owl; reproduction (Mendenhall et al. 1983)
Inorganics							
Mercury/Methylmercury	mg/kg, ww	0.18[a]	1.8	Mallard; reproduction (Heinz 1979, Heinz and Hoffman 2003, Heinz 1974, 1976)	0.011	0.11	Carolina wren; 'Reproduction (Jackson 2011)

Table 8-5
TRVs for Bird Egg Tissue Assessment

Notes

[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

No bird egg TRVs were developed specifically for the NBSA BERA (Windward 2019). All TRVs were selected from the LPRSA BERA or the LPR FFS (USEPA 2014).

Acronyms and Abbreviations:

BERA = baseline ecological risk assessment
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency
-- = not available

References:

Blus, L.J. 1984. DDE in birds' eggs: comparison of two methods for estimating critical levels. *Wilson Bull* 96(2):268-276.

Chapman, J. 2003. Memorandum dated March 6, 2003: Toxicity Reference Values (TRVs) for Mammals and Birds Based on Selected Aroclors. Ecologist, US Environmental Protection Agency Region 5, Chicago, IL.

Genelly, R.E. and R.L. Rudd. 1956. Effects of DDT, toxaphene, and dieldrin on pheasant reproduction. *Auk* 73:529-539.

Heinz, G.H. 1974. Effects of low dietary levels of methyl mercury on mallard reproduction. *Bull Environ Contam Toxicol* 11(4):386-392.

Heinz, G.H. 1976. Methylmercury: second-year feeding effects on mallard reproduction and duckling behavior. *J Wildl Manag* 40(1):82-90.

Heinz, G.H. 1979. Methylmercury: reproductive and behavioral effects on three generations of mallard ducks. *J Wildl Manag* 43(2):394-401.

Heinz, G.H. and D.J. Hoffman. 2003. Embryotoxic thresholds of mercury: estimates from individual mallard eggs. *Arch Environ Contam Toxicol* 44:257-264

Jackson, A.K., D.C. Evers, M.A.Etterson, A.M. Condon, S.B. Folsom, J. Detweiler, J. Schmerfeld, D.A. Cristol. 2011. Mercury exposure affects the reproductive success of a free-living terrestrial songbird, the Carolina wren (*Thryothorus ludovicianus*) *Auk* 128:759–769.

Mendenhall, V.M., E.E. Klaas, and M.A.R. McLane. 1983. Breeding success of barn owls (*Tyto alba*) fed low levels of DDE and dieldrin. *Arch Environ Contam Toxicol* 12:235-240.

Peakall, D.B. and M.L. Peakall. 1973. Effect of a polychlorinated biphenyl on the reproduction of artificially and naturally incubated dove eggs. *J App Ecol* 10:863-868.

Peakall, D.B., J.L. Lincer, and S.E. Bloom. 1972. Embryonic mortality and chromosomal alterations caused by Aroclor 1254 in ring doves. *Environ Health Perspect* 1:103-104.

USEPA. 2003. Analyses of Laboratory and Field Studies of Reproductive Toxicity in Birds Exposed to Dioxin-like Compounds for Use in Ecological Risk Assessment. EPA/600/R-03/114F. National Center for Environmental Assessment, US Environmental Protection Agency, Cincinnati, OH.

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June

Table 8-6
Calculated Tissue HQs for Bird Eggs with NBSA and LPR FFS Selected TRVs (NBSA-wide)

Constituent	Units	Bird Egg Tissue - HQs (NBSA-Wide)			
		Double-crested Cormorant			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
2,3,7,8-TCDD	unitless	**4**	0.4	**2**	0.6
Total Dioxin/Furan TEQ Bird	unitless	**5**	0.5	**2**	0.9
Polychlorinated Biphenyls					
Total PCBs	unitless	**12**	**1**	**27**	**15**
Total PCB TEQ Bird	unitless	**20**	**2**	**9**	**3**
Total Dioxin/Furan/PCB TEQ Bird	unitless	**22**	**2**	**9**	**4**
Pesticides					
Total DDx (2,4 & 4,4)	unitless	**16**	**2**	**13**	**2**
Dieldrin	unitless	0.0006	0.00006	0.0009	0.00002
Inorganics					
Mercury	unitless	**3**	0.3	**46**	**5**
Methylmercury	unitless	**2**	0.2	**29**	**3**

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

Cormorant egg EPCs are derived from cormorant egg data collected at Shooter's Island in the NBSA in Parsons (2003).

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

EPC = exposure point concentration
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
UCL = upper confidence limit
ww = wet weight

References:

Parsons. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. NYDEC. 28 February 2003.

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 8-15
Weight of Evidence Risk Summary for Birds

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Principal HQs→	Primary Evaluation: NBSA: Maximum LOAEL HQ[b]	Primary Evaluation: LPR FFS: Maximum LOAEL HQ[b]	Sensitivity Analyses: NBSA: Maximum LOAEL HQ[b]	Sensitivity Analyses: LPR FFS: Maximum LOAEL HQ[b]	Site-Specific Toxicity Measures	Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Assessment Endpoint: Survival, growth, and/or reproduction of birds													
Spotted sandpiper	Lead	Dietary	Dietary	HQ < 1	**3 [NBSA-wide, SW]**	HQ < 1	**1 [NBSA-wide, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • MDC used as EPC in SW assessment zone • Diet and SUF assumptions likely overestimate risk	Unlikely	No
Spotted sandpiper	Mercury	Dietary	Dietary	HQ < 1	**1 [SW]**	HQ < 1	**1 [NBSA-wide, N, SE, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • SW zone EPCs calculated using MDC • Diet and SUF assumptions likely overestimate risk	Unlikely	No
Spotted sandpiper	Total Dioxin/Furan/PCB TEQ Bird	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [NBSA-wide, N, SE, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • MDC used as EPC in SW assessment zone • Diet and SUF assumptions likely overestimate risk	Unlikely	No
Spotted sandpiper	Total HMW PAH	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [N]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • Diet and SUF assumptions likely overestimate risk	Unlikely	No
Great blue heron	Total DDx (2,4 & 4,4)	Dietary	Dietary	HQ < 1	**2 [NBSA-wide, N, SE, SW]**	HQ < 1	**3 [NBSA-wide, N, SE, SW]**	--	--	Dietary HQs	• Low magnitude of HQs ≥ 1 • SW zone EPCs calculated using MDC • SUF assumptions likely overestimate risk	Unlikely	No
Great blue heron	Total Dioxin/Furan/PCB TEQ Bird	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [N]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
Great blue heron	Total PCB TEQ Bird	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [N]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
Great blue heron	Mercury	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [NBSA-wide, N, SE, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • MDC used as EPC in SW assessment zone • SUF assumptions likely overestimate risk	Unlikely	No
Great blue heron	Methylmercury	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [NBSA-wide, N, SE, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • MDC used as EPC in SW assessment zone • SUF assumptions likely overestimate risk	Unlikely	No
Double-crested cormorant	Total Dioxin/Furan/PCB TEQ Bird	Dietary, Egg	Egg	**2 [NBSA-wide]**	**4 [NBSA-wide]**	HQ < 1 (Dietary)[d]	**2 [NBSA-wide, N, SE, SW] (Dietary)[d]**	No reproductive impairment (Parsons 2003)	Species-specific Egg HQs < 1	Site- and Species-Specific LOE	• Low magnitude of HQs ≥ 1 • NBSA and LPR FFS TRVs are conservative • Site data and species-specific toxicity data indicate no unacceptable risk	Unlikely	No
Double-crested cormorant	Total PCB TEQ Bird	Dietary, Egg	Egg	**2 [NBSA-wide]**	**3 [NBSA-wide]**	HQ < 1 (Dietary)[d]	**1 [N, SW] (Dietary)[d]**	No reproductive impairment (Parsons 2003)	Species-specific Egg HQs < 1	Site- and Species-Specific LOE	• Low magnitude of egg HQs ≥ 1 • Dietary NBSA HQs < 1 • NBSA and LPR FFS dietary and egg TRVs are conservative • Site data and species-specific toxicity data indicate no unacceptable risk	Unlikely	No
Double-crested cormorant	Total PCBs	Dietary, Egg	Egg	**1 [NBSA-wide]**	**15 [NBSA-wide]**	HQ < 1 (Dietary)[d]	HQ < 1 (Dietary)[d]	No reproductive impairment (Parsons 2003)	--	Site-Specific LOE	• NBSA and LPR FFS TRVs are conservative • Site-specific data indicate no unacceptable risk	Unlikely	No
Double-crested cormorant	Total DDx (2,4 & 4,4)	Dietary, Egg	Egg	**2 [NBSA-wide]**	**2 [NBSA-wide]**	HQ < 1 (Dietary)[d]	**4 [NBSA-wide, N, SE, SW] (Dietary)[d]**	No reproductive impairment (Parsons 2003)	--	Site-Specific LOE	• Low magnitude of dietary and egg HQs ≥ 1 • Site-specific data indicate no unacceptable risk	Unlikely	No
Double-crested cormorant	Mercury	Dietary, Egg	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [NBSA-wide, N, SE, SW]**	No reproductive impairment (Parsons 2003)	--	Site-Specific LOE	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary and egg HQs ≥ 1 • Site-specific data indicate no unacceptable risk	Unlikely	No
Double-crested cormorant	Methylmercury	Dietary, Egg	Dietary	HQ < 1	**1 [SE]**	HQ < 1	**2 [NBSA-wide, N, SE, SW]**	No reproductive impairment (Parsons 2003)	--	Site-Specific LOE	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary and egg HQs ≥ 1 • Site-specific data indicate no unacceptable risk	Unlikely	No

Table 8-15
Weight of Evidence Risk Summary for Birds

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Principal HQs→	Primary Evaluation: NBSA: Maximum LOAEL HQ[b]	Primary Evaluation: LPR FFS: Maximum LOAEL HQ[b]	Sensitivity Analyses: NBSA: Maximum LOAEL HQ[b]	Sensitivity Analyses: LPR FFS: Maximum LOAEL HQ[b]	Site-Specific Toxicity Measures	Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Double-crested cormorant	Copper	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	**1 [SW]**	No reproductive impairment (Parsons 2003)	--	Site-Specific LOE	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary HQs ≥ 1 • Site-specific data indicate no unacceptable risk	Unlikely	No
Lesser scaup	Lead	Dietary	Dietary	HQ < 1	**1 [SW]**	HQ < 1	**1 [NBSA-wide, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • EPCs for SW zone calculated using clam MDCs	Unlikely	No

Notes:
a Preliminary COCs are identified as COPECs/receptors with a LOAEL HQ greater than or equal to 1 for egg tissue or dietary exposures using NBSA BERA or LPR FFS TRVs for any exposure areas or evaluation scenarios.
[b] Maximum LOAEL HQs for all receptor/COPEC combinations with LOAEL HQs ≥ 1; all exposure areas with LOAEL HQs ≥ 1 are presented in brackets.
[c] All relevant sensitivity analyses considered. See Section 8.3.
[d] Sensitivity analyses not conducted for egg tissue; dietary HQs for sensitivity analyses presented.

Abbreviations:
"--" = not applicable
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
FFS = focused feasibility study
HQ = hazard quotient
LOAEL = lowest observed adverse effect limit
LOE = line of evidence
LPR = Lower Passaic River
MDC = maximum detected concentration
NE = line of evidence not evaluated
NBSA = Newark Bay Study Area
PCB = polychlorinated biphenyl
SUF = site use factor
SW = southwest
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
WB = whole-body

References:
Parsons, K.C. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. NYSDEC. February 28.

Table 9-1
Exposure Parameters for Representative Mammal Receptors

Receptor Species	Guild	Body Weight[a] (kg)	Food Ingestion FIR (kg/day, ww)	Food Ingestion Source	Incidental Sediment Ingestion SI (percent)	Incidental Sediment Ingestion SIR[b] (kg/day, dw)	Incidental Sediment Ingestion Source	Diet Composition Dietary Items	Diet Composition Source	Diet Composition Proposed NBSA BERA Diet	Site Use SUF (unitless)	Site Use Source
River otter	Piscivorous	8.0	0.78	Nagy (2001), Carnivora (equation 10)	2.0	0.0031	No empirical data available; based on feeding habits and best professional judgment.	Fish, shellfish, aquatic insects, waterfowl	USEPA (1993)	5% worm, 10% clam, 5% blue crab, 80% fish (≤ 30 cm)	0.50	River otters inhabit "some" marine environments and are found in "non-polluted waterways" and areas showing "little human impact' (USEPA 1993).
Muskrat	Omnivorous/ herbivorous	1.0	0.23	Nagy (2001), Rodentia (equation 12)	2.8	0.0013	Assumed to be similar to hispid cotton rat (Garten 1980).	Aquatic vegetation, fish, mollusks	USEPA (1993)	85% sediment (surrogate for vegetation), 5% clams, 10% fish (≤ 15 cm)	1.0	Muskrat is expected in Newark Bay year-round.
Harbor seal	Piscivorous	80	1.8	Ashwell-Erickson and Elsner (1981)[c]	2.0	0.0071	No empirical data available; based on feeding habits and best professional judgment.	Fish, shellfish	USEPA (1993)	5% clams, 5% blue crab, 90% fish (≤ 30 cm)	0.50	Harbor seals are found as far south as eastern Long Island but generally winter offshore (NYDEC). In addition, harbor seals require adequate places to haul out, which are not found in Newark Bay (USEPA 1993).

Notes:
[a] Average of male and female adult body weights reported in USEPA (1993).
[b] Assuming 80% moisture in the diet.
[c] FIR (kg/day) = $0.079*BW^{0.71}$ (Ashwell-Erickson and Elsner 1981).

Acronyms and Abbreviations:
BERA = baseline ecological risk assessment
BW = body weight
cm = centimeters
FIR = food ingestion rate
kg = kilograms
kg/day, dw = kilograms per day, dry weight
kg/day, ww = kilograms per day, wet weight
NBSA = Newark Bay Study Area
NYDEC = New York Department of Environmental Conservation
SI = sediment ingestion
SIR = sediment ingestion rate
SUF = site use factor
USEPA = U.S. Environmental Protection Agency
% = percent

References:
Ashwell-Erickson, S. and R. Elsner. 1981. The Energy Cost of Free Existence for Bering Sea Harbor and Spotted seals. In: Hood, D.W. and J.A. Calder, Eds., The Eastern Bering Sea Shelf: Oceanography and Resources. V2. Washington, DC. Department of Commerce. pp. 869-89
Garten, C.T, Jr. 1980. Ingestion of soil by hispid cotton rats, white-footed mice, and eastern chipmunks. *J Mammal* 61(1):136-137.
Nagy, K.A. 2001. Food Requirements of Wild Animals: Predictive Equations for Free-living Mammals, Reptiles, and Birds. Nutrition Abstracts and Reviews, Series B 71, 21R-31R.
USEPA. 1993. Wildlife exposure factors handbook. EPA/600/R-93/187a. Office of Research and Development, US Environmental Protection Agency, Washington, DC.

Table 9-2
Bioaccumulation Factors Selected for Sediment-to-Plants

Constituent	Sediment to Plants Bioaccumulation Factor[a]	
Dioxins/Furans		
2,3,7,8-TCDD	Cp= 0.0056 * Cs	b
Total Dioxin/Furan TEQ Mammal	Cp= 0.0056 * Cs	b,c
Polychlorinated Biphenyls		
Total PCBs	Cp = 0.01 * Cs	b,d
Total PCB TEQ Mammal	Cp = 0.01 * Cs	b,e
Total Dioxin/Furan/PCB TEQ Mammal	Cp = 0.01 * Cs	b,e
Pesticides		
Total DDx (2,4 & 4,4)	ln(Cp)= 0.7524 * ln(Cs) - 2.5119	f
Dieldrin	Cp = 0.41 * Cs	
Total Chlordane	Cp = 0.011 * Cs	g
Hexachlorobenzene	Cp = 0.026 * Cs	h
Polycyclic Aromatic Hydrocarbons		
Benzo(a)pyrene	ln(Cp)= 0.9750 * ln(Cs) - 2.0615	
Total HMW PAH	ln(Cp)= 0.9469 * ln(Cs) - 1.7026	
Total LMW PAH	ln(Cp)= 0.4544 * ln(Cs) - 1.3205	
Inorganics		
Arsenic	Cp = 0.03752 * Cs	
Cadmium	ln(Cp) = 0.546 * ln(Cs) - 0.475	
Chromium	Cp = 0.041 * Cs	
Cobalt	Cp = 0.0075 * Cs	
Copper	ln(Cp) = 0.394 * ln(Cs) + 0.668	
Lead	ln(Cp) = 0.561 * ln(Cs) - 1.328	
Mercury	ln(Cp) = 0.544 * ln(Cs) - 0.996	i
Methylmercury	--	
Nickel	ln(Cp) = 0.748 * ln(Cs) - 2.223	
Selenium	ln(Cp) = 1.104 * ln(Cs) - 0.677	
Silver	Cp = 0.014 * Cs	
Vanadium	Cp = 0.00485 * Cs	
Zinc	ln(Cp) = 0.554 * ln(Cs) + 1.575	

Notes:

[a] Plant bioaccumulation factors are from USEPA (2007) unless otherwise noted.

[b] Selected from USEPA (1999)

[c] Based on TCDD

[d] Travis and Arms (1988)

[e] Based on total PCBs

[f] Total DDx based on combined DDD, DDE, DDT.

[g] log BCF = 1.588 - 0.578 x log Kow (Travis and Arms 1988), where log Kow = 6.16.

[h] log BCF = 1.588 - 0.578 x log Kow (Travis and Arms 1988), where log Kow = 5.503.

[i] Selected from Bechtel Jacobs Company (1998)

Sediment data is in dry weight while all tissue data is in wet weight. In order to convert from sediment concentration (dw) to plant tissue concentration using the BAF, we assumed 80% moisture to adjust the plant tissue to wet weight..

Table 9-2
Bioaccumulation Factors Selected for Sediment-to-Plants

Acronyms and Abbreviations:

-- = not available; assumed plant concentration equal to sediment concentration
Cp = Concentration in plant tissue (mg/kg dry weight)
Cs = Concentration in sediment (mg/kg)
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of DDE, DDD, and DDT
USEPA = U.S. Environmental Protection Agency

References:

Bechtel Jacobs Company. 1998. Empirical Models for the Uptake of Inorganic Chemicals from Soil by Plants. Bechtel Jacobs Company LLC, Oak Ridge, Tennessee. BJC/OR-133.

Travis, C.C, and A.D. Arms. 1988. Bioconcentration of organics in beef, milk, and vegetation. *Environ Sci Technol* 22(3):271-274.

USEPA. 1999. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Appendix D: Bioconcentration Factors (BCFs) for Wildlife Measurement Receptors. Peer Review Draft. August.

USEPA. 2007. Updated Attachment 4-1 to USEPA's 2005 Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. Office of Solid Waste and Emergency Response, Washington D.C. April.

Table 9-3
TRVs for Mammal Dietary Assessment

Constituent	Units	Mammal - Dietary TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Total Dioxin/Furan TEQ Mammal	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Polychlorinated Biphenyls								
Total PCBs	mg/kg bw/day	0.08	0.10	Mink; reproduction (Chapman 2003)		0.069	0.082	Mink; reproduction (Chapman 2003)
Total PCB TEQ Mammal	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Total Dioxin/Furan/PCB TEQ Mammal	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg bw/day	0.13[a]	1.30	Mouse; reproduction (Ware and Good 1967)	X	0.8	4	Rat; reproduction (Fitzhugh 1948)
Dieldrin	mg/kg bw/day	0.02	0.03	Rat; reproduction (Harr et al. 1970)		0.015	0.03	Rat; reproduction (Harr et al. 1970)
Chlordane	mg/kg bw/day	2.1[a]	21	Rat; reproduction and growth (Narotsky and Kavlok 1995)	X	--	--	--
Hexachlorobenzene	mg/kg bw/day	0.013[a]	0.13	Mink; reproduction (Bleavins et al. 1984)	X	--	--	--
Polycyclic Aromatic Hydrocarbons								
Total HMW PAH	mg/kg bw/day	--	--	--		0.62	3.1	Mouse; survival (Culp et al. 1998)
Total LMW PAH	mg/kg bw/day	--	--	--		50	150	Rat; growth (Navarro et al. 1991)
Total PAH	mg/kg bw/day	0.615	3.07	Mouse; survival (Culp et al 1998 as cited in USEPA 2007c)	X	--	--	--
Inorganics								
Arsenic	mg/kg bw/day	2.6	5.4	Rat; growth (Byron et al. 1967)		--	--	--
Cadmium	mg/kg bw/day	3.5	13	Rat; growth (Machemer and Lorke 1981)		--	--	--
Chromium	mg/kg bw/day	0.96[a]	9.62	Mouse; reproduction (Zahid et al. 1990; cited in USEPA 2008)	X	--	--	--
Copper	mg/kg bw/day	18	26	Mink; reproduction (Aulerich et al. 1982)		3.4	6.8	Mink; reproduction (Aulerich et al. 1982; cited in USEPA 2007a)
Lead	mg/kg bw/day	11	90	Rat; growth (Azar et al. 1973)		0.71	7	Rat; reproduction (Grant et al. 1980; cited in USEPA 2005b)
Mercury/Methylmercury	mg/kg bw/day	0.16	0.25	Mink; growth/survival (Wobeser et al. 1976)		0.016	0.027	Mink; growth and survival (Wobeser et al. 1976; cited in USEPA 1995)
Nickel	mg/kg bw/day	40	80	Rat; reproduction (Ambrose et al. 1976)		--	--	--
Selenium	mg/kg bw/day	0.016[a]	0.16	Rat; growth (Behne et al. 1992)		--	--	--
Silver	mg/kg bw/day	18.8[a]	188	Rat; reproduction (Shavlovski et al. 1995; cited in USEPA 2006)	X	--	--	--
Zinc	mg/kg bw/day	160	320	Rat; reproduction (Schlicker and Cox 1968		--	--	--

Table 9-3
TRVs for Mammal Dietary Assessment

Notes:
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
BERA = baseline ecological risk assessment
COPEC = constituent of potential ecological concern
FFS = focused feasibility study
HMW = high molecular weight
LMW = low molecular weight
LPR = Lower Passaic River
LPRSA = Lower Passaic River Study Area
LOAEL = lowest observed adverse effects level
mg/kg bw/day = milligrams per kilogram of body weight per day
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency
-- = not available

References:
Ambrose AM, Larson PS, Borzelleca JF, Hennigar Jr GR. 1976. Long term toxicologic assessment of nickel in rats and dogs. *J Food Sci Technol* 13(4):181-187.

Aulerich RJ, Ringer RK, Bleavins MR, Napolitano A. 1982. Effects of supplemental dietary copper on growth, reproductive performance and kit survival of standard dark mink and the acute toxicity of copper to mink. *J Anim Sci* 55(2):337-343.

Aulerich, R.J., R.K. Ringer, M.R. Bleavins, and A. Napolitano. 1982. Effects of supplemental dietary copper on growth, reproductive performance and kit survival of standard dark mink and the acute toxicity of copper to mink. *J Anim Sci* 55(2):337-343.

Azar A, Trochimowicz HJ, Maxfield ME. 1973. Review of lead studies in animals carried out at Haskell Laboratory-two-year feeding study and response to hemorrhage study. In: Barth D, Ed. Environmental Health Aspects of Lead, International Symposium, Amsterdam, the Netherlands. Commission of European Communities. pp 199-210.

Behne D, Kyriakopoulos A, Gessner H, Walzog B, Meinhold H. 1992. Type I iodothyronine deiodinase activity after high selenium intake, and relations between selenium and iodine metabolism in rats. *J Nutr* 122(7):1542-1546.

Bleavins, M.R., R.J. Aulerich, and R.K. Ringer. 1984. Effects of chronic dietary hexachlorobenzene exposure on the reproductive performance and survivability of mink and European ferrets. *Arch Environ Contam Toxicol* 13:357-365.

Byron, W.R., G.W. Bierbower, J.B. Brouwer, W.H. Hansen. 1967. Pathologic changes in rats and dogs from a two-year feeding of sodium arsenite or sodium asrsenate. *Toxicology and Applied Pharmacology* 10: 132-147.

Chapman, J. 2003. Memorandum dated March 6, 2003: Toxicity Reference Values (TRVs) for Mammals and Birds Based on Selected Aroclors. Ecologist, US Environmental Protection Agency Region 5, Chicago, IL.

Culp, S.J., D.W. Gaylor, W.G. Sheldon, L.S. Goldstein, and F.A. Beland. 1998. A comparison of the tumors induced by coal tar and benzo[a]pyrene in a 2-year bioassay. *Carcinogenesis* 19(1):117-124.

Fitzhugh, O.G. 1948. Use of DDT insecticides on food products. *Ind and Eng Chemistry* 40(4):704-705.

Grant, L. D., C.A. Kimmel, G.L. West, C.M. Martinez-Vargas, and J.L. Howard. 1980. Chronic low level lead toxicity in the rat. 2. Effects on postnatal physical and behavioral development. *Toxicol Appl Pharmacol* 56(1):42-58.

Harr, J.R., R.R. Claeys, J.F. Bone, and T.W. McCorcle. 1970. Dieldrin toxidosis: rat reproduction. *Am J Vet Res* 31(1):181-189.

Hext PM, Pinto PJ, Rimmel BA. 1999. Subchronic feeding study of antimony trioxide in rats. *J Appl Toxicol* 19:205-209.

Hochstein, J.R., J.A. Render, S.J. Bursian, and R.J. Aulerich. 2001. Chronic toxicity of dietary 2,3,7,8-tetrachlorodibenzo-p-dioxin to mink. *Vet Hum Toxicol* 43(3):134-139.

Machemer L, Lorke D. 1981. Embryotoxic effect of cadmium on rats upon oral administration. *Toxicol Appl Pharmacol* 58:438-443.

Narotskv, M.G. and R.J. Kavlock. 1995. A multidisciplinary approach to toxicological screening: II. Developmental toxicity. *J Toxicol Environ Health* 1995;45(2):145-71.

Navarro, HA; Price, CJ; Marr, MC; Myers, CB; Heindel, JJ; Schwetz, BA. 1991. Developmental toxicity evaluation of naphthalene (CAS NO. 91-20-3) administered by gavage to Sprague-Dawley (CD) rats on gestation days 6 through 15. Chemistry and Life Sciences, Research Triangle Institute (RTI). Research Triangle Park, NC. RTI Master Protocol Number: RTI-376. December 5.

Schlicker, S.A. and D.H. Cox. 1968. Maternal dietary zinc, and development and zinc, iron, and copper content of the rat fetus. *J Nub* 95:287-294.

Shavlovski, M.M., N.A. Chebotar, L.A. Konopistseva, E.T. Zakharova, A.M. Kachourin, V.B. Vassiliev, and V.S. Gaitskhoki. 1995. Embryotoxicity of silver ions is diminished by ceruloplasmin-further evidence for its role in the transport of copper. *Biometals* 8(2):122-8.

Tillitt, D.E., R.W. Gale, J.C. Meadows, J.L. Zajicek, P.H. Peterman, S.N. Heaton, P.D. Jones, S.J. Bursian, T.J. Kubiak, J.P. Giesy, and R.J. Aulerich. 1996. Dietary exposure of mink to carp from Saginaw Bay. 3. Characterization of dietary exposure to planar halogenated hydrocarbons, dioxin equivalents, and biomagnification. *Environ Sci Technol* 30:283-291.

USEPA. 1995. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Wildlife: DDT, mercury, 2,3,7,8-TCDD, PCBs. EPA-820-B-95-008. Office of Water, US Environmental Protection Agency, Washington, DC.

USEPA. 2005b. Ecological Soil Screening Levels for Lead. Interim final. OSWER Directive 9285.7-70. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington, DC. Available from: https://rais.ornl.gov/documents/eco-ssl_lead.pdf.

USEPA. 2006. Ecological Soil Screening Levels for Silver. Interim final. OSWER Directive 9285.7-77. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington. Available from: https://rais.ornl.gov/documents/eco-ssl_silver.pdf

USEPA. 2007a. Ecological Soil Screening Levels for Copper. Interim final. Revised February 2007. OSWER Directive 9285.7-68. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington, DC. Available from: https://rais.ornl.gov/documents/eco-ssl_copper.pdf

USEPA. 2007c. Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs). Interim final. OSWER Directive 9285.7-78. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington. Available from: https://rais.ornl.gov/documents/eco-ssl_pah.pdf.

USEPA. 2008. Ecological Soil Screening Levels for Chromium. Interim final. OSWER Directive 9285.7- 66. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington, DC. Available from: https://rais.ornl.gov/documents/eco-ssl_chromium.pdf

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQua

Ware, G.W. and E.E. Good. 1967. Effects of insecticides on reproduction in the laboratory mouse. II. Mirex, telodrin, and DDT. *Toxicol Appl Pharmacol* 10:54-61.

Wobeser, G., N.D. Nielson, and B. Schiefer. 1976. Mercury and mink II: experimental methyl mercury intoxication. *Can J Comp Med* 40:34-45.

Zahid, Z.R., Z.S. Al-Hakkak, A.H.H. Kadhim, E.A. Elias, and I.S. Al-Jumaily. 1990. Comparative effects of trivalent and hexavalent chromium on spermatogenesis of the mouse. *Toxicol Environ Chem* 25(2-3):131-136.

Table 9-4a
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	NBSA-wide River Otter Piscivore				NBSA-wide Shorelines Muskrat Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.6	0.2	**20**	0.7	0.3	0.08	**8**	0.3
Total Dioxin/Furan TEQ Mammal	unitless	0.7	0.2	**21**	0.8	0.3	0.09	**10**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	0.6	0.5	0.7	0.6	0.3	0.3	0.4	0.3
Total PCB TEQ Mammal	unitless	0.2	0.06	**6**	0.2	0.2	0.05	**6**	0.2
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.8	0.2	**25**	0.9	0.4	0.1	**13**	0.5
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.003	0.05	0.005	0.008	0.002
Dieldrin	unitless	0.03	0.01	0.03	0.01	0.02	0.008	0.02	0.008
Total Chlordane	unitless	0.002	0.0002	NC	NC	0.0006	0.00006	NC	NC
Hexachlorobenzene	unitless	0.005	0.0005	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0009	NC	NC	0.2	0.03
Total LMW PAH	unitless	NC	NC	0.00006	0.00002	NC	NC	0.0003	0.0001
Total PAH	unitless	0.008	0.002	NC	NC	0.1	0.03	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.02	NC	NC	0.05	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.01	0.003	NC	NC
Chromium	unitless	0.04	0.004	NC	NC	0.2	0.02	NC	NC
Copper	unitless	0.03	0.02	0.2	0.08	0.05	0.03	0.2	0.1
Lead	unitless	0.01	0.002	0.2	0.02	0.05	0.006	0.8	0.08
Mercury	unitless	0.03	0.02	0.3	0.2	0.2	0.1	**2**	0.9
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.02	0.01	0.2	0.1
Nickel	unitless	0.0007	0.0004	NC	NC	0.003	0.002	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0004	0.00004	NC	NC
Zinc	unitless	0.01	0.006	NC	NC	0.07	0.03	NC	NC

Table 9-4a
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	NBSA-wide Harbor Seal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
2,3,7,8-TCDD	unitless	0.1	0.04	**5**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.2	0.05	**5**	0.2
Polychlorinated Biphenyls					
Total PCBs	unitless	0.1	0.1	0.2	0.1
Total PCB TEQ Mammal	unitless	0.05	0.01	**2**	0.06
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.2	0.06	**6**	0.2
Pesticides					
Total DDx (2,4 & 4,4)	unitless	0.02	0.002	0.004	0.0008
Dieldrin	unitless	0.007	0.004	0.007	0.004
Total Chlordane	unitless	0.0004	0.00004	NC	NC
Hexachlorobenzene	unitless	0.001	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH	unitless	NC	NC	0.0006	0.0001
Total LMW PAH	unitless	NC	NC	0.00001	0.000005
Total PAH	unitless	0.002	0.0003	NC	NC
Inorganics					
Arsenic	unitless	0.006	0.003	NC	NC
Cadmium	unitless	0.0004	0.0001	NC	NC
Chromium	unitless	0.007	0.0007	NC	NC
Copper	unitless	0.007	0.005	0.04	0.02
Lead	unitless	0.002	0.0002	0.03	0.003
Mercury	unitless	0.007	0.004	0.07	0.04
Methylmercury	unitless	0.008	0.005	0.08	0.05
Nickel	unitless	0.0001	0.00006	NC	NC
Selenium	unitless	0.6	0.06	NC	NC
Silver	unitless	0.0001	0.00001	NC	NC
Zinc	unitless	0.002	0.001	NC	NC

Table 9-4a
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual

Table 9-4b
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Constituent	Units	North Zone				North Shorelines			
		Piscivore				Omnivore			
		River Otter				Muskrat			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	**1**	0.3	**33**	**1**	0.4	0.1	**13**	0.5
Total Dioxin/Furan TEQ Mammal	unitless	**1**	0.3	**35**	**1**	0.4	0.1	**14**	0.5
Polychlorinated Biphenyls									
Total PCBs	unitless	0.8	0.6	0.9	0.8	0.4	0.3	0.4	0.4
Total PCB TEQ Mammal	unitless	0.2	0.07	**7**	0.3	0.1	0.03	**4**	0.1
Total Dioxin/Furan/PCB TEQ Mammal	unitless	**1**	0.4	**41**	**1**	0.5	0.2	**17**	0.6
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.08	0.008	0.01	0.003	0.05	0.005	0.009	0.002
Dieldrin	unitless	0.03	0.01	0.03	0.01	0.02	0.008	0.02	0.008
Total Chlordane	unitless	0.002	0.0002	NC	NC	0.0007	0.00007	NC	NC
Hexachlorobenzene	unitless	0.008	0.0008	NC	NC	0.005	0.0005	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.005	0.001	NC	NC	0.08	0.02
Total LMW PAH	unitless	NC	NC	0.0001	0.00004	NC	NC	0.0002	0.00008
Total PAH	unitless	0.01	0.003	NC	NC	0.07	0.01	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.02	NC	NC	0.05	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.009	0.002	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.2	0.02	NC	NC
Copper	unitless	0.03	0.02	0.03	0.02	0.04	0.03	0.04	0.03
Lead	unitless	0.01	0.001	0.2	0.02	0.04	0.005	0.6	0.06
Mercury	unitless	0.03	0.02	0.3	0.2	0.2	0.1	**2**	0.9
Methylmercury	unitless	0.04	0.02	0.4	0.2	0.02	0.01	0.2	0.1
Nickel	unitless	0.0008	0.0004	NC	NC	0.003	0.001	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0005	0.00005	NC	NC
Zinc	unitless	0.01	0.006	NC	NC	0.03	0.02	NC	NC

Table 9-4b
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Constituent	Units	North Zone / Piscivore / Harbor Seal			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
2,3,7,8-TCDD	unitless	0.3	0.07	**8**	0.3
Total Dioxin/Furan TEQ Mammal	unitless	0.3	0.08	**9**	0.3
Polychlorinated Biphenyls					
Total PCBs	unitless	0.2	0.2	0.2	0.2
Total PCB TEQ Mammal	unitless	0.06	0.02	**2**	0.07
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.3	0.09	**10**	0.4
Pesticides					
Total DDx (2,4 & 4,4)	unitless	0.02	0.002	0.003	0.0007
Dieldrin	unitless	0.007	0.004	0.007	0.004
Total Chlordane	unitless	0.0005	0.00005	NC	NC
Hexachlorobenzene	unitless	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH	unitless	NC	NC	0.0008	0.0002
Total LMW PAH	unitless	NC	NC	0.00003	0.00001
Total PAH	unitless	0.003	0.0006	NC	NC
Inorganics					
Arsenic	unitless	0.006	0.003	NC	NC
Cadmium	unitless	0.0004	0.0001	NC	NC
Chromium	unitless	0.009	0.0009	NC	NC
Copper	unitless	0.006	0.004	0.006	0.004
Lead	unitless	0.002	0.0002	0.03	0.003
Mercury	unitless	0.008	0.005	0.08	0.04
Methylmercury	unitless	0.009	0.006	0.09	0.05
Nickel	unitless	0.0001	0.00007	NC	NC
Selenium	unitless	0.6	0.06	NC	NC
Silver	unitless	0.0001	0.00001	NC	NC
Zinc	unitless	0.003	0.001	NC	NC

Table 9-4b
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual

Table 9-4c
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Constituent	Units	Southeast Zone				Southeast Shorelines			
		Piscivore				Omnivore			
		River Otter				Muskrat			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.6	0.2	**19**	0.7	0.3	0.07	**8**	0.3
Total Dioxin/Furan TEQ Mammal	unitless	0.7	0.2	**22**	0.8	0.3	0.08	**9**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	0.5	0.4	0.5	0.4	0.2	0.2	0.3	0.2
Total PCB TEQ Mammal	unitless	0.1	0.04	**5**	0.2	0.1	0.03	**3**	0.1
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.7	0.2	**24**	0.9	0.3	0.1	**11**	0.4
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.07	0.007	0.01	0.002	0.04	0.004	0.006	0.001
Dieldrin	unitless	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.0006	0.00006	NC	NC
Hexachlorobenzene	unitless	0.006	0.0006	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0008	NC	NC	0.08	0.02
Total LMW PAH	unitless	NC	NC	0.00003	0.00001	NC	NC	0.0003	0.00009
Total PAH	unitless	0.004	0.0009	NC	NC	0.07	0.01	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.01	NC	NC	0.04	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.01	0.003	NC	NC
Chromium	unitless	0.06	0.006	NC	NC	0.3	0.03	NC	NC
Copper	unitless	0.02	0.02	0.1	0.06	0.05	0.03	0.2	0.1
Lead	unitless	0.006	0.0008	0.1	0.01	0.03	0.004	0.5	0.05
Mercury	unitless	0.03	0.02	0.3	0.2	0.2	0.1	**2**	0.9
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.02	0.01	0.2	0.1
Nickel	unitless	0.002	0.0008	NC	NC	0.004	0.002	NC	NC
Selenium	unitless	**2**	0.2	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0007	0.00007	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.04	0.02	NC	NC

Table 9-4c
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Constituent	Units	Southeast Zone / Piscivore / Harbor Seal			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
2,3,7,8-TCDD	unitless	0.1	0.04	**5**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.2	0.05	**5**	0.2
Polychlorinated Biphenyls					
Total PCBs	unitless	0.1	0.1	0.1	0.1
Total PCB TEQ Mammal	unitless	0.04	0.01	**1**	0.04
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.2	0.05	**6**	0.2
Pesticides					
Total DDx (2,4 & 4,4)	unitless	0.02	0.002	0.003	0.0006
Dieldrin	unitless	0.006	0.003	0.006	0.003
Total Chlordane	unitless	0.0003	0.00003	NC	NC
Hexachlorobenzene	unitless	0.001	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH	unitless	NC	NC	0.0007	0.0001
Total LMW PAH	unitless	NC	NC	0.000007	0.000002
Total PAH	unitless	0.0007	0.0001	NC	NC
Inorganics					
Arsenic	unitless	0.006	0.003	NC	NC
Cadmium	unitless	0.0004	0.0001	NC	NC
Chromium	unitless	0.008	0.0008	NC	NC
Copper	unitless	0.005	0.004	0.03	0.01
Lead	unitless	0.0009	0.0001	0.01	0.001
Mercury	unitless	0.007	0.005	0.07	0.04
Methylmercury	unitless	0.008	0.005	0.08	0.05
Nickel	unitless	0.0001	0.00006	NC	NC
Selenium	unitless	0.6	0.06	NC	NC
Silver	unitless	0.0001	0.00001	NC	NC
Zinc	unitless	0.002	0.001	NC	NC

Table 9-4c
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual

Table 9-4d

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Constituent	Units	Southwest Zone				Southwest Shorelines			
		Piscivore				Omnivore			
		River Otter				Muskrat			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.3	0.09	**10**	0.4	0.2	0.05	**5**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.4	0.1	**12**	0.4	0.2	0.05	**6**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	0.8	0.7	0.9	0.8	0.6	0.5	0.7	0.6
Total PCB TEQ Mammal	unitless	0.3	0.09	**10**	0.4	0.5	0.1	**15**	0.5
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.6	0.2	**20**	0.7	0.4	0.1	**14**	0.5
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.2	0.02	0.03	0.005	0.08	0.008	0.01	0.003
Dieldrin	unitless	0.04	0.02	0.04	0.02	0.01	0.007	0.01	0.007
Total Chlordane	unitless	0.002	0.0002	NC	NC	0.0003	0.00003	NC	NC
Hexachlorobenzene	unitless	0.005	0.0005	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.006	0.001	NC	NC	0.3	0.06
Total LMW PAH	unitless	NC	NC	0.00005	0.00002	NC	NC	0.0006	0.0002
Total PAH	unitless	0.009	0.002	NC	NC	0.3	0.06	NC	NC
Inorganics									
Arsenic	unitless	0.04	0.02	NC	NC	0.07	0.03	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.02	0.004	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.3	0.03	NC	NC
Copper	unitless	0.06	0.04	0.3	0.2	0.06	0.04	0.3	0.2
Lead	unitless	0.04	0.005	0.7	0.07	0.1	0.02	**2**	0.2
Mercury	unitless	0.03	0.02	0.3	0.2	0.2	0.1	**2**	**1**
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.01	0.009	0.1	0.09
Nickel	unitless	0.001	0.0005	NC	NC	0.005	0.003	NC	NC
Selenium	unitless	**4**	0.4	NC	NC	**4**	0.4	NC	NC
Silver	unitless	0.0009	0.00009	NC	NC	0.0004	0.00004	NC	NC
Zinc	unitless	0.02	0.008	NC	NC	0.1	0.06	NC	NC

Table 9-4d

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Constituent	Units	Southwest Zone / Piscivore / Harbor Seal			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
2,3,7,8-TCDD	unitless	0.07	0.02	**2**	0.09
Total Dioxin/Furan TEQ Mammal	unitless	0.09	0.03	**3**	0.1
Polychlorinated Biphenyls					
Total PCBs	unitless	0.2	0.2	0.2	0.2
Total PCB TEQ Mammal	unitless	0.08	0.02	**3**	0.09
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.2	0.04	**5**	0.2
Pesticides					
Total DDx (2,4 & 4,4)	unitless	0.04	0.004	0.007	0.001
Dieldrin	unitless	0.01	0.005	0.01	0.005
Total Chlordane	unitless	0.0004	0.00004	NC	NC
Hexachlorobenzene	unitless	0.001	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH	unitless	NC	NC	0.0009	0.0002
Total LMW PAH	unitless	NC	NC	0.00001	0.000003
Total PAH	unitless	0.002	0.0003	NC	NC
Inorganics					
Arsenic	unitless	0.007	0.003	NC	NC
Cadmium	unitless	0.0004	0.0001	NC	NC
Chromium	unitless	0.007	0.0007	NC	NC
Copper	unitless	0.01	0.01	0.07	0.04
Lead	unitless	0.005	0.0006	0.08	0.008
Mercury	unitless	0.008	0.005	0.08	0.04
Methylmercury	unitless	0.007	0.005	0.07	0.04
Nickel	unitless	0.0002	0.00008	NC	NC
Selenium	unitless	0.8	0.08	NC	NC
Silver	unitless	0.0002	0.00002	NC	NC
Zinc	unitless	0.003	0.002	NC	NC

Table 9-4d

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone)

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual

Table 9-8
Weight of Evidence Risk Summary for Mammals

Receptor	Preliminary COC[a]	Lines of Evidence: HQ LOE: Available HQs	Principal HQs→	Primary Evaluation: NBSA Maximum LOAEL HQ[b]	Primary Evaluation: LPR FFS Maximum LOAEL HQ[b]	Sensitivity Analyses[c]: NBSA Maximum LOAEL HQ[b]	Sensitivity Analyses[c]: LPR FFS Maximum LOAEL HQ[b]	Site-Specific Toxicity Measures	Other	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver (LOAEL HQ ≥ 1 and Supporting LOE)
Assessment Endpoint: Survival, growth, and/or reproduction of mammals													
River Otter	2,3,7,8-TCDD	Dietary	Dietary	HQ < 1	**1 [N]**	HQ < 1	**2 [NBSA-wide, N, SE]**	--	--	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
River Otter	Total Dioxin/Furan TEQ Mammal	Dietary	Dietary	HQ < 1	**1 [N]**	HQ < 1	**3 [NBSA-wide, N, SE]**	--	--	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
River Otter	Total Dioxin/Furan/PCB TEQ Mammal	Dietary	Dietary	HQ < 1	**1 [N]**	HQ < 1	**3 [NBSA-wide, N, SE, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
River Otter	Total PCBs	Dietary	Dietary	HQ < 1	HQ < 1	**1 [NBSA-wide, N, SW]**	**2 [NBSA-wide, N, SW]**	--	--	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
Muskrat	Mercury	Dietary	Dietary	HQ < 1	**1 [SW]**	NA	NA	--	--	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1	Unlikely	No
Harbor Seal	None	Dietary	Dietary	HQ < 1	HQ < 1	HQ < 1	HQ < 1	--	--	Dietary HQs	• All HQs < 1	Not expected	No

Notes:
[a] Preliminary COCs are identified as COPECs/receptors with a LOAEL HQ greater than or equal to 1 for dietary exposures using NBSA BERA or FFS TRVs for any exposure areas or evaluation scenarios.
[b] Maximum LOAEL HQs for all receptor/COPEC combinations with LOAEL HQs ≥ 1; all exposure areas with LOAEL HQs ≥ 1 are presented in brackets.
[c] All relevant sensitivity analyses considered. See Section 9.2.

Abbreviations:
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
BERA = Baseline Ecological Risk Assessment
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect limit
LOE = line of evidence
LPR = Lower Passaic River
MDC = maximum detected concentration
NE = line of evidence not evaluated
NOAEL = no observed adverse effect limit
NBSA = Newark Bay Study Area
PCB = polychlorinated biphenyl
SQT = sediment quality triad
SUF = site use factor
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
UCL = 95 percent upper confidence limit
-- = not applicable

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Assessment Endpoint: Survival, growth, and/or reproduction of benthic invertebrates					
Benthic Invertebrate Communities	see Table 11-1b for Sediment Quality Triad risk conclusions			Localized Risk per SQT	
Polychaete Worm	2,3,7,8-TCDD, Total PCBs, Arsenic	SQT	• Localized risk to benthic communities (see Table 11-1b for conclusions of SQT) • No effect on growth/survival in site-specific toxicity tests (Iannuzzi et al. 2008)	Localized Risk per SQT	
Softshell Clam	2,3,7,8-TCDD, Total PCBs	Tissue HQs	• LPR FFS HQs ≥ 1 • LPR FFS TRVs based on bivalve data • Site-specific study on eastern oyster indicates potential bivalve reproductive impairment (Wintermyer and Cooper 2003)	Possible	Yes
Softshell Clam	Arsenic, Lead	Tissue HQs	• High magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Possible	Yes
Softshell Clam	Mercury	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Softshell Clam	Total HMW PAHs, Cadmium, Chromium, Copper, Nickel, Selenium, Silver, Zinc	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach • Selenium and silver present at concentrations near or below background	Unlikely	No
Blue Crab	2,3,7,8-TCDD, Total PCBs	Tissue HQs	• LPR FFS HQs ≥ 1 • High magnitude of the HQs ≥ 1 • LPR FFS TRVs based on bivalve data and considered uncertain for crabs	Possible	Yes
Blue Crab	Total DDx	Tissue HQs	• High magnitude of the HQs ≥ 1 based on alternate NBSA TRVs • High uncertainty with invertebrate tissue HQ approach	Possible	Yes
Blue Crab	Mercury, Methylmercury	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Blue Crab	Dieldrin, Arsenic, Cadmium, Copper, Mercury, Methylmercury, Selenium, Silver	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach • Selenium and silver present at concentrations near or below background	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Assessment Endpoint: Survival, growth, and/or reproduction of fish					
Mummichog/Killifish	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, PCB TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• LPR FFS WB tissue HQs > 10 • Alternate NBSA WB tissue HQs > 1 • NBSA WB tissue HQs < 1 • Egg HQs < 1 • Site-specific pathology data did not show abnormalities • Site-specific reproductive study indicates endocrine impairments. relative to populations that are not urban-adapted (Bugel et al. 2010, 2011, 2014)	Possible	Yes
Mummichog/Killifish	Total PCBs	Tissue HQs	• Tissue LOAEL HQs < 1 for most scenarios • Egg HQs < 1 • Low magnitude of the HQs ≥ 1 • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Total DDx (2,4 & 4,4)	Tissue HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 in Southwest Zone • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Copper	Background	• Tissue copper at/within background • Dietary HQs < 1 • Low magnitude of tissue HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Mercury, Methylmercury	Tissue HQs	• WB Tissue HQs < 1 • Dietary HQs < 1 in most scenarios • Low magnitude of dietary HQs ≥ 1 in Southwest Zone • Egg LOAEL HQs < 1 • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Silver	Background	• Tissue LOAEL HQs < 1 in most scenarios • Silver < background in sediment • Low magnitude of tissue HQs ≥ 1 in North Zone • Dietary LOAEL HQs < 1 • Low confidence in both tissue and dietary TRVs • Site-specific pathology data did not show abnormalities	Unlikely	No
American Eel	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• LPR FFS WB tissue HQs approaching 10 • NBSA WB tissue HQs < 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
American Eel	Total PCBs	Tissue HQs	• NBSA WB tissue HQs < 1 • Low magnitude of the WB tissue HQs ≥ 1 based on LPR FFS TRVs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Total DDx (2,4 & 4,4)	Tissue HQs	• NBSA WB tissue HQs < 1 • Low magnitude of the WB tissue HQs ≥ 1 based on LPR FFS TRVs in North Zone • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Copper	Dietary HQs	• Dietary HQs < 1 for all scenarios • Low magnitude of tissue HQs ≥ 1 in Southwest Zone • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Mercury/Methylmercury	Tissue HQs	• Tissue LOAEL HQs < 1 in most scenarios • Dietary LOAEL HQs < 1 in most scenarios • Low magnitude of LOAEL HQs ≥ 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Selenium	Background	• Selenium < background in sediment • Tissue LOAEL HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in Southeast Zone • Dietary HQs < 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Summer/Winter Flounder	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• LPR FFS WB tissue HQs approaching 10 • NBSA WB tissue HQs < 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
Summer/Winter Flounder	Total PCBs	Tissue HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of the HQs ≥ 1 in the North Zone • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Dietary HQs in Southwest Zone calculated using clam MDC • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Copper	Dietary HQs	• Dietary HQs < 1 • WB tissue HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in North Zone • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Mercury/Methylmercury	Tissue HQs	• Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
White Perch	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• WB tissue LOAEL HQs ≥ 1 for most scenarios • WB tissue LPR FFS LOAEL HQs > 10 for all scenarios • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
White Perch	Total PCB TEQ, Total PCBs	Tissue HQs	• WB tissue LOAEL HQs < 1 in most scenarios • Low magnitude of the WB tissue HQs ≥ 1 • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Total DDx (2,4 & 4,4)	Tissue HQs	• WB tissue LOAEL HQs > 1 in most cases • Low magnitude of the tissue LOAEL HQ ≥ 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
White Perch	Arsenic, Zinc	Tissue HQs	• Tissue and dietary HQs < 1 • Low magnitude of the liver HQs ≥ 1 (arsenic) or based on unbounded NOAEL (zinc) • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Chromium	Tissue HQs	• WB tissue and dietary HQs < 1 in most scenarios • Tissue and dietary TRVs conservative • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
White Perch	Copper	Dietary HQs	• Dietary HQs < 1 • Low confidence in the tissue and dietary TRVs • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Uncertain	Uncertain
White Perch	Mercury	Tissue HQs	• WB Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Liver HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Selenium, Silver	Background	• Selenium related to background conditions • Tissue and dietary HQs < 1 • Liver HQs ≥ 1 based on unbounded NOAEL • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Assessment Endpoint: Survival, growth, and/or reproduction of birds					
Spotted sandpiper	Total Dioxin/Furan/PCB TEQ Bird, Total HMW PAH, Lead, Mercury	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • Diet and SUF assumptions likely overestimate risk • MDC used as EPC in some cases	Unlikely	No
Great blue heron	Total Dioxin/Furan/PCB TEQ Bird, Total PCB TEQ Bird, Total DDx (2,4 & 4,4), Mercury, Methylmercury	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • Diet and SUF assumptions likely overestimate risk • MDC used as EPC in some cases	Unlikely	No
Double-crested cormorant	Total Dioxin/Furan/PCB TEQ Bird, Total PCB TEQ Bird, Total PCBs	Site- and Species-Specific LOE	• Low magnitude of HQs ≥ 1 • NBSA and LPR FFS TRVs are conservative • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No
Double-crested cormorant	Total DDx (2,4 & 4,4)	Site-Specific LOE	• Low magnitude of dietary and egg HQs ≥ 1 • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Double-crested cormorant	Mercury, Methylmercury	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary and egg HQs ≥ 1 • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No
Double-crested cormorant	Copper	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary HQs ≥ 1 • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No
Lesser scaup	Lead	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • EPCs for Southwest Zone calculated using clam MDCs	Unlikely	No
Assessment Endpoint: Survival, growth, and/or reproduction of mammals					
River Otter	2,3,7,8-TCDD, Total Dioxin/Furan TEQ , Dioxin/Furan/PCB TEQ, Total PCBs	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
Muskrat	Mercury	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1	Unlikely	No
Harbor Seal	None	Dietary HQs	• All HQs < 1	Not expected	No
Assessment Endpoint: Survival, growth, and/or reproduction of reptiles					
Diamondback terrapin	None	Qualitative Evaluation	• Exposures assumed to be similar to or less than for mammals in NBSA • Surface water quality acceptable • Quantitative assessment for some metals in LPRSA (Windward 2019) did not find unacceptable risk	Not expected	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Notes:

[a] Preliminary COCs are identified as COPECs/receptors with a LOAEL HQ greater than or equal to 1 for any exposure areas or evaluation scenarios.

[b] Risk Drivers identified based on LOAEL HQs ≥ 1 and supporting LOEs.

Acronyms and Abbreviations:

BERA = Baseline Ecological Risk Assessment
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect limit
LOE = line of evidence
LPR = Lower Passaic River
MDC = maximum detected concentration
NOAEL = no observed adverse effect limit
NBSA = Newark Bay Study Area
PCB = polychlorinated biphenyl
SQT = sediment quality triad
SUF = site use factor
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
WB = whole-body
-- = not applicable

References:

Iannuzzi, T.J., T.N. Armstrong, E.R. Long, J. Iannuzzi, and D.F. Ludwig. 2008. Sediment quality triad assessment of an industrialized estuary of the northeastern USA. *Environ Monit Assess* 139:257-275.

Bugel S.M., L.A. White, and K.R. Cooper. 2010. Impaired reproductive health of killifish (*Fundulus heteroclitus*) inhabiting Newark Bay, NJ, a chronically contaminated estuary. *Aquat Toxicol* 96:182-193.

Bugel, S.M., L.A. White, and K.R. Cooper. 2011. Decreased vitellogenin inducibility and 17ß-estradiol levels correlated with reduced egg production in killifish (*Fundulus heteroclitus*) from Newark Bay, New Jersey. *Aquat Toxicol* 105:1-12.

Bugel, S.M., J.A. Bonventre, L.A. White, R.L Tanguay, and K.R. Cooper. 2014. Chronic exposure of killifish to a highly polluted environment desensitizes estrogen-responsive reproductive and biomarker genes. *Aquat Toxicol* 152:222-231.

Parsons, K.C. 2003. Chemical Residues in Cormorants from New York Harbor and Control Location. NYSDEC. February 28.

Wintermyer, M.L., and K.R. Cooper. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica* Gmelin) tissues and the effects on egg fertilization and development. *J Shellfish Res* 22(3):737-746.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June.

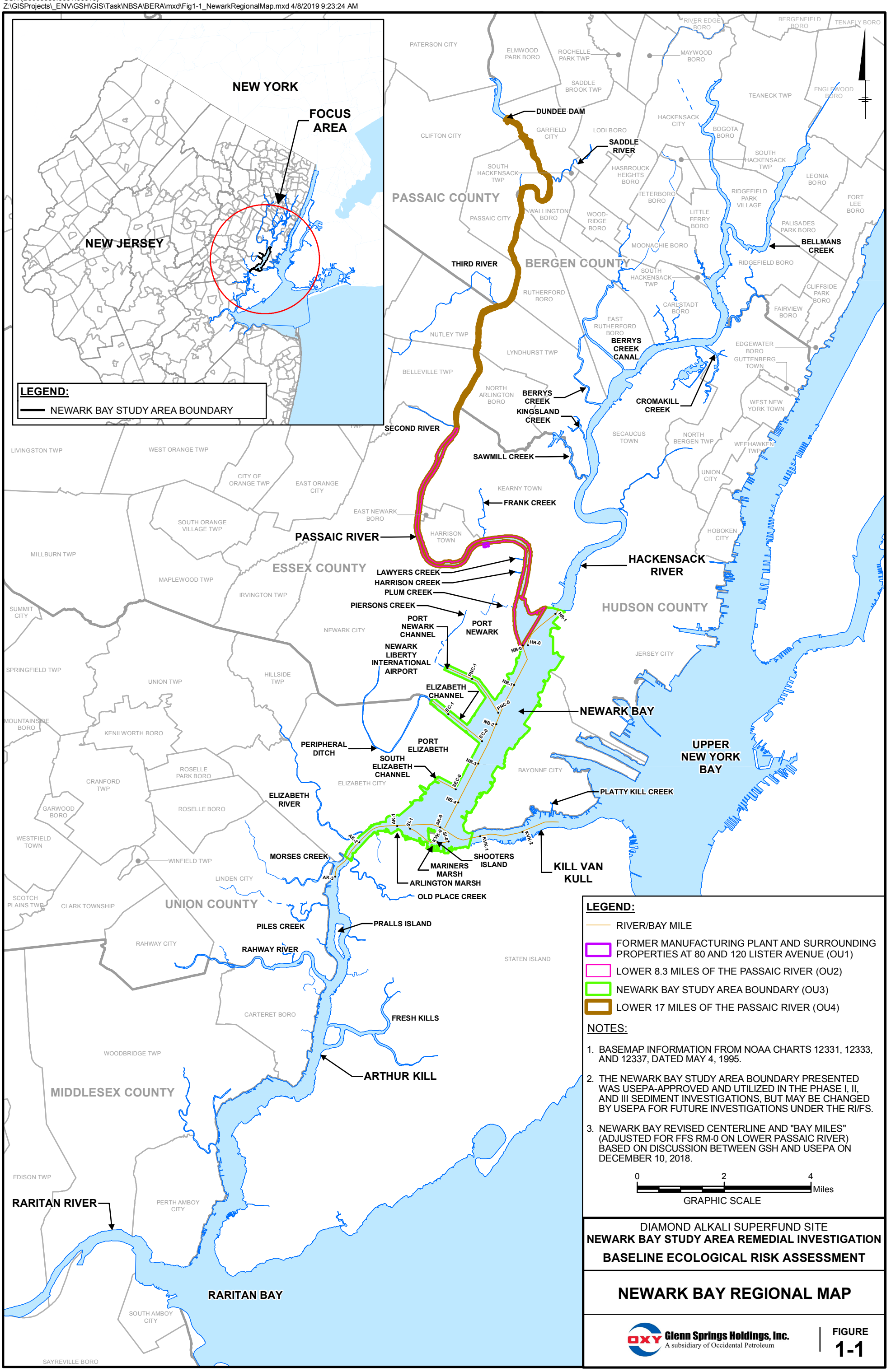
Table 11-1b
Sediment Quality Triad Evaluation Weight of Evidence Summary and Conclusions

Category	Line of Evidence	Summary
BIC	• Most BIC metrics are similar to or greater than Jamaica Bay reference. • NY/NJ B-IBI scores suggested impact for 1/30 stations; slightly impacted for 8/30 stations; not impacted for 21/30 stations. • Most BIC metrics were not associated with sediment or porewater chemistry.	There is no evidence that chemical concentrations are impacting the BIC composition in the NBSA.
Acute Toxicity	• Two of 30 SQT stations exhibited acute toxicity, 151 and 154 located along the southwestern shoreline (Figure 6-2). • Average survival as a percent of control was comparable to reference. • Multiple chemicals are elevated in sediment and porewater at stations 151 and 154. • Acute toxicity is correlated with multiple chemicals in sediment and porewater: metals, pesticides, PCBs, PAHs and dioxins/furans. • Areas of predicted acute toxicity are of limited extent, most occurring in the south geographic area (Figure 6-6).	Areas of elevated chemical concentrations likely to cause acute toxicity in the NBSA are of limited areal extent (Figure 6-6). Multiple chemicals are associated with acute toxicity: metals, pesticides, PCBs, PAHs and dioxins/furans. Mean amphipod survival as a percent of control in the NBSA is comparable to that of Jamaica Bay.
Chronic Toxicity	• Six of 30 SQT stations exhibited 28-day survival significantly different than control, two in the north, two in the central, and two in the south geographic areas (Figure 6-2). A total of 11 stations had 28-day survival less than 80% of control although only 5 of these were significantly different than control. Six stations had 28-day survival less than control minus the minimum detectable difference (MDD). The MDD was 33%. • Growth and reproductive endpoints were significantly different than control at 18 and 13 stations respectively. • Multiple chemicals in sediment and porewater are correlated with chronic toxicity endpoints: metals, pesticides, PCBs, PAHs and dioxins/furans. • Areas of predicted chronic toxicity (Figure 6-8) in the north and south are similarly located as those where acute toxicity is predicted.	Chronic toxicity endpoints are associated with chemical concentrations but there is more unexplained variability in the chronic endpoints. Model-predicted chronic toxicity is also of limited extent in the NBSA (Figure 6-8). Multiple chemicals are associated with chronic toxicity: metals, pesticides, PCBs, PAHs and dioxins/furans.
Sediment Chemistry	• High frequency of exceedances (up to 100%) of threshold (i.e., T20, ERL, and PEL) sediment quality guidelines for all chemical groups (Table 6-6). • Less frequent exceedances of median values (i.e., T50, ERM, PEL). • 15/30 SQT samples exceeded the T80 value for mercury. • These screening level guidelines were not predictive of toxicity in the NBSA and therefore provided little information about risks to benthic invertebrates. • For PAHs, sum of toxic units exceed 1 in 7 samples.	Sediment quality guidelines were exceeded for most chemicals although these guidelines were not predictive of toxicity in the NBSA and therefore provided little information about risks to benthic invertebrates. Exceedances of PAH toxic units indicate potential PAH risk.
Porewater Chemistry	• High frequency (20/30) of exceedances of chronic water quality criteria for at least one of following chemicals: arsenic, copper, zinc, total PCBs, and total DDx. • Low frequency (5/30) of exceedances of acute water quality criteria: one for arsenic, one for copper and three for zinc. • Sum of toxic PAH units are ≥ 1 in two samples that also exhibited acute toxicity.	Water quality criteria were exceeded for arsenic, copper, zinc, total PCBs, and total DDx. PAHs exceed values predictive of toxicity.
SQT Scoring	Two of 30 SQT stations (i.e., 151 and 154) are classified as medium impact. Depending on the scoring method 11 to 19 stations are classified as low impact with the remainder (i.e., 9 to 17 depending on the scoring method) classified as no impact.	Most SQT stations are classified as low or no impact.
SQT Conclusions	**• Potential risk to the benthic community is possible in localized areas due to elevated concentrations of multiple co-occurring COPECs, including dioxins/furans, PCBs, pesticides (particularly total DDx), PAHs, and many inorganics (particularly, but not limited to, arsenic, cadmium, chromium, and mercury).** **• Outside of these areas, benthic communities compare favorably with reference conditions in Jamaica Bay.**	

Acronyms and Abbreviations:
BIC = Benthic Invertebrate Community
B-IBI = Benthic Index of Biotic Integrity
COPECs = constituents of potential ecological concern
ERL = effect range-low
ERM =effect range-median
NBSA = Newark Bay Study Area
NY/NJ = New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEL = probable effect level
SQT = sediment quality triad
Tp = the concentration at which "p" percent of samples are predicted to be toxic
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane

FIGURES

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
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LEGEND:

- RIVER/BAY MILE
- FORMER MANUFACTURING PLANT AND SURROUNDING PROPERTIES AT 80 AND 120 LISTER AVENUE (OU1)
- LOWER 8.3 MILES OF THE PASSAIC RIVER (OU2)
- NEWARK BAY STUDY AREA BOUNDARY (OU3)
- LOWER 17 MILES OF THE PASSAIC RIVER (OU4)

NOTES:

1. BASEMAP INFORMATION FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995.
2. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.
3. NEWARK BAY REVISED CENTERLINE AND "BAY MILES" (ADJUSTED FOR FFS RM-0 ON LOWER PASSAIC RIVER) BASED ON DISCUSSION BETWEEN GSH AND USEPA ON DECEMBER 10, 2018.

0 2 4 Miles
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NEWARK BAY REGIONAL MAP

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
1-1

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
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LEGEND:

- NAVIGATION CHANNEL
- REACH BOUNDARY
- NEWARK BAY STUDY AREA BOUNDARY

NOTES:

1. AERIAL PHOTOS DATED 2015 (ESRI CLOUD IMAGERY).
2. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD 83.
3. PORT AUTHORITY OF NEW YORK AND NEW JERSEY HOWLAND HOOK MARINE TERMINAL LEASED BY AND ALSO KNOWN AS NEW YORK CONTAINER TERMINAL.
4. BASE MAP INFORMATION, REACH BOUNDARIES AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12333 AND 12337, DATED DECEMBER 2012 (UPDATED 8/13/2018) AND FEBRUARY 2013 (UPDATED 8/13/2018), RESPECTIVELY. NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
5. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.

0 0.8 1.6 Miles

GRAPHIC SCALE

80 AND 120 LISTER AVENUE (OU1)
ROUTE 1 & 9 BRIDGE
PASSAIC RIVER
POINT-NO-POINT REACH
KEARNY POINT
HACKENSACK RIVER
CONRAIL BRIDGE REMNANTS
PIERSONS CREEK
LIGHT "5"
KEARNY POINT REACH
DROYERS POINT REACH
LIGHT "NB"
LOWER PASSAIC RIVER RESTORATION PROJECT (LPRRP) DOWNSTREAM BOUNDARY
DROYERS POINT
TURNING BASIN
NEWARK LIBERTY INTERNATIONAL AIRPORT
PORT NEWARK CHANNEL
PORT NEWARK INSHORE CHANNEL
PORT NEWARK INSHORE REACH
NORTH REACH
LEHIGH VALLEY LIFT BRIDGE
JERSEY CITY
ELIZABETH CHANNEL
PORT NEWARK PORT NEWARK PIERHEAD CHANNEL
NEWARK BAY BRIDGE (VINCENT R. CASCIANO I-78 MEMORIAL BRIDGE)
PORT NEWARK BRANCH REACH
PORT ELIZABETH BRANCH REACH
PORT NEWARK PIERHEAD REACH
MIDDLE REACH (NORTH)
PORT ELIZABETH INSHORE CHANNEL
NEWARK
NEWARK BAY CDF (CELL 1S)
NEWARK BAY
PORT NEWARK BRANCH CHANNEL
PORT ELIZABETH BRANCH CHANNEL
PORT ELIZABETH MARINE TERMINAL
MIDDLE REACH (SOUTH)
PERIPHERAL DITCH
PORT ELIZABETH PIERHEAD CHANNEL
SOUTH ELIZABETH CHANNEL
PORT ELIZABETH SOUTH REACH
SOUTH REACH
ELIZABETH
BAYONNE
ELIZABETH RIVER
BAYONNE BRIDGE
NORTH OF SHOOTERS ISLAND REACH
BERGEN POINT WEST REACH
BERGEN POINT EAST REACH
ARTHUR KILL LIFT BRIDGE
SHOOTERS ISLAND
ELIZABETHPORT REACH
SOUTH OF SHOOTERS ISLAND REACH
PORT RICHMOND
KILL VAN KULL
HOWLAND HOOK MARINE TERMINAL
PORT IVORY
MARINERS HARBOR
GOETHALS BRIDGE
GULFPORT REACH
ARTHUR KILL
STATEN ISLAND
PRALLS ISLAND

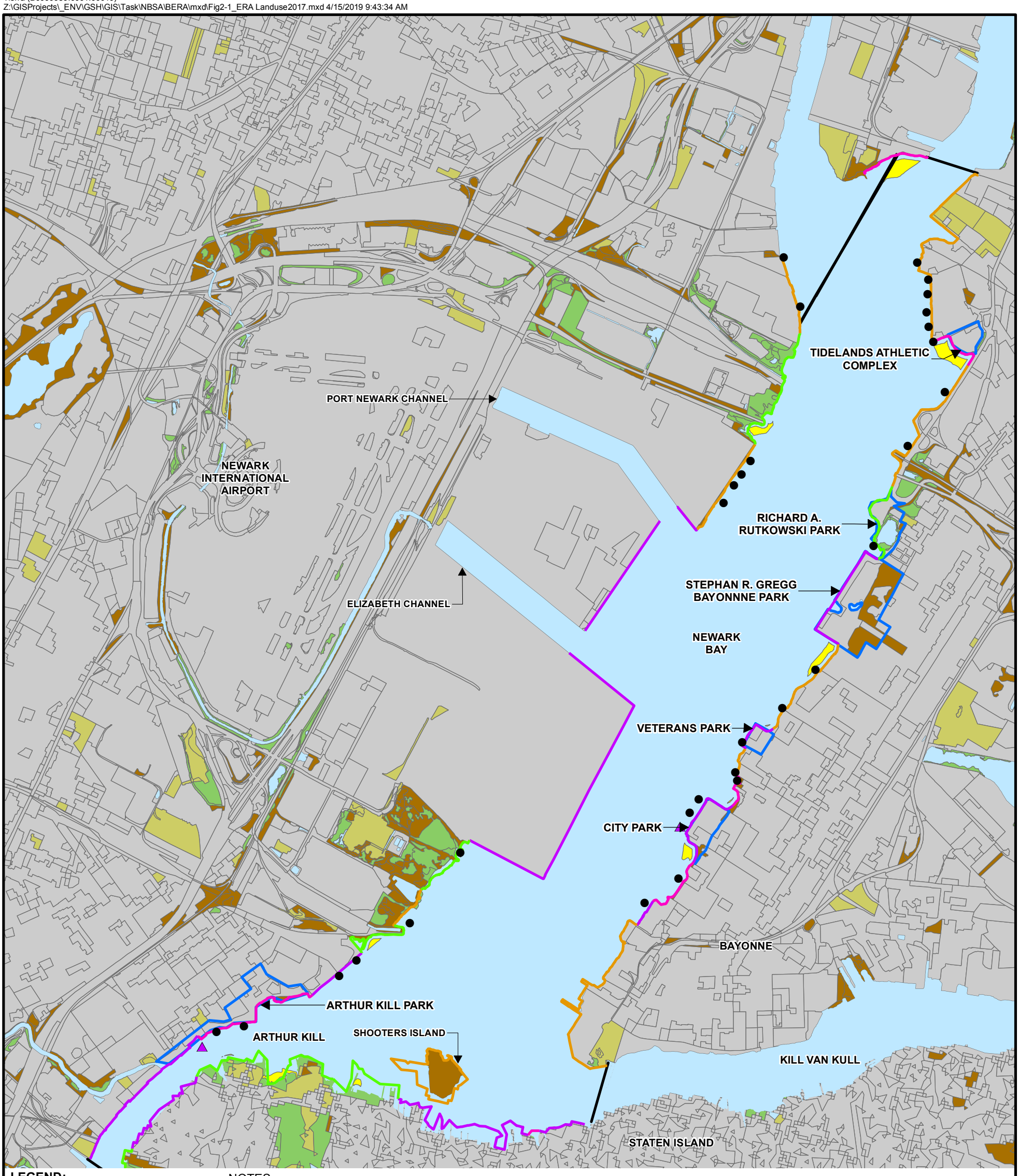
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NEWARK BAY REGIONAL FEATURES

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
1-2

City: SYR Div/Group: IM Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Tierra (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig2-1_ERA Landuse2017.mxd 4/15/2019 9:43:34 AM



LEGEND:

- BOAT RAMP
- DISCHARGE PIPE OBSERVATION
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS
- PARKS AND RECREATIONAL AREAS
- INTERTIDAL AREA
- NEWARK BAY STUDY AREA BOUNDARY

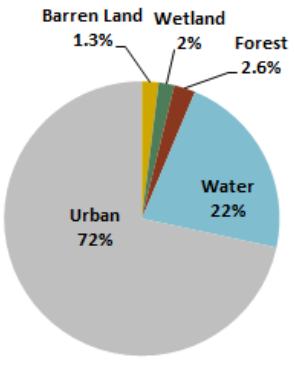
OBSERVED SHORELINE HABITAT:

- BULKHEAD
- MIXED INTERTIDAL
- RIPRAP
- VEGETATION

NOTES:

1. 2012 NEW JERSEY LAND USE DATA (UPDATED IN 2015) DOWNLOADED FROM THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION GEOGRAPHIC INFORMATION SYSTEM WEBSITE AT www.state.nj.us/dep/gis.
2. 2011 NEW YORK NATIONAL LAND COVER DATA DOWNLOADED FROM THE NEW YORK STATE GEOGRAPHIC INFORMATION SYSTEMS CLEARINGHOUSE AT www.nysgis.state.ny.us.
3. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.
4. THE PIE CHART PROVIDED REPRESENTS THE BREAKDOWN OF LAND USE FOR THE ENTIRE AREA SHOWN IN THE FIGURE. THIS INCLUDES INFORMATION FROM THE FOLLOWING MUNICIPALITIES: ELIZABETH, BAYONNE CITY, KEARNY TOWN, NEWARK CITY, JERSEY CITY, AND STATEN ISLAND BOROUGH.
5. THE INTERTIDAL AREAS SHOWN ARE CONSISTENT WITH THOSE PRESENTED IN THE PROBLEM FORMULATION (TIERRA 2013) AND VERIFIED DURING THE RECONNAISSANCE SURVEY (TIERRA 2015).
6. OBSERVATIONS MADE IN 2013 REGARDING DISCHARGE PIPES, INTERTIDAL AREAS, BOAT RAMPS, AND SHORELINE HABITAT (TIERRA 2015).
7. REFERENCES:
TIERRA. 2013. FINAL NEWARK BAY STUDY AREA PROBLEM FORMULATION. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. TIERRA SOLUTIONS, INC., EAST BRUNSWICK, NJ. JUNE.
TIERRA. 2015. NEWARK BAY STUDY AREA RECONNAISSANCE SURVEY REPORT. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. APRIL.

0 3,000 6,000 Feet
GRAPHIC SCALE



Percentage of Land Cover

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NBSA LAND/SHORELINE HABITATS MAP

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-1

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00004)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\RemedialInvestigation\mxd\FigXX_EPA_REMAP_Locs.mxd 1/9/2019 12:32:06 PM

LEGEND:

- REMAP 1993/1994
- REMAP 1998
- REMAP 2003
- REMAP 2008
- REMAP 2013
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLAT

0 1.25 2.5 Miles

GRAPHIC SCALE

PASSAIC RIVER
HACKENSACK RIVER
PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
MORSES CREEK
GOETHALS BRIDGE
ARTHUR KILL
PILES CREEK
PRALLS ISLAND
FRESH KILLS CREEK
CONRAIL BRIDGE REMNANTS
BAYONNE BRIDGE
SHOOTERS ISLAND
KILL VAN KULL
RARITAN BAY

NB330 NB450 NB361 NB450 NB108 NB405 NB324 NB205 NB114 NB405 NB018 NB425 NB319 NB225 NB425 NB111 NB323 NB066 NB065 NB021 NB104 NB329 NB427 NB025 NB227 NB427 NB027 NB110 NB217 NB452 NB452 NB102 NB325 NB216 NB416 NB416 NB105 NB112 NB454 NB454 NB326 NB426 NB426 NB406 NB036 NB039 NB206 NB406 NB226 NB412 NB327 NB412 NB212 NB306 NB106 NB201 NB305 NB401 NB401 NB103 NB431 NB431 NB231 NB301 NB044 NB222 NB423 NB312 NB223 NB113 NB310 NB045 NB423 NB052 NB202 NB053 NB307 NB309 NB413 NB213 NB413 NB407 NB407 NB331 NB207 NB115 NB352 NB350 NB218 NB418 NB418 NB228 NB047 NB211 NB203 NB313 NB109 NB455 NB455 NB459 NB459 NB316 NB224 NB424 NB424 NB204 NB318 NB414 NB314 NB414 NB214 NB419 NB353 NB419 NB219 NB210 NB410 NB410 NB209 NB107 NB355 NB461 NB461 NB409 NB409 NB359 NB430 NB430 NB230 NB208 NB357 NB075 NB453 NB453 NB354 NB429 NB429 NB229 NB457 NB457

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

USEPA REMAP LOCATIONS -1993 THROUGH 2013

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-2

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00013)
T:_ENV\GSH\GIS\Task\NBSA\BERA\mxd\HistoricalBenthicIndexBioticIntegrity.mxd 7/21/2020 2:44:19 PM

LEGEND:

- USEPA (1993/1994)
- USEPA (1998)
- USEPA (2003)
- USEPA (2008)
- USEPA (2013)

B-IBI SCORE

- IMPACTED (1 TO <2)
- SLIGHTLY IMPACTED (2 TO <3)
- NON-IMPACTED (3 TO 5)
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
NEWARK BAY NORTH
NEWARK BAY CENTRAL
NEWARK BAY
NEWARK BAY SOUTH
KILL VAN KULL
SHOOTERS ISLAND

NB065 NB104 NB329 NB427 NB227 NB025 NB427 NB027 NB110 NB217 NB452 NB452 NB102 NB416 NB325 NB216 NB416 NB105 NB454 NB454 NB112 NB327 NB406 NB206 NB406 NB426 NB036 NB326 NB039 NB226 NB426 NB412 NB306 NB412 NB212 NB106 NB201 NB305 NB401 NB401 NB103 NB431 NB231 NB431 NB301 NB044 NB222 NB113 NB045 NB223 NB423 NB310 NB312 NB423 NB052 NB202 NB053 NB213 NB309 NB413 NB413 NB307 NB047 NB211

0 2,500 5,000 Feet
GRAPHIC SCALE

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. THE BENTHIC INVERTEBRATE COMMUNITY DATA WERE COLLECTED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) UNDER THE REGIONAL ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM (R-EMAP). THE NY/NJ HARBOR BENTHIC INDEX OF BIOTIC INTEGRITY (B-IBI) VALUES WERE EITHER PRESENTED IN PUBLISHED REPORTS OR CALCULATED DIRECTLY FROM THE SPECIES COUNT DATA.

   THE SOURCES OF DATA ARE AS FOLLOWS:
   USEPA (1993/94): EPA/902-R-98-001
   USEPA (1998): EPA/902-R-03-002
   USEPA (2003): https://archive.epa.gov/emap/archive-emap
   USEPA (2008 AND 2013): https://www.waterqualitydata.us

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

HISTORICAL BENTHIC INDEX OF BIOTIC INTEGRITY

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
2-3

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
T:_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig2-4_BenthicIndexBioticIntegrity.mxd 7/21/2020 2:54:01 PM

LEGEND:

B-IBI SCORE

- IMPACTED (1 TO <2)
- SLIGHTLY IMPACTED (2 TO <3)
- NON-IMPACTED (3 TO 5)
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
NEWARK BAY NORTH
NEWARK BAY CENTRAL
NEWARK BAY SOUTH
NEWARK BAY
KILL VAN KULL
SHOOTERS ISLAND

164 140 163 165 162 136 161 137 138 160 159 158 139 157 141 156 142 143 144 155 145 154 153 152 151 146 150 149 148 147

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. B-IBI = BENTHIC INDEX OF BIOTIC INTEGRITY

0 2,500 5,000 Feet
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

BENTHIC INDEX OF BIOTIC INTEGRITY RESULTS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
2-4

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-4_Overall Crab Clam Sediment Sampling Locations.mxd 2/6/2019 9:41:22 AM

LEGEND:

- CLAM AND SEDIMENT SAMPLING LOCATION
- INTERTIDAL CRAB SAMPLING LOCATION
- CRAB ZONE SAMPLING LOCATION
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
NEWARK BAY CDF (CELL 1S)
NEWARK BAY NORTH
NEWARK BAY CENTRAL
NEWARK BAY SOUTH
KILL VAN KULL
SHOOTERS ISLAND

122A, 122B, 122C, 122
123A, 123B, 123
133, 133
132A, 132B, 132
124, 124
125, 125
126
127A, 127B, 127
131A, 131B, 131
130, 130
135
129, 129
134, 134

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. THE GRAY SQUARES REPRESENT LOCATIONS WHERE CRAB TRAPS WERE PLACED FOR THE COLLECTION OF CRABS FOR THE ZONE SAMPLES (NEWARK BAY NORTH, CENTRAL, AND SOUTH). THE GREEN DIAMONDS REPRESENT INTERTIDAL CRAB SAMPLE LOCATIONS THAT WERE GEOREFERENCED. THE COMPOSITE CRAB ZONE SAMPLES WERE NOT GEOREFERENCED AND ARE NOT SHOWN ON THIS FIGURE.

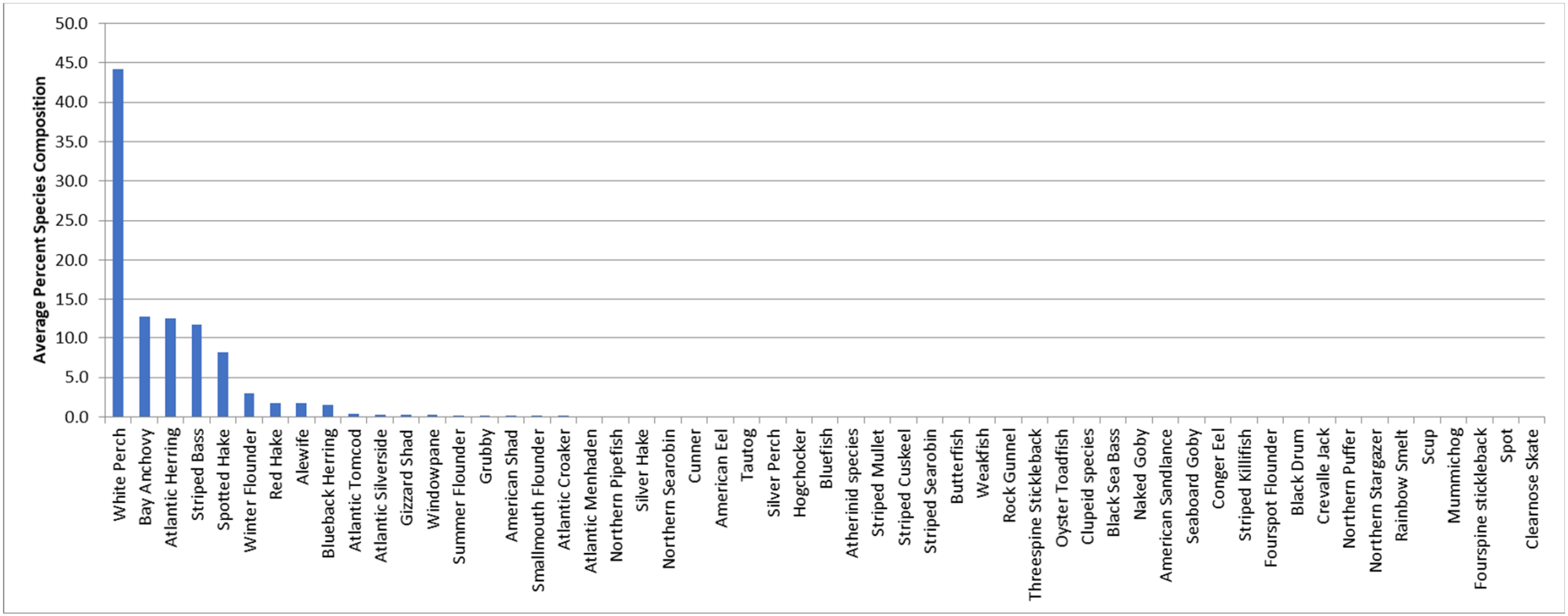
0 2,500 5,000 Feet
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

CRAB, CLAM, AND SEDIMENT SAMPLING LOCATIONS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-5



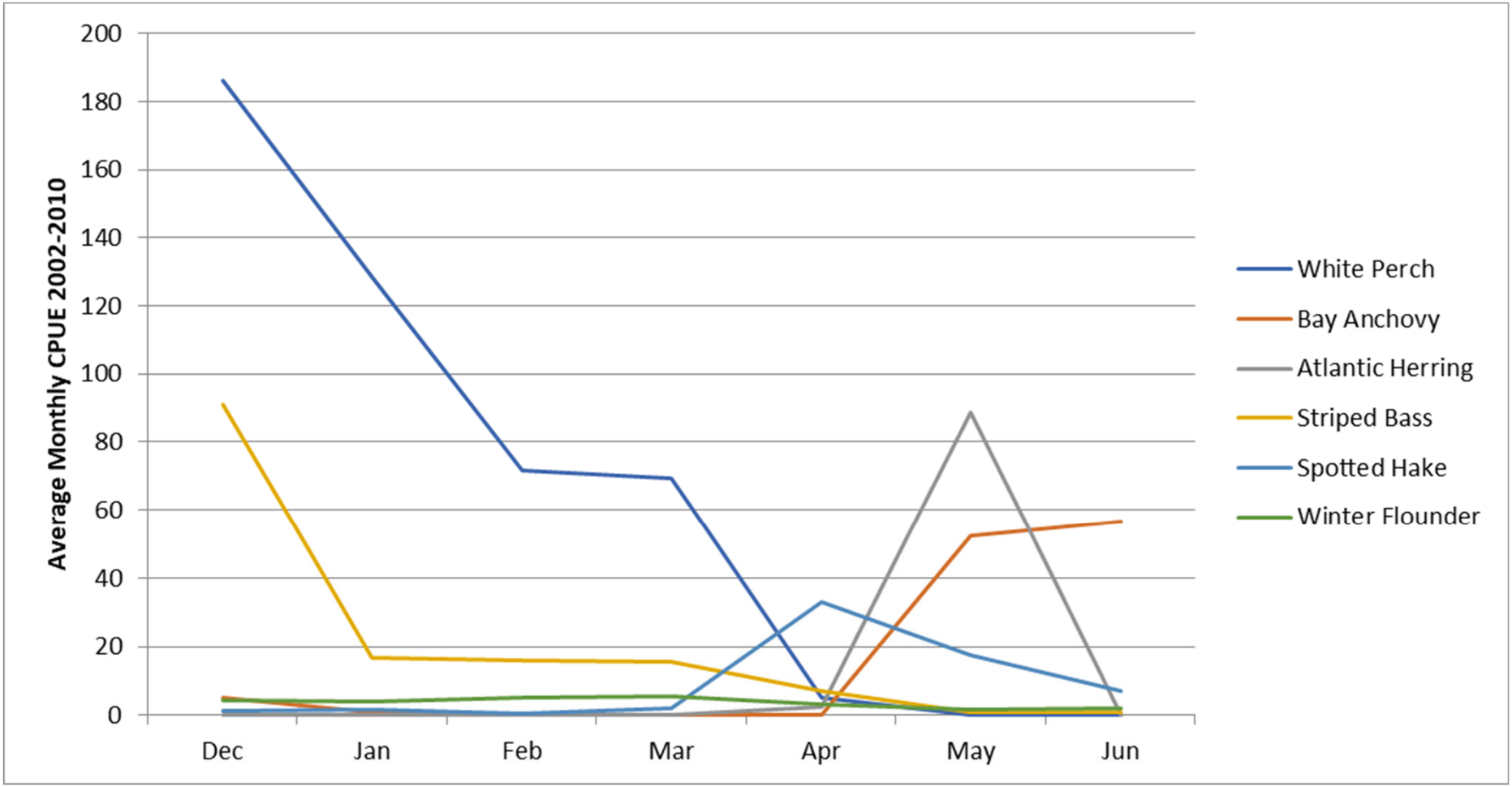
Notes:
CPUE = number of fish per 10-minute trawl
From the USACE Aquatic Biological Survey 2002-2010 bottom trawl/demersal fish surveys

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

AVERAGE PERCENT SPECIES CATCH PER UNIT EFFORT (CPUE) OF DEMERSAL FISH IN NEWARK BAY 2002-2010

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-6a



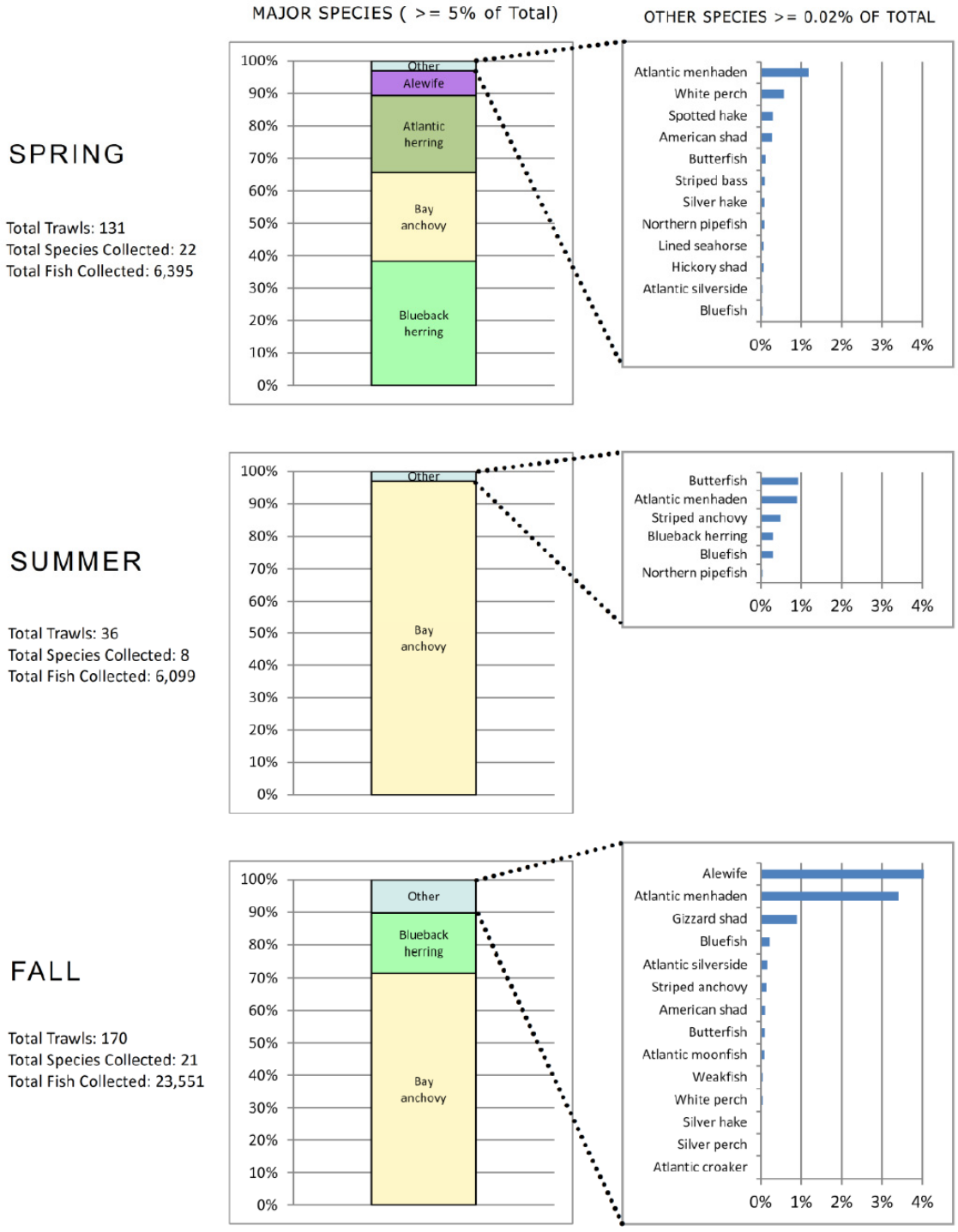
Notes:
CPUE = number of fish per 10-minute trawl
Six species are the predominant fish catch in terms of percent composition
From the USACE Aquatic Biological Survey 2002-2010 bottom trawl/demersal fish surveys

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

AVERAGE MONTHLY CATCH PER UNIT EFFORT (CPUE) OF DEMERSAL FISH IN NEWARK BAY 2002-2010

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-6b



Note:
Mid-water fish collections from the USACE Migratory Finfish Surveys in Newark Bay during 2006 and 2011-2013 spring (March – May), summer (June to August), and fall (September to December) seasons.

Reference:
USACE. 2015. Migratory Finfish Summary Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District. New York, New York.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SUMMARY OF SEASONAL CATCH IN MID-WATER TRAWLS IN NEWARK BAY, 2006 AND 2011-2013

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-7

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-5_FishSamplingLocs_2014Fall.mxd 2/6/2019 9:45:18 AM

LEGEND:

- EEL POT
- MINNOW TRAP
- SEINE
- TRAWL*
- TRAWL LINE
- GILLNET
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK

PORT NEWARK CHANNEL

NEWARK BAY NORTH

ELIZABETH CHANNEL

NEWARK LIBERTY INTERNATIONAL AIRPORT

NEWARK BAY CDF (CELL 1S)

NEWARK BAY CENTRAL

PERIPHERAL DITCH

SOUTH ELIZABETH CHANNEL

NEWARK BAY

NEWARK BAY SOUTH

KILL VAN KULL

SHOOTERS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. * LOCATIONS WHERE START AND END COORDINATES WERE NOT RECORDED.

0 2,500 5,000 Feet

GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FISH SAMPLING LOCATIONS - FALL 2014

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-8

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-6_FishSamplingLocs_2015Spring.mxd 2/6/2019 9:43:06 AM

LEGEND:

- ANGLING-DRIFT
- EEL POT
- TROTLINE
- ANGLING-TROLL
- GILLNET
- TRAWL
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK

PORT NEWARK CHANNEL

NEWARK BAY NORTH

ELIZABETH CHANNEL

NEWARK LIBERTY INTERNATIONAL AIRPORT

NEWARK BAY CDF (CELL 1S)

NEWARK BAY CENTRAL

PERIPHERAL DITCH

SOUTH ELIZABETH CHANNEL

NEWARK BAY

NEWARK BAY SOUTH

KILL VAN KULL

SHOOTERS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).

0 2,500 5,000 Feet

GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FISH SAMPLING LOCATIONS - SPRING/SUMMER 2015

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-9

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-7_FishSamplingLocs_2016Spring.mxd 2/6/2019 9:44:05 AM

LEGEND:

- GILLNET
- TRAWL
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK

PORT NEWARK CHANNEL

NEWARK BAY NORTH

ELIZABETH CHANNEL

NEWARK LIBERTY INTERNATIONAL AIRPORT

NEWARK BAY CDF (CELL 1S)

NEWARK BAY CENTRAL

PERIPHERAL DITCH

SOUTH ELIZABETH CHANNEL

NEWARK BAY

NEWARK BAY SOUTH

KILL VAN KULL

SHOOTERS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).

0 2,500 5,000 Feet

GRAPHIC SCALE

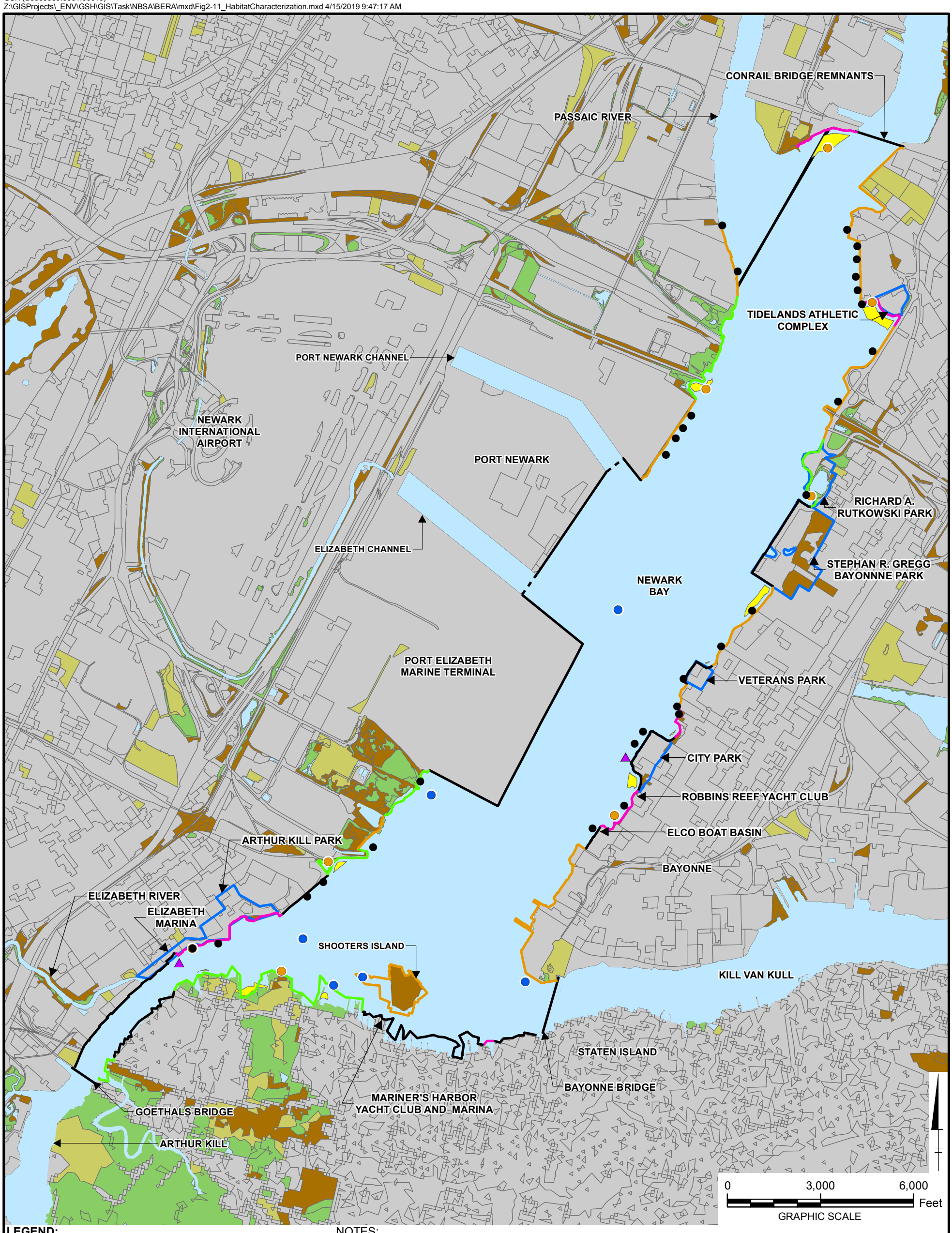
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FISH SAMPLING LOCATIONS - SPRING 2016

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-10

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
GSH (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig2-11_HabitatCharacterization.mxd 4/15/2019 9:47:17 AM



LEGEND:

- BIRD NEST LOCATION
- MAMMAL OBSERVATION
- DISCHARGE PIPE OBSERVATION
- BOAT RAMP
- NEWARK BAY STUDY AREA BOUNDARY
- INTERTIDAL AREA
- PARKS AND RECREATIONAL AREAS

OBSERVED SHORELINE HABITAT:

- BULKHEAD
- MIXED INTERTIDAL
- RIPRAP
- VEGETATION

LANDCOVER:

- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS

NOTES:

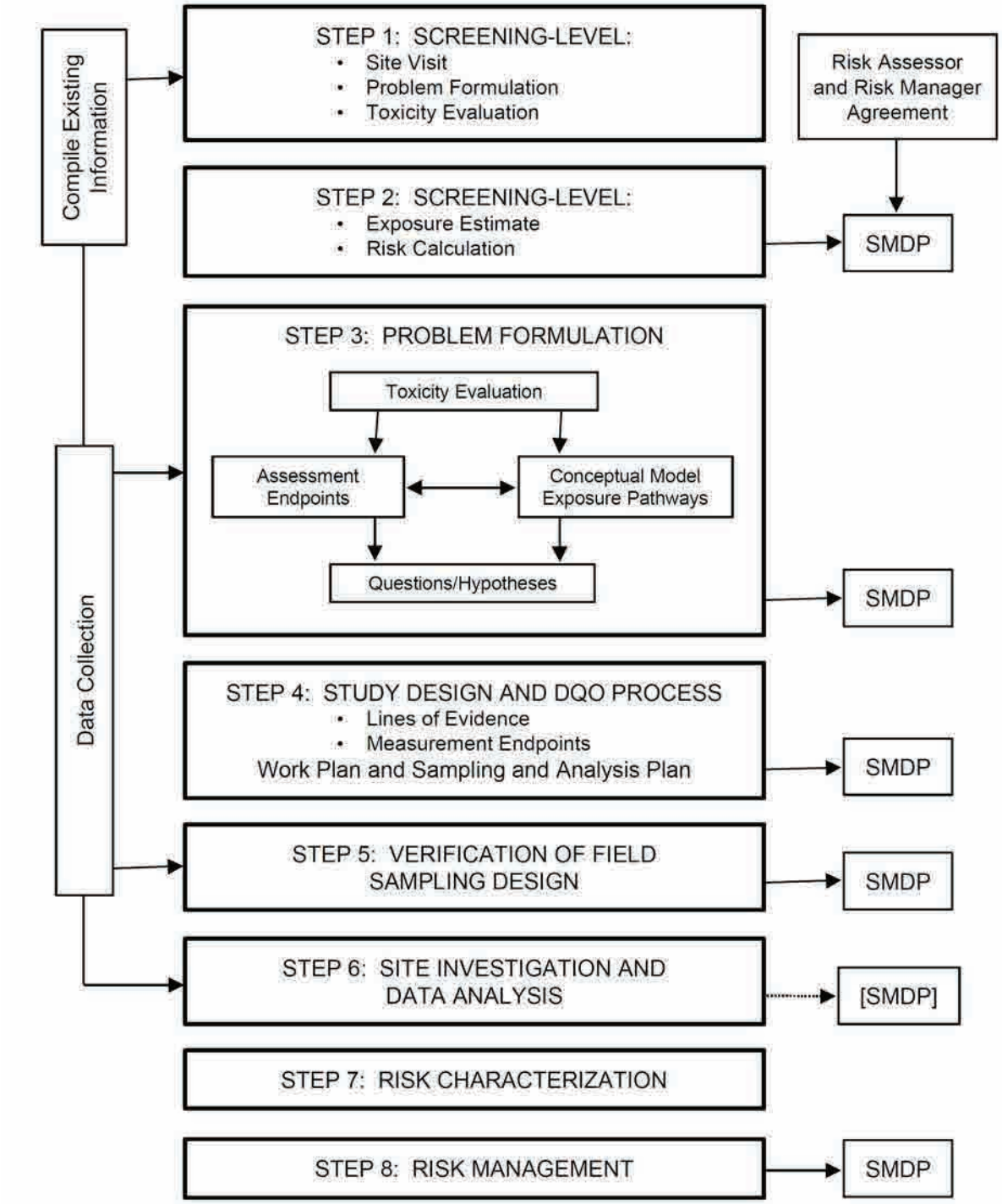
1. 2012 NEW JERSEY LAND USE DATA (UPDATED IN 2015) DOWNLOADED FROM THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION GEOGRAPHIC INFORMATION SYSTEM WEBSITE AT www.state.nj.us/dep/gis.
2. 2011 NEW YORK NATIONAL LAND COVER DATA DOWNLOADED FROM THE NEW YORK STATE GEOGRAPHIC INFORMATION SYSTEMS CLEARINGHOUSE AT www.nysgis.state.ny.us.
3. THE INTERTIDAL AREAS SHOWN ARE CONSISTENT WITH THOSE PRESENTED IN THE PROBLEM FORMULATION (TIERRA 2013) AND WERE VERIFIED DURING THE RECONNAISSANCE SURVEY. (TIERRA 2015)
4. THE NEWARK BAY STUDY AREA BOUNDARY WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I AND II SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.
5. REFERENCES:
TIERRA. 2013. FINAL NEWARK BAY STUDY AREA PROBLEM FORMULATION. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. TIERRA SOLUTIONS, INC., EAST BRUNSWICK, NJ. JUNE.
TIERRA. 2015. NEWARK BAY STUDY AREA RECONNAISSANCE SURVEY REPORT. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. APRIL.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

BIRD NEST AND MAMMAL OBSERVATION LOCATIONS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
2-11



SMDP = Scientific Management Decision Point

[SMDP] = only if change to the sampling and analysis plan is necessary

DQO = Data Quality Objective

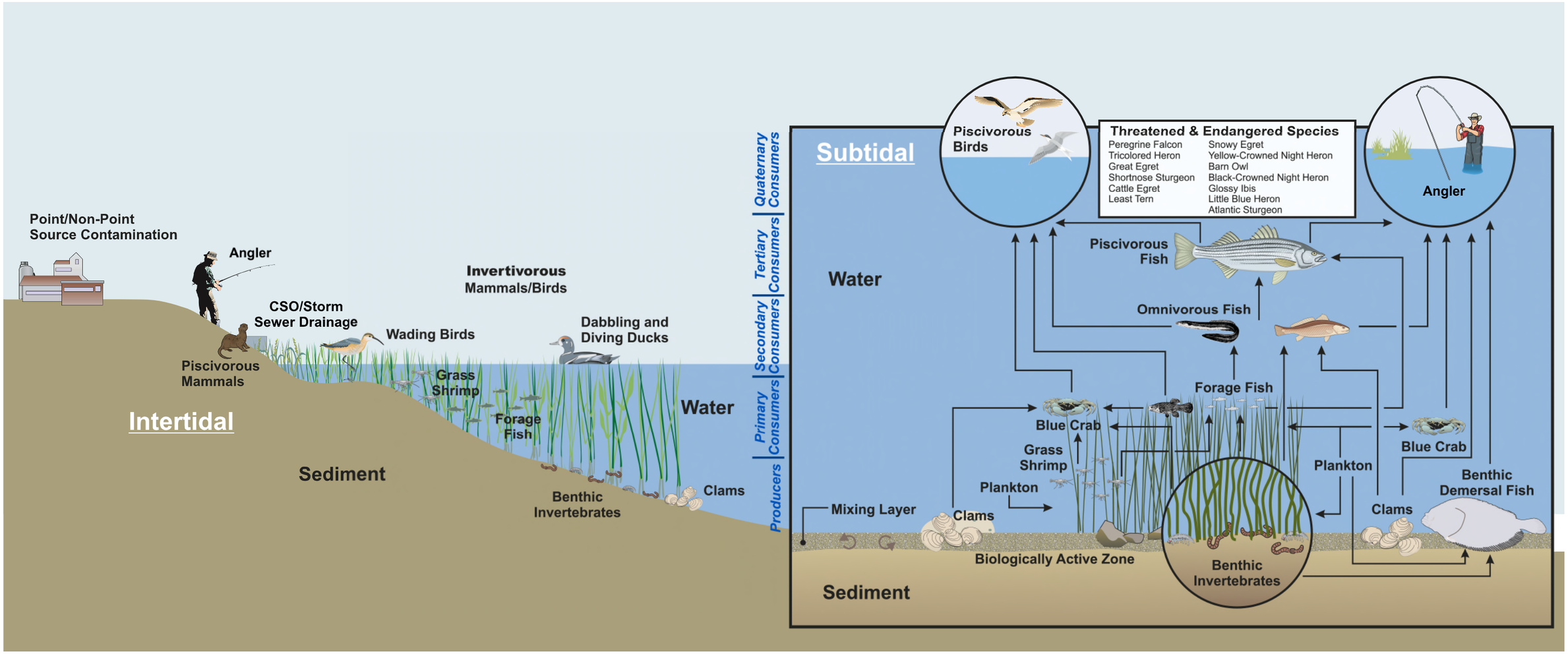
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

EIGHT-STEP ECOLOGICAL RISK ASSESSMENT PROCESS FOR SUPERFUND (USEPA 1997)

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
3-1

05/29/2013 SYRACUSE, NY-ENV/CAD DJHOWES
B0009989/0023/00003/CDR/09989G02.CDR



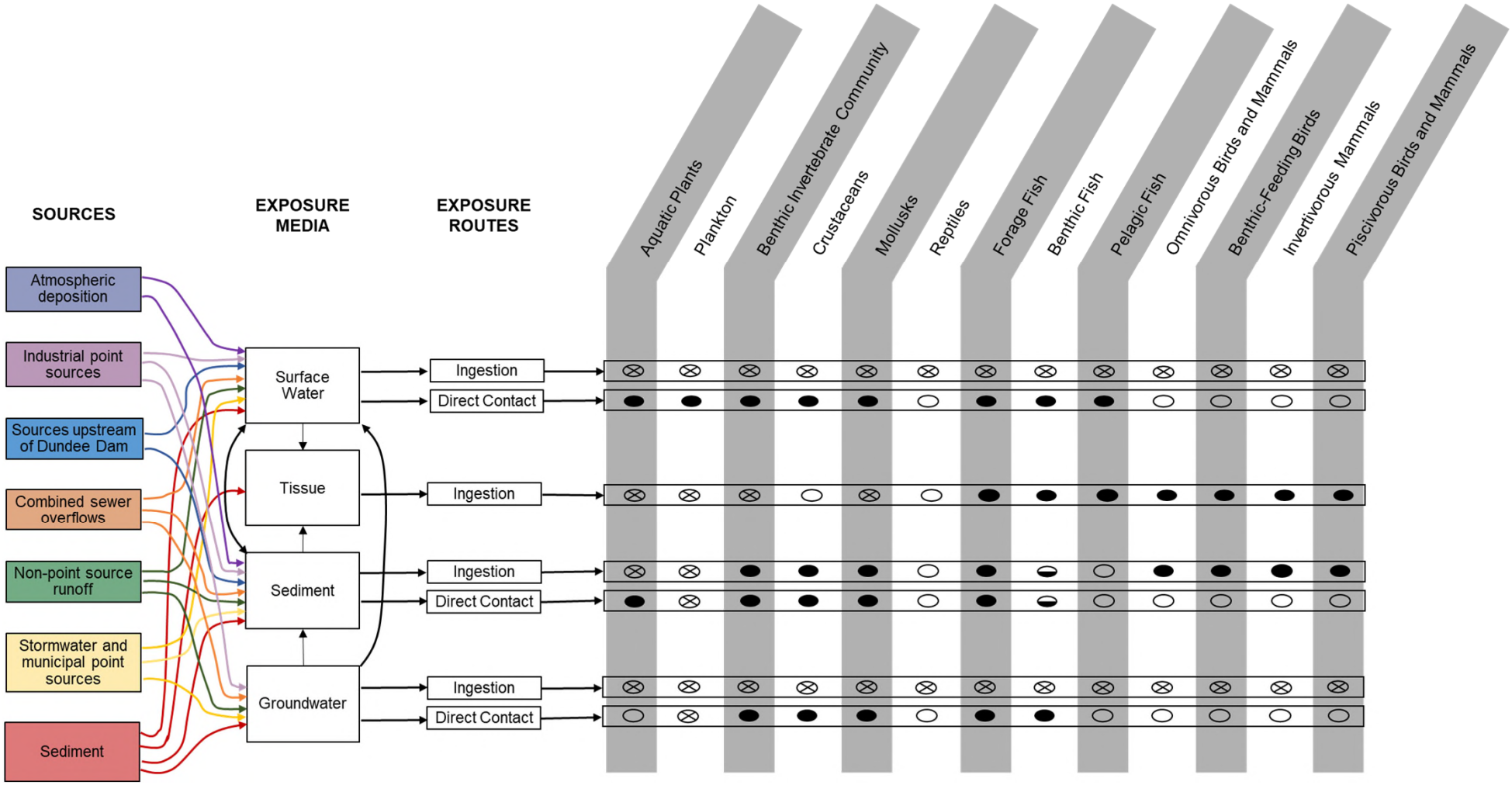
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

CONCEPTUAL FOOD WEB DIAGRAM

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
3-2

04/22/2020 \\ARCADIS-US.COM\OFFICE\DATA\SYRACUSE-NY\ENV\COM\PROJECT MATERIALS\30009165.00002\B. BUTTERLY\M. COFFEY



- Complete and major exposure pathway, quantitatively evaluated
- Complete and minor exposure pathway, qualitatively evaluated
- Incomplete pathway
- Complete exposure pathway but not determined whether major or minor

Note: While the tissue exposure pathways are listed as incomplete for plankton and the benthic invertebrate community, there are animals in each of these receptor groups that are both carnivorous and herbivorous/filter-feeders.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

ECOLOGICAL CONCEPTUAL SITE MODEL

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
3-3

City: CITRIX Div/Group: IM/DV Created By: ksinsabaugh Last Saved By: ldrum
Newark Bay (B0009989.0047.00001)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig3-4_Sampling Locations.mxd 8/27/2019 1:03:17 PM

LEGEND:

- CLAM AND SEDIMENT SAMPLING LOCATION
- INTERTIDAL CRAB SAMPLING LOCATION
- CRAB ZONE SAMPLING LOCATION
- ANGLING-DRIFT
- EEL POT
- TROTLINE
- GILLNET
- MINNOW TRAP
- SEINE
- TRAWL*
- SEPTEMBER 2015 SQT AND POREWATER SEDIMENT SAMPLING STATIONS
- GILLNET
- TRAWL
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY
- INTERTIDAL AREAS
- INDUSTRIAL WATERFRONT

ASSESSMENT ZONES

- NORTH
- SOUTHEAST
- SOUTHWEST
- REGULARLY DREDGED DEEP WATER CHANNELS

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
KILL VAN KULL
SHOOTERS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. THE GRAY SQUARES REPRESENT LOCATIONS WHERE CRAB TRAPS WERE PLACED FOR THE COLLECTION OF CRABS FOR THE ZONE SAMPLES. THE COMPOSITE CRAB ZONE SAMPLES WERE NOT GEOREFERENCED AND ARE NOT SHOWN ON THIS FIGURE.
4. * LOCATIONS WHERE START AND END COORDINATES WERE NOT RECORDED.
5. SQT REPRESENTS THREE ANALYSES: SEDIMENT CHEMISTRY, BENTHIC INVERTEBRATE COMMUNITY, AND TOXICITY TESTING WITH L. PLUMULOSUS (10-DAY AND 28-DAY).
6. SEE TABLES 4-10 AND 4-11 FOR SAMPLE IDs IN EACH ZONE.

0 2,500 5,000 Feet
GRAPHIC SCALE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

BASELINE ECOLOGICAL RISK ASSESSMENT

NEWARK BAY SAMPLING LOCATIONS AND ASSESSMENT ZONES

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
3-4

City: Citrix Div/Group: IM/DV Created By: K. SINSABAUGH Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-1_SW_SampleLocs.mxd 2/6/2019 9:52:39 AM

LEGEND:

- PHYSICAL AND CHEMICAL SURFACE WATER SAMPLE LOCATION
- CHEMICAL ONLY SURFACE WATER SAMPLE LOCATION
- PHYSICAL ONLY SURFACE WATER SAMPLE LOCATION
- TIDAL 1
- TIDAL 2
- NEWARK BAY STUDY AREA
- SHORELINE
- UNDERGROUND TRIBUTARY

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. CHEMICAL DATA WERE COLLECTED DURING EIGHT FIELD SAMPLING EVENTS (2011-2013) BY THE COOPERATING PARTIES GROUP IN ACCORDANCE WITH THE QUALITY ASSURANCE PROJECT PLAN AND FIELD SAMPLING PLAN ADDENDUM (AECOM 2011).
4. PHYSICAL DATA WERE COLLECTED IN MARCH - NOVEMBER 2010 BY THE COOPERATING PARTIES GROUP IN ACCORDANCE WITH THE QUALITY ASSURANCE PROJECT PLAN/FIELD SAMPLING PLAN ADDENDUM (AECOM 2010).
5. REFERENCES:
   A. AECOM. 2011. QUALITY ASSURANCE PROJECT PLAN/FIELD SAMPLING PLAN ADDENDUM, REMEDIAL INVESTIGATION WATER COLUMN MONITORING/SMALL VOLUME CHEMICAL DATA COLLECTION, LOWER PASSAIC RIVER RESTORATION PROJECT. REVISION 2.
   B. AECOM 2010. REMEDIAL INVESTIGATION WATER COLUMN MONITORING/PHYSICAL DATA COLLECTION FOR THE LOWER PASSAIC RIVER, NEWARK BAY AND WET WEATHER MONITORING: LOWER PASSAIC RIVER RESTORATION PROJECT. QUALITY ASSURANCE PROJECT PLAN. REVISION 5.
6. THE LOCATION OF TIDAL 1 VARIED BY EVENT AND IS APPROXIMATELY ONE MILE DOWNSTREAM OF THE SALT WEDGE. THE LOCATION OF TIDAL 2 VARIED BY EVENT AND IS APPROXIMATELY HALFWAY BETWEEN TIDAL 1 AND STATION 014 BUT NOT ABOVE STATION 042.

0 1.25 2.5 Miles

GRAPHIC SCALE

175
DUNDEE DAM
SR1
SADDLE RIVER
PASSAIC
135
BERGEN
3R1
102
2R1
ESSEX
067
PASSAIC RIVER
HACKENSACK RIVER
HKN
042
014
HUDSON
PIERSONS CREEK
CONRAIL BRIDGE REMNANTS
000
PORT NEWARK CHANNEL
NNE
ELIZABETH CHANNEL
NBN
NNW
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
NBE
PERIPHERAL DITCH
UNION
SOUTH ELIZABETH CHANNEL
NBS
KILL VAN KULL
ARK
KVK
MORSES CREEK
GOETHALS BRIDGE
BAYONNE BRIDGE
ARTHUR KILL
SHOOTERS ISLAND
PILES CREEK

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SURFACE WATER SAMPLE LOCATIONS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
4-1

CITY: Citrix DIV/GROUP: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
Newark Bay (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-2_SQTSedimentSamplingStations.mxd 2/6/2019 10:31:31 AM

LEGEND:

- CLAM AND SEDIMENT SAMPLING LOCATION
- SURFACE WATER COLLECTION LOCATION

ANALYSES
- BHHRA
- SQT/PW
- SQT/PW+Bio
- SQT/PW+BHHRA
- SQT/PW+Bio+BHHRA

GEOMORPHIC AREAS
- NAVIGATION CHANNELS
- SUBTIDAL FLATS
- TRANSITIONAL SLOPES
- INTERTIDAL AREAS
- POTENTIAL HUMAN-SEDIMENT CONTACT LOCATION
- SHORELINE
- UNDERGROUND TRIBUTARY
- GEOGRAPHIC ZONE BOUNDARY

GEOMORPHIC AREAS:
- HISTORICALLY DISTURBED SUBTIDAL FLATS
- INDUSTRIAL WATERFRONT
- INTERTIDAL AREA
- NAVIGATION CHANNEL
- PORT CHANNEL
- SUBTIDAL FLATS
- TRANSITIONAL SLOPES

OBSERVED SHORELINE USE:
- DISTURBED UPLANDS
- HABITAT
- HABITAT/RECREATIONAL
- INDUSTRIAL/COMMERCIAL
- RECREATIONAL
- RESIDENTIAL

0 2,500 5,000 Feet
GRAPHIC SCALE

CONRAIL BRIDGE REMNANTS
HACKENSACK RIVER
PASSAIC RIVER
PIERSONS CREEK
PORT NEWARK CHANNEL
INDUSTRIAL/COMMERCIAL ACCESS AREA
LEHIGH VALLEY RAILROAD BRIDGE
NEW JERSEY TURNPIKE
RICHARD A RUTOWSKI PARK
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
VETERANS PARK
TRAILER PARK
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
ARTHUR KILL
KILL VAN KULL
SHOOTERS ISLAND
BAYONNE BRIDGE

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. THE GEOMORPHIC AREAS SHOWN ARE CONSISTENT WITH THOSE PRESENTED IN THE CSM (GSH 2018).
4. SQT REPRESENTS THREE ANALYSES: SEDIMENT CHEMISTRY, BENTHIC INVERTEBRATE COMMUNITY, AND TOXICITY TESTING WITH L. PLUMULOSUS (10-DAY AND 28-DAY).
5. SURFACE WATER WAS NOT A TARGETED SAMPLING MATRIX. SURFACE WATER WAS COLLECTED AND USED IN THE FIELD FACILITY FOR THE SHIPMENT OF SEDIMENT FOR POREWATER ANALYSES.
6. GEOMORPHIC AREA DESIGNATIONS FOR EACH SAMPLING LOCATION ARE BASED ON THE FIELD-COLLECTED GEOGRAPHIC COORDINATES OF THE ACTUAL SAMPLING LOCATIONS AS RECORDED DURING SEDIMENT COLLECTION ACTIVITIES. (GSH 2017)
7. CLAM AND SEDIMENT SAMPLING LOCATIONS SHOWN ARE IDENTICAL TO THOSE ON FIGURE 2-4.
8. REFERENCES:
A. GSH. 2018. CONCEPTUAL SITE MODEL. NEWARK BAY STUDY AREA. REVISION 2. AUGUST.
B. GSH. 2017. SEDIMENT QUALITY TRIAD AND POREWATER FIELD REPORT. NEWARK BAY STUDY AREA. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. REVISION 1. SEPTEMBER.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SQT AND POREWATER SAMPLING STATIONS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
4-2

City: SYR Div/Group: IM/DV Created By: ksinsabaugh Last Saved By: ksinsabaugh
Newark Bay (B0009989.0045.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-3_PhIIISedimentCollectionLocations.mxd 2/6/2019 9:47:46 AM

LEGEND:

- ACTUAL PHASE III SEDIMENT SAMPLING LOCATION
- INDIVIDUAL LOCATIONS WHICH COMPRISE COMPOSITE SAMPLES
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- BOUNDARY OF PHASE III COMPOSITE SAMPLING AREA

PROPOSED USEPA SUBUNIT

- 1
- 2
- 3
- 4
- 5
- 6

PASSAIC RIVER
PIERSONS CREEK
PORT NEWARK CHANNEL
COMP01
ELIZABETH CHANNEL
COMP10
COMP02
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
COMP04
SOUTH ELIZABETH CHANNEL
COMP03
COMP05
PERIPHERAL DITCH
COMP08
COMP06
COMP09
KILL VAN KULL
COMP07
SHOOTERS ISLAND
ARTHUR KILL
PRALLS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. COMPOSITE SAMPLES WERE COLLECTED IN THE DREDGED PORTION OF THE NAVIGATION CHANNEL DURING THE 2016 PHASE III SAMPLING PROGRAM.
4. THE PHASE III SEDIMENT INVESTIGATION FIELD REPORT (GSH 2017) PROVIDES INFORMATION REGARDING SAMPLE LOCATIONS WHICH WERE SHIFTED FROM PROPOSED LOCATIONS, OR WERE ABANDONED DUE TO LACK OF RECOVERY.
5. REFERENCES:
A. GSH. 2017. NEWARK BAY STUDY AREA PHASE III SEDIMENT INVESTIGATION FIELD REPORT. REVISION 1. JUNE.

0 3,000 6,000 Feet
GRAPHIC SCALE

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PHASE III SEDIMENT SAMPLING LOCATIONS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
4-3

City: SYR Div/Group: IM/DV Created By: ksinsabaugh Last Saved By: kgpeters
Newark Bay (B0009989.0045.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig4-4_PhIIISedimentCollectionLocations_Apr2020.mxd 4/20/2020 12:27:52 PM

LEGEND:

- SUBTIDAL
- SHORELINE
- SHORELINE / INTERTIDAL MUDFLAT
- REGULARLY DREDGED NAVIGATION CHANNEL
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- BOUNDARY OF PHASE III COMPOSITE SAMPLING AREA

BERA ASSESSMENT ZONES

- NORTH
- SOUTHEAST
- SOUTHWEST
- REGULARLY DREDGED DEEP WATER CHANNEL
- UNMAINTAINED/UNDREDGED NAVIGATION CHANNEL

PASSAIC RIVER
PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
KILL VAN KULL
SHOOTERS ISLAND
ARTHUR KILL
PRALLS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
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3. COMPOSITE SAMPLES WERE COLLECTED IN THE DREDGED PORTION OF THE NAVIGATION CHANNEL DURING THE 2016 PHASE III SAMPLING PROGRAM.
4. THE PHASE III SEDIMENT INVESTIGATION FIELD REPORT (GSH 2017) PROVIDES INFORMATION REGARDING SAMPLE LOCATIONS WHICH WERE SHIFTED FROM PROPOSED LOCATIONS, OR WERE ABANDONED DUE TO LACK OF RECOVERY.
5. ALL INTERTIDAL MUDFLATS ARE ALSO CATEGORIZED AS SHORELINE.
6. REFERENCES:
A. GSH. 2017. NEWARK BAY STUDY AREA PHASE III SEDIMENT INVESTIGATION FIELD REPORT. REVISION 1. JUNE.

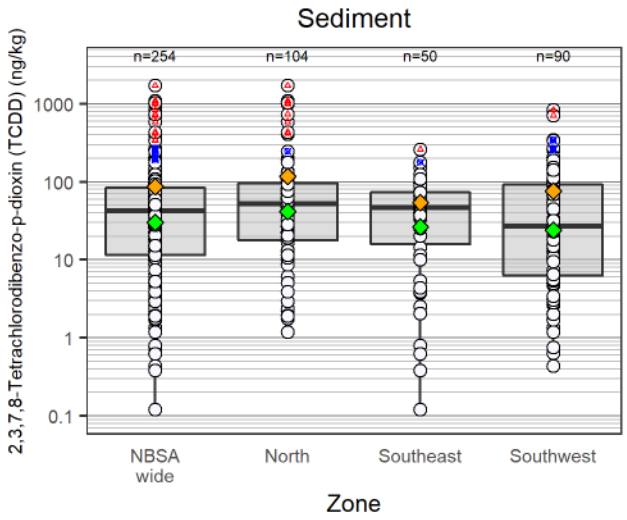
0 3,000 6,000 Feet
GRAPHIC SCALE

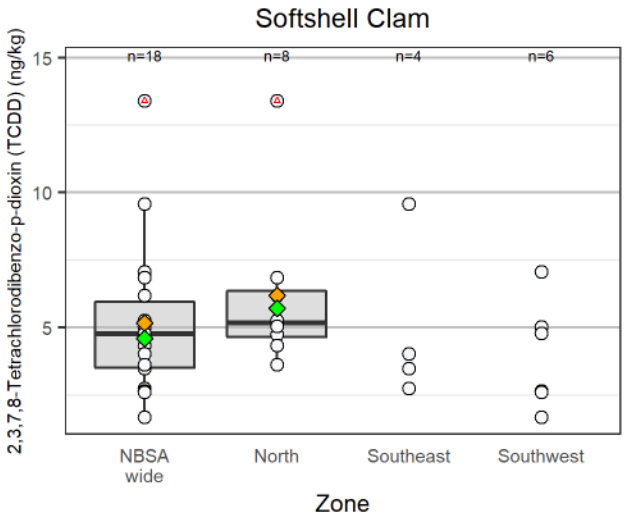
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

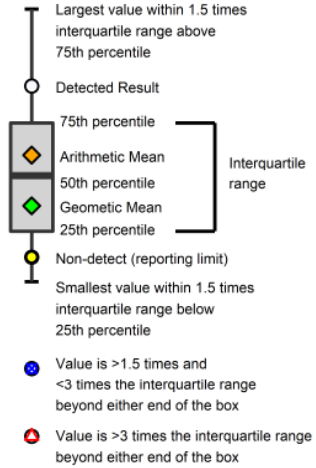
SEDIMENT SAMPLES USED FOR RISK ASSESSMENT

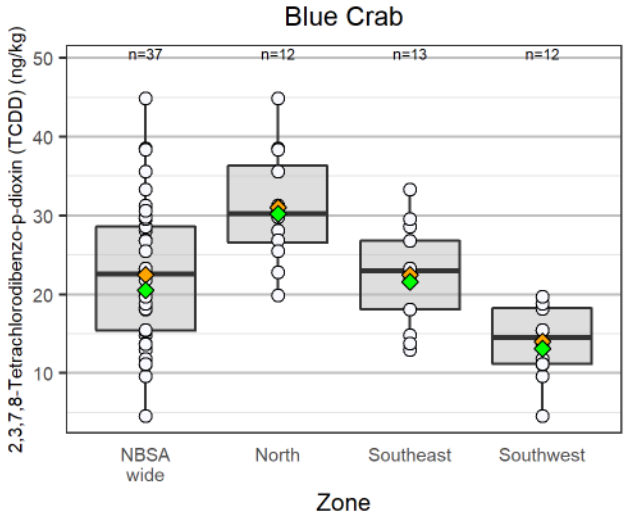
Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

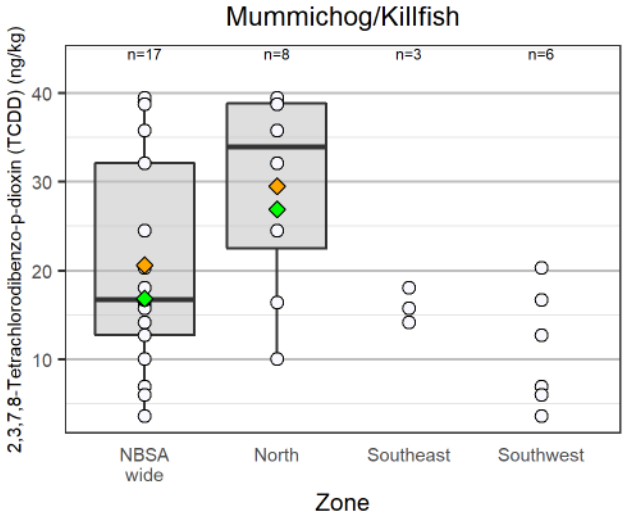
FIGURE
4-4











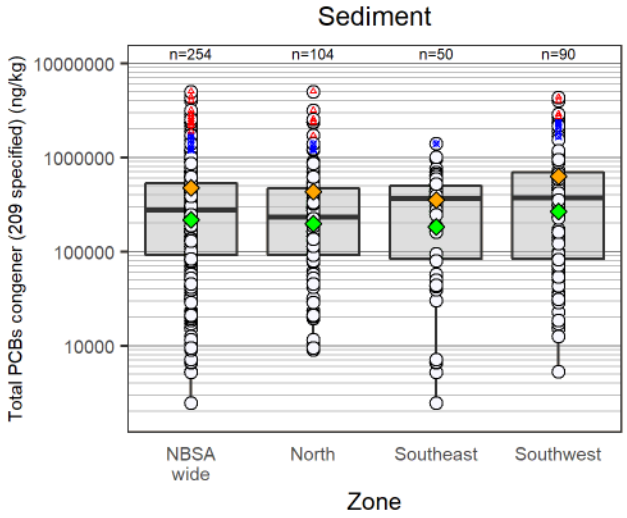
Notes:
Includes Phase III sediment and whole-body biota samples.
n = number of samples
Non-detects plotted at the reporting limit.
For percentiles, non-detects included at the reporting limit.
For arithmetic and geometric mean, non-detects included at 1/2 the reporting limit.
Pink shaded area represents range of non-detect reporting limits.
Percentiles/mean not estimated for n<8 and/or frequency of detection<50%.

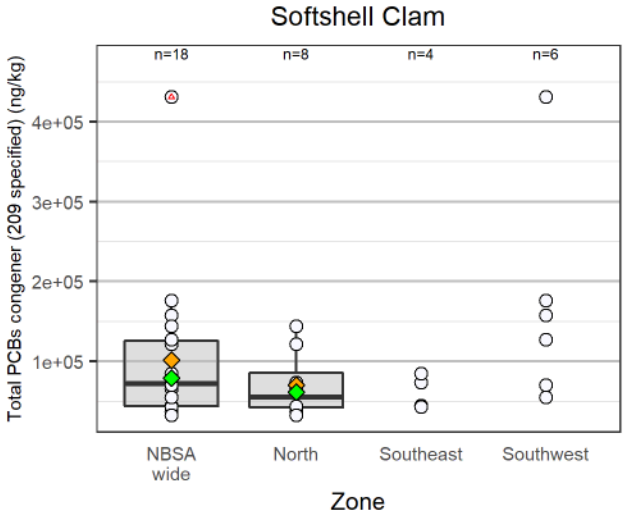
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

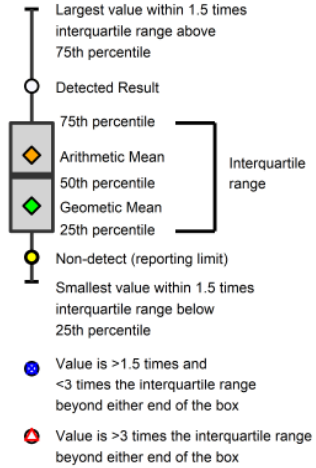
SEDIMENT & BIOTA TISSUE BOXPLOTS:2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (TCDD)

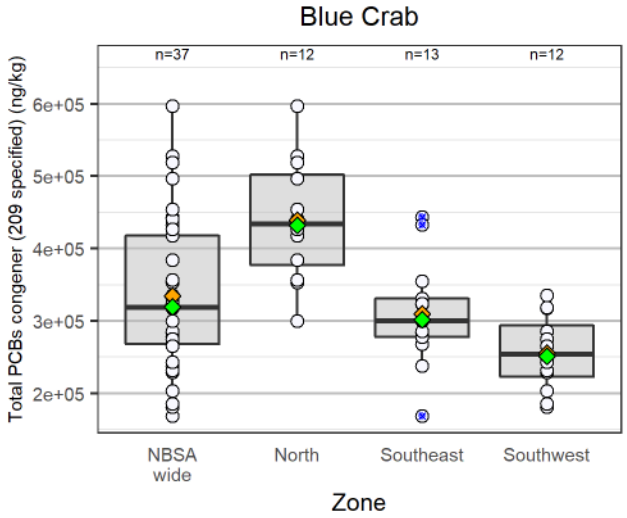
OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

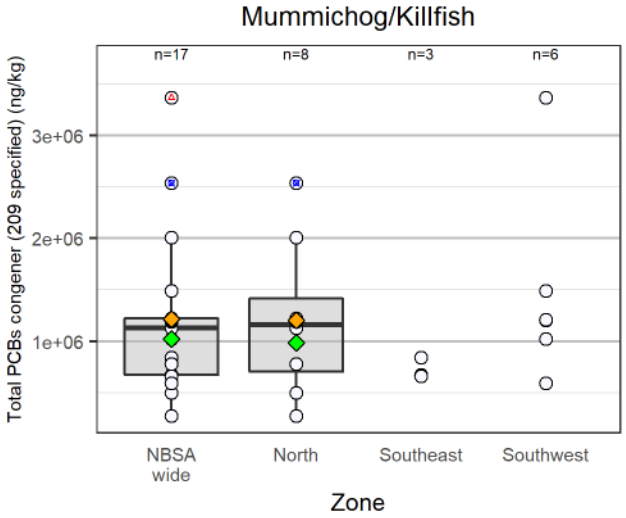
FIGURE
4-5











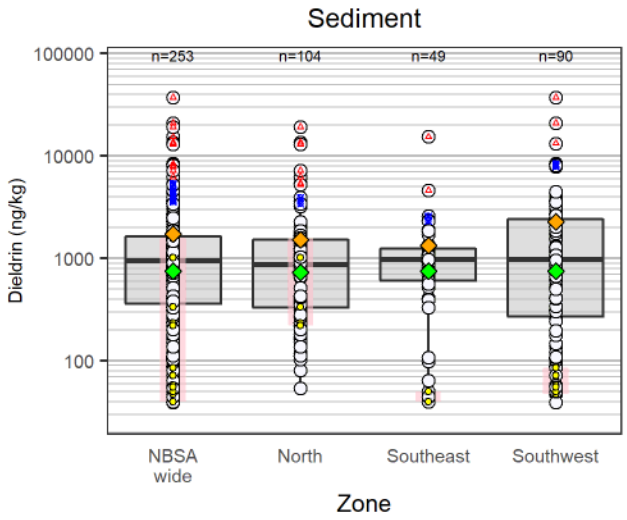
Notes:
Includes Phase III sediment and whole-body biota samples.
n = number of samples
Non-detects plotted at the reporting limit.
For percentiles, non-detects included at the reporting limit.
For arithmetic and geometric mean, non-detects included at 1/2 the reporting limit.
Pink shaded area represents range of non-detect reporting limits.
Percentiles/mean not estimated for n<8 and/or frequency of detection<50%.

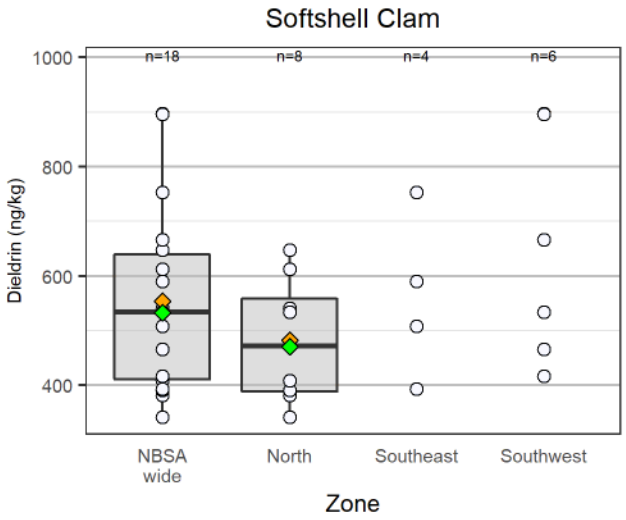
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

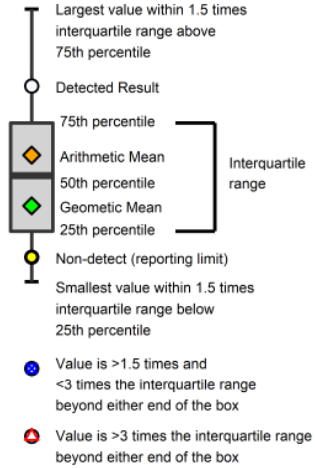
SEDIMENT & BIOTA TISSUE BOXPLOTS:TOTAL PCBS CONGENER (209 SPECIFIED)

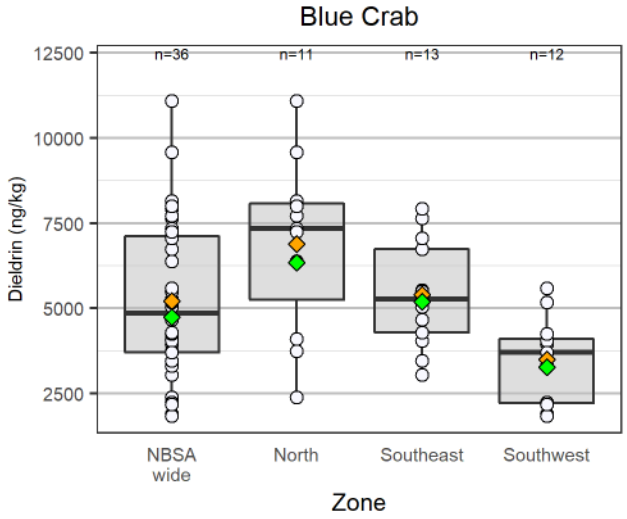
OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

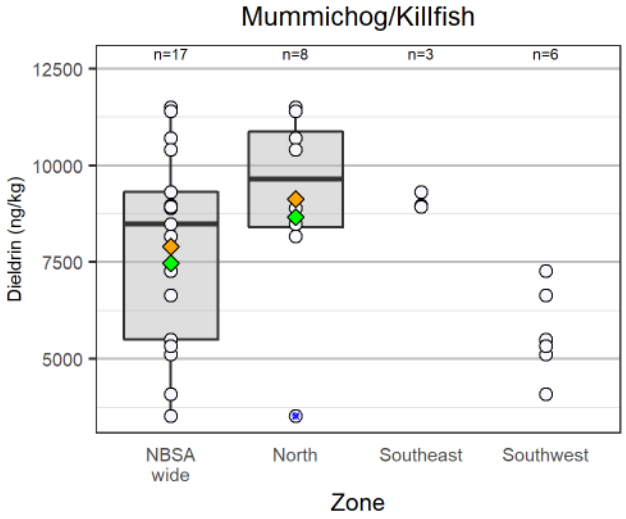
FIGURE
4-5











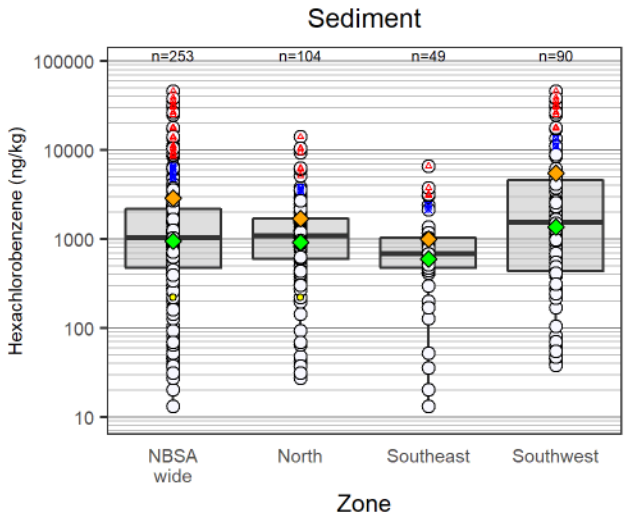
Notes:
Includes Phase III sediment and whole-body biota samples.
n = number of samples
Non-detects plotted at the reporting limit.
For percentiles, non-detects included at the reporting limit.
For arithmetic and geometric mean, non-detects included at 1/2 the reporting limit.
Pink shaded area represents range of non-detect reporting limits.
Percentiles/mean not estimated for n<8 and/or frequency of detection<50%.

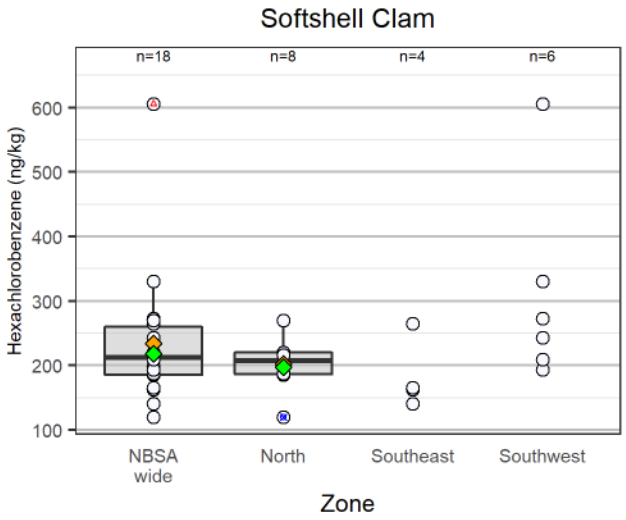
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

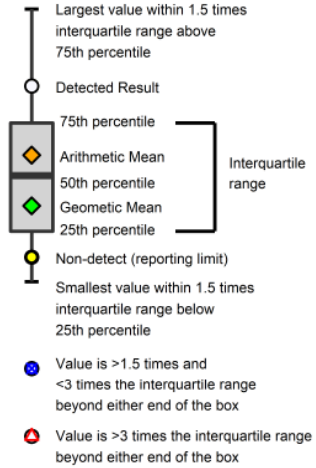
SEDIMENT & BIOTA TISSUE BOXPLOTS:DIELDRIN

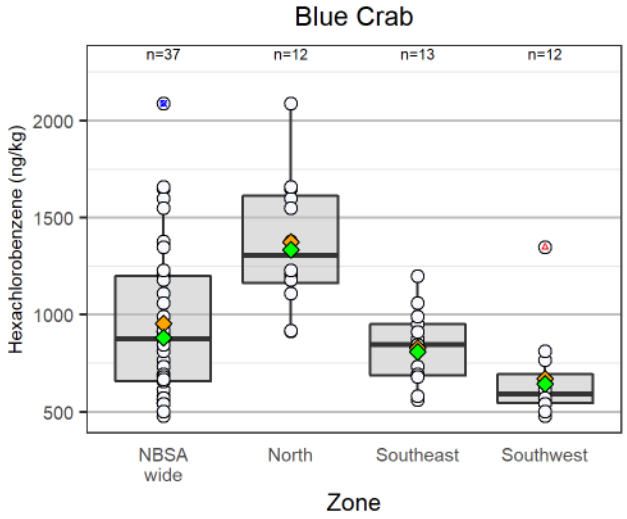
OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

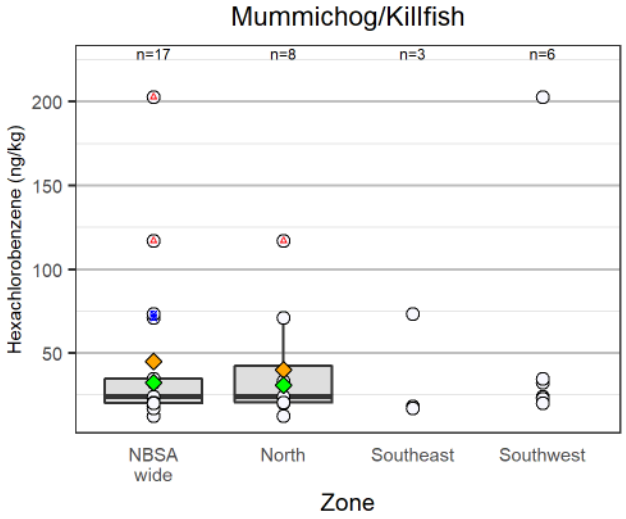
FIGURE
4-5











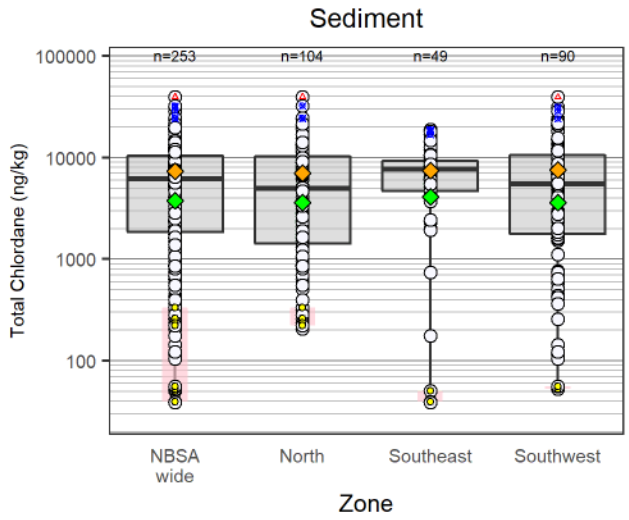
Notes:
Includes Phase III sediment and whole-body biota samples.
n = number of samples
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For arithmetic and geometric mean, non-detects included at 1/2 the reporting limit.
Pink shaded area represents range of non-detect reporting limits.
Percentiles/mean not estimated for n<8 and/or frequency of detection<50%.

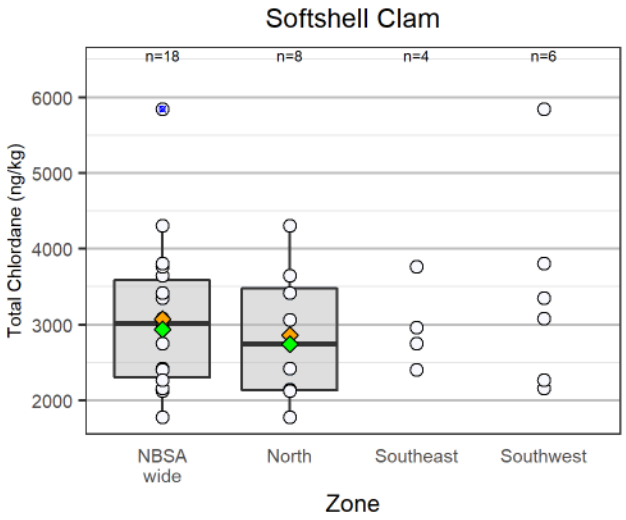
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

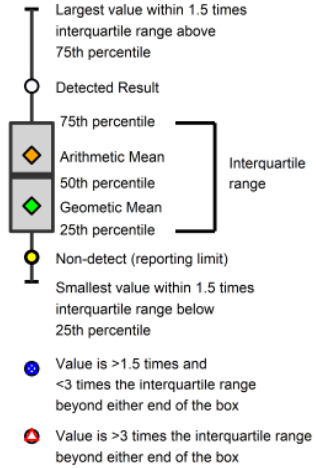
SEDIMENT & BIOTA TISSUE BOXPLOTS:HEXACHLOROBENZENE

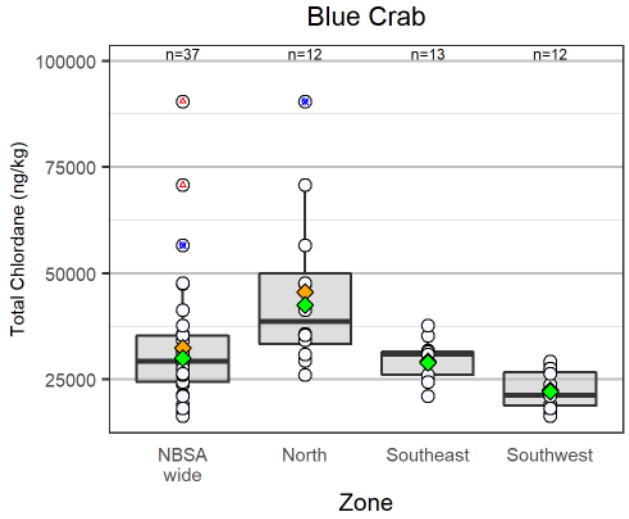
OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

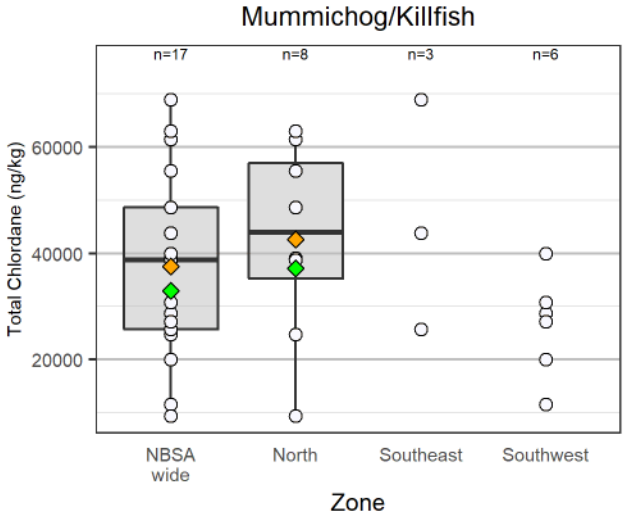
FIGURE
4-5











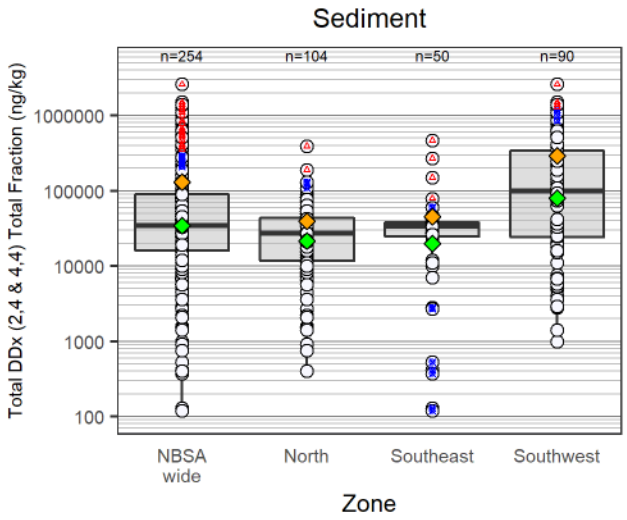
Notes:
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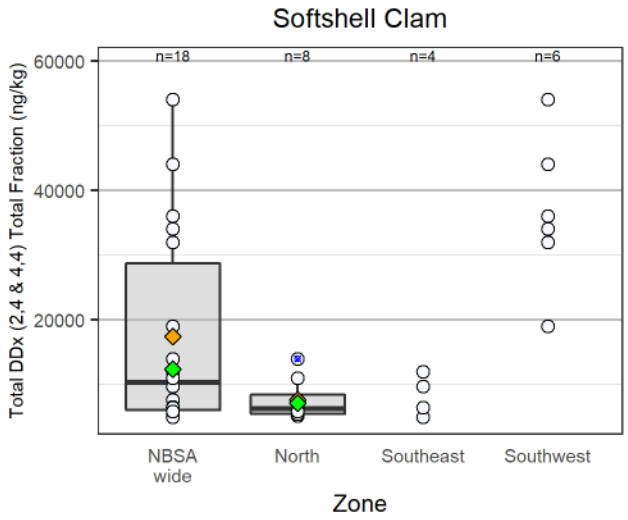
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

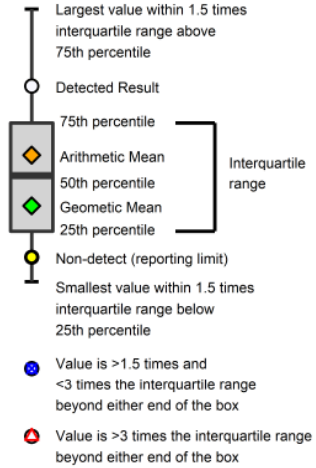
SEDIMENT & BIOTA TISSUE BOXPLOTS:TOTAL CHLORDANE

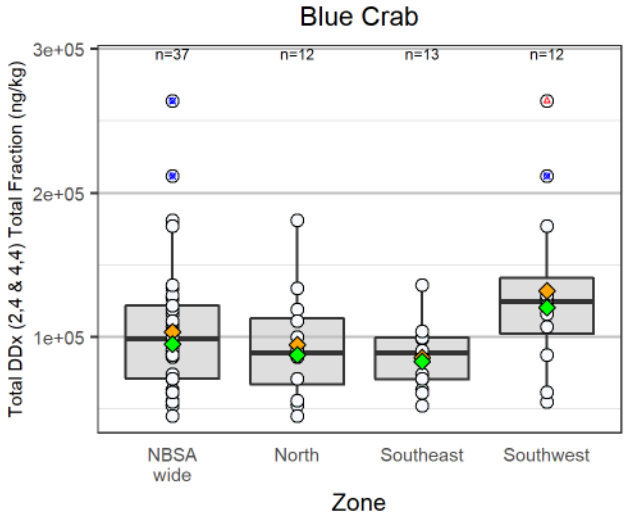
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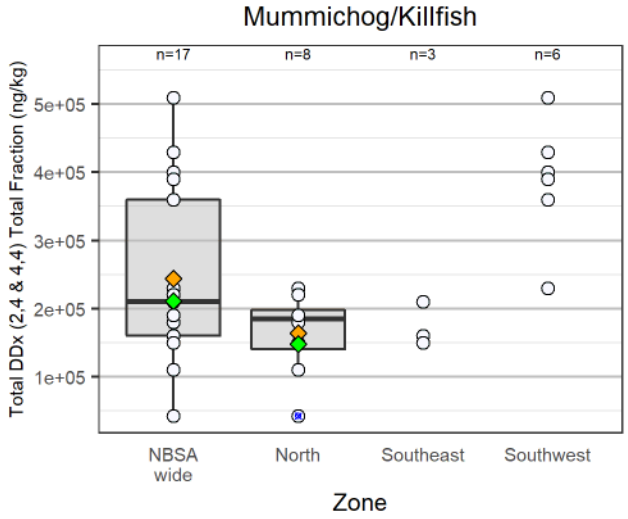
FIGURE
4-5











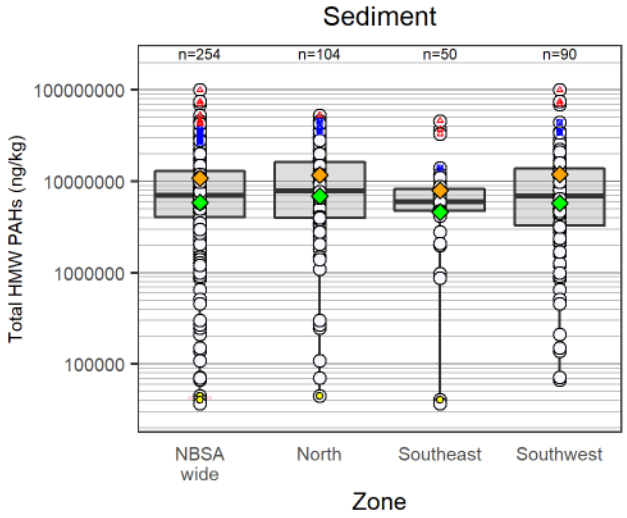
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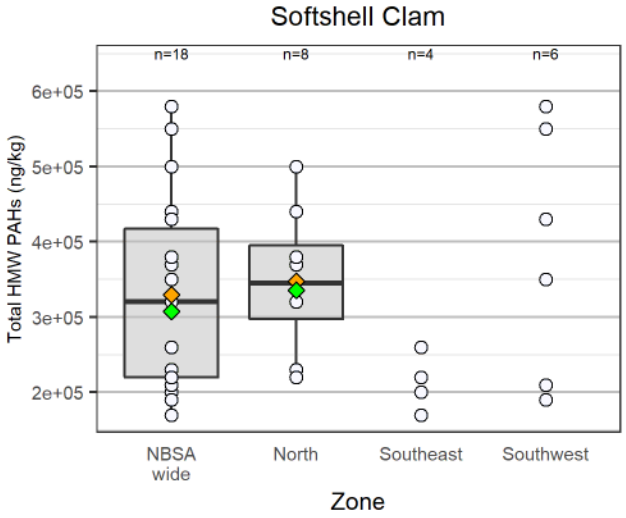
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

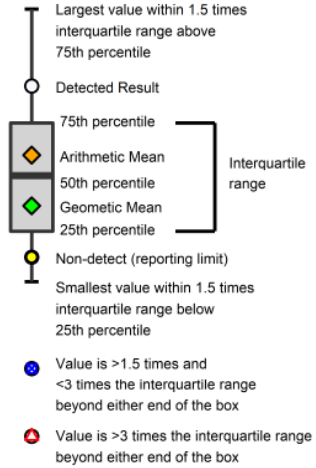
SEDIMENT & BIOTA TISSUE BOXPLOTS:TOTAL DDX (2,4 & 4,4) TOTAL FRACTION

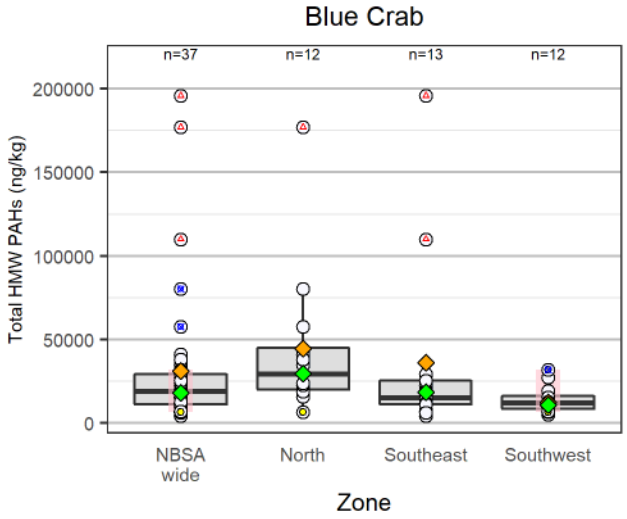
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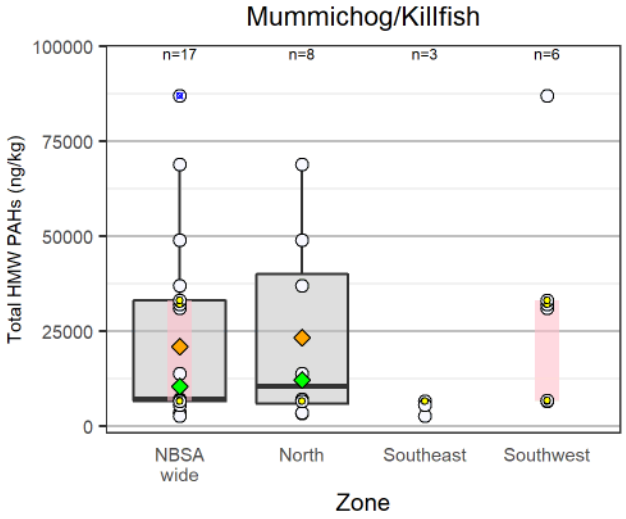
FIGURE
4-5











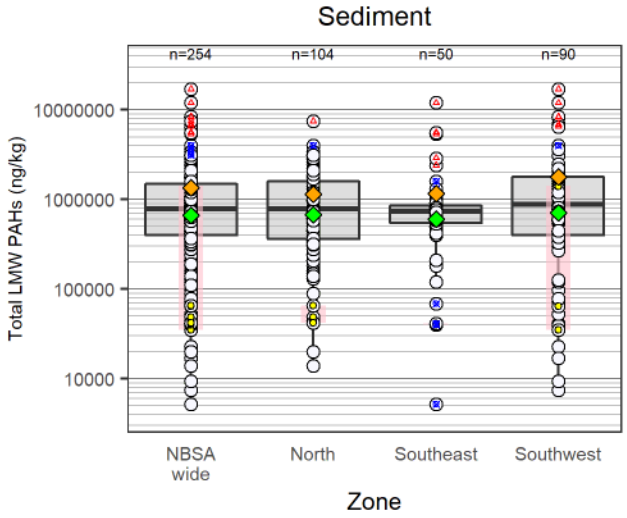
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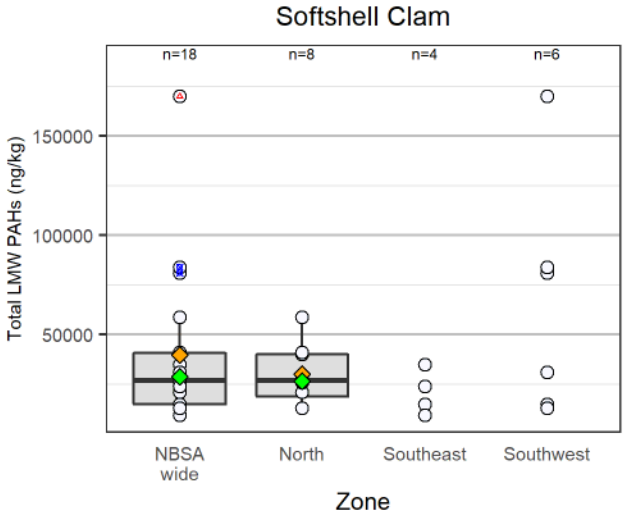
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

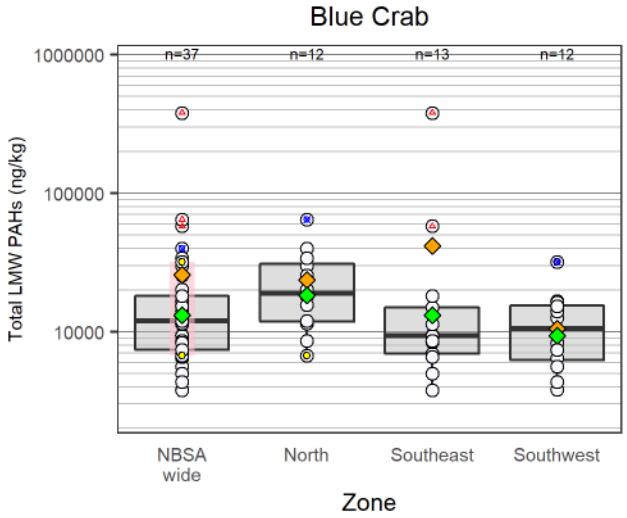
SEDIMENT & BIOTA TISSUE BOXPLOTS:TOTAL HMW PAHS

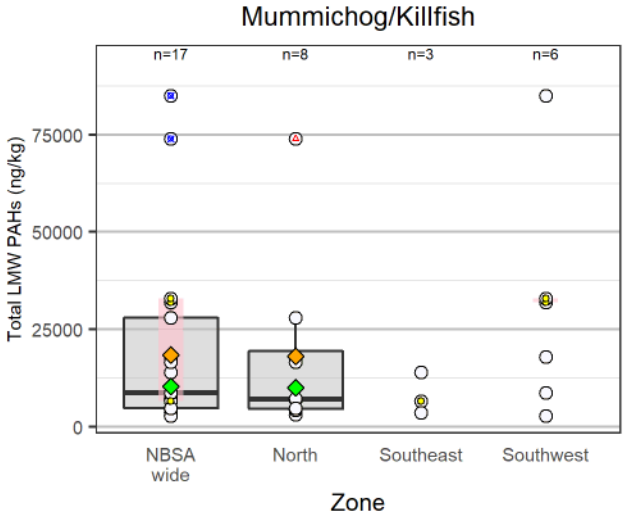
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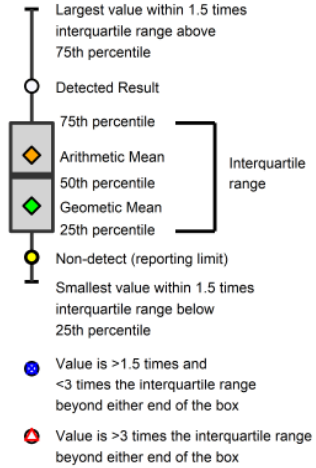
FIGURE
4-5











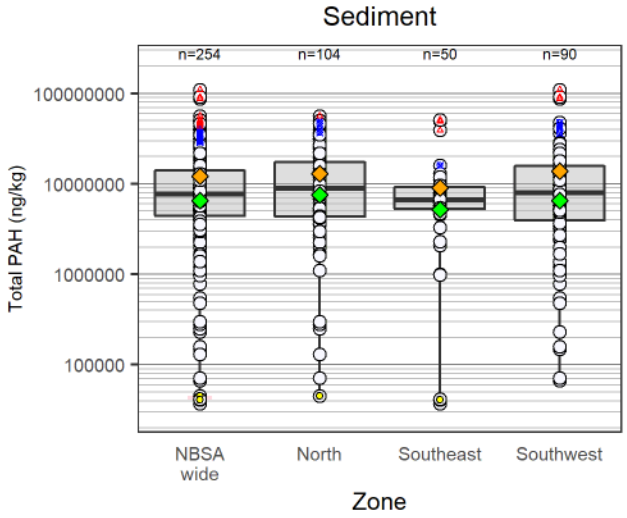
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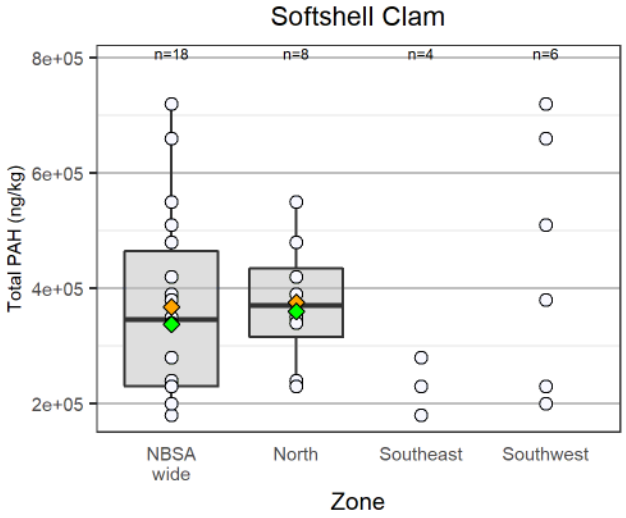
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

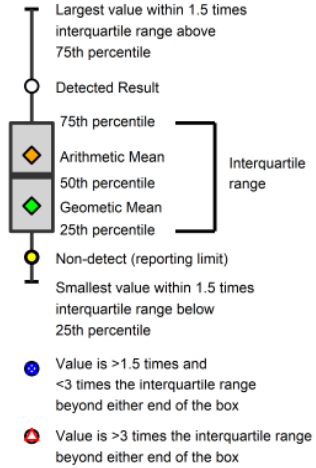
SEDIMENT & BIOTA TISSUE BOXPLOTS:TOTAL LMW PAHS

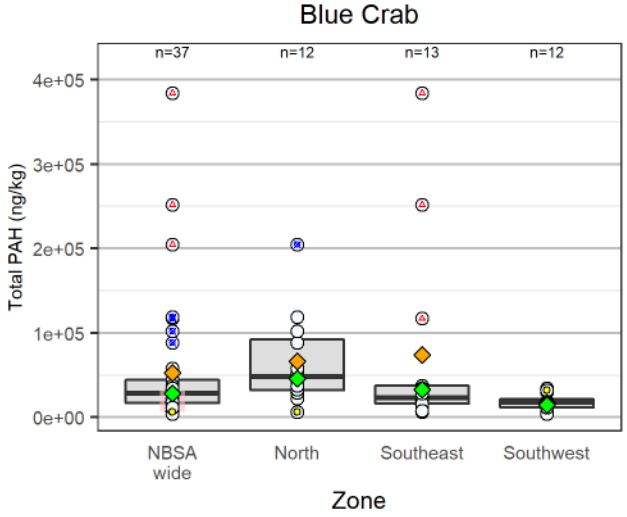
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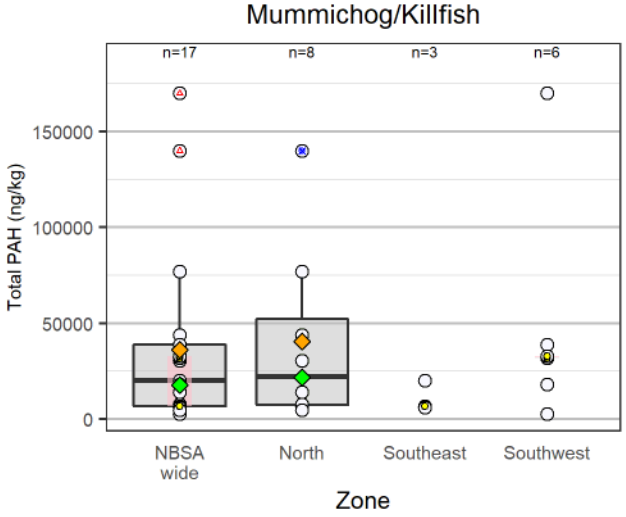
FIGURE
4-5











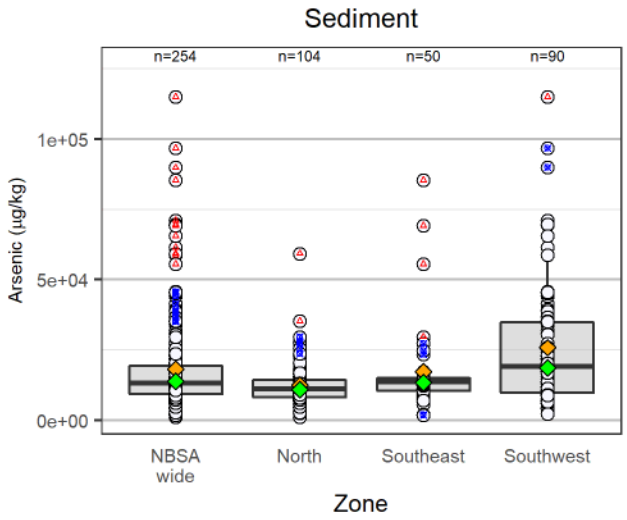
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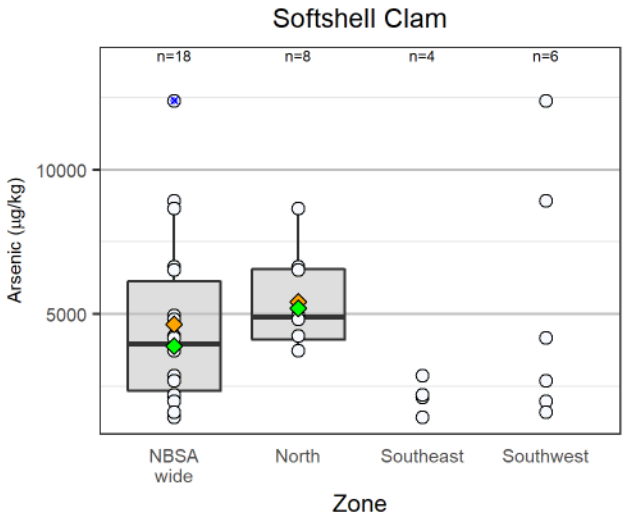
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

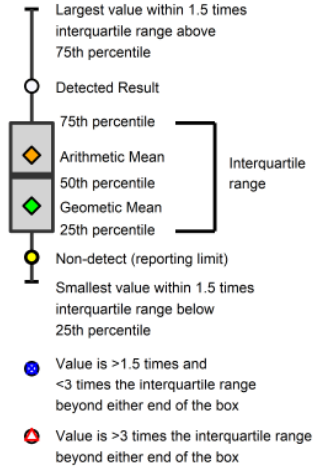
SEDIMENT & BIOTA TISSUE BOXPLOTS:TOTAL PAH

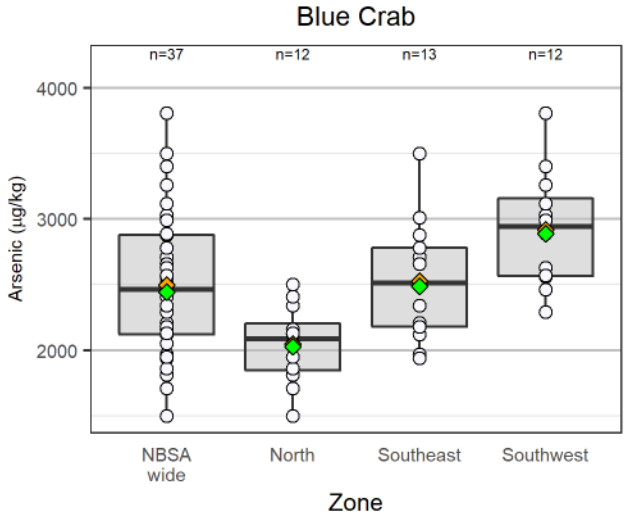
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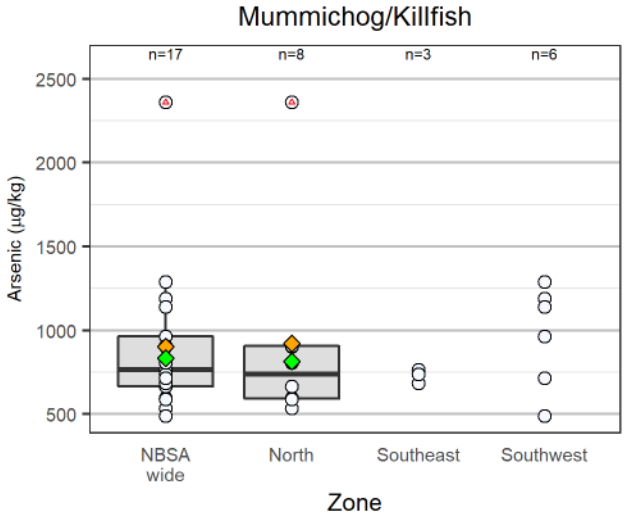
FIGURE
4-5











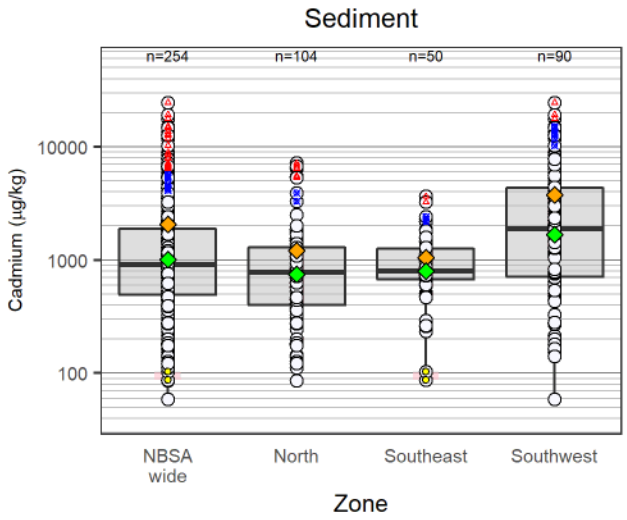
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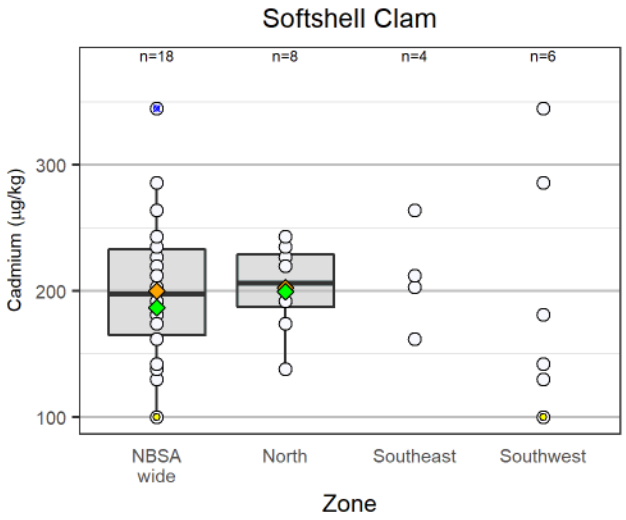
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

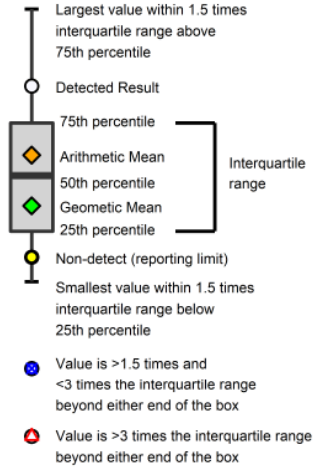
SEDIMENT & BIOTA TISSUE BOXPLOTS:ARSENIC

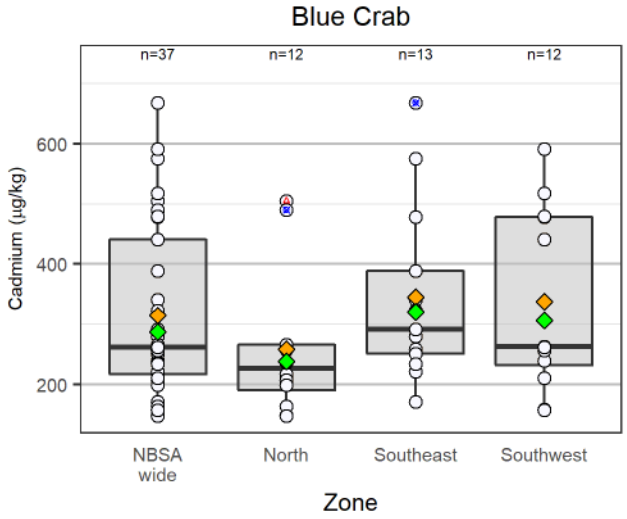
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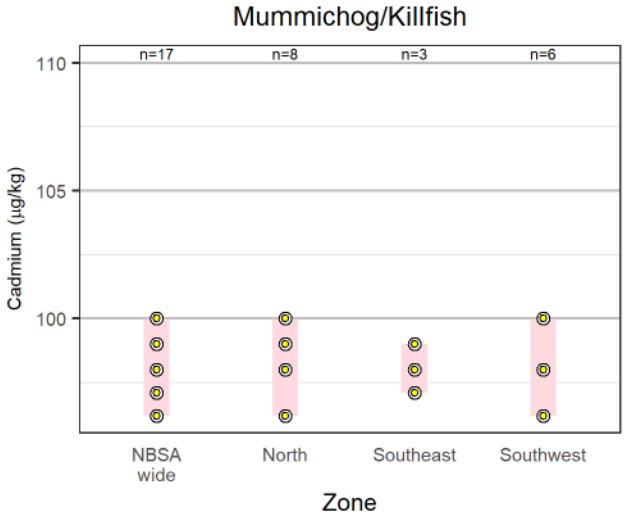
FIGURE
4-5











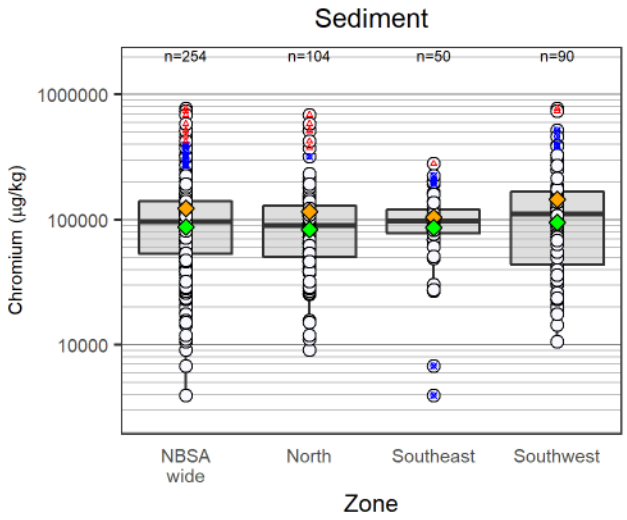
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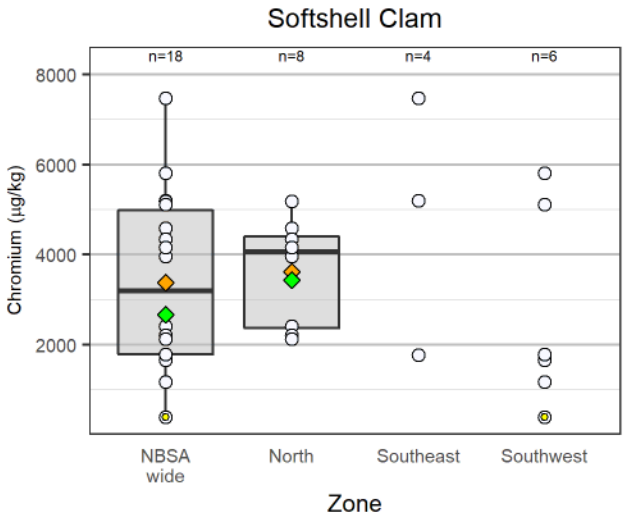
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

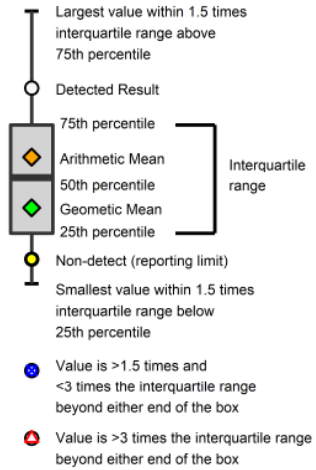
SEDIMENT & BIOTA TISSUE BOXPLOTS:CADMIUM

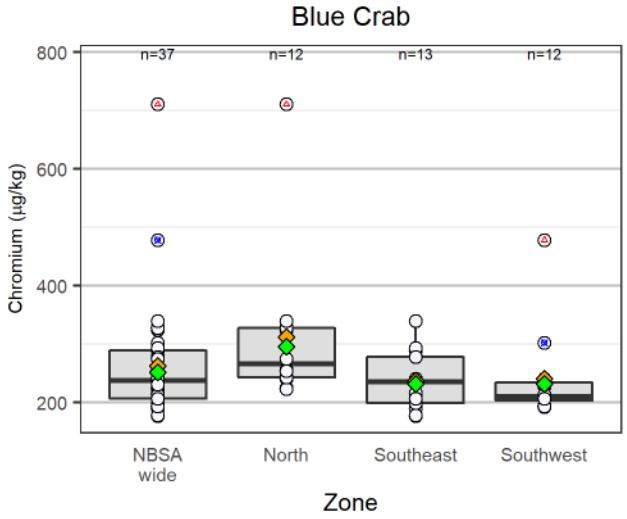
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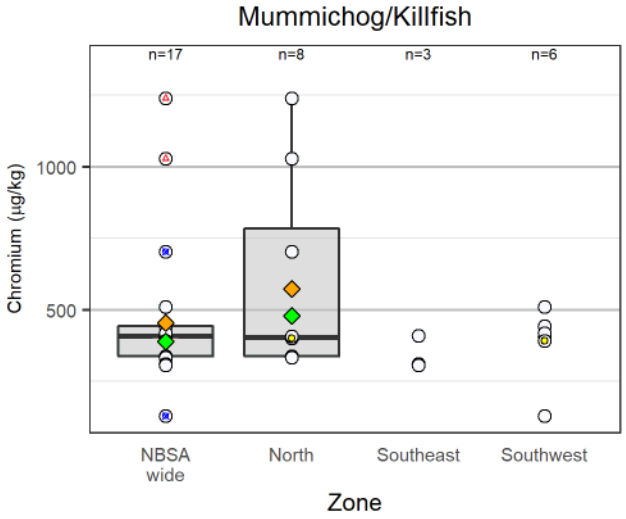
FIGURE
4-5











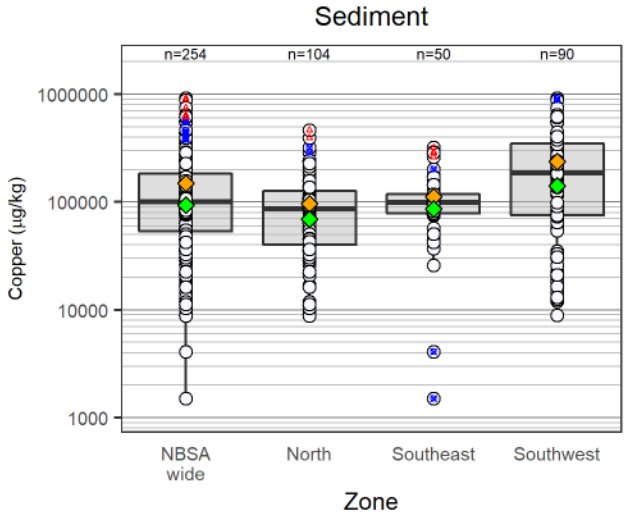
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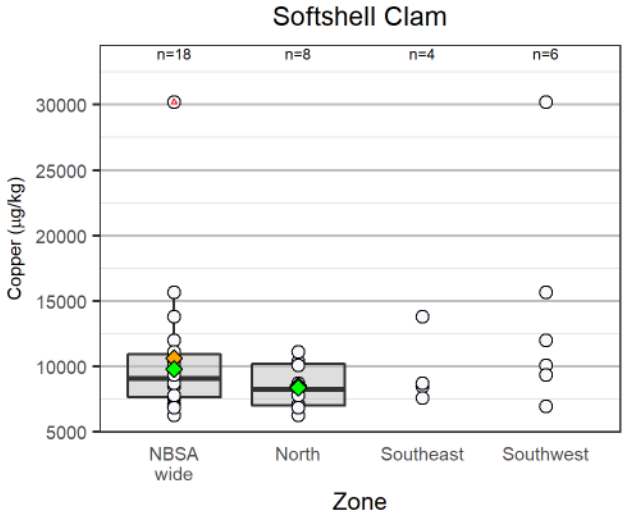
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

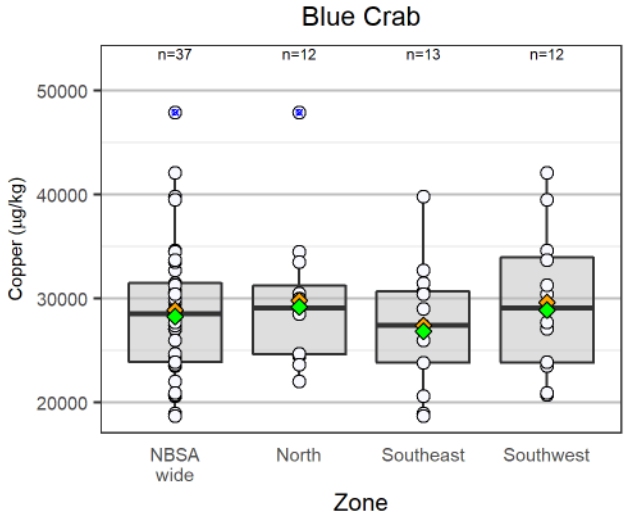
SEDIMENT & BIOTA TISSUE BOXPLOTS:CHROMIUM

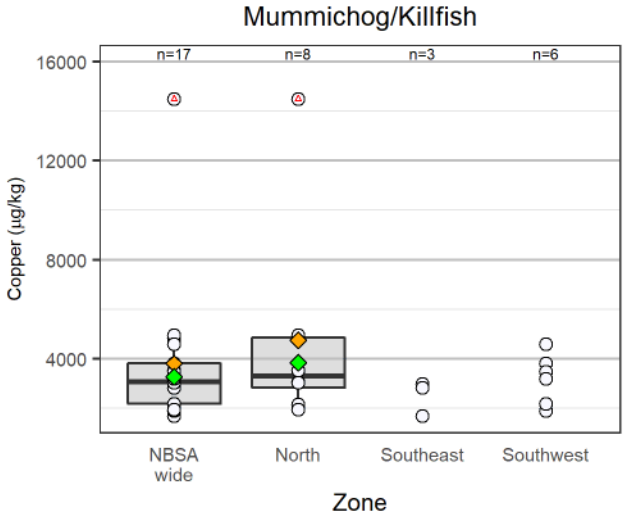
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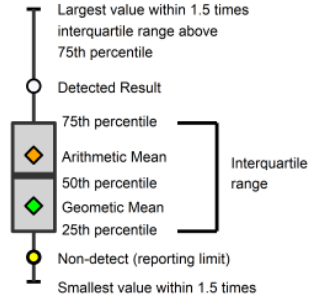
FIGURE
4-5











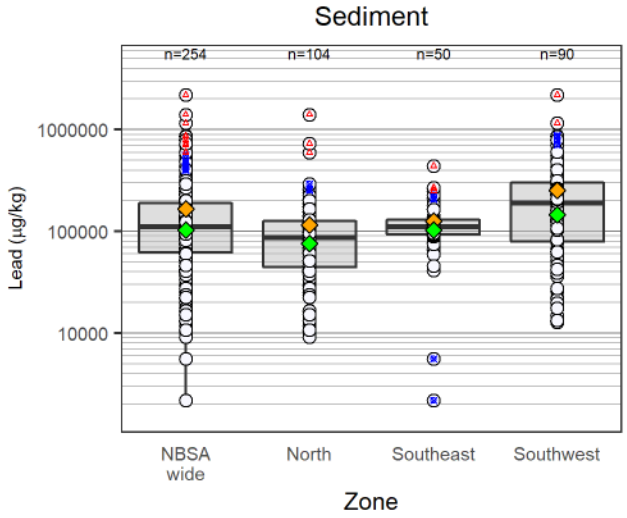
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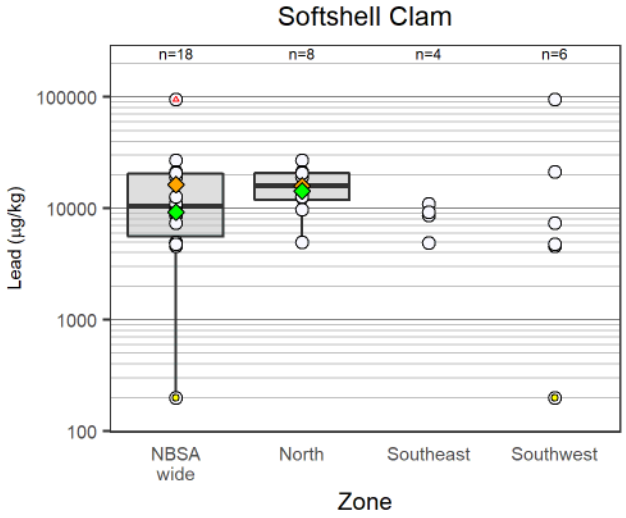
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

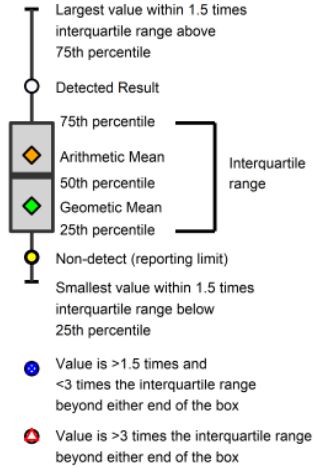
SEDIMENT & BIOTA TISSUE BOXPLOTS:COPPER

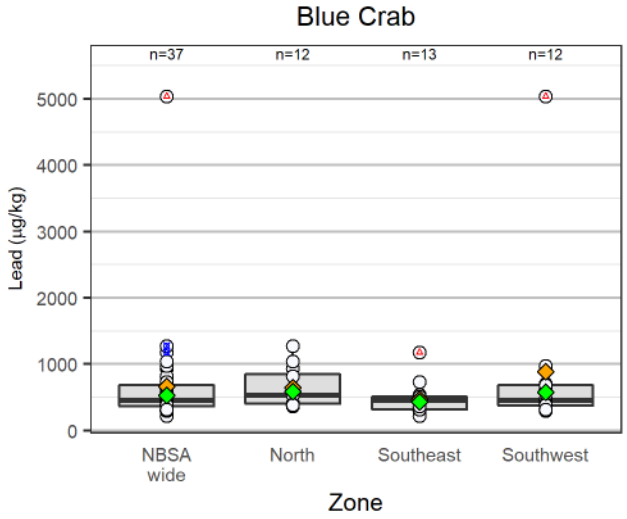
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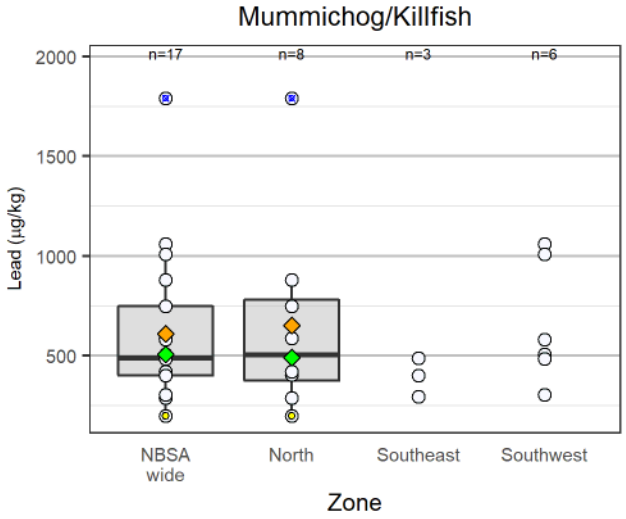
FIGURE
4-5











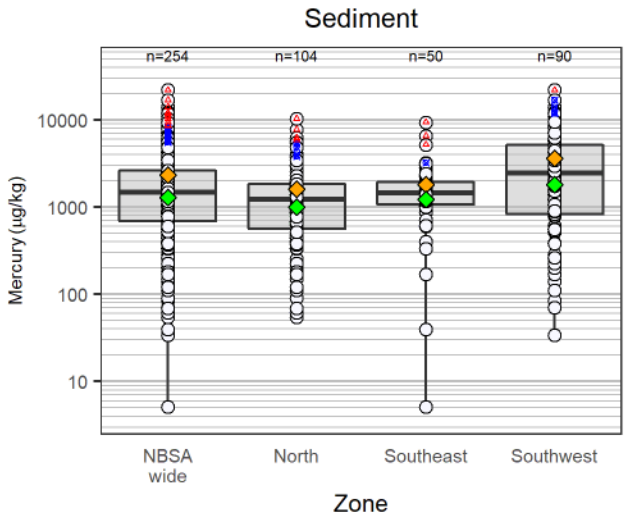
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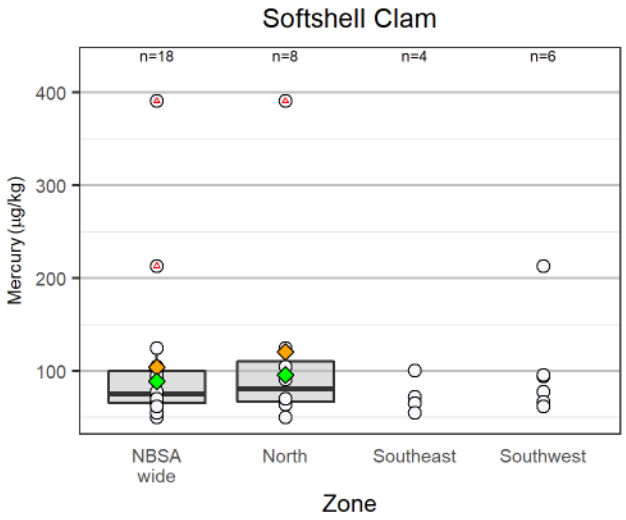
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

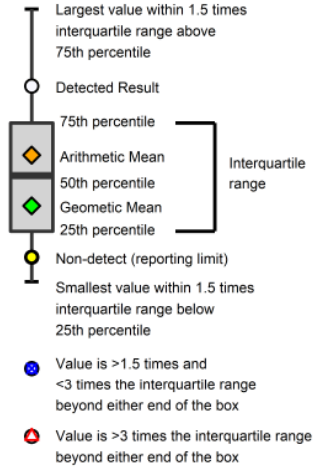
SEDIMENT & BIOTA TISSUE BOXPLOTS:LEAD

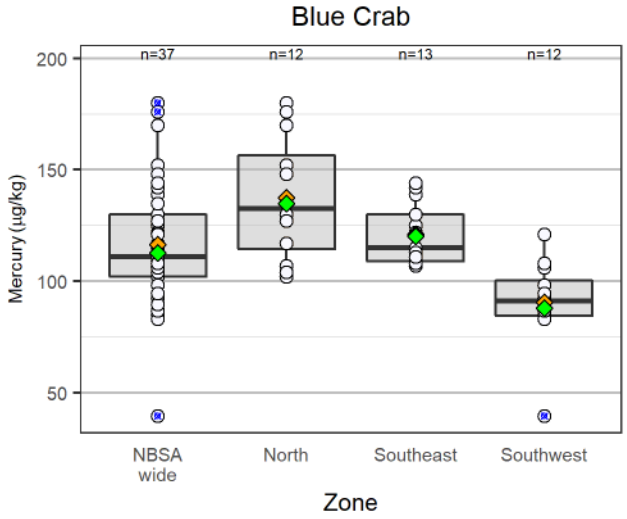
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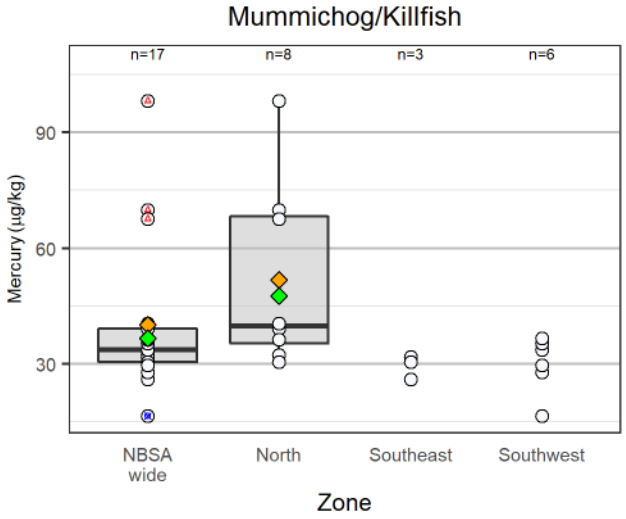
FIGURE
4-5











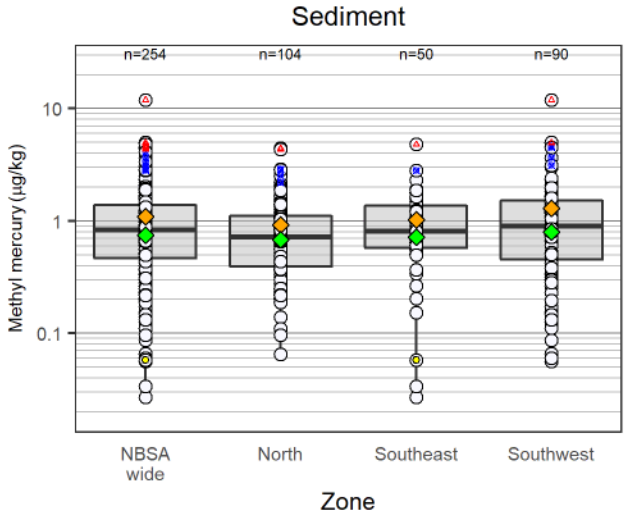
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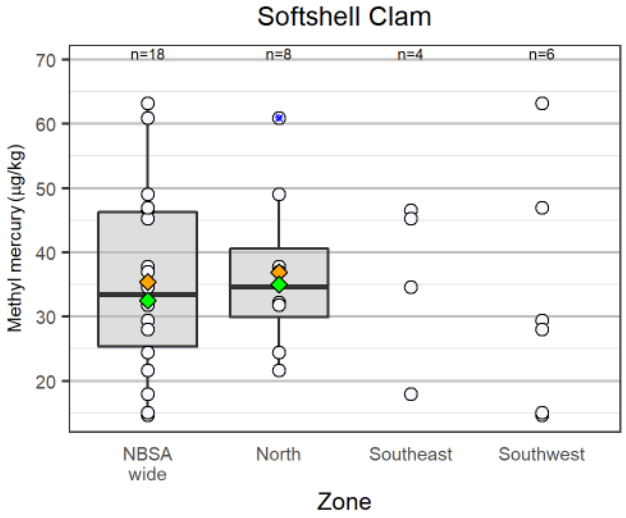
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

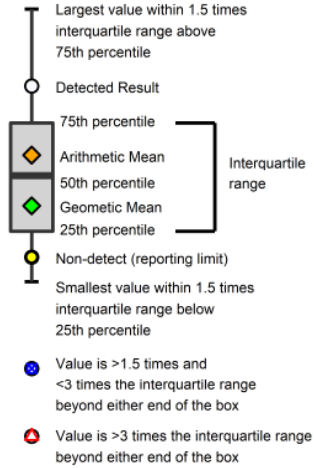
SEDIMENT & BIOTA TISSUE BOXPLOTS:MERCURY

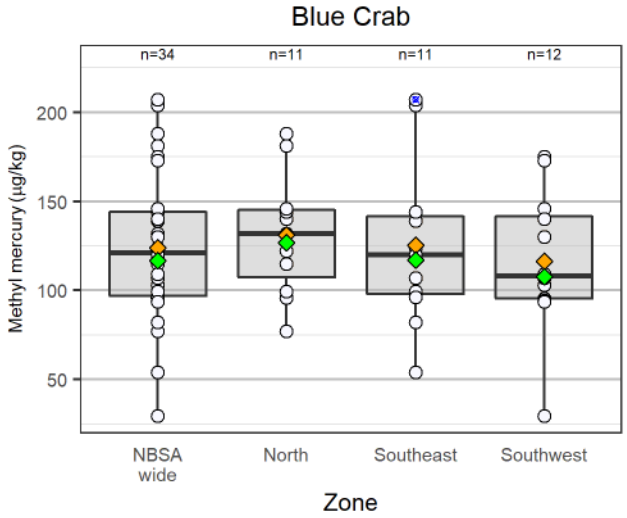
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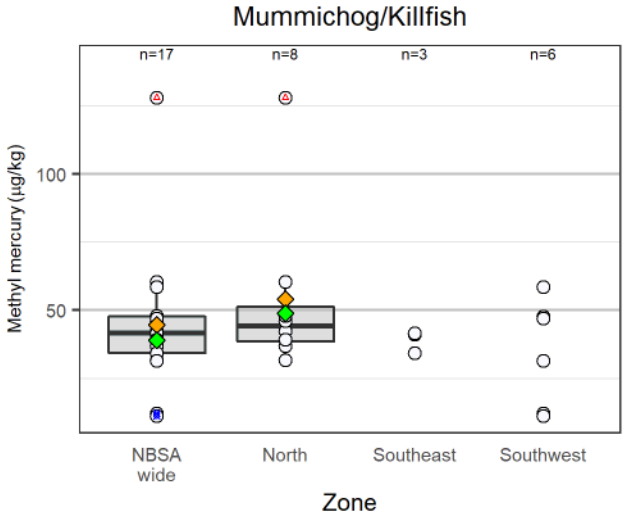
FIGURE
4-5











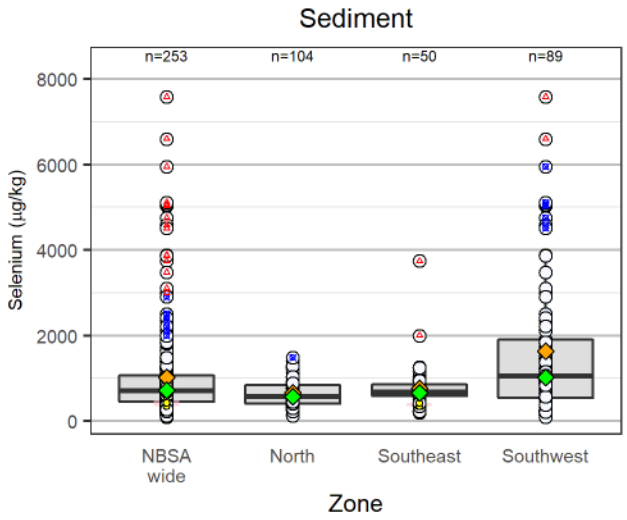
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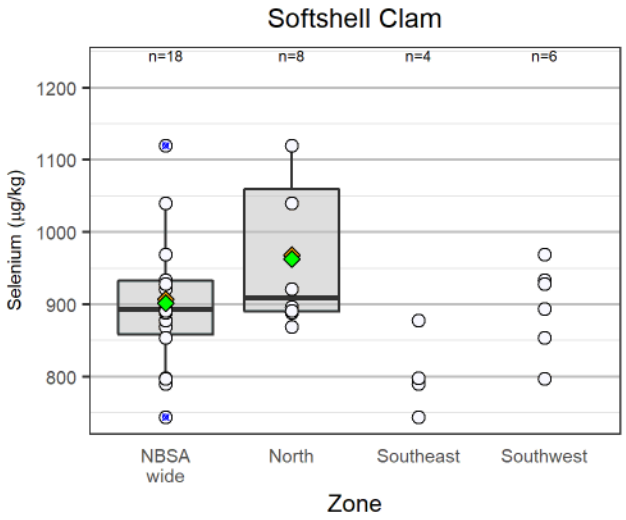
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

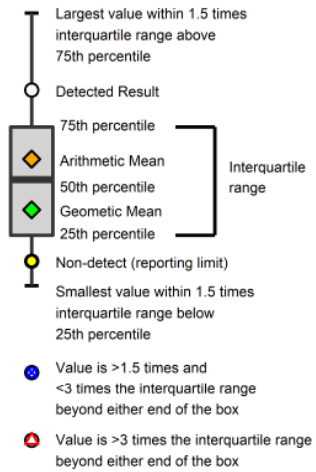
SEDIMENT & BIOTA TISSUE BOXPLOTS:METHYL MERCURY

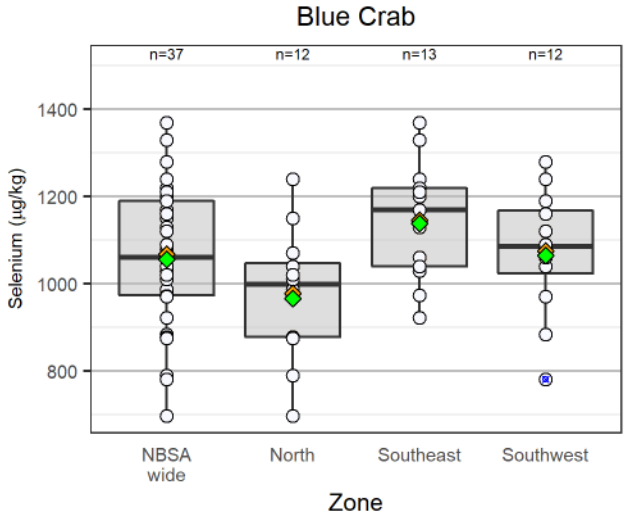
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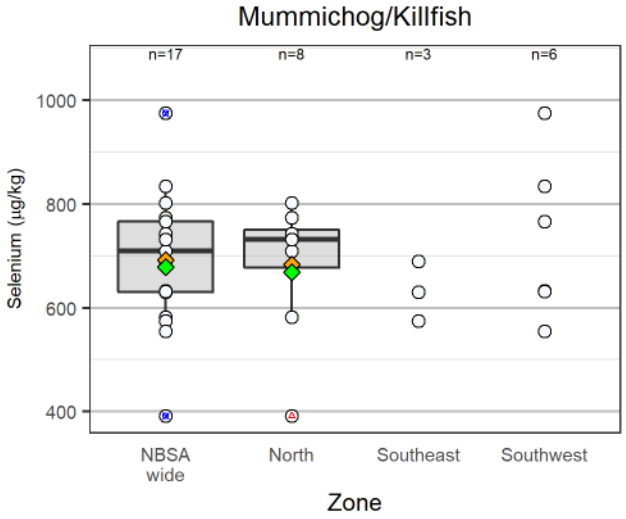
FIGURE
4-5











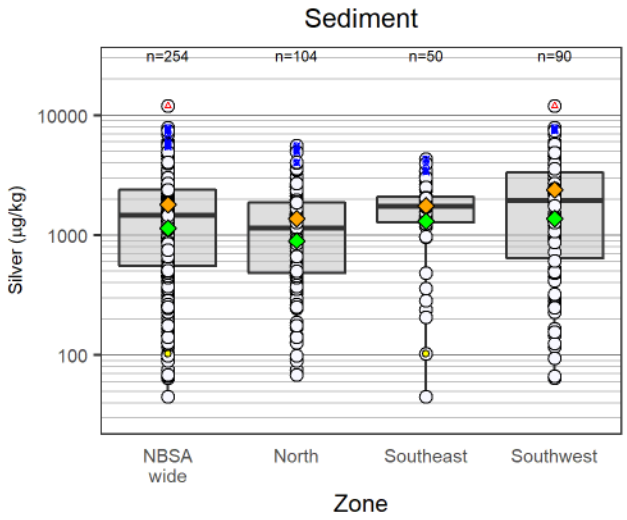
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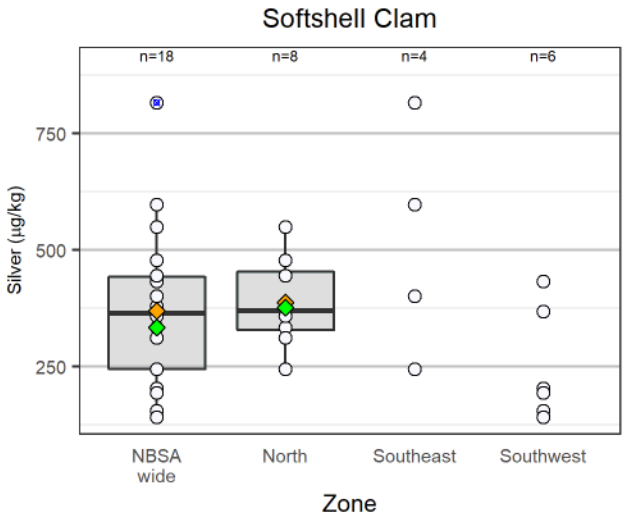
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

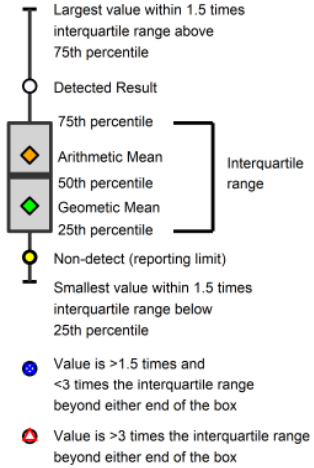
SEDIMENT & BIOTA TISSUE BOXPLOTS:SELENIUM

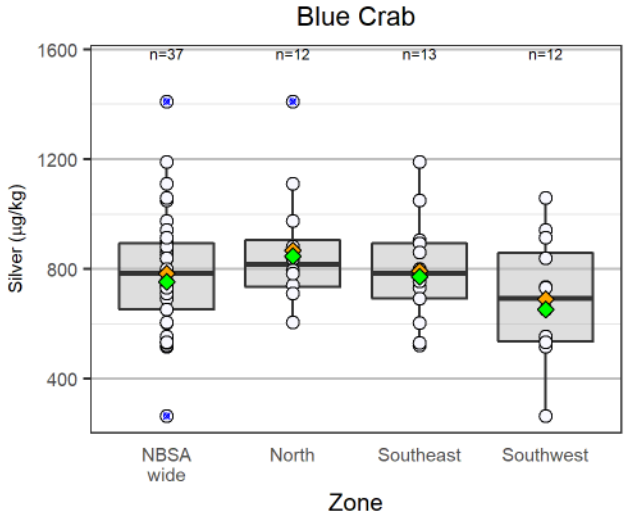
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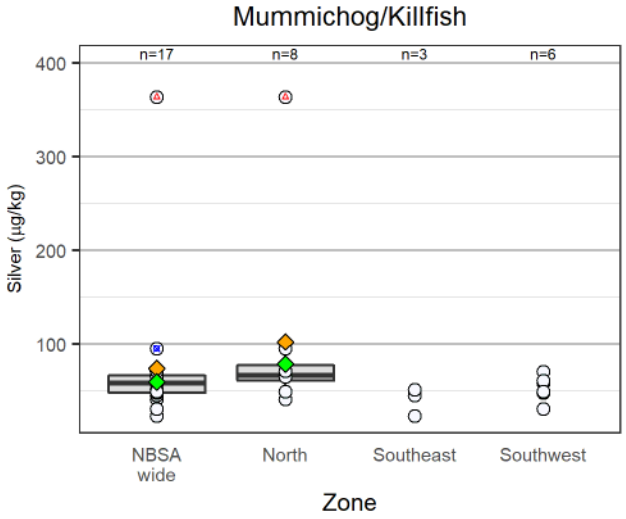
FIGURE
4-5











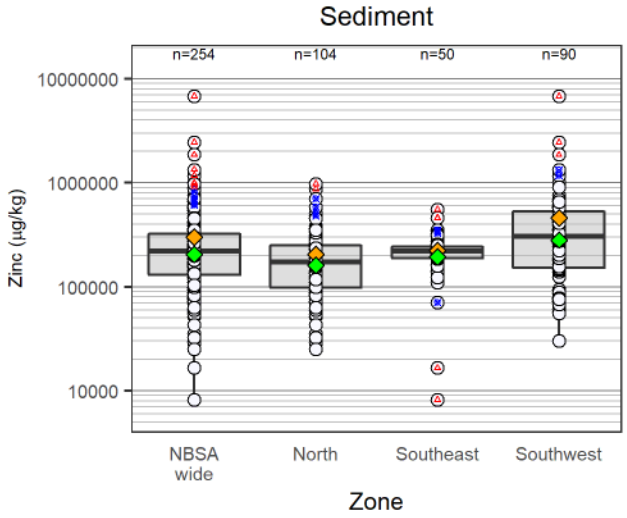
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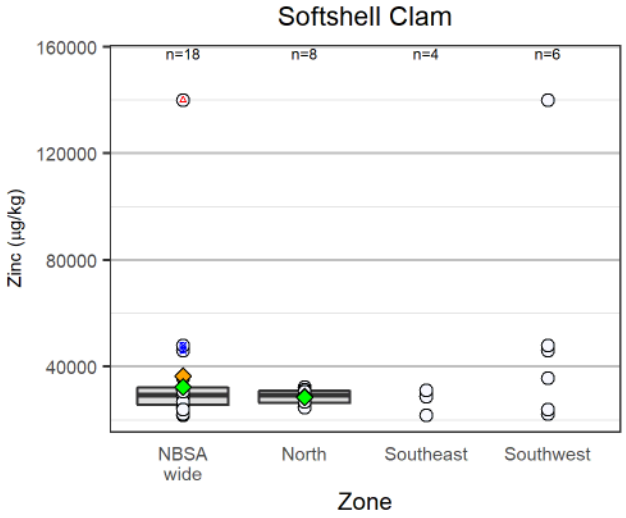
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

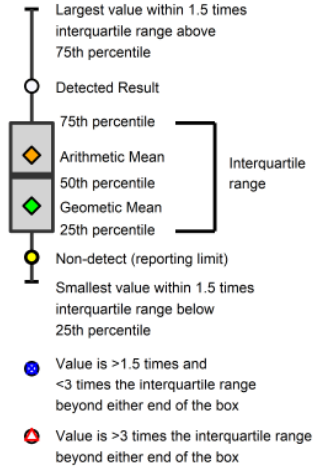
SEDIMENT & BIOTA TISSUE BOXPLOTS:SILVER

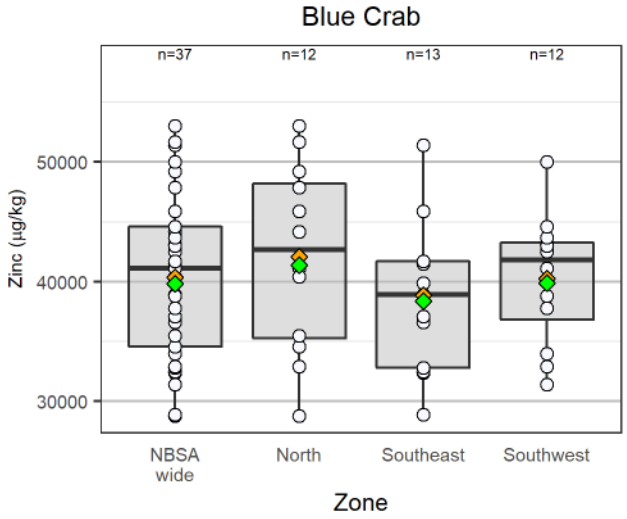
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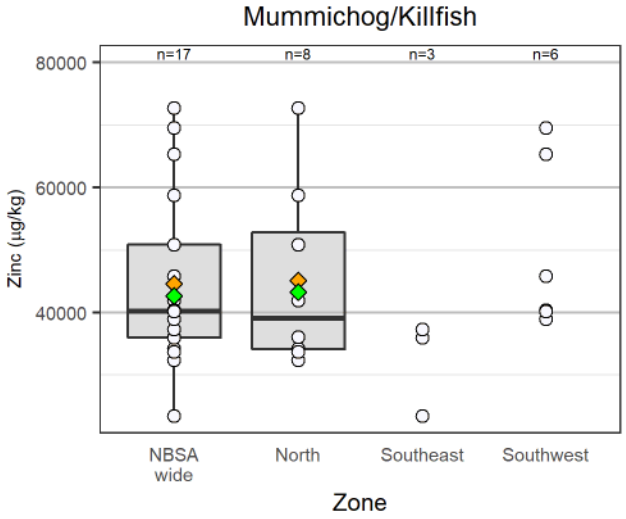
FIGURE
4-5











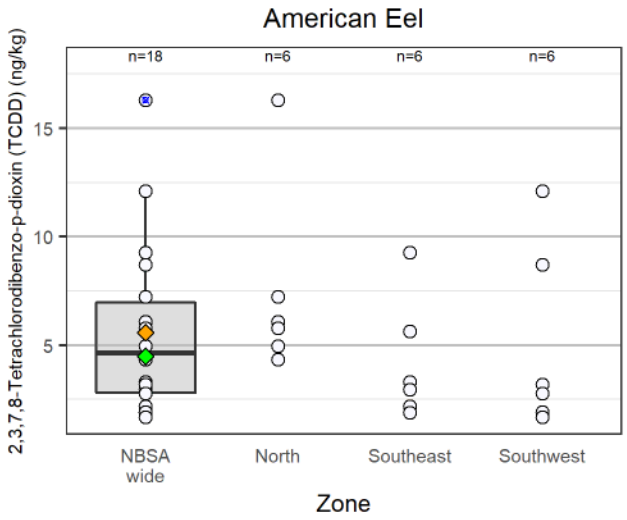
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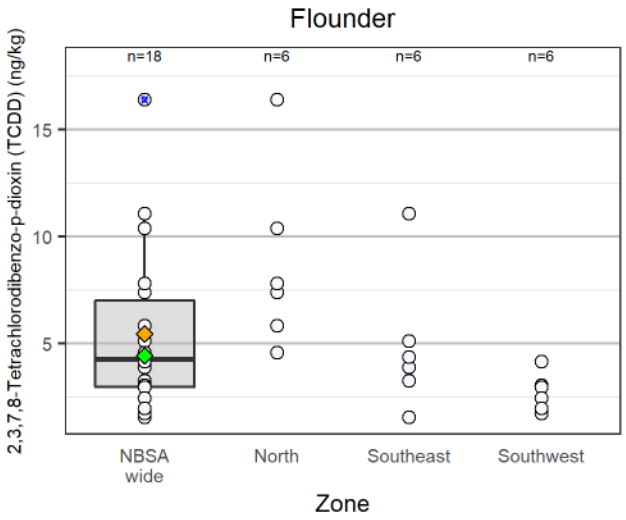
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

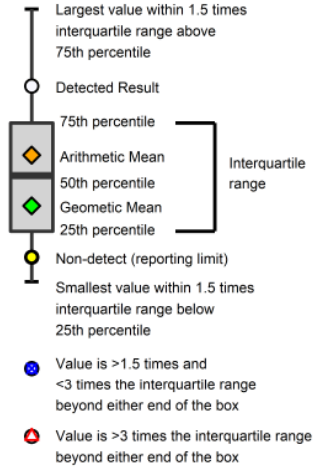
SEDIMENT & BIOTA TISSUE BOXPLOTS:ZINC

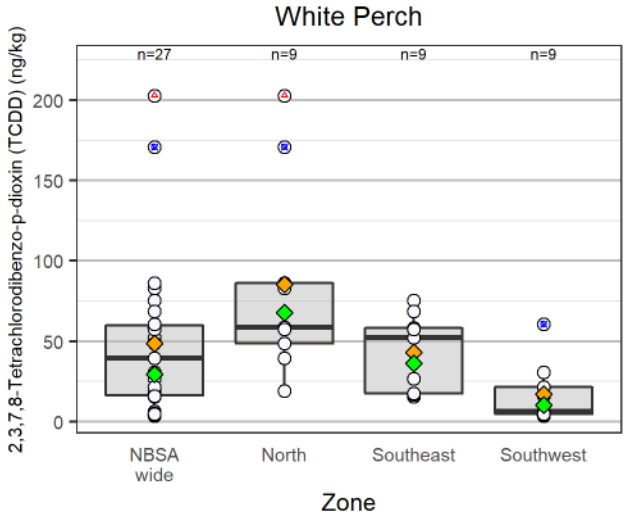
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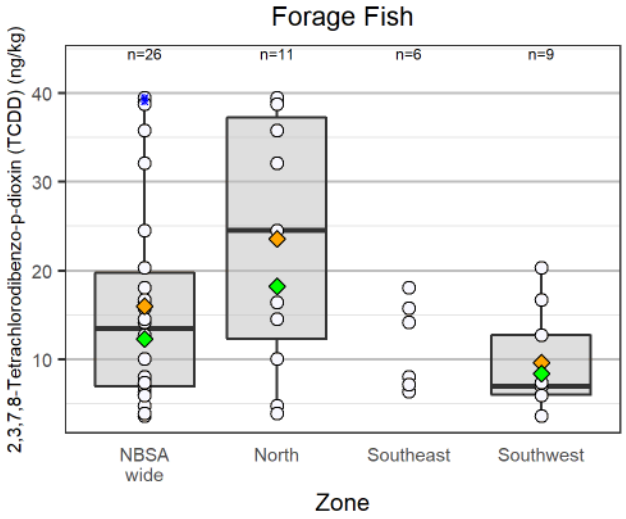
FIGURE
4-5











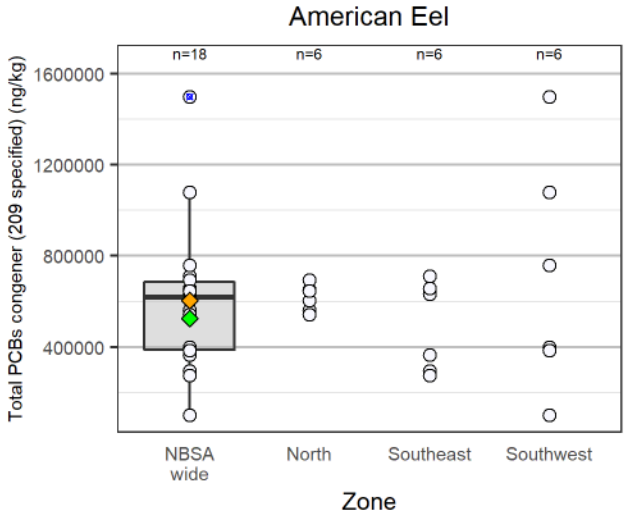
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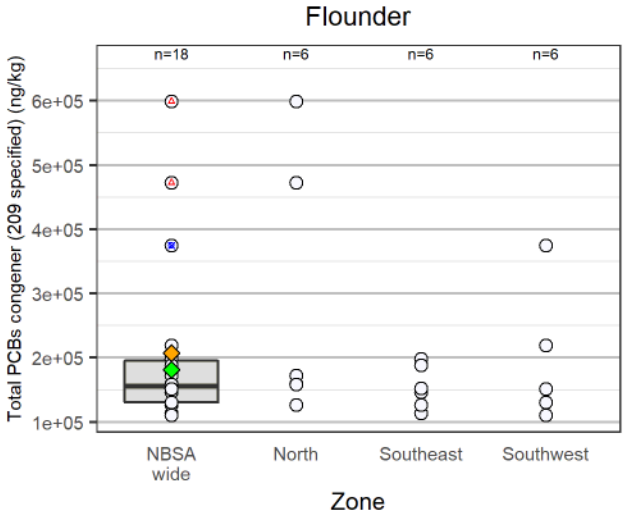
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

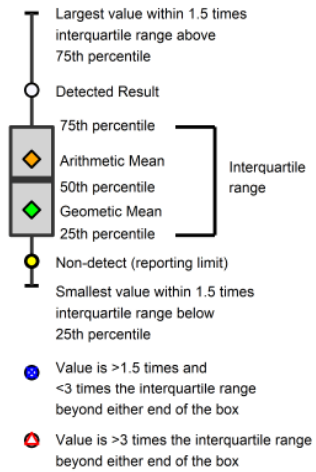
FISH TISSUE BOXPLOTS: 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (TCDD)

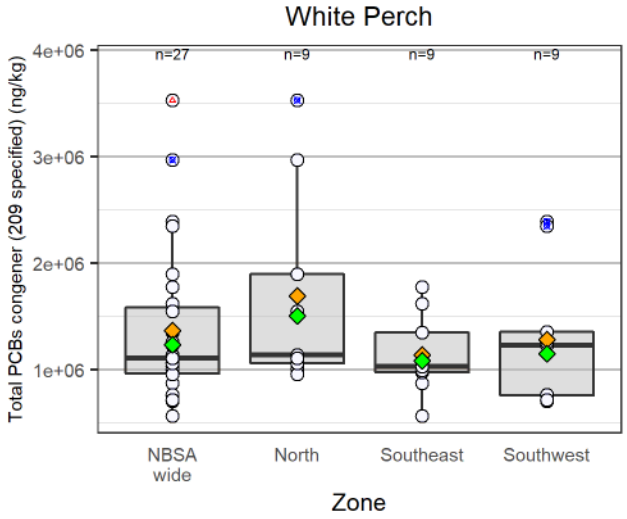
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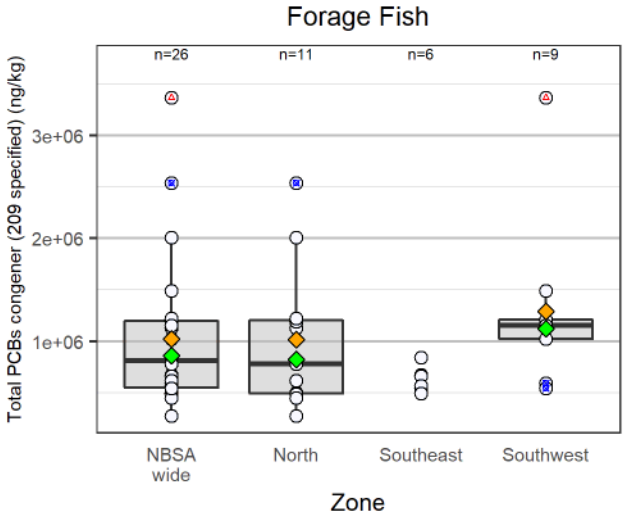
FIGURE
4-6











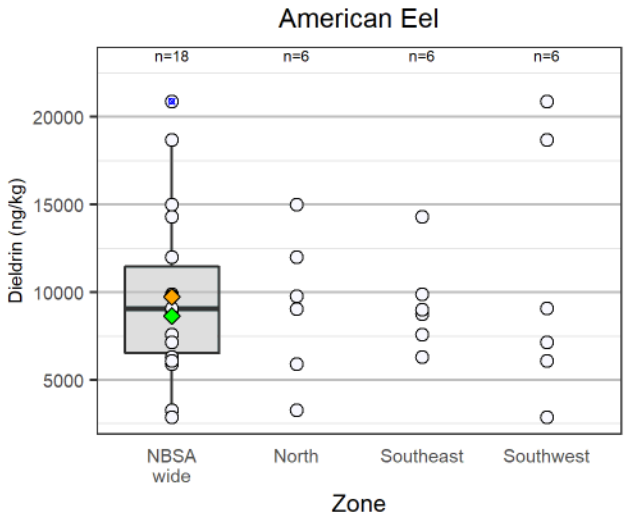
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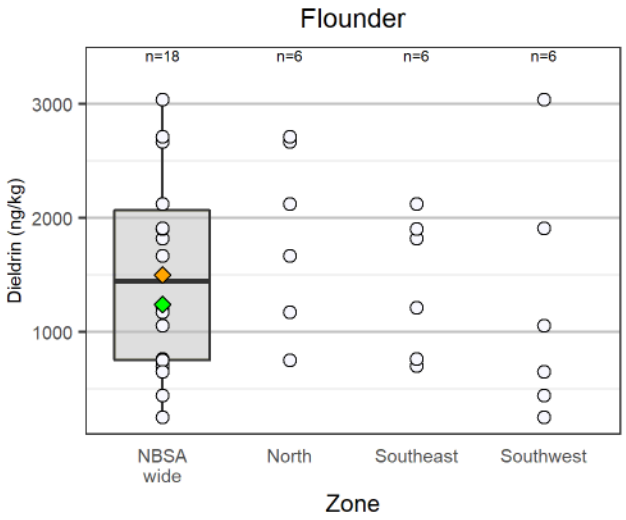
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

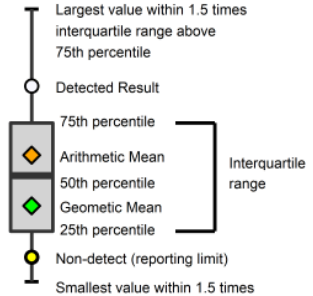
FISH TISSUE BOXPLOTS: TOTAL PCBS CONGENER (209 SPECIFIED)

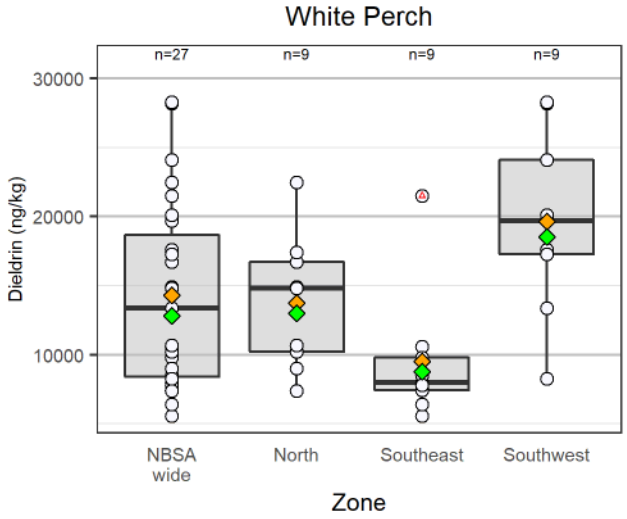
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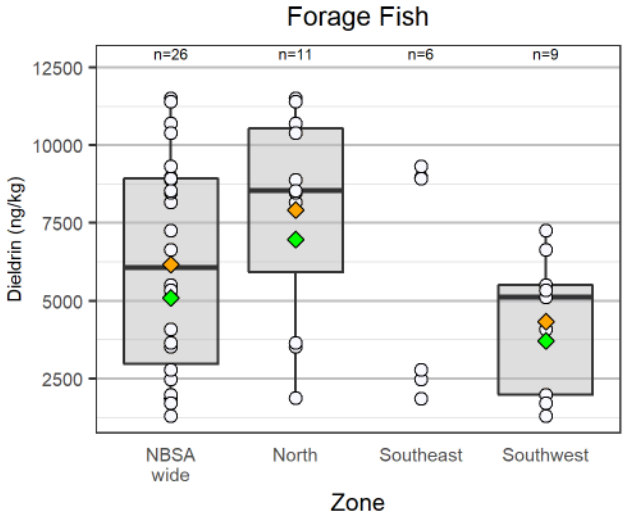
FIGURE
4-6











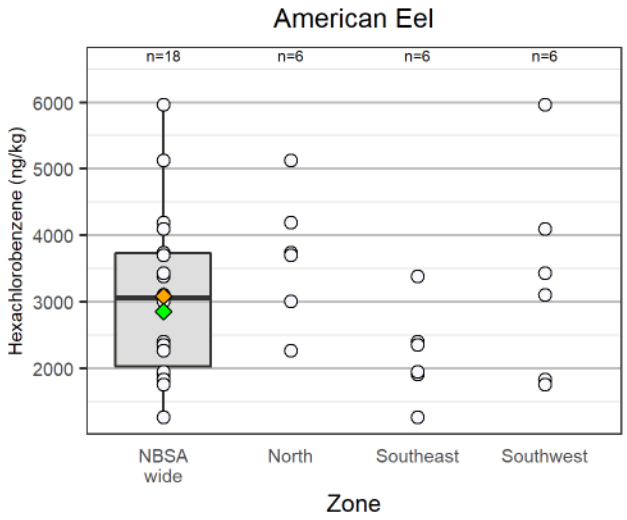
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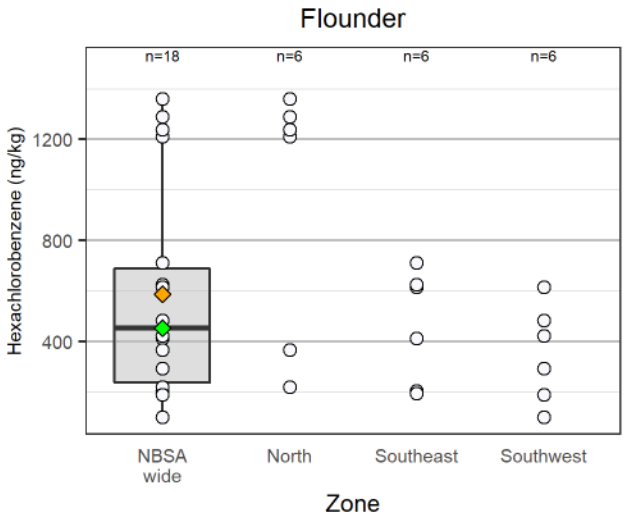
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

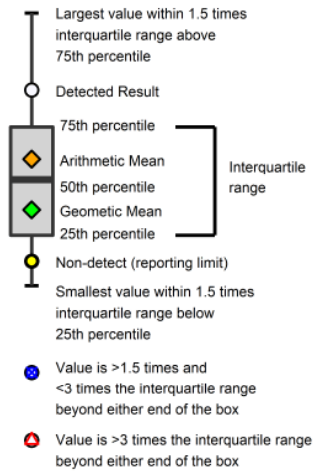
FISH TISSUE BOXPLOTS: DIELDRIN

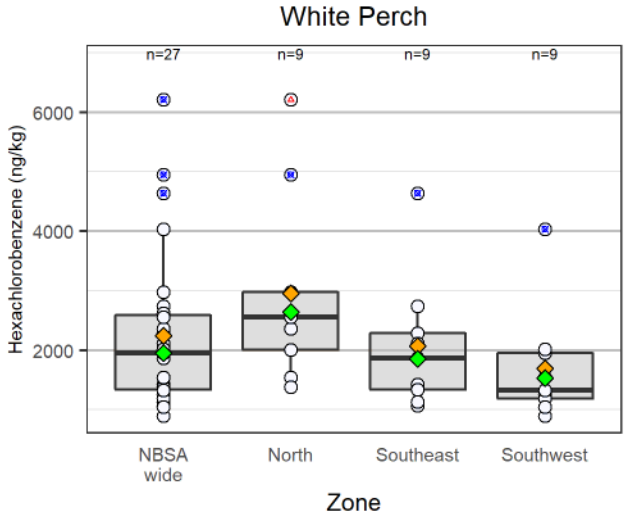
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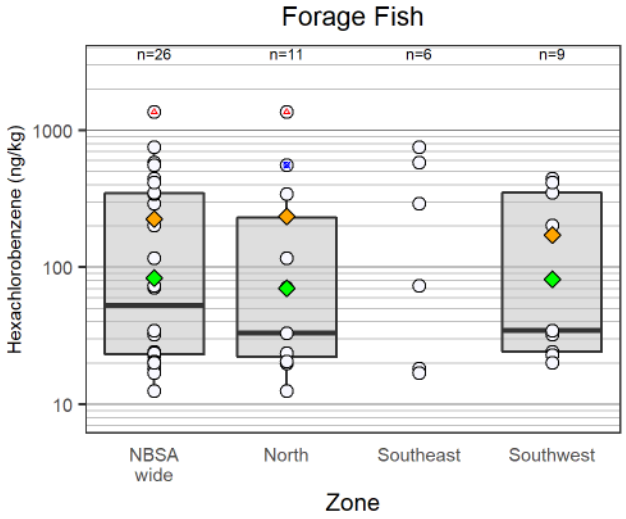
FIGURE
4-6











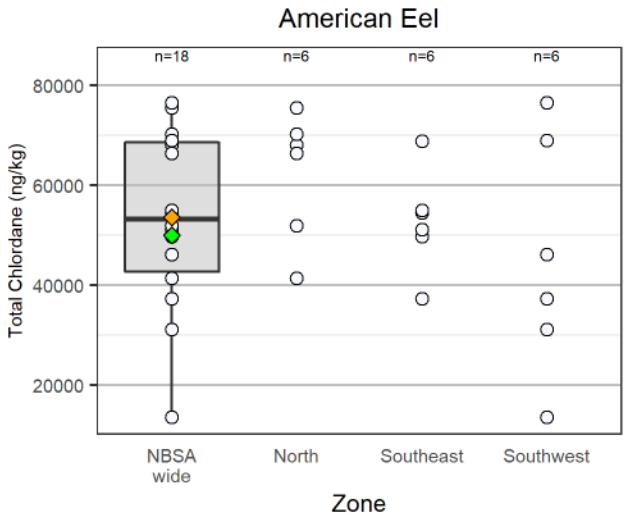
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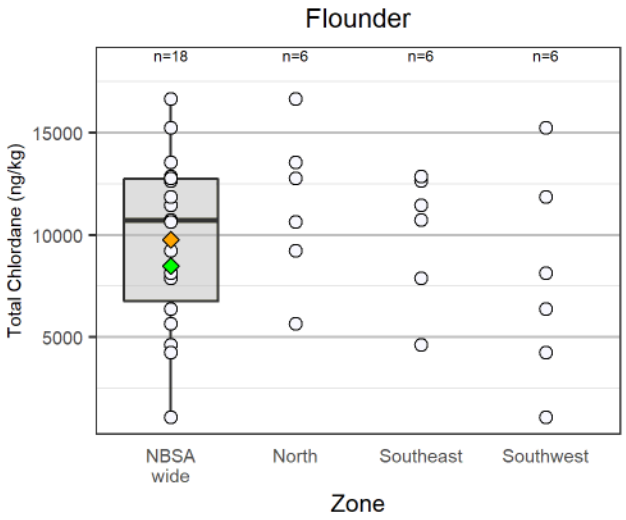
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

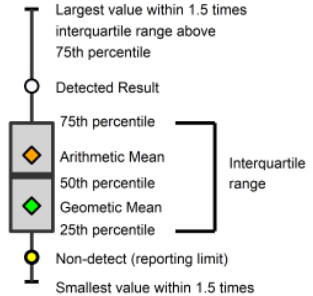
FISH TISSUE BOXPLOTS: HEXACHLOROBENZENE

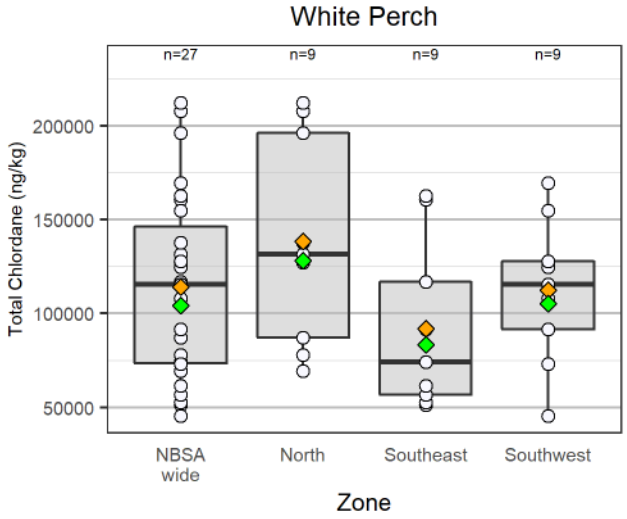
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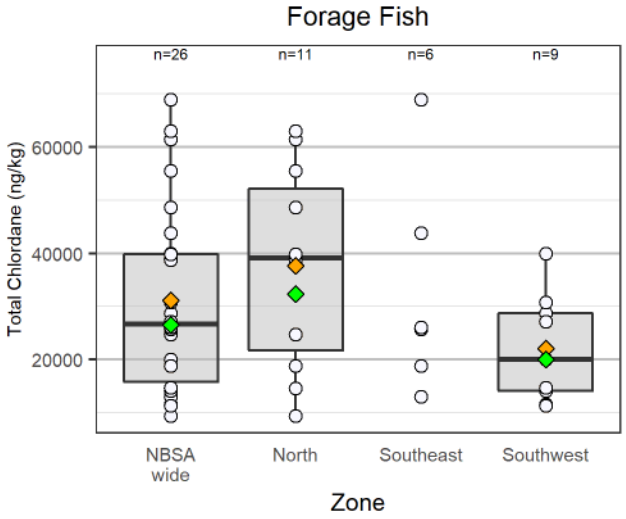
FIGURE
4-6











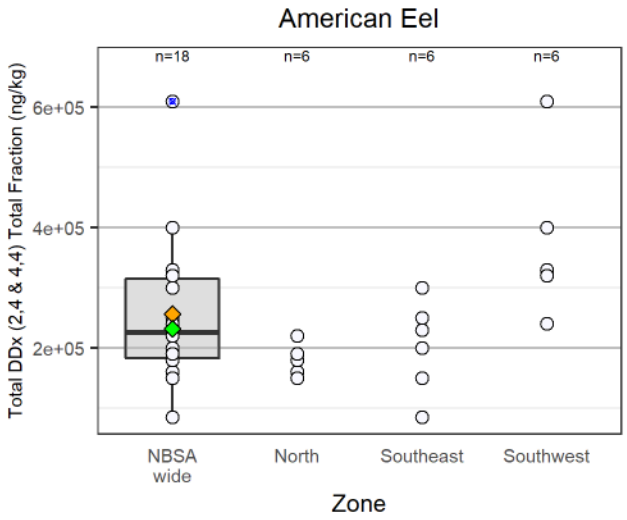
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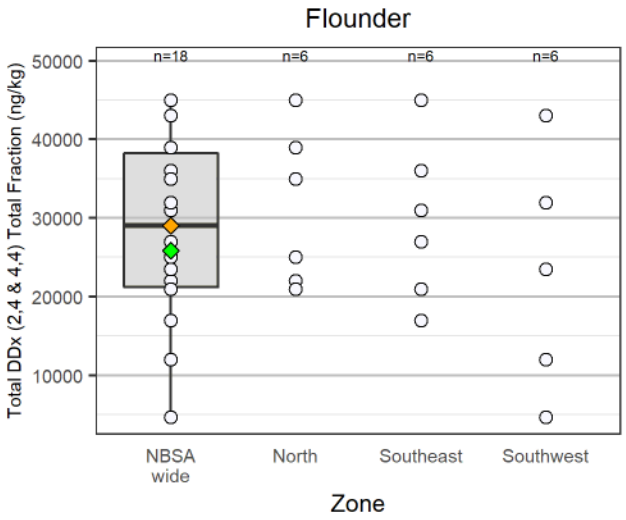
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

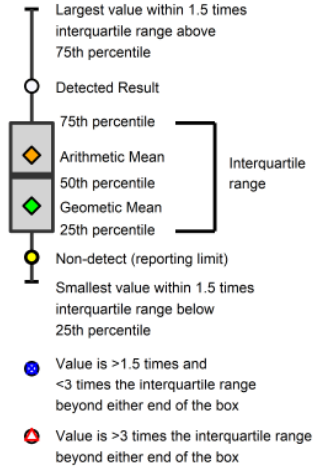
FISH TISSUE BOXPLOTS: TOTAL CHLORDANE

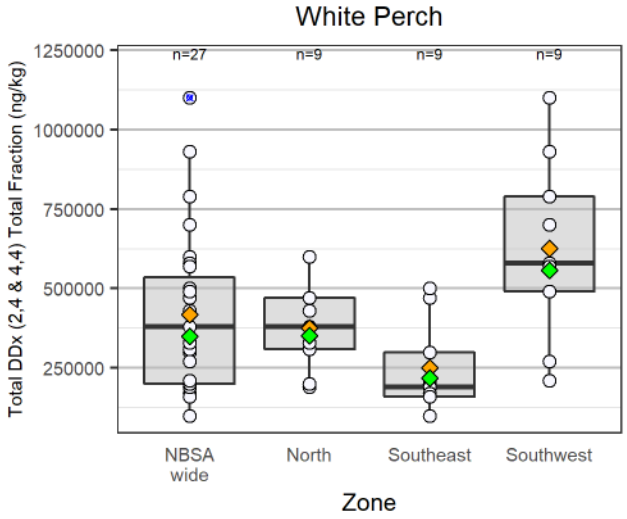
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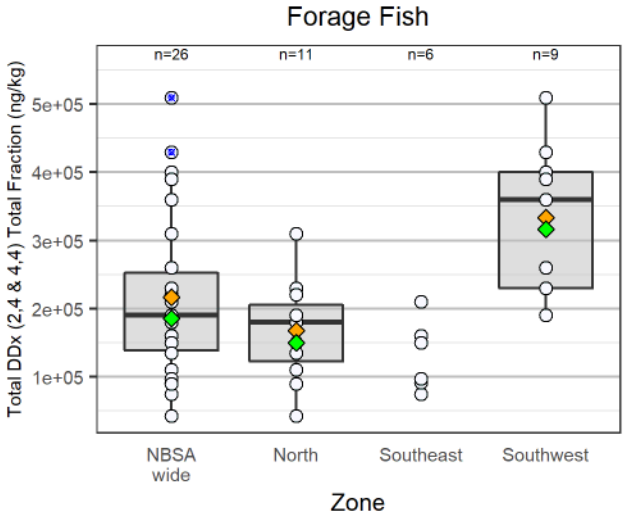
FIGURE
4-6











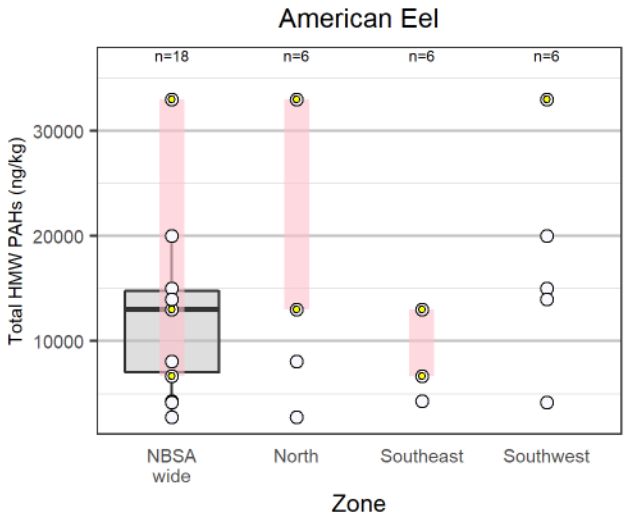
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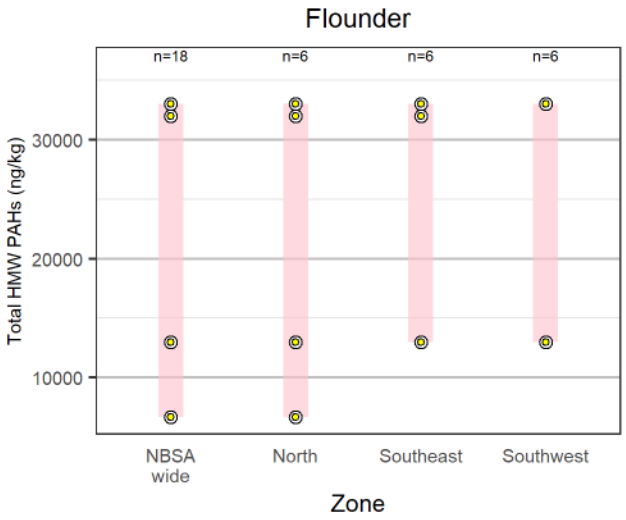
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

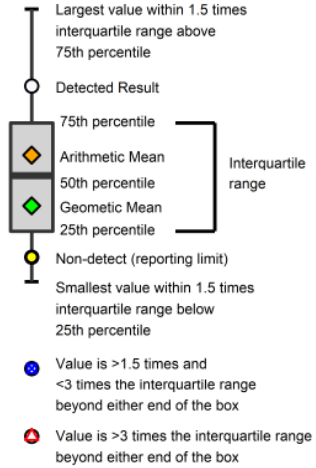
FISH TISSUE BOXPLOTS: TOTAL DDX (2,4 & 4,4) TOTAL FRACTION

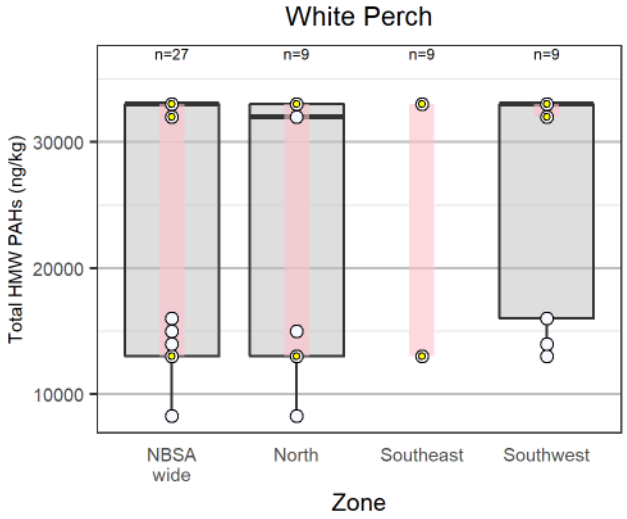
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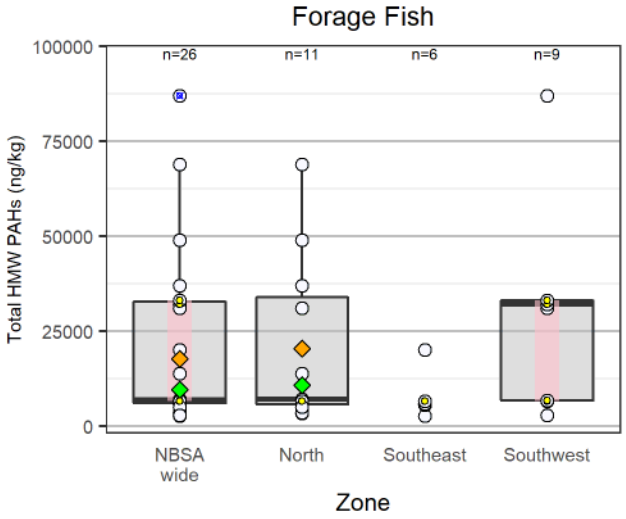
FIGURE
4-6











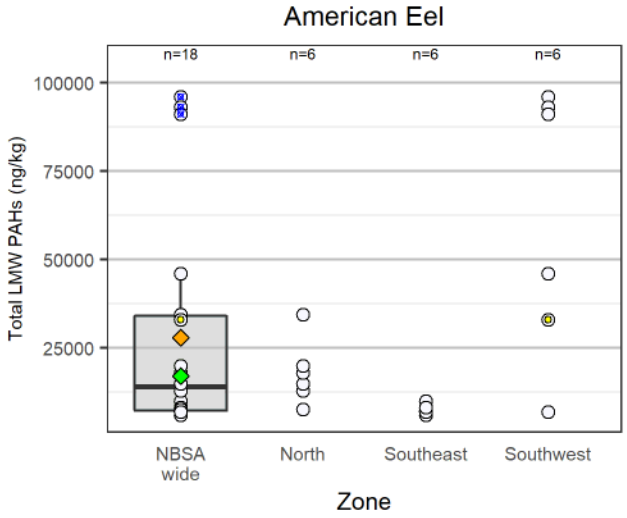
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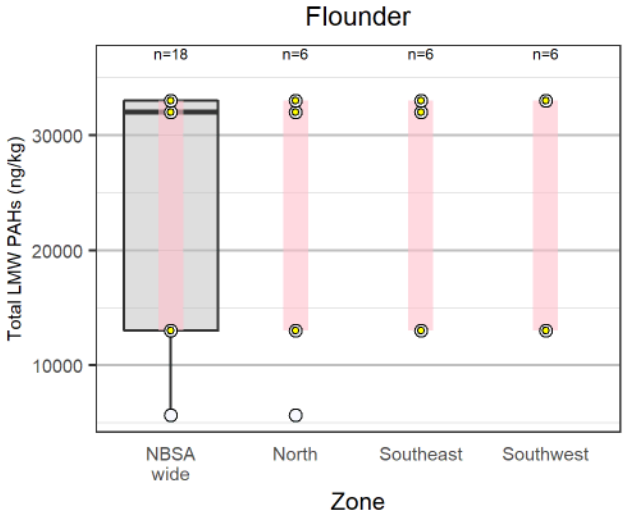
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

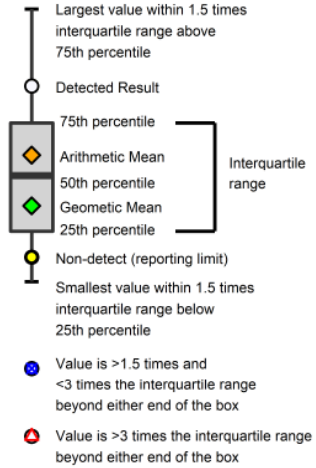
FISH TISSUE BOXPLOTS: TOTAL HMW PAHS

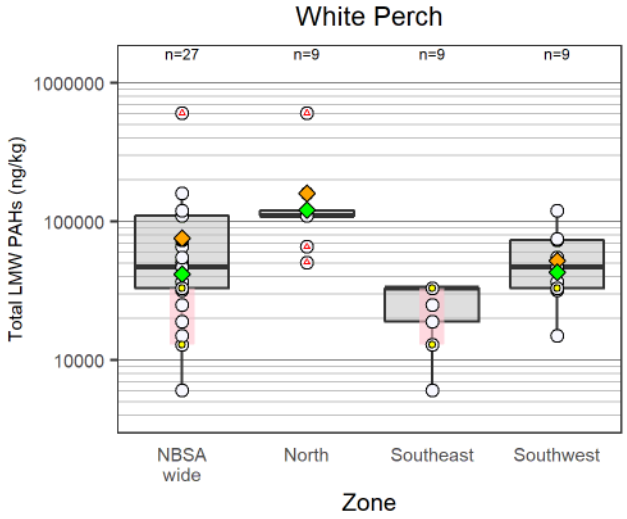
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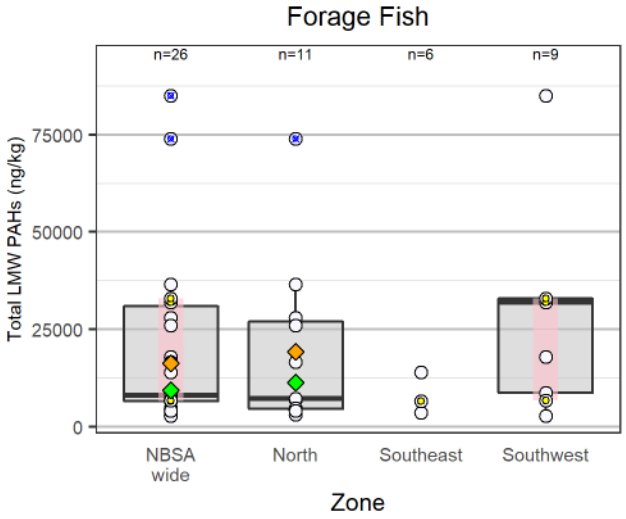
FIGURE
4-6











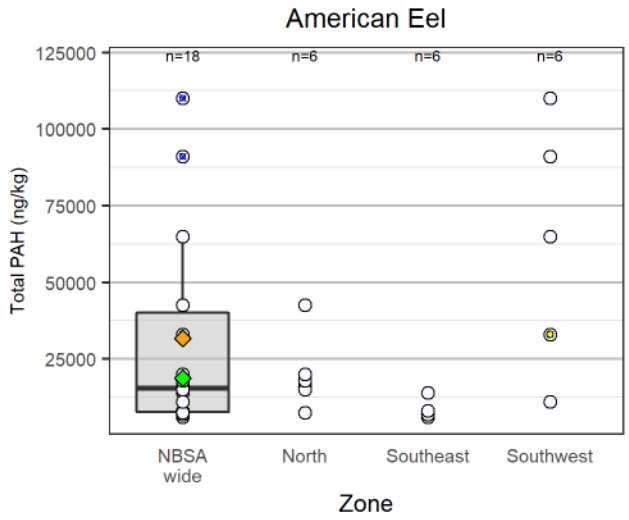
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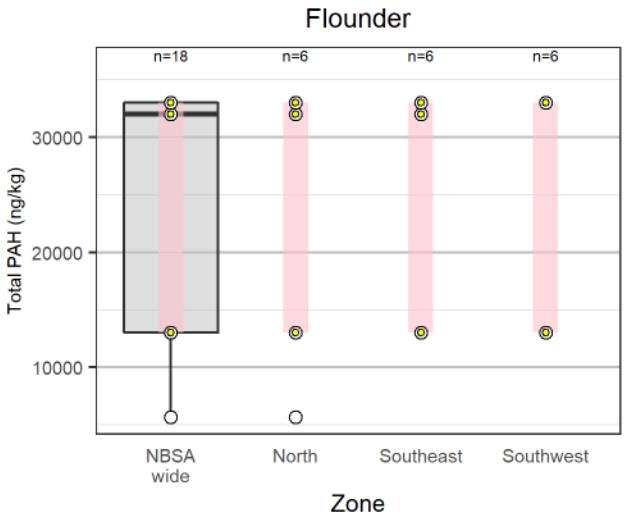
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

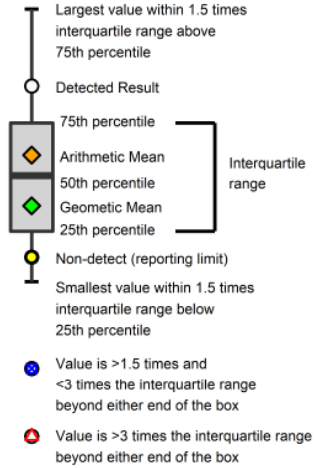
FISH TISSUE BOXPLOTS: TOTAL LMW PAHS

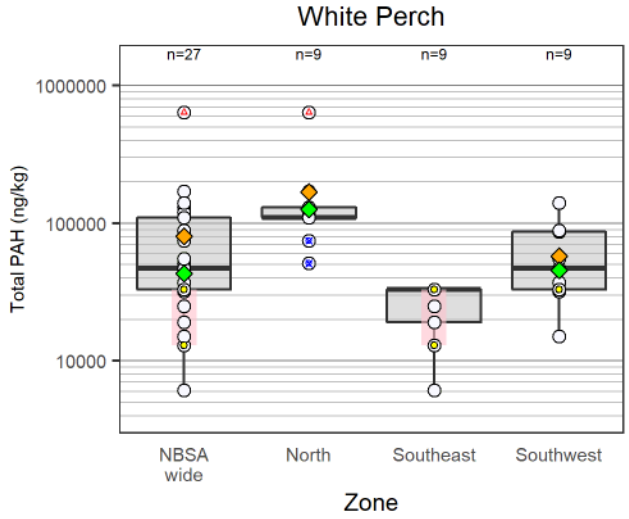
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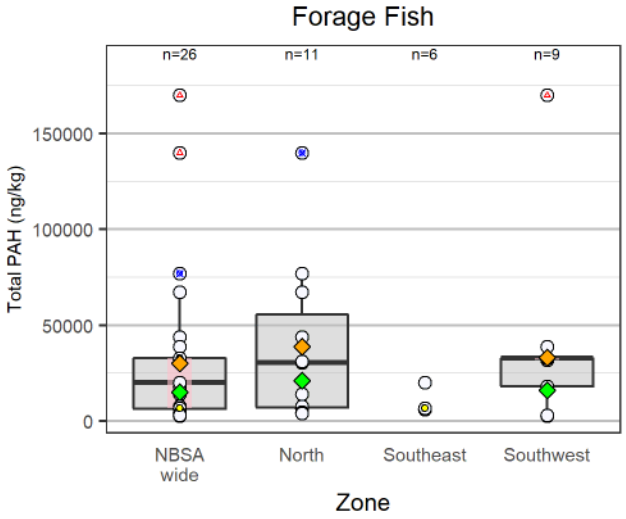
FIGURE
4-6











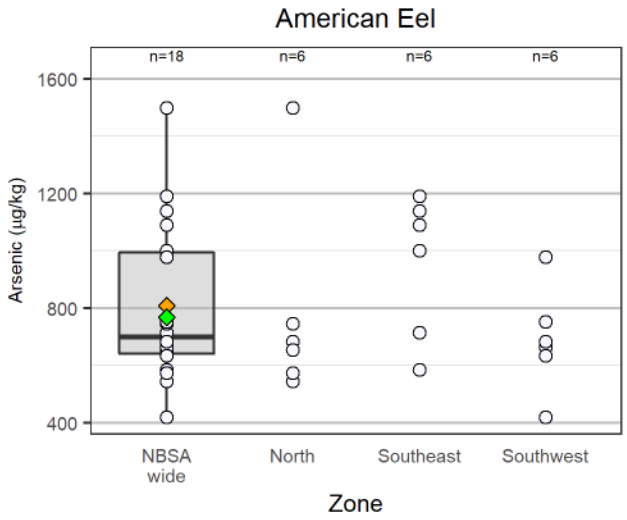
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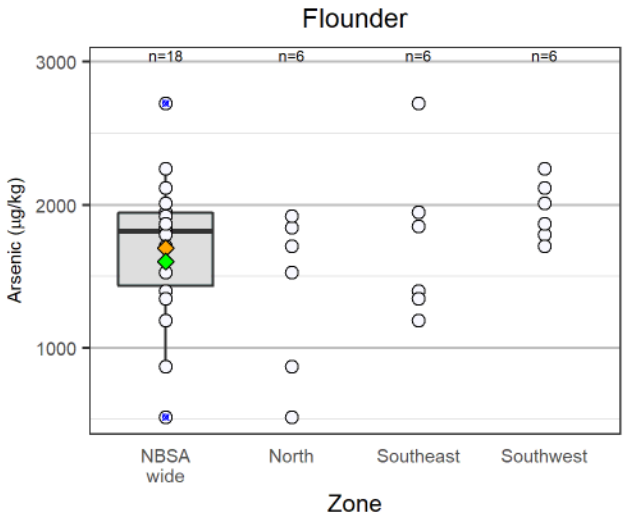
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

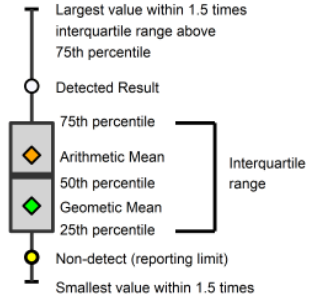
FISH TISSUE BOXPLOTS: TOTAL PAH

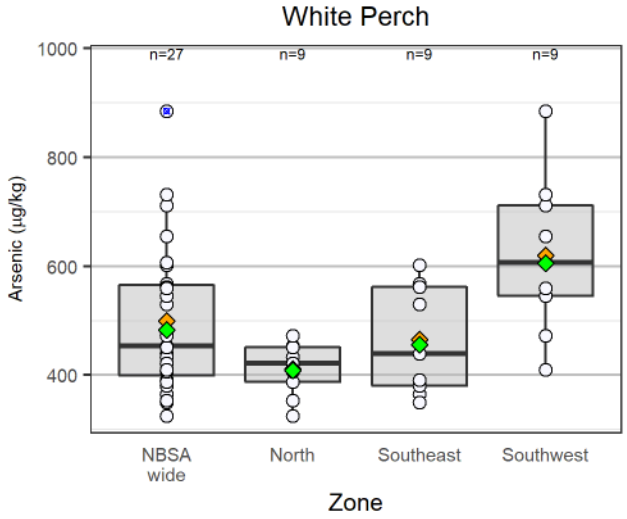
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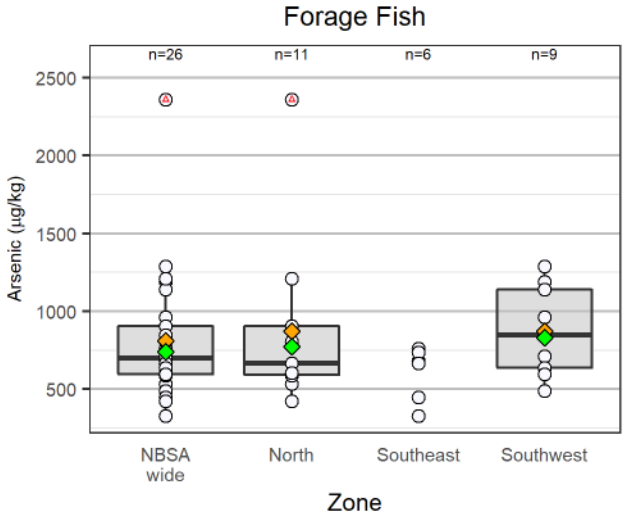
FIGURE
4-6











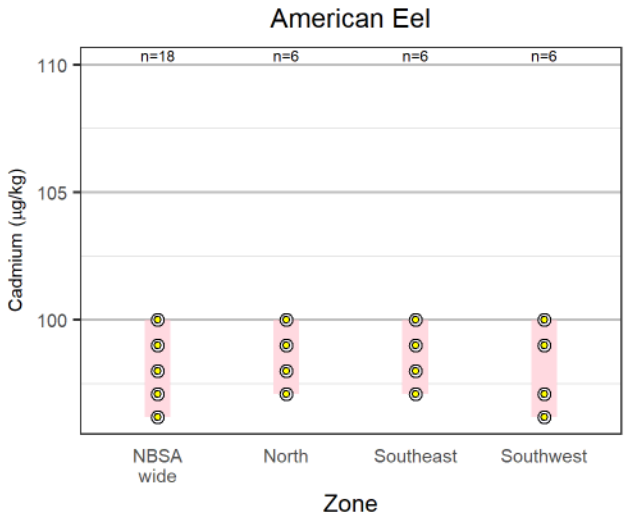
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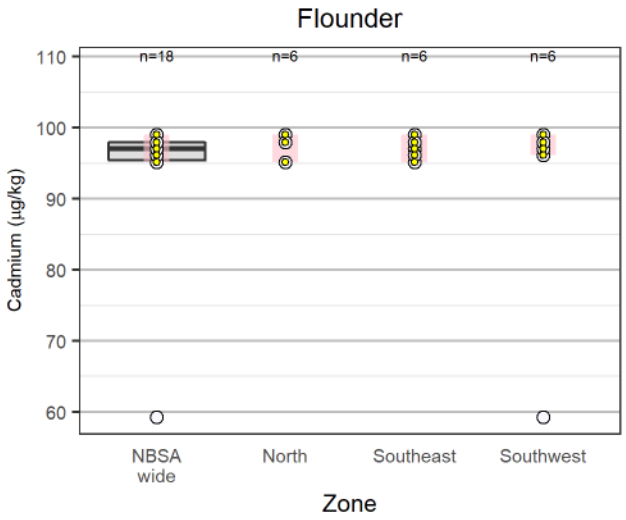
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

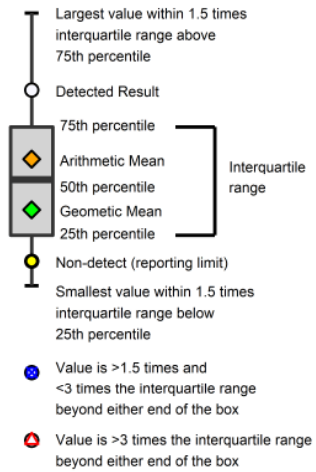
FISH TISSUE BOXPLOTS: ARSENIC

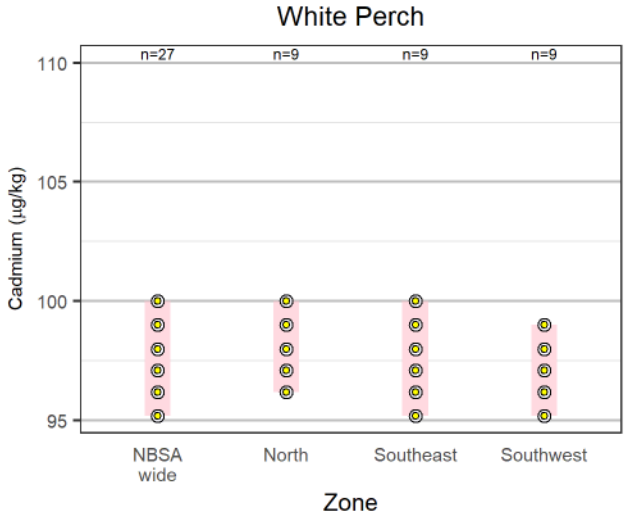
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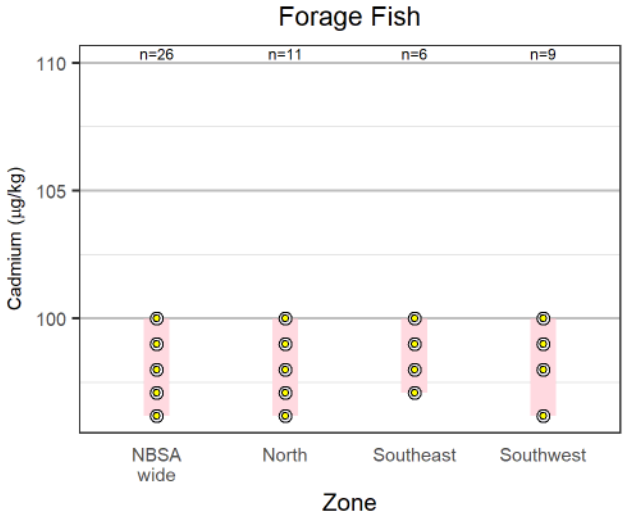
FIGURE
4-6











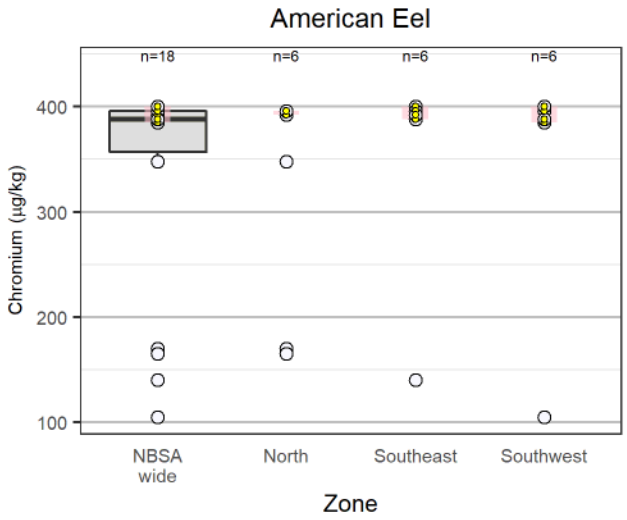
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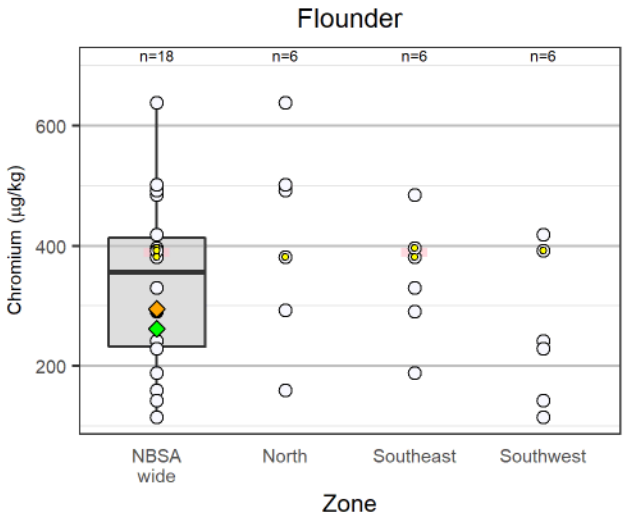
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
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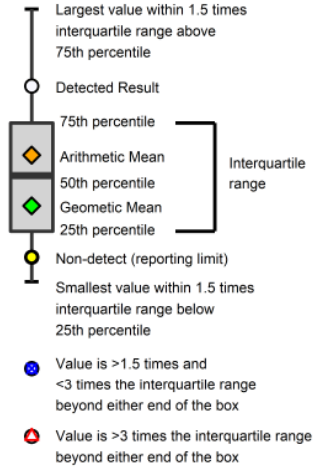
FISH TISSUE BOXPLOTS: CADMIUM

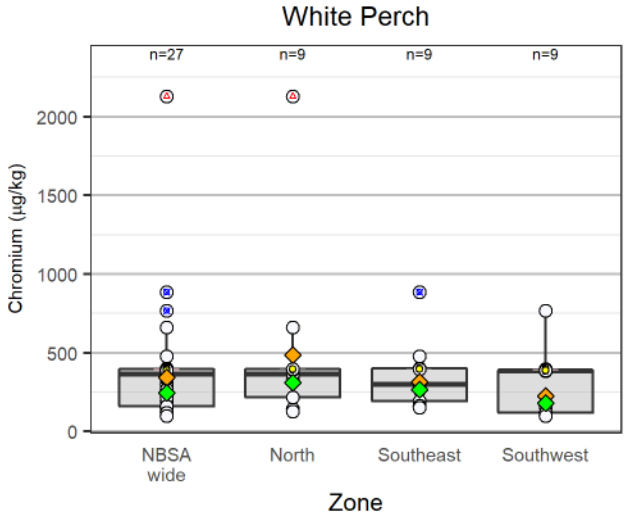
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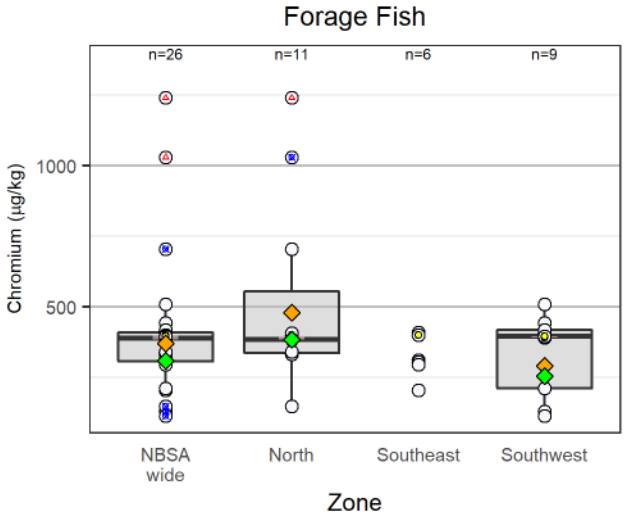
FIGURE
4-6











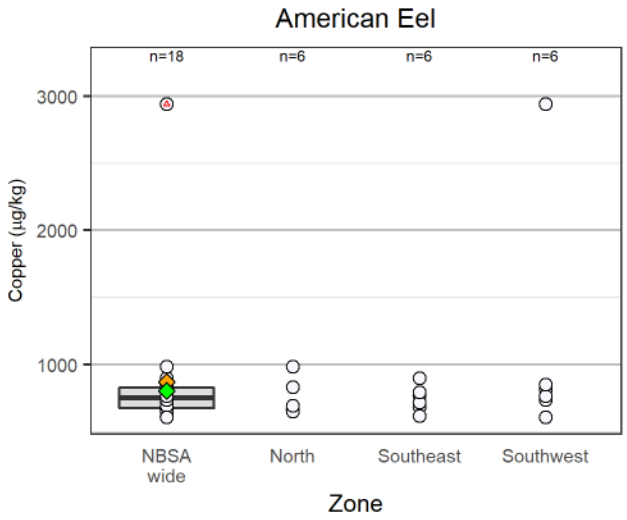
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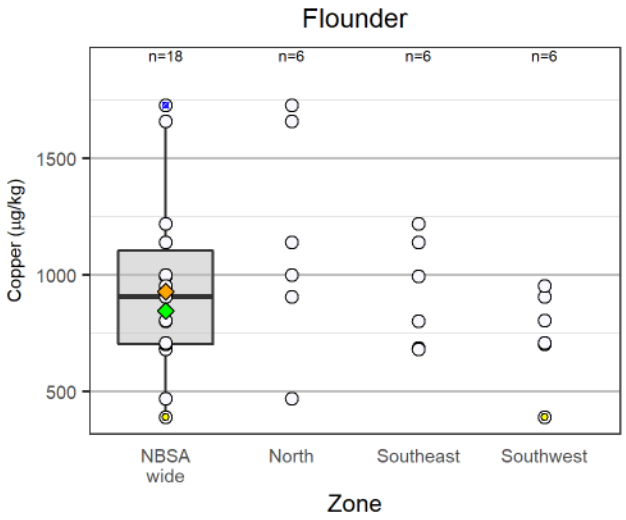
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
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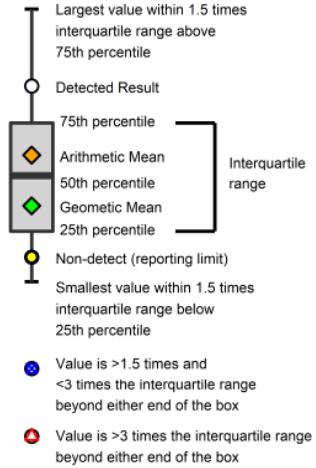
FISH TISSUE BOXPLOTS: CHROMIUM

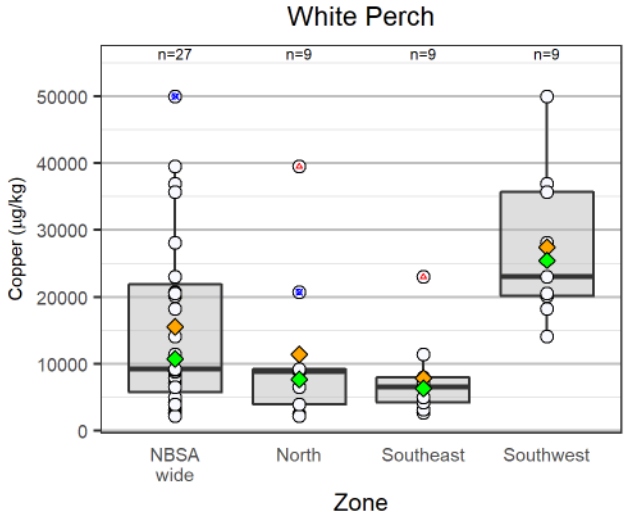
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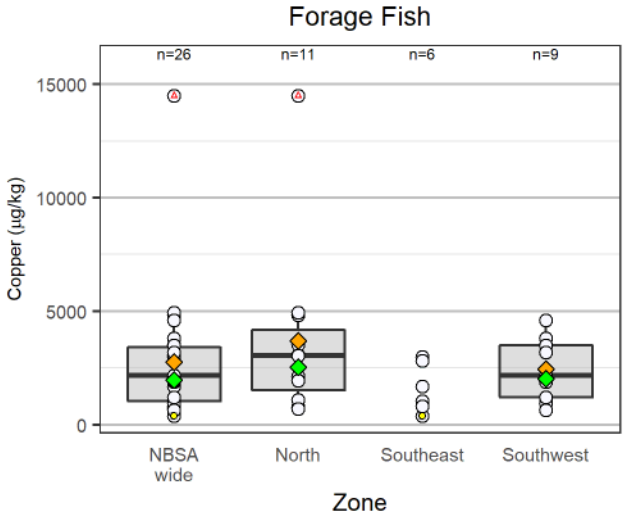
FIGURE
4-6











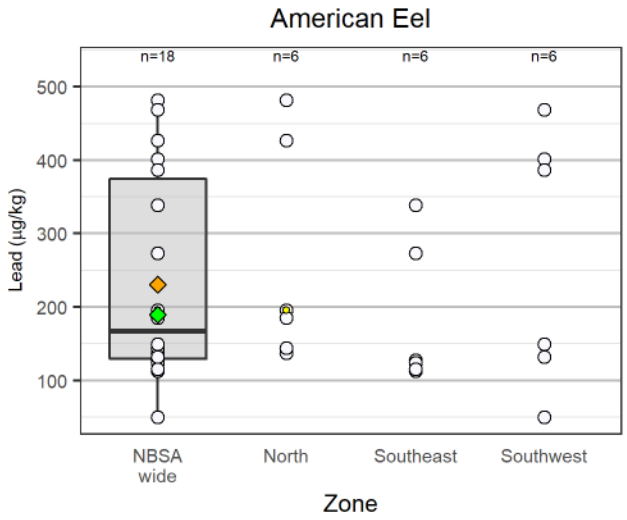
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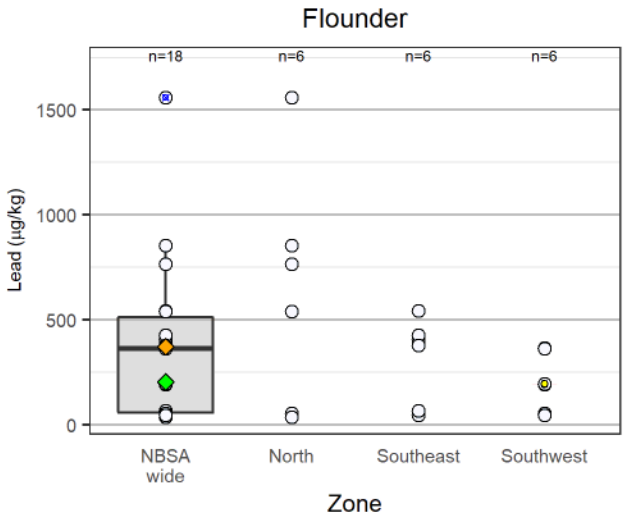
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

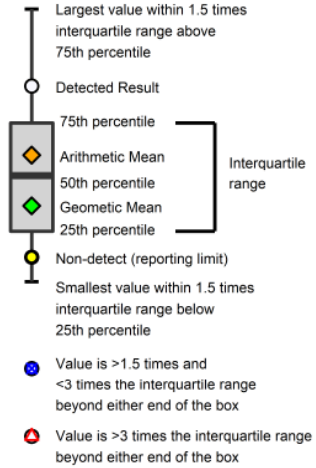
FISH TISSUE BOXPLOTS: COPPER

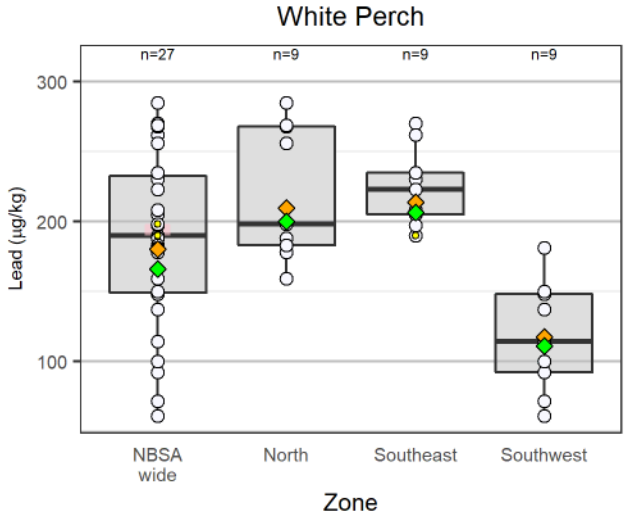
OXY Glenn Springs Holdings, Inc.
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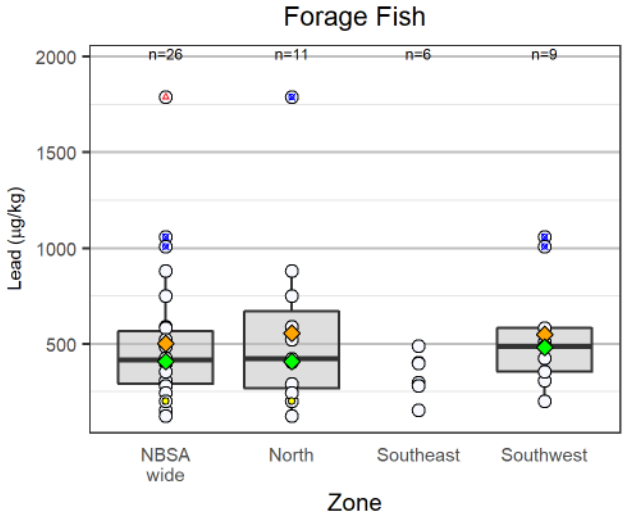
FIGURE
4-6











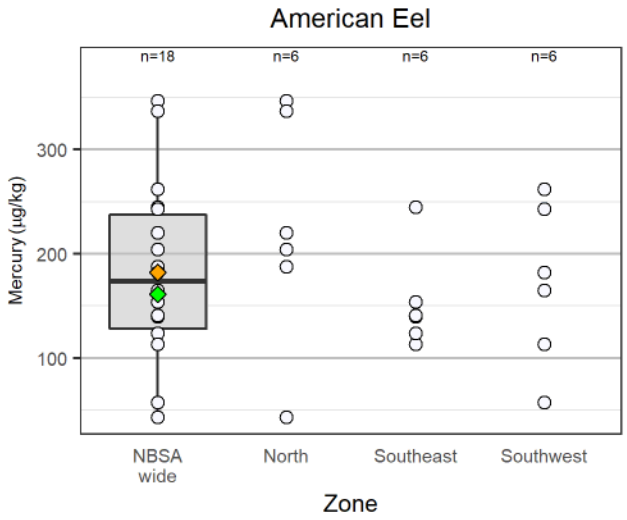
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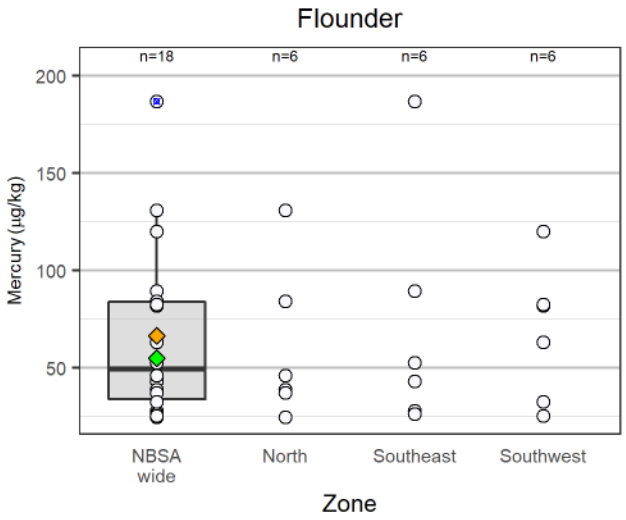
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

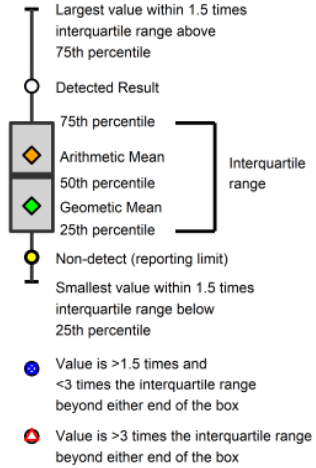
FISH TISSUE BOXPLOTS: LEAD

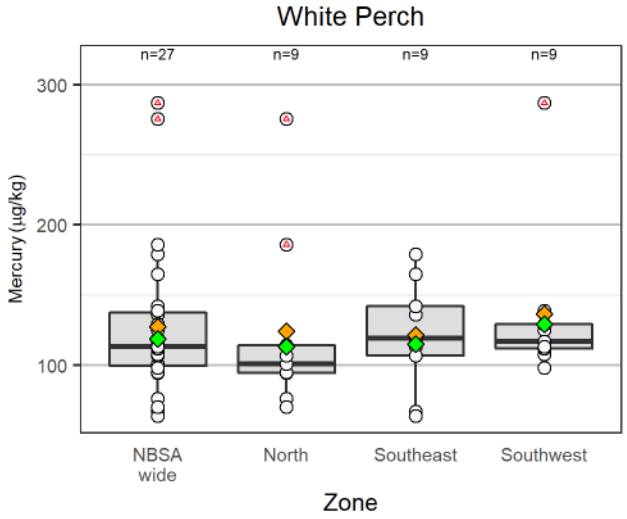
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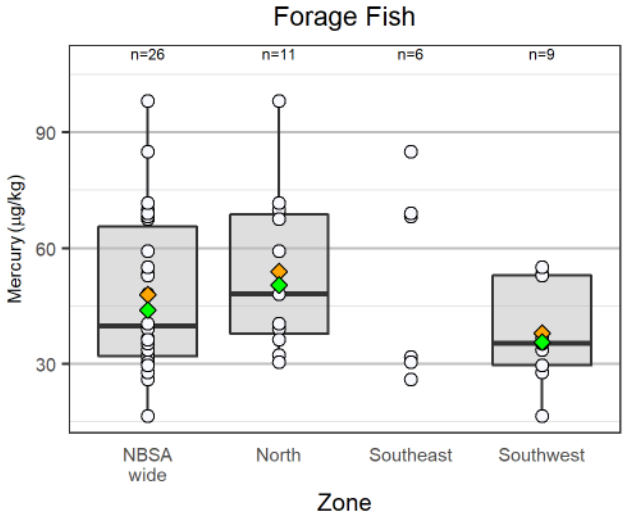
FIGURE
4-6











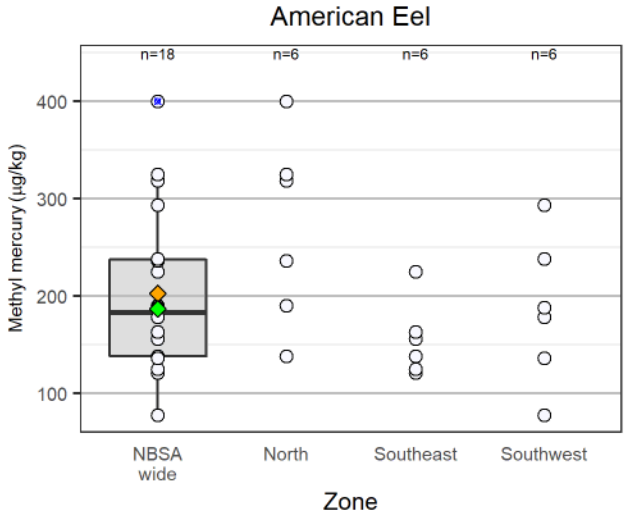
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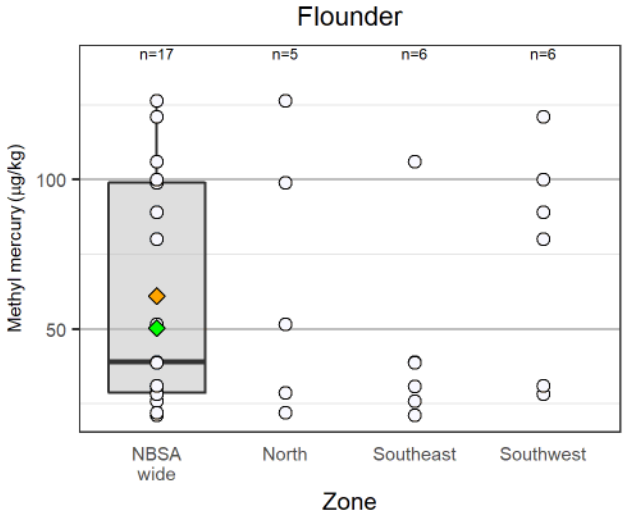
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

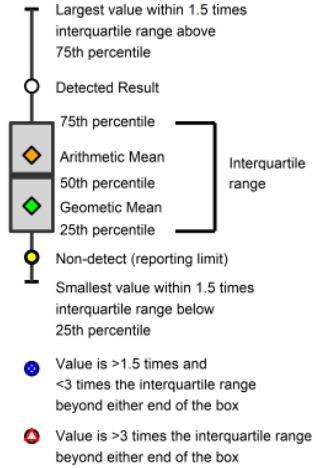
FISH TISSUE BOXPLOTS: MERCURY

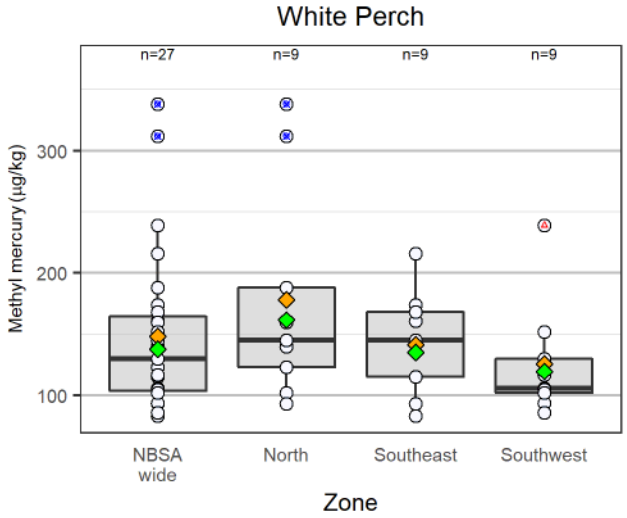
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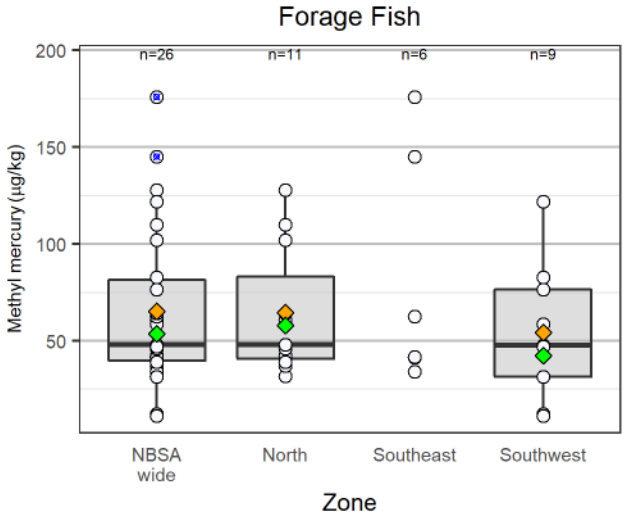
FIGURE
4-6











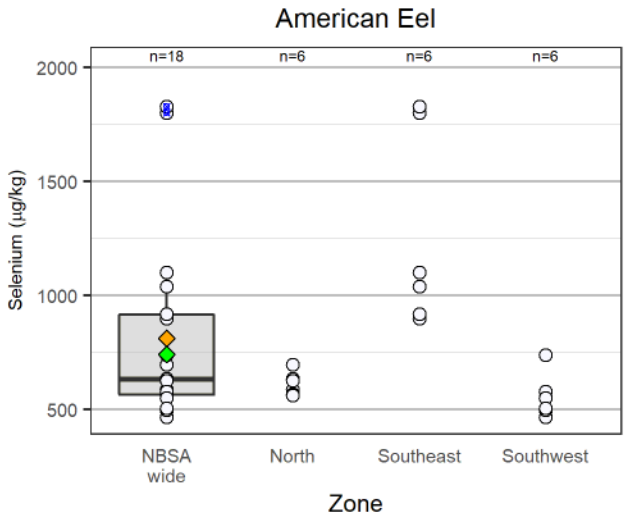
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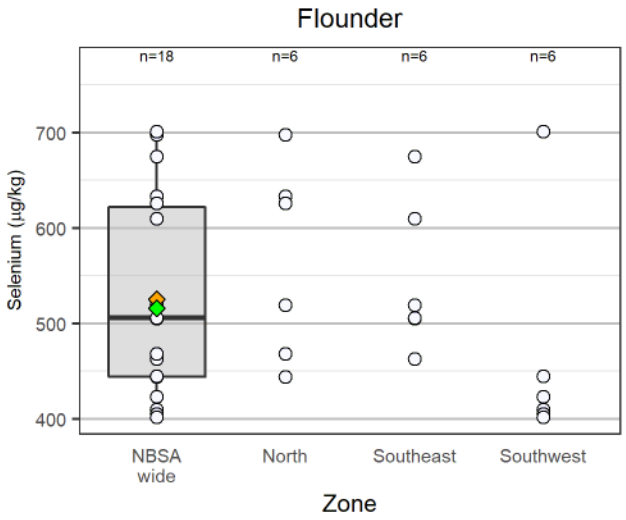
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

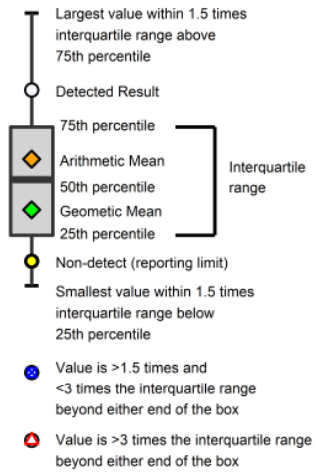
FISH TISSUE BOXPLOTS: METHYL MERCURY

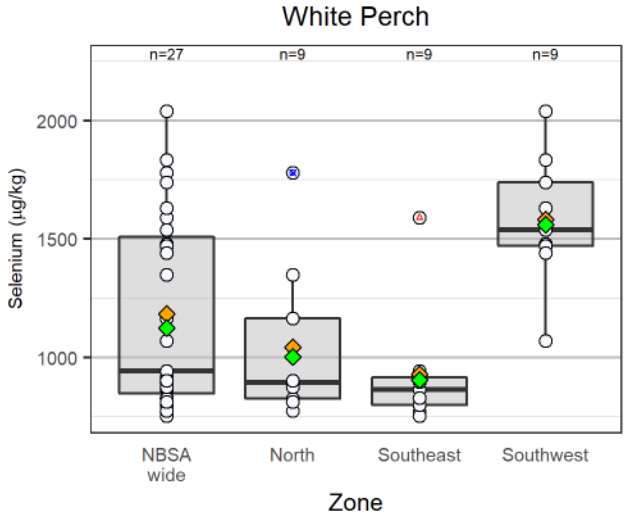
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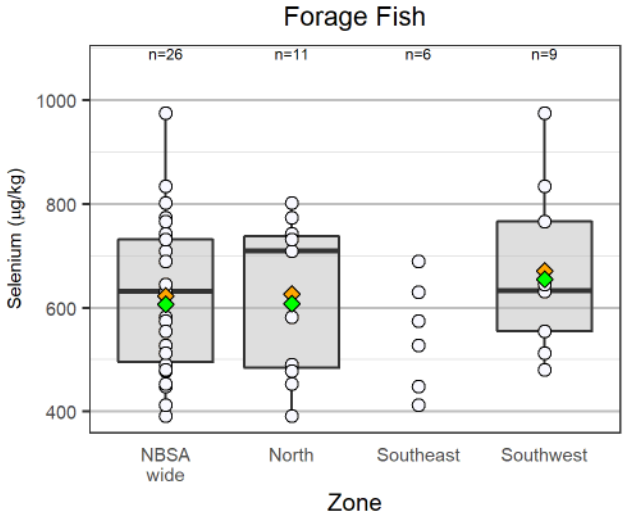
FIGURE
4-6











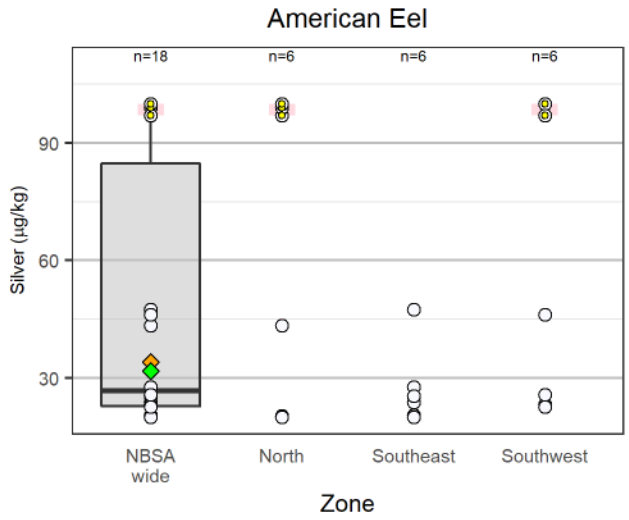
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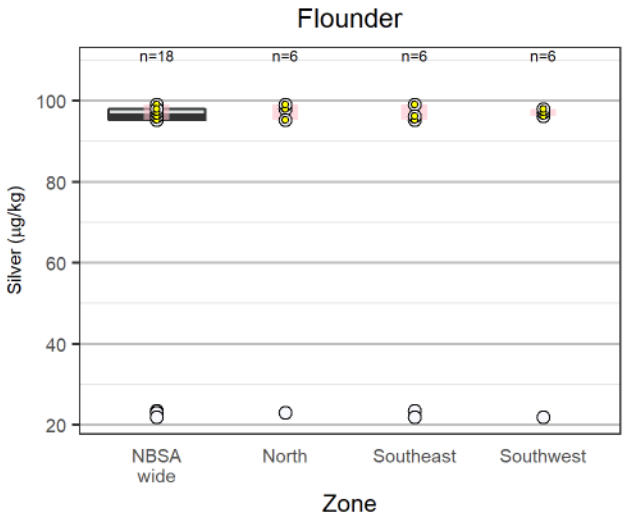
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NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

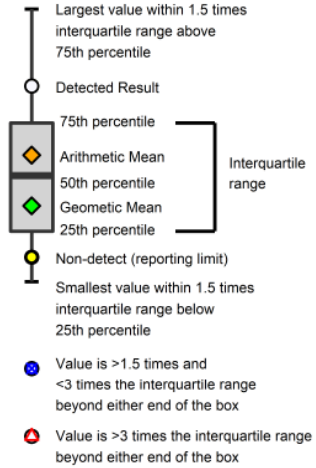
FISH TISSUE BOXPLOTS: SELENIUM

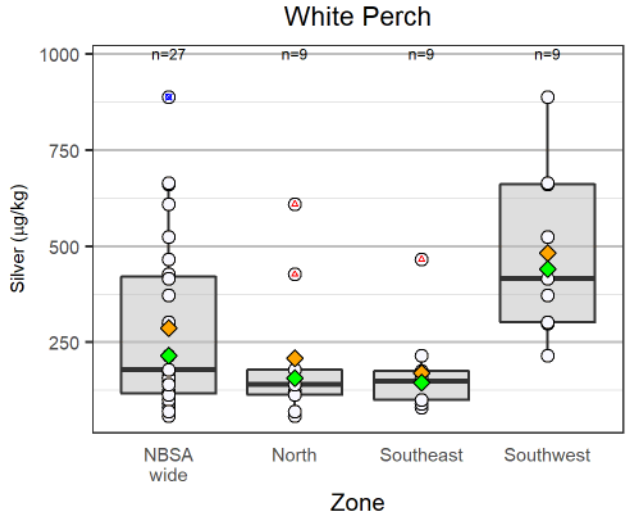
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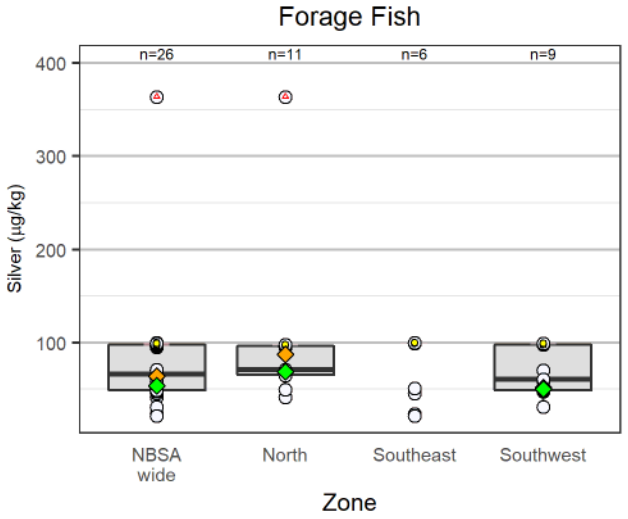
FIGURE
4-6











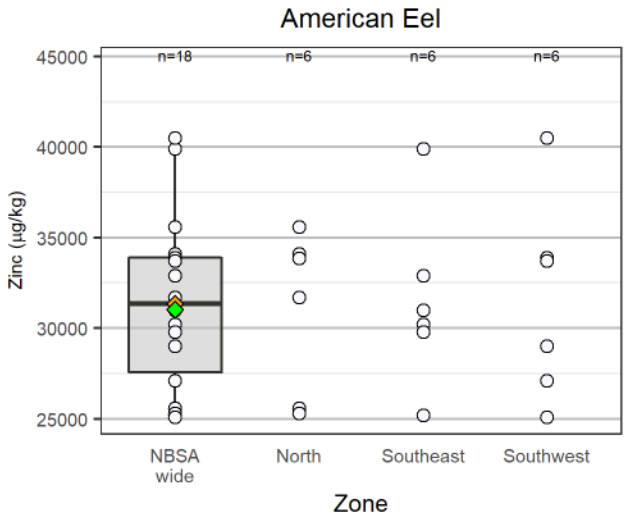
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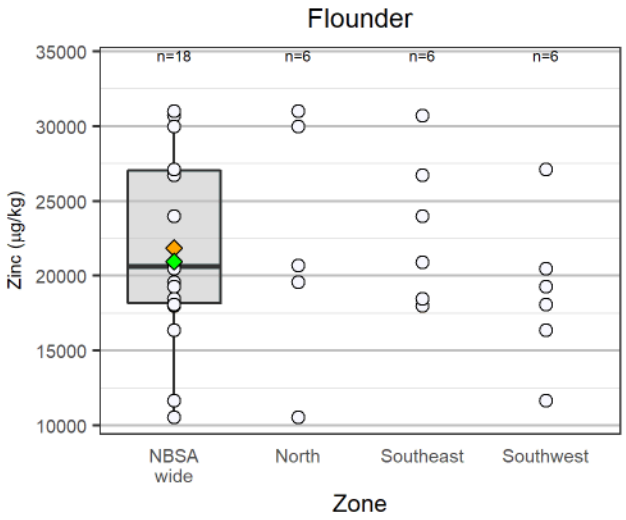
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
BASELINE ECOLOGICAL RISK ASSESSMENT

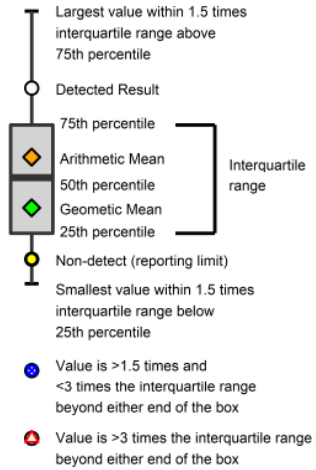
FISH TISSUE BOXPLOTS: SILVER

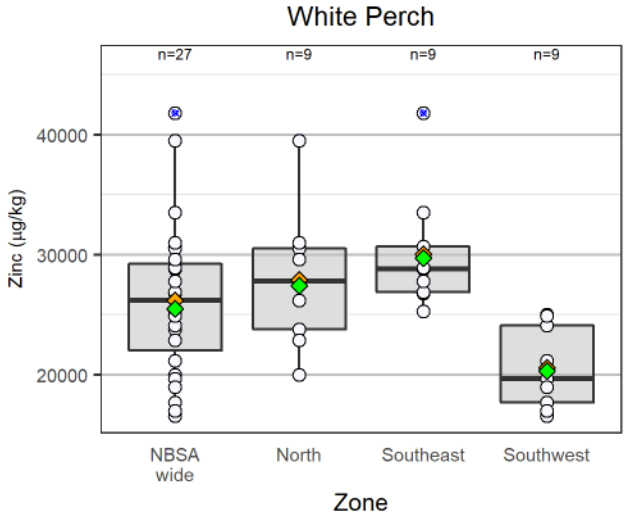
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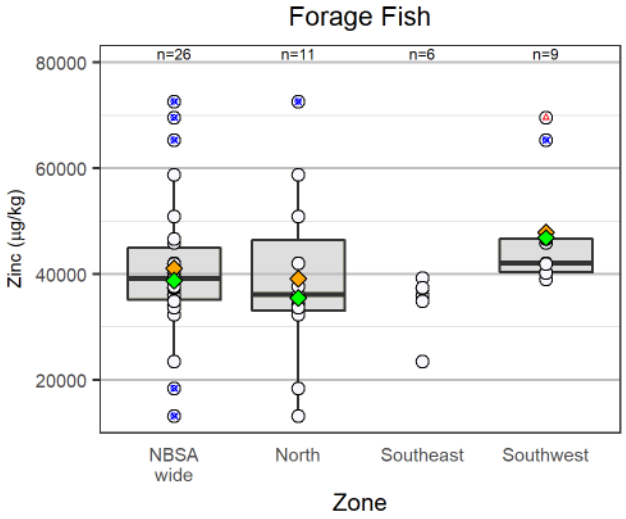
FIGURE
4-6











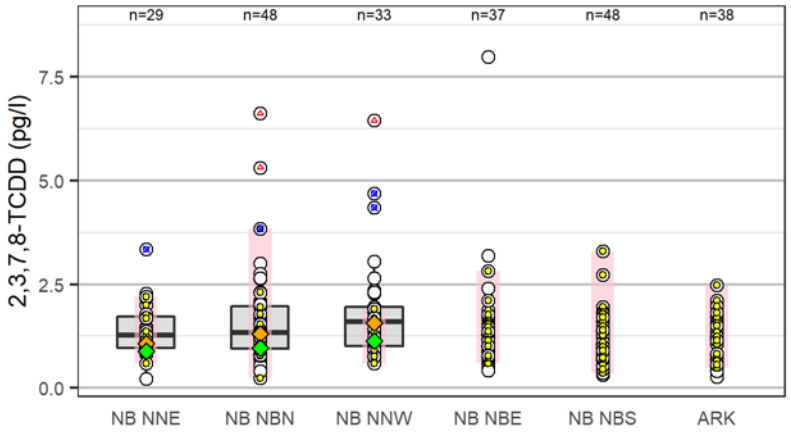
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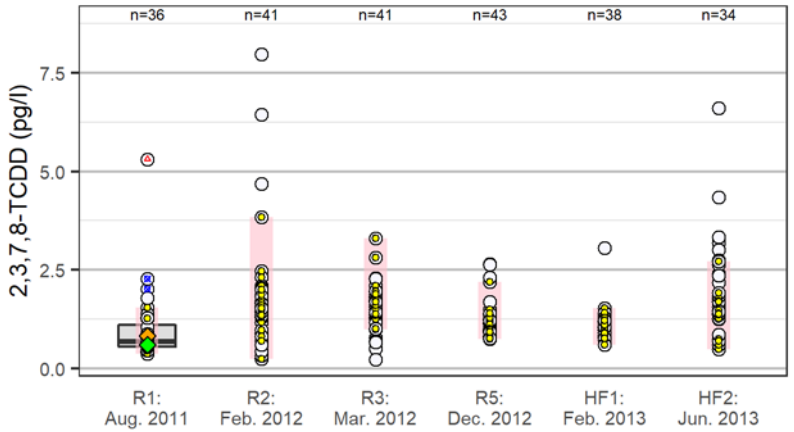
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION (OU3)
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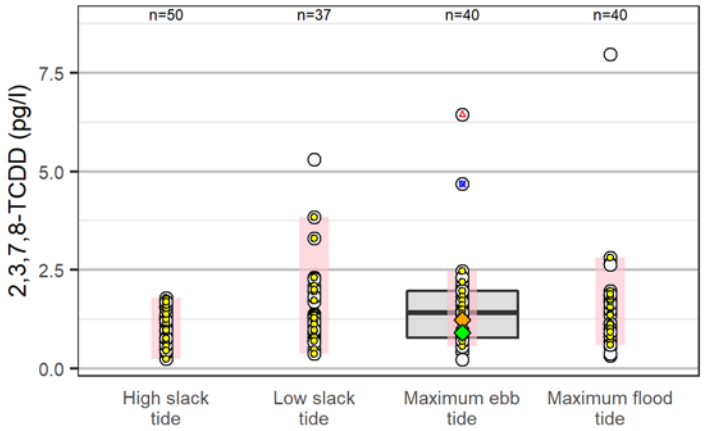
FISH TISSUE BOXPLOTS: ZINC

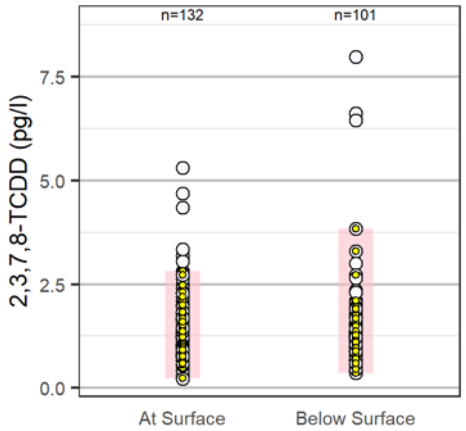
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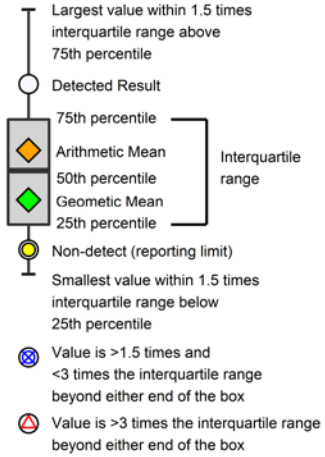
FIGURE
4-6











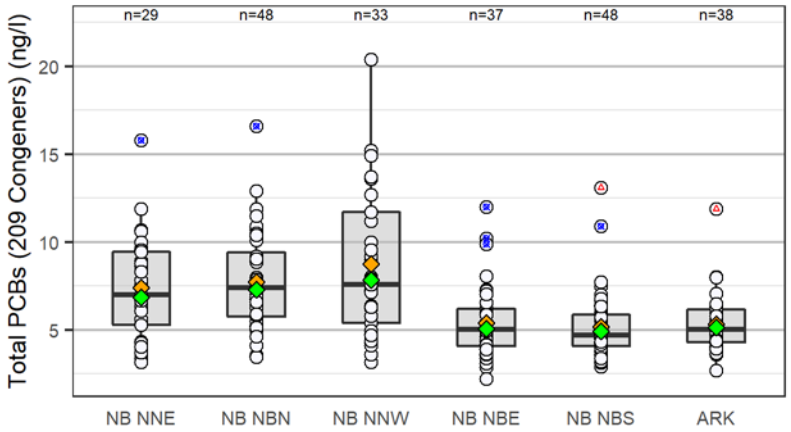
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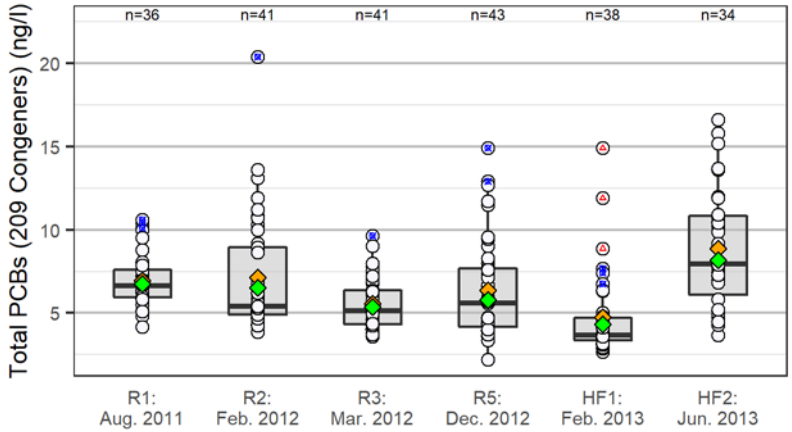
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

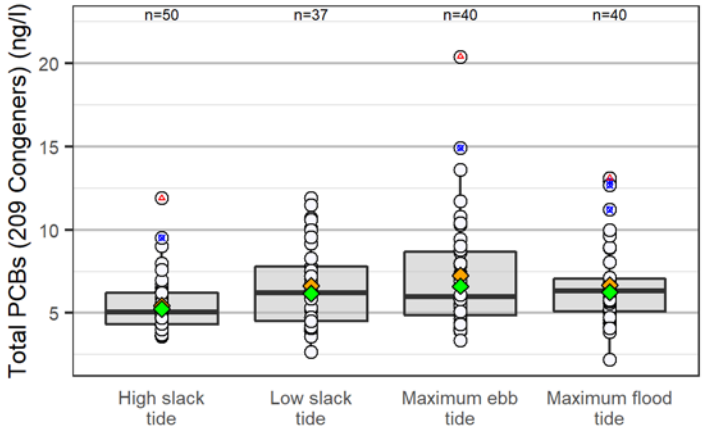
SURFACE WATER RESULTS- 2,3,7,8-TCDD

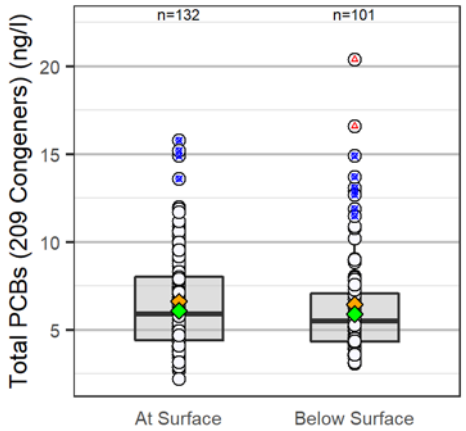
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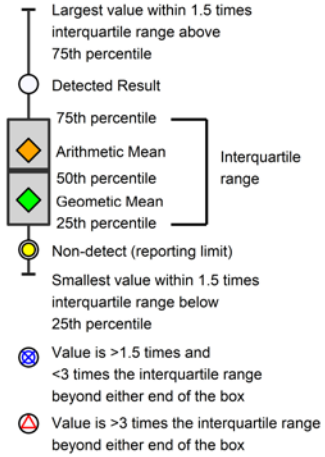
FIGURE
5-1











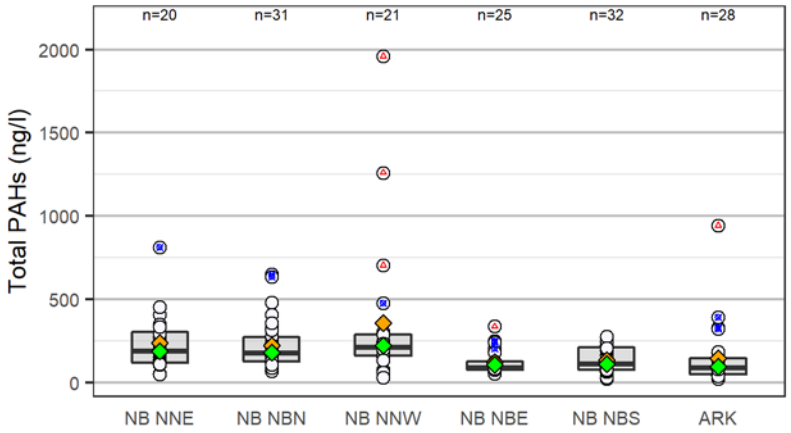
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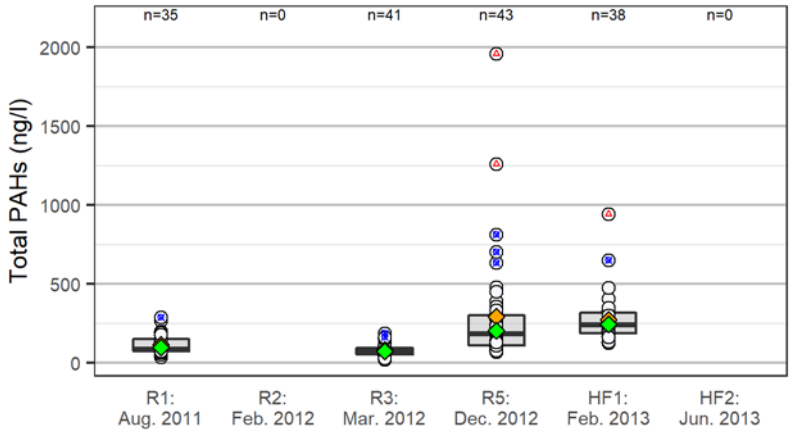
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

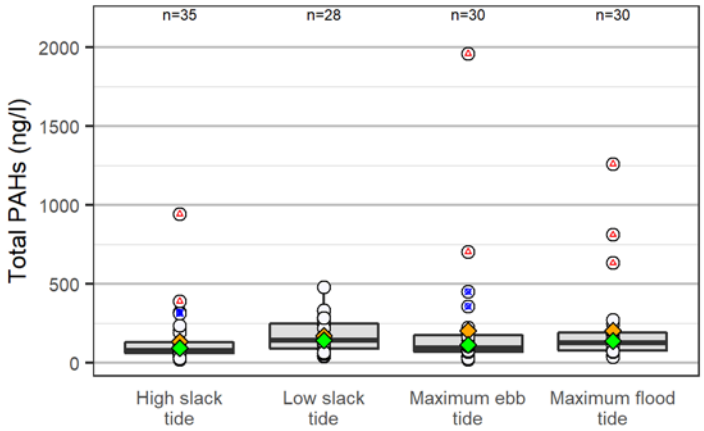
SURFACE WATER RESULTS- TOTAL PCBS (209 CONGENERS)

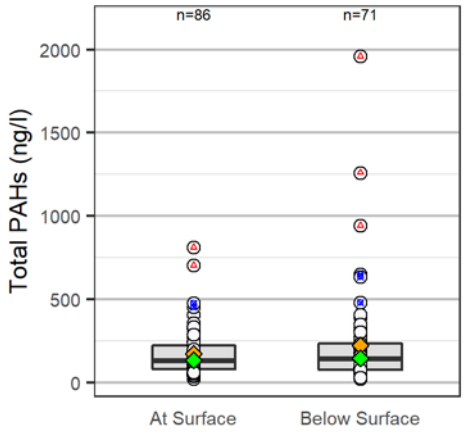
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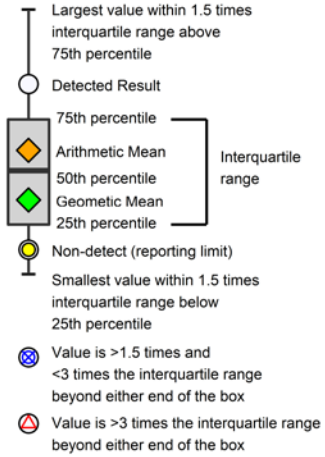
FIGURE
5-1











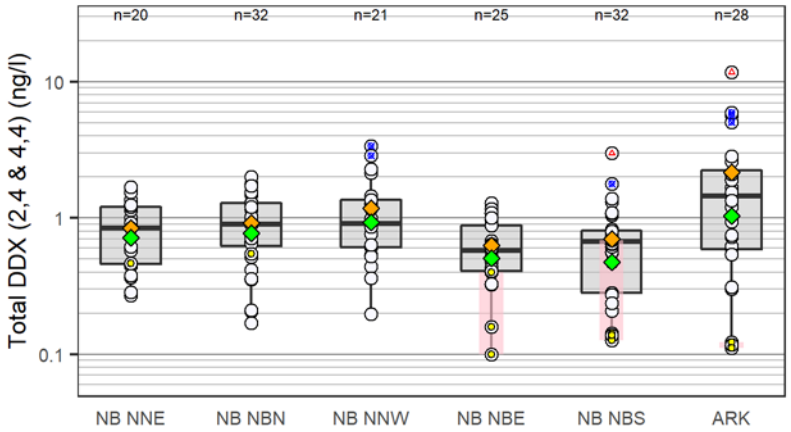
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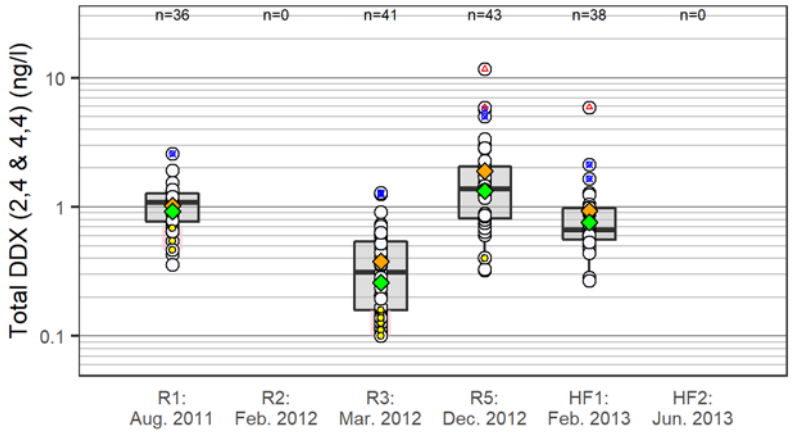
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NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

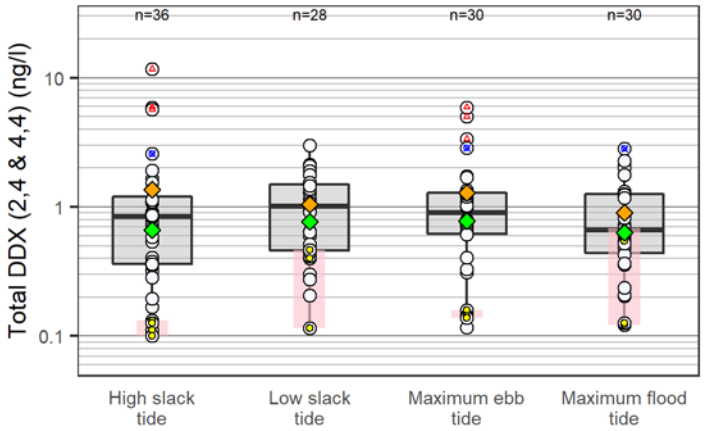
SURFACE WATER RESULTS- TOTAL PAHS

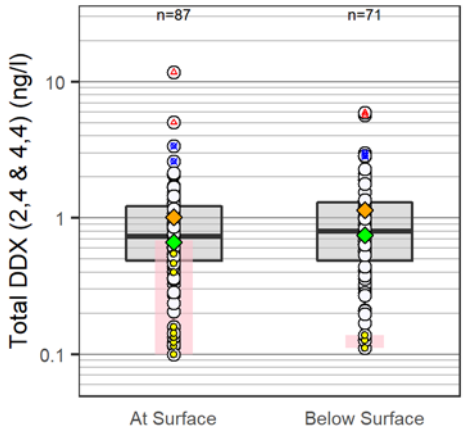
Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

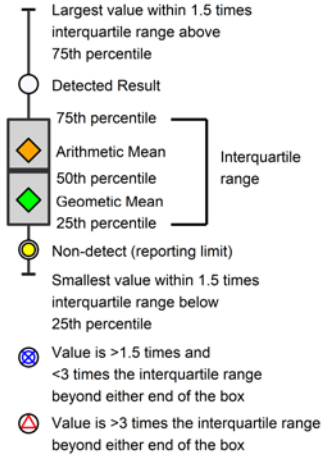
FIGURE
5-1











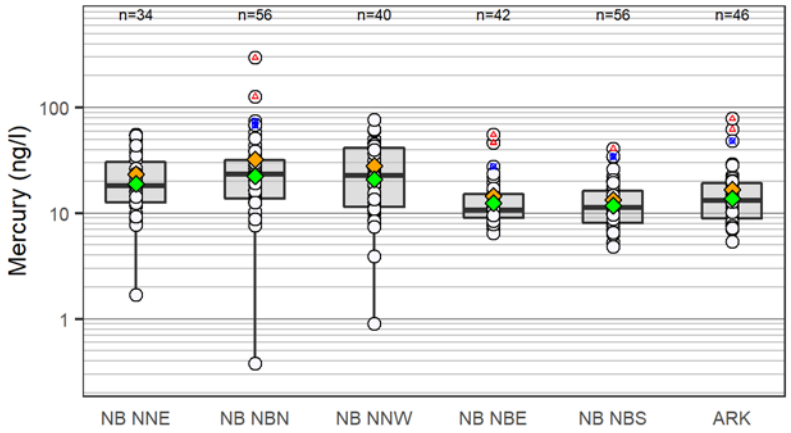
Notes:
Surface water sampling conducted under the Chemical Water Column Monitoring Program (2011-2013). Data were downloaded from ourpassaic.org.
Six sampling stations located in the Newark Bay Study Area (NNE, NBN, NNW, NBE, NBS, ARK).
n = number of samples
Non-detects plotted at the reporting limit.
For percentiles, non-detects included at the reporting limit.
For arithmetic mean, non-detects included at 1/2 the reporting limit.
Pink shaded area represents range of non-detect reporting limits.
Percentiles/mean not estimated for n<8 and/or frequency of detection<50%.

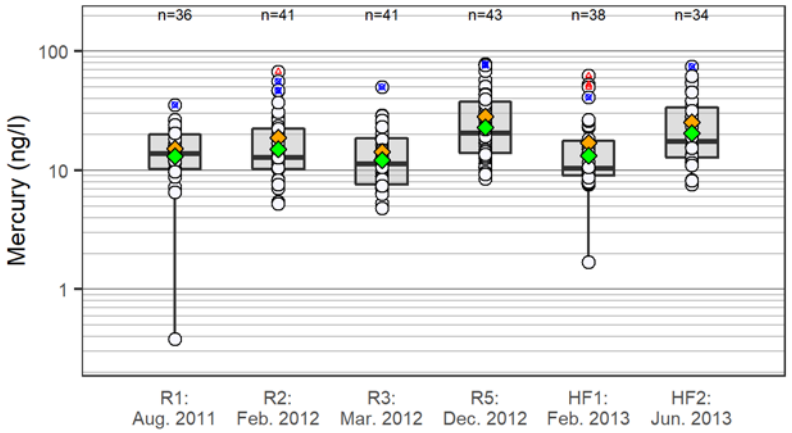
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

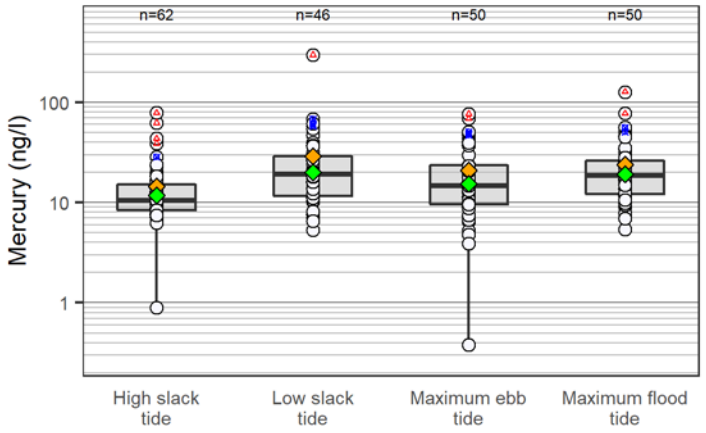
SURFACE WATER RESULTS- TOTAL DDX (2,4 & 4,4)

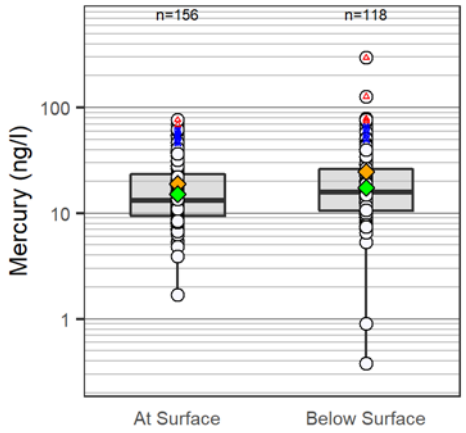
Glenn Springs Holdings, Inc.
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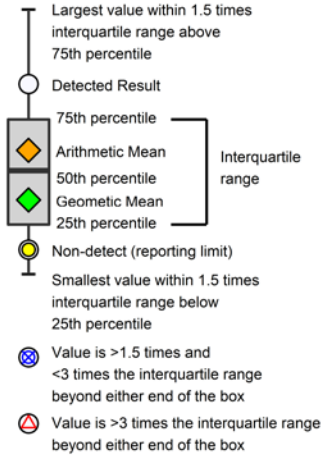
FIGURE
5-1











Notes:
Surface water sampling conducted under the Chemical Water Column Monitoring Program (2011-2013). Data were downloaded from ourpassaic.org.
Six sampling stations located in the Newark Bay Study Area (NNE, NBN, NNW, NBE, NBS, ARK).
n = number of samples

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SURFACE WATER RESULTS- MERCURY

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FIGURE
5-1

CITY: Citrix DIV/GROUP: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-1_SQTSedimentSamplingStations.mxd 4/8/2019 9:22:32 AM

LEGEND:

- SURFACE WATER COLLECTION LOCATION

ANALYSES
- SQT/PW
- SQT/PW+BIOACCUMULATION

GEOMORPHIC AREAS
- NAVIGATION CHANNELS
- SUBTIDAL FLATS
- TRANSITIONAL SLOPES
- INTERTIDAL AREAS
- SHORELINE
- UNDERGROUND TRIBUTARY
- GEOGRAPHIC ZONE BOUNDARY

GEOMORPHIC AREAS:
- HISTORICALLY DISTURBED SUBTIDAL FLATS
- INDUSTRIAL WATERFRONT
- INTERTIDAL AREA
- NAVIGATION CHANNEL
- PORT CHANNEL
- SUBTIDAL FLATS
- TRANSITIONAL SLOPES

0 2,500 5,000 Feet
GRAPHIC SCALE

PIERSONS CREEK
CONRAIL BRIDGE REMNANTS
HACKENSACK RIVER
PASSAIC RIVER
PORT NEWARK CHANNEL
INDUSTRIAL/COMMERCIAL ACCESS AREA
LEHIGH VALLEY RAILROAD BRIDGE
NEW JERSEY TURNPIKE
ELIZABETH CHANNEL
RICHARD A RUTOWSKI PARK
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
VETERANS PARK
TRAILER PARK
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
ARTHUR KILL
KILL VAN KULL
SHOOTERS ISLAND
BAYONNE BRIDGE

140 164 163 165 162 136 161 137 138 160 159 158 139 157 141 142 156 143 144 145 155 154 153 152 151 146 150 149 148 147

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. AERIAL PHOTOS DATED 2015 (ESRI CLOUD IMAGERY).
3. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
4. THE GEOMORPHIC AREAS SHOWN ARE CONSISTENT WITH THOSE PRESENTED IN THE CSM (GSH 2019).
5. SQT REPRESENTS THREE ANALYSES: SEDIMENT CHEMISTRY, BENTHIC INVERTEBRATE COMMUNITY, AND TOXICITY TESTING WITH L. PLUMULOSUS (10-DAY AND 28-DAY). PW REPRESENTS SEDIMENT POREWATER CHEMISTRY.
6. SURFACE WATER WAS NOT A TARGETED SAMPLING MATRIX. SURFACE WATER WAS COLLECTED AND USED IN THE FIELD FACILITY FOR THE SHIPMENT OF SEDIMENT FOR POREWATER ANALYSES.
7. GEOMORPHIC AREA DESIGNATIONS FOR EACH SAMPLING LOCATION ARE BASED ON THE FIELD-COLLECTED GEOGRAPHIC COORDINATES OF THE ACTUAL SAMPLING LOCATIONS AS RECORDED DURING SEDIMENT COLLECTION ACTIVITIES. (GSH 2017)
8. REFERENCES:
A. GSH. 2019. CONCEPTUAL SITE MODEL. NEWARK BAY STUDY AREA. REVISION 2. JANUARY.
B. GSH. 2017. SEDIMENT QUALITY TRIAD AND POREWATER FIELD REPORT. NEWARK BAY STUDY AREA. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. REVISION 1. SEPTEMBER.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SQT SAMPLING STATIONS

Glenn Springs Holdings, Inc.
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FIGURE
6-1

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00013)
T:_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-2_SedimentToxicityResults.mxd 7/21/2020 2:52:35 PM

LEGEND:

- 10-DAY SURVIVAL FOR *LEPTOCHEIRUS PLUMULOSUS*
- 28-DAY SURVIVAL FOR *LEPTOCHEIRUS PLUMULOSUS*
- SURVIVAL STATISTICALLY DIFFERENT THAN CONTROLS
- SURVIVAL NOT STATISTICALLY DIFFERENT THAN CONTROLS
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
NEWARK BAY NORTH
NEWARK BAY CENTRAL
NEWARK BAY SOUTH
NEWARK BAY
KILL VAN KULL
SHOOTERS ISLAND

136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).

0 2,500 5,000 Feet
GRAPHIC SCALE

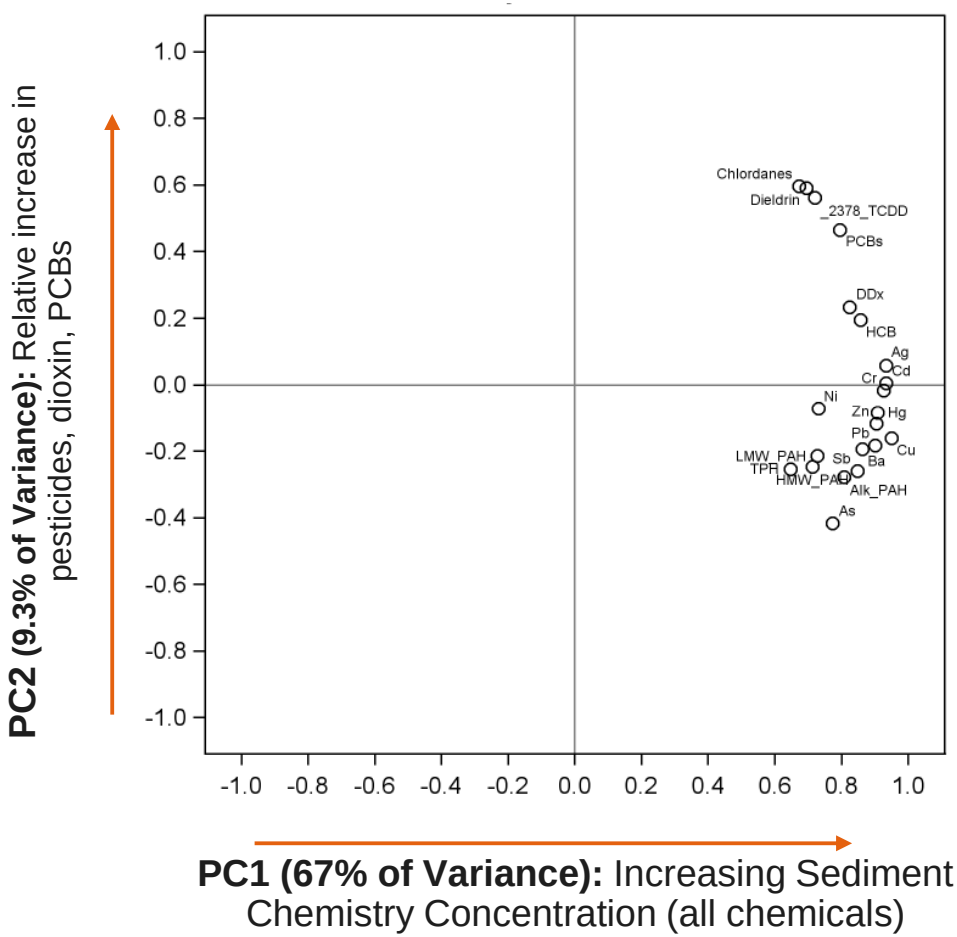
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

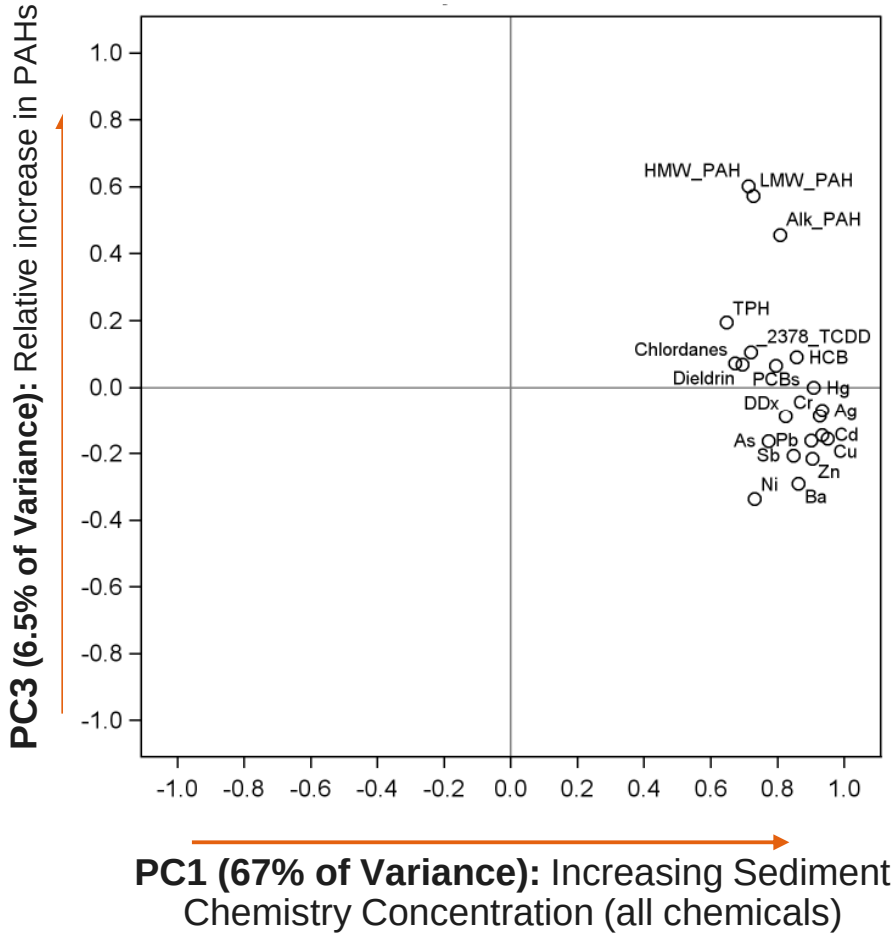
SEDIMENT TOXICTY RESULTS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
6-2

Graphs show the correlation of each individual analyte or analyte group to the first, second and third principal components.





KEY

Sb = Antimony	_2378_TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
As = Arsenic	PCBs = Totals PCB Congeners
Ba = Barium	DDT = Total DDx (2,4' and 4,4')
Cd = Cadmium	HCB = Hexachlorobenzene
Cr = Chromium	Chlordanes = Total Alpha + Gamma Chlordane
Cu = Copper	Dieldrin = Dieldrin
Pb = Lead	LMW_PAH = Total Low Molecular Weight Polycyclic Aromatic Hydrocarbons
Hg = Mercury	HMW_PAH = Total High Molecular Weight Polycyclic Aromatic Hydrocarbons
Ni = Nickel	Alk_PAH = Total Alkylated Polycyclic Aromatic Hydrocarbons
Ag = Silver	TPH = Total Petroleum Hydrocarbons
Zn = Zinc	

DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

BASELINE ECOLOGICAL RISK ASSESSMENT

PRINCIPAL COMPONENT ANALYSIS OF SEDIMENT CHEMISTRY: LOADINGS

Glenn Springs Holdings, Inc.
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FIGURE
6-3

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: Idrum
GSH (B0009989.0061.00013)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-4_SedimentPrincipalComponentScores.mxd 8/27/2019 12:19:05 PM

LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

SEDIMENT CHEMISTRY PRINCIPAL COMPONENT SCORE

- < -2
- -2 TO 0
- 0 TO 2
- 2 TO 5
- > 5

0 3,000 6,000 Feet

GRAPHIC SCALE

PASSAIC RIVER
CONRAIL BRIDGE REMNANTS
PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
KILL VAN KULL
BAYONNE BRIDGE
SHOOTERS ISLAND
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

NOTES:

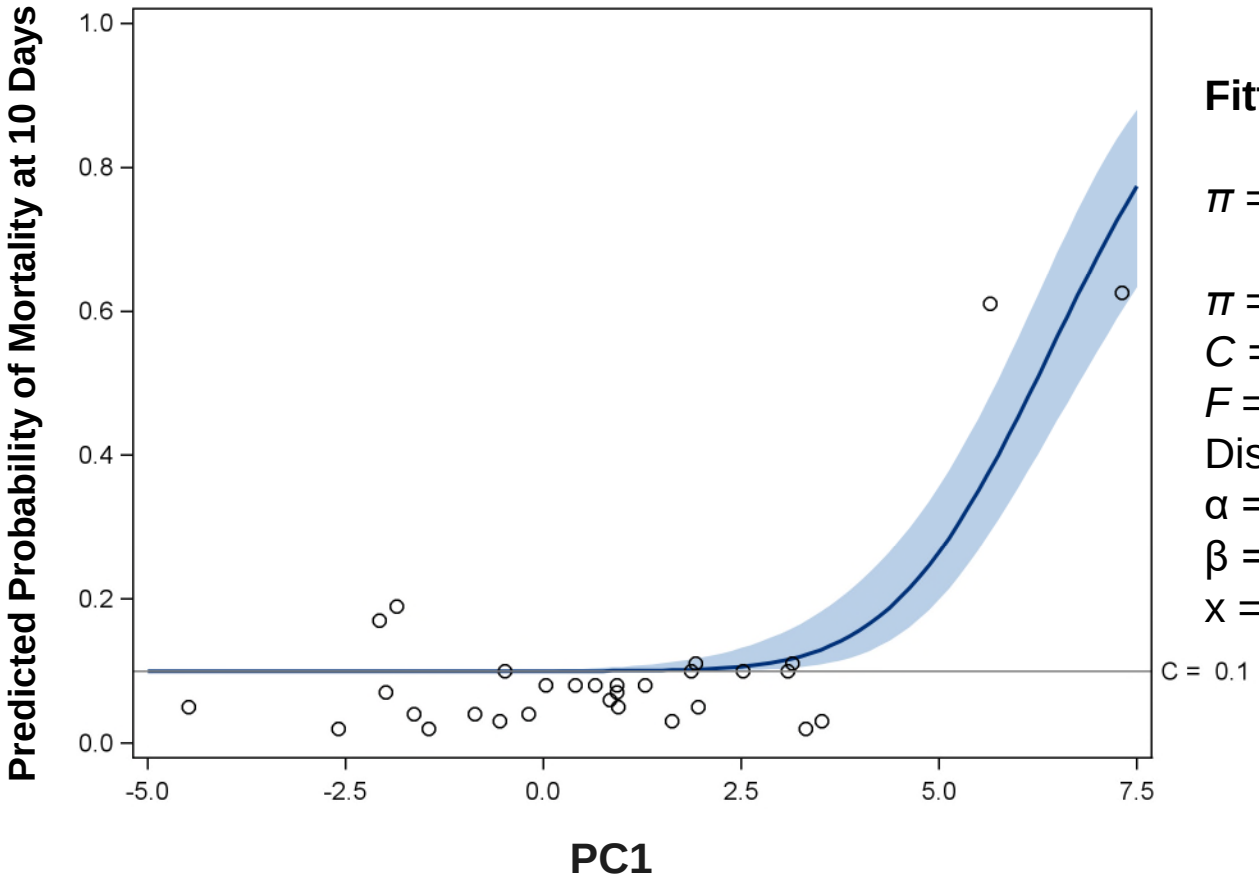
1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. BASE MAP INFORMATION AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995. PASSAIC NAVIGATION CHANNEL WAS PROVIDED BY THE USACE. ALL NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
4. FIGURE SHOWS THE SCORES FOR THE FIRST PRINCIPAL COMPONENT FOR ALL PHASE III SURFACE SEDIMENT LOCATIONS. THE PRINCIPAL COMPONENT ANALYSIS IS DESCRIBED IN SECTION 3.2 OF APPENDIX A OF THE BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE NEWARK BAY STUDY AREA.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SEDIMENT CHEMISTRY PRINCIPAL COMPONENT SCORES

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FIGURE 6-4



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -4.0444
β = 0.6288
x = PC1 Score

Blue shading represents 90% confidence limits of the fitted probit model.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT MODEL OF 10-DAY AMPHIPOD MORTALITY: SEDIMENT

Glenn Springs Holdings, Inc.
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FIGURE
6-5

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-6_AmphipodSurvival_10day.mxd 4/8/2019 9:38:24 AM

LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

MODEL PREDICTED 10 DAY AMPHIPOD SURVIVAL

- > 80% OF CONTROL
- 60 - 80% OF CONTROL
- < 60% OF CONTROL

0 3,000 6,000 Feet

GRAPHIC SCALE

PASSAIC RIVER
PIERSONS CREEK
CONRAIL BRIDGE REMNANTS
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
KILL VAN KULL
SHOOTERS ISLAND
BAYONNE BRIDGE
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

383 384 331 190 154 191 199 194 206 201 207 213 208 220 151 235 134 129 237 239 232

NOTES:

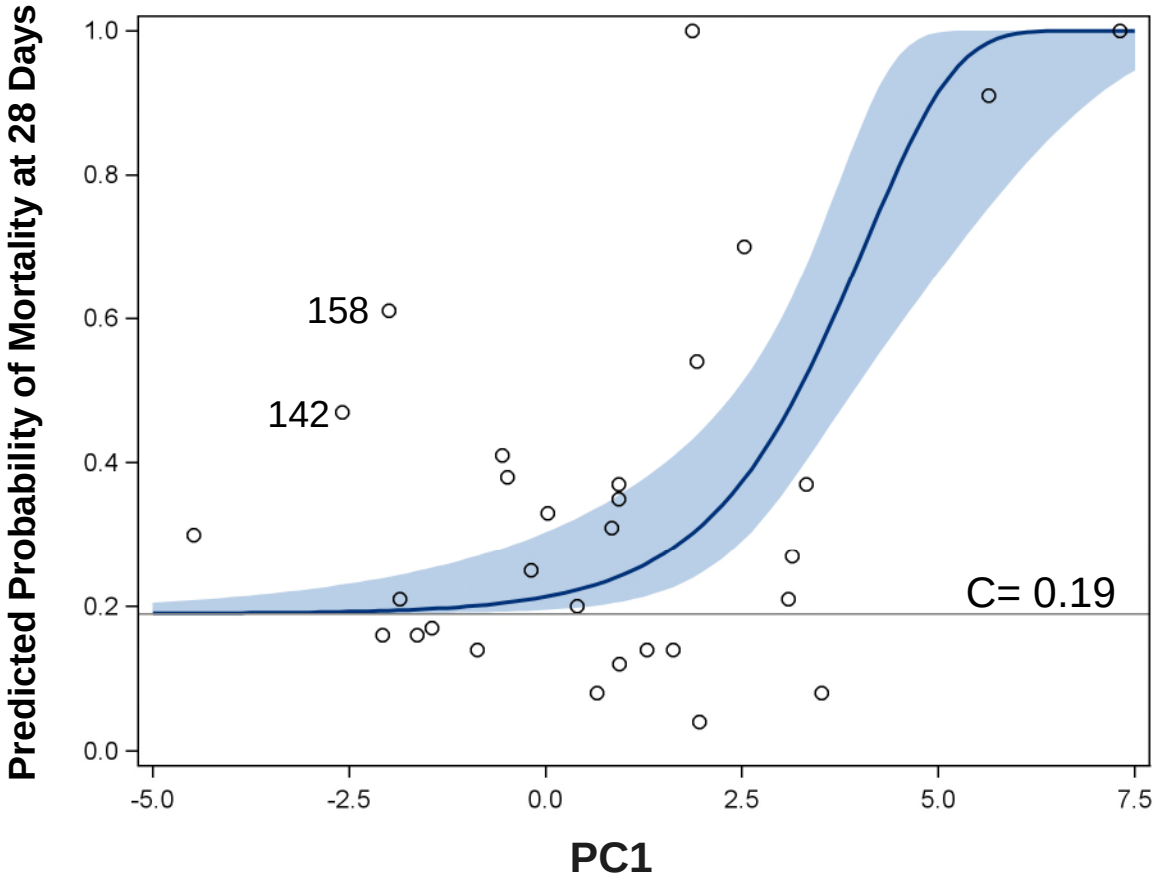
1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. BASE MAP INFORMATION AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995. PASSAIC NAVIGATION CHANNEL WAS PROVIDED BY THE USACE. ALL NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
4. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

MODEL PREDICTED 10-DAY AMPHIPOD SURVIVAL

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
6-6



Fitted Gompertz Model:

$\pi = C+(1-C)F(\alpha + \beta_i x_i)$

π = Probability of mortality at 28 days
C = 0.19 (i.e. control mortality)
F = Cumulative Gompertz Distribution Function
α = -4.4644
β_1 = 0.8683
x_1 = PC1 Score
β_2 = 1.4585
x_2 = PC2 Score

Blue shading represents 90% confidence limits of the fitted Gompertz model. PC2 not shown. Selected observations are labeled with the station name.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

GOMPERTZ MODEL OF 28-DAY AMPHIPOD MORTALITY: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
6-7

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: Idrum
GSH (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-8_AmphipodSurvival_28day.mxd 8/27/2019 1:23:08 PM

LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

MODEL PREDICTED 28 DAY AMPHIPOD SURVIVAL

- > 80% OF CONTROL
- 60 - 80% OF CONTROL
- < 60% OF CONTROL

0 3,000 6,000 Feet
GRAPHIC SCALE

PASSAIC RIVER
PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
CONRAIL BRIDGE REMNANTS
KILL VAN KULL
BAYONNE BRIDGE
SHOOTERS ISLAND
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

371, 293, 312, 321, 161, 138, 327, 160, 333, 383, 331, 384, 338, 408, 353, 143, 127B, 172, 173, 179, 184, 183, 180, 154, 190, 185, 191, 199, 206, 207, 212, 213, 222, 220, 151, 224, 245, 235, 225, 129, 237, 176, 239, 149, 250, 231, 232

NOTES:

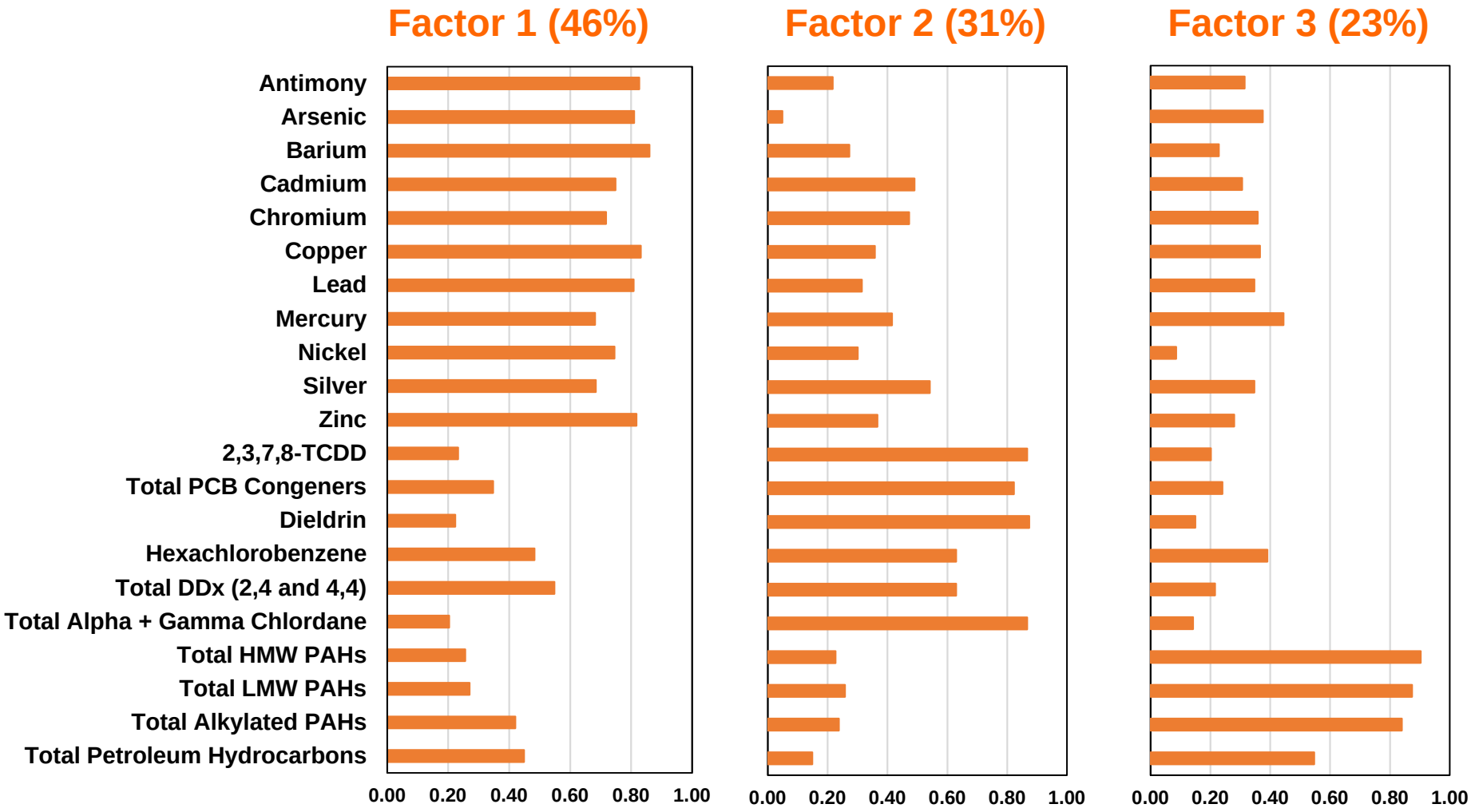
1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. BASE MAP INFORMATION AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995. PASSAIC NAVIGATION CHANNEL WAS PROVIDED BY THE USACE. ALL NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
4. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

MODEL PREDICTED 28 DAY AMPHIPOD SURVIVAL

Glenn Springs Holdings, Inc.
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FIGURE
6-8



Graphs show the correlation (x-axis) of each individual analyte or analyte group to the first, second and third factors. Numbers in parentheses indicate the percent of the variance explained by the factor.
PAH = Polycyclic Aromatic Hydrocarbon
HMW = High Molecular Weight.
LMW = Low Molecular Weight.
TCDD = Tetrachlorodibenzo-p-dioxin
DDx = dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene , and dichlorodiphenyltrichloroethane
PCB = polychlorinated biphenyl

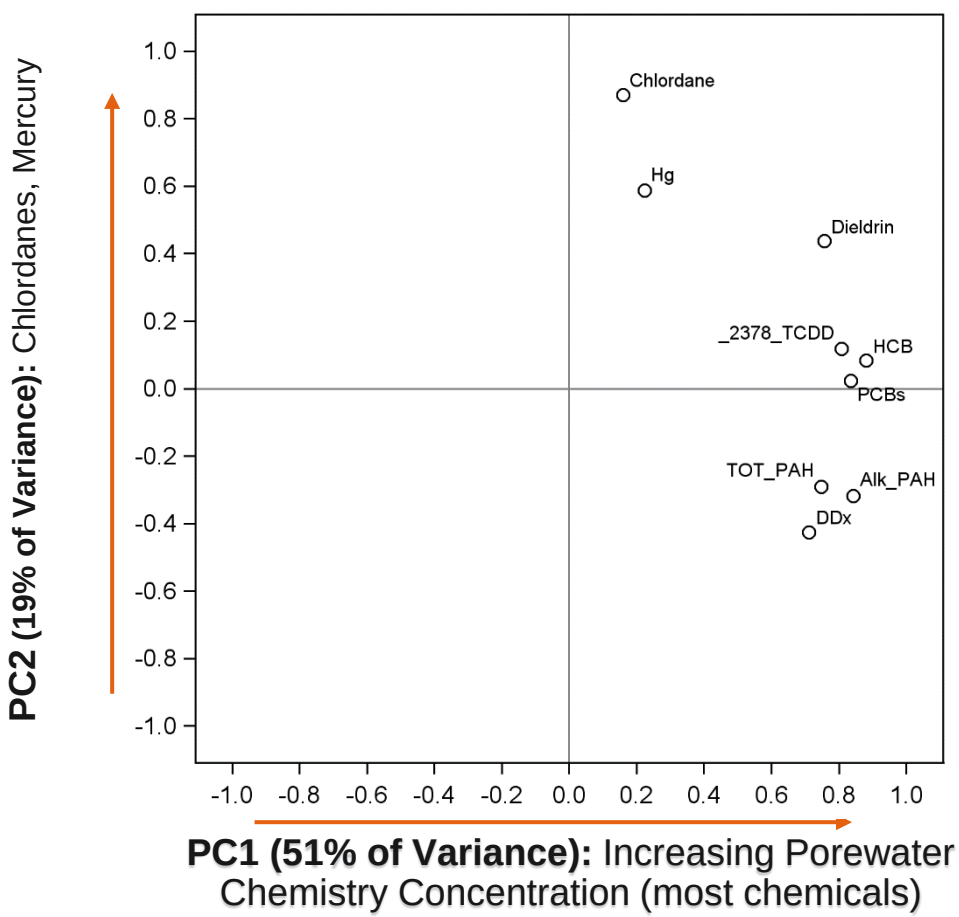
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

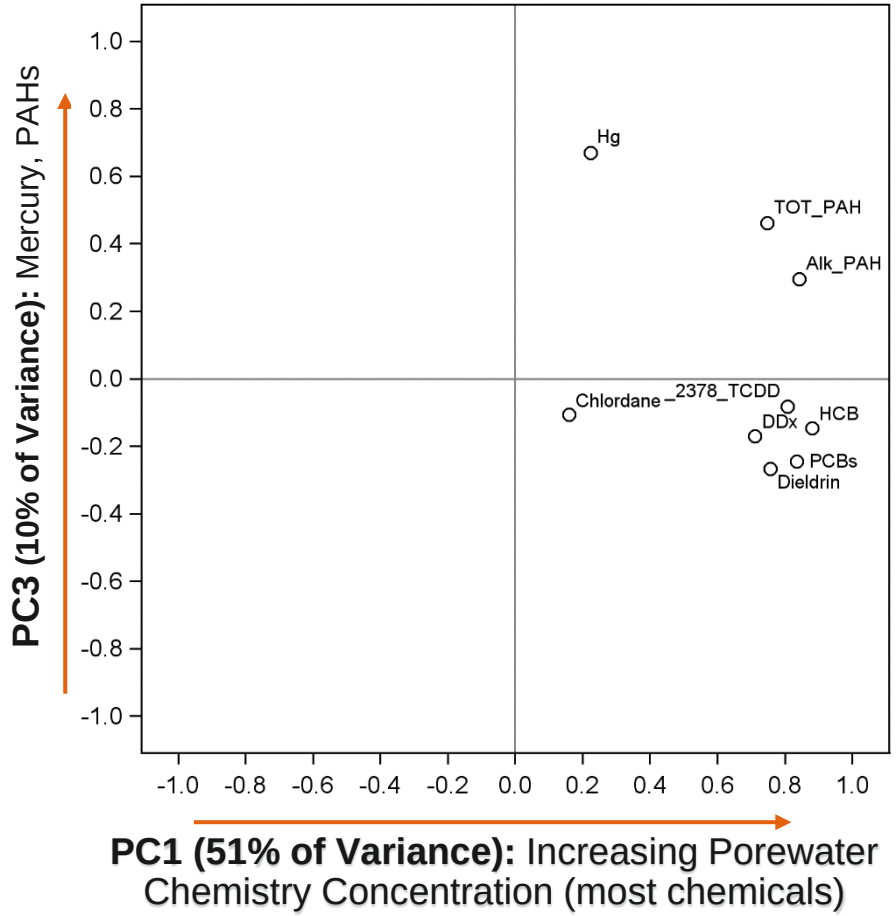
FACTOR ANALYSIS OF SEDIMENT CHEMISTRY

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
6-9

Graphs show the correlation of each individual analyte or analyte group to the first, second and third principal components.





KEY
_2378_TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
PCBs = Totals PCB Congeners
DDx = Total DDx (2,4' and 4,4')
HCB = Hexachlorobenzene
Chlordane = Total Alpha + Gamma Chlordane
Dieldrin = Dieldrin
TOT_PAH = Total Polycyclic Aromatic Hydrocarbons
Alk_PAH = Total Alkylated Polycyclic Aromatic Hydrocarbons
Hg = Mercury
PC = Principal Component

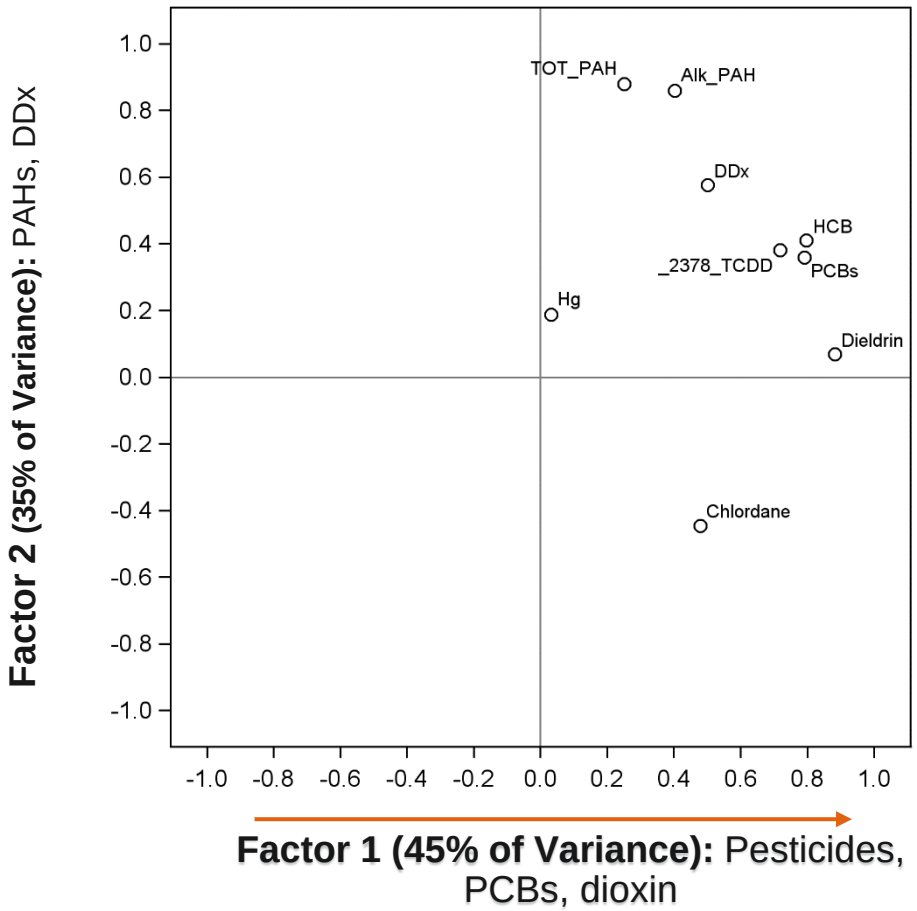
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

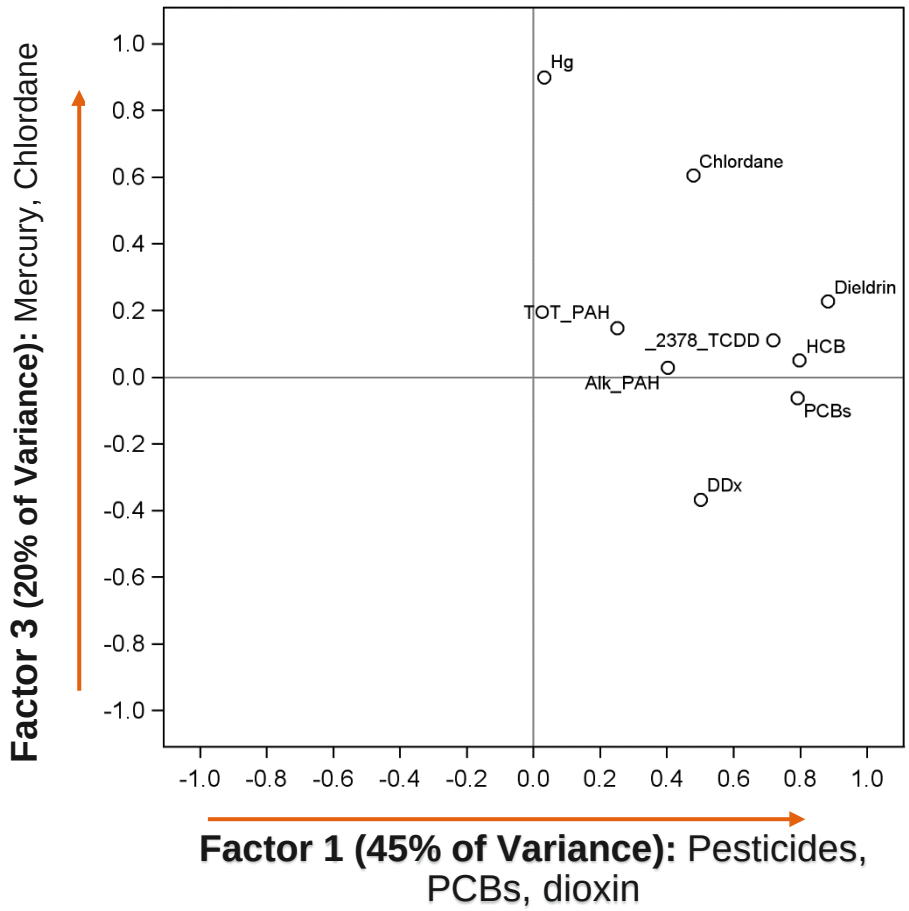
PRINCIPAL COMPONENT ANALYSIS OF POREWATER CHEMISTRY

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
6-10

Graphs show the correlation of each individual analyte or analyte group to the first, second and third principal components.





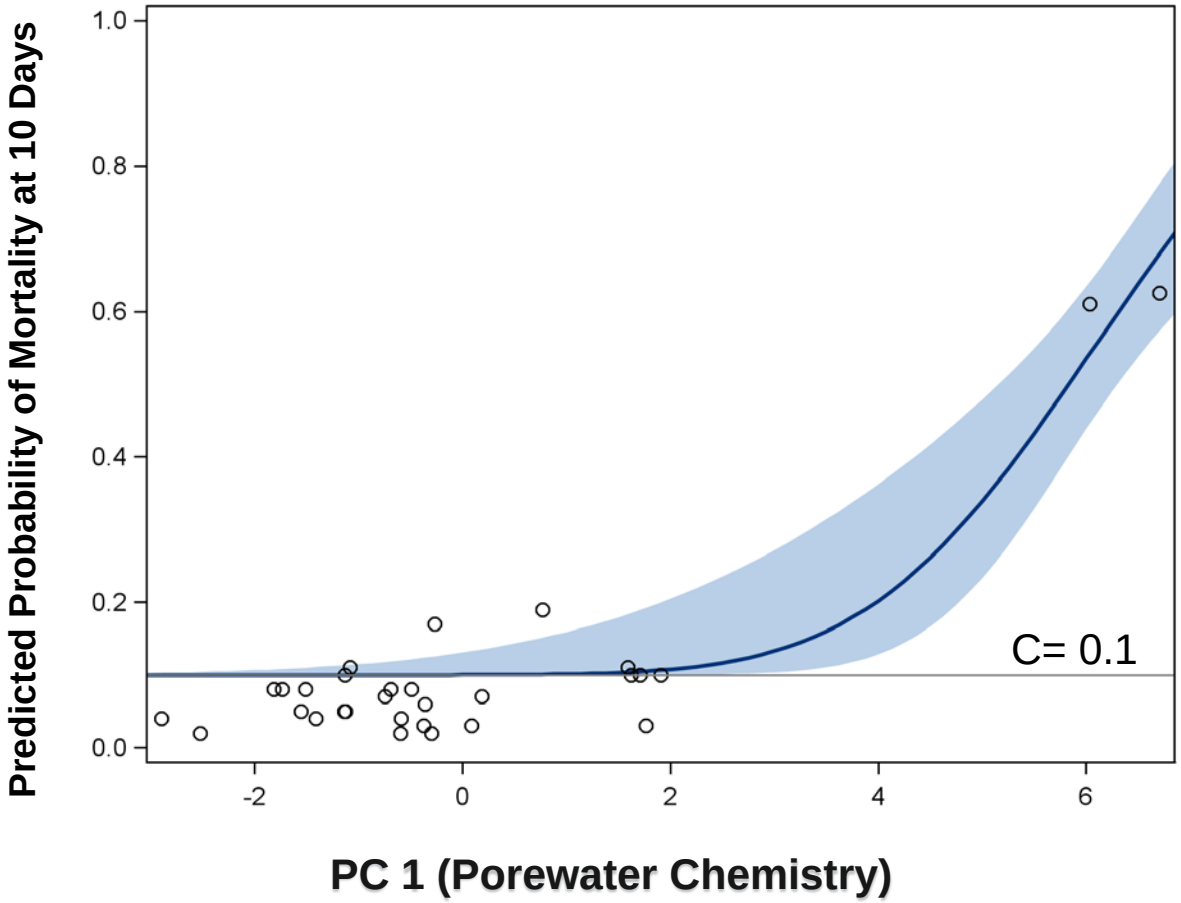
KEY
_2378_TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
PCBs = Totals PCB Congeners
DDx = Total DDx (2,4' and 4,4')
HCB = Hexachlorobenzene
Chlordane = Total Alpha + Gamma Chlordane
Dieldrin = Dieldrin
TOT_PAH = Total Polycyclic Aromatic Hydrocarbons
Alk_PAH = Total Alkylated Polycyclic Aromatic Hydrocarbons
Hg = Mercury

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NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR ANALYSIS OF POREWATER CHEMISTRY

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FIGURE
6-11



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -3.537
β = 0.5826
x = PC 1 Score

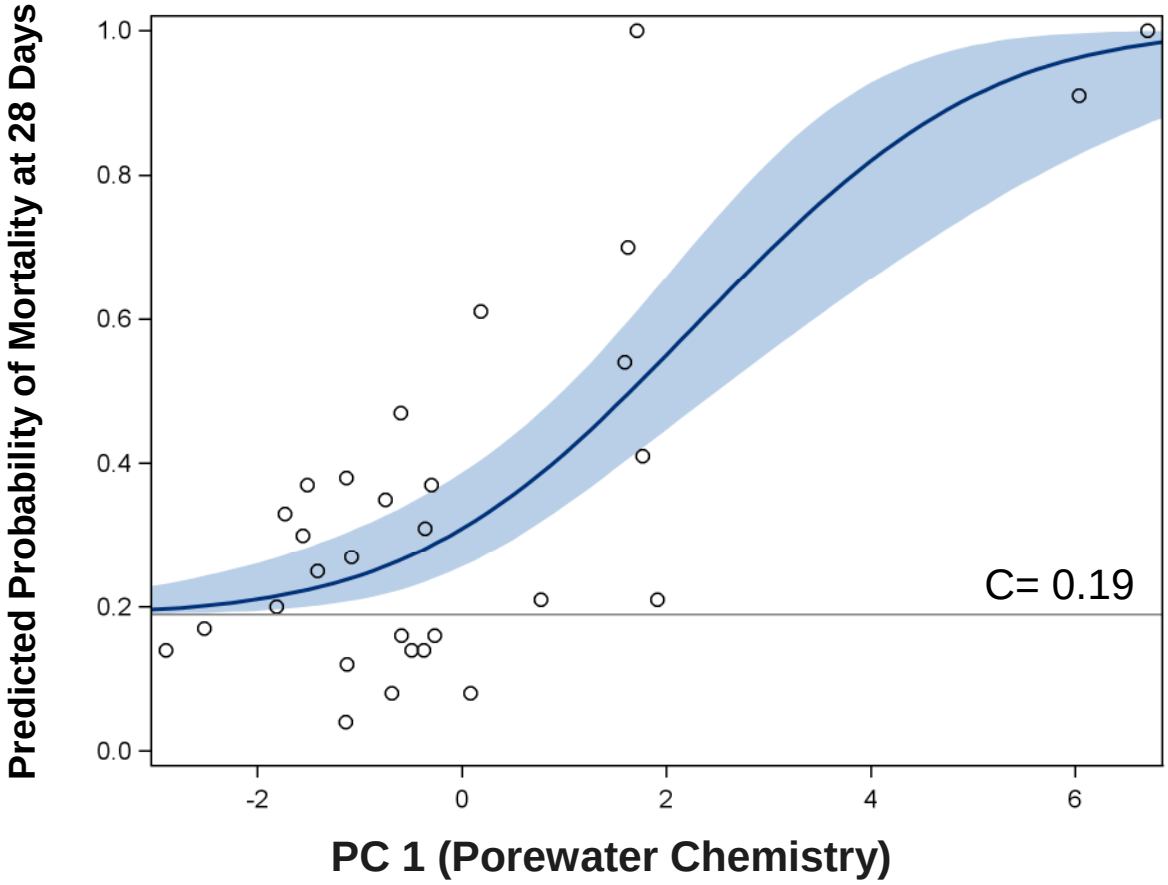
Blue shading represents 90% confidence limits of the fitted probit model.
PC = Principal Component

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BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT MODEL FOR 10-DAY AMPHIPOD MORTALITY: POREWATER

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FIGURE
6-12



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

π = Probability of mortality at 10 days
C = 0.19 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -1.0460
β = 0.4530
x = PC 1 Score

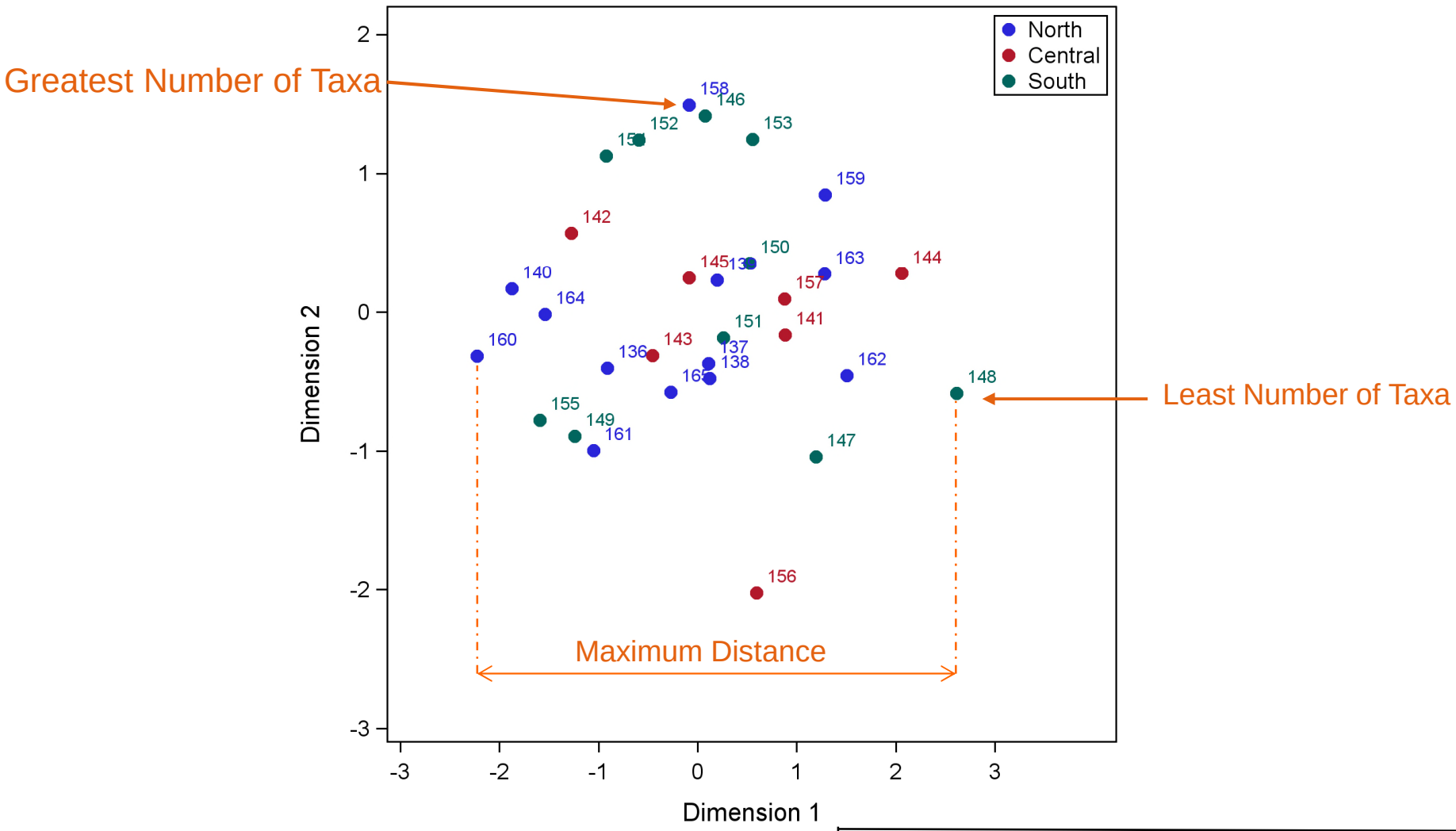
Blue shading represents 90% confidence limits of the fitted probit model.
PC = Principal Component

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PROBIT MODEL FOR 28-DAY AMPHIPOD MORTALITY: POREWATER

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FIGURE
6-13



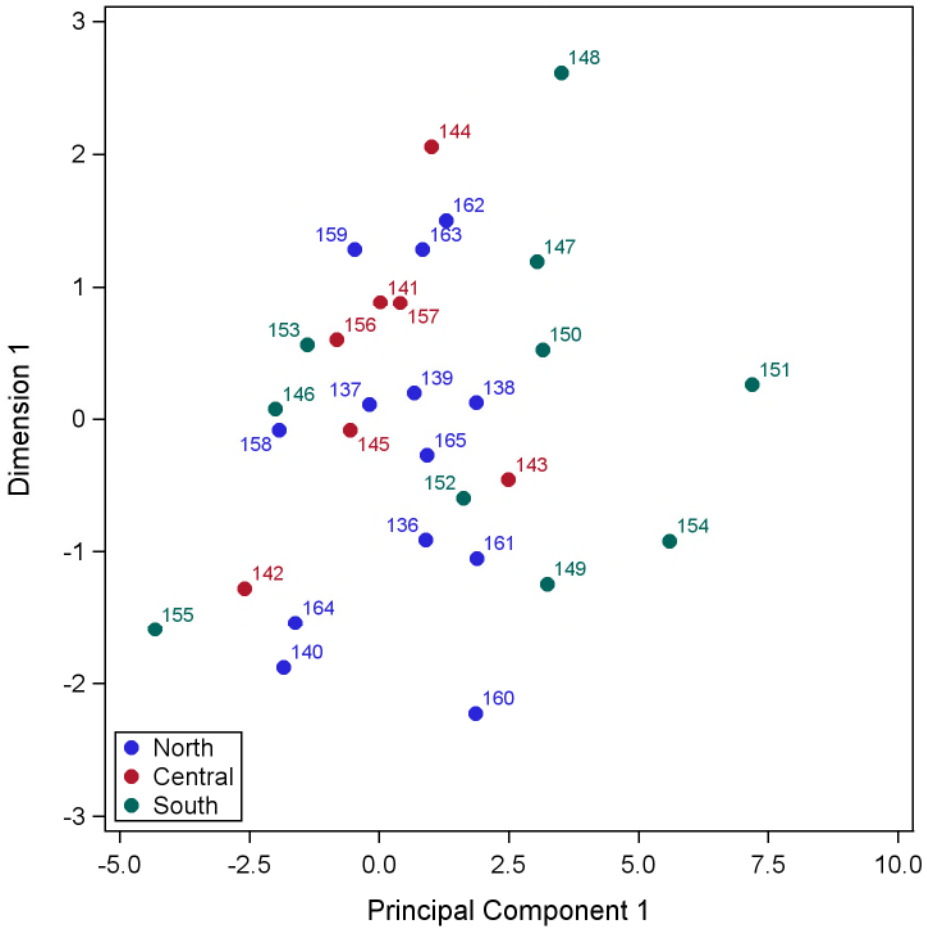
Notes:
Graph show the dimension scores derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix. Stations closer together are more similar in composition than stations further apart on the graph. The double arrow line shows the maximum distance between stations.

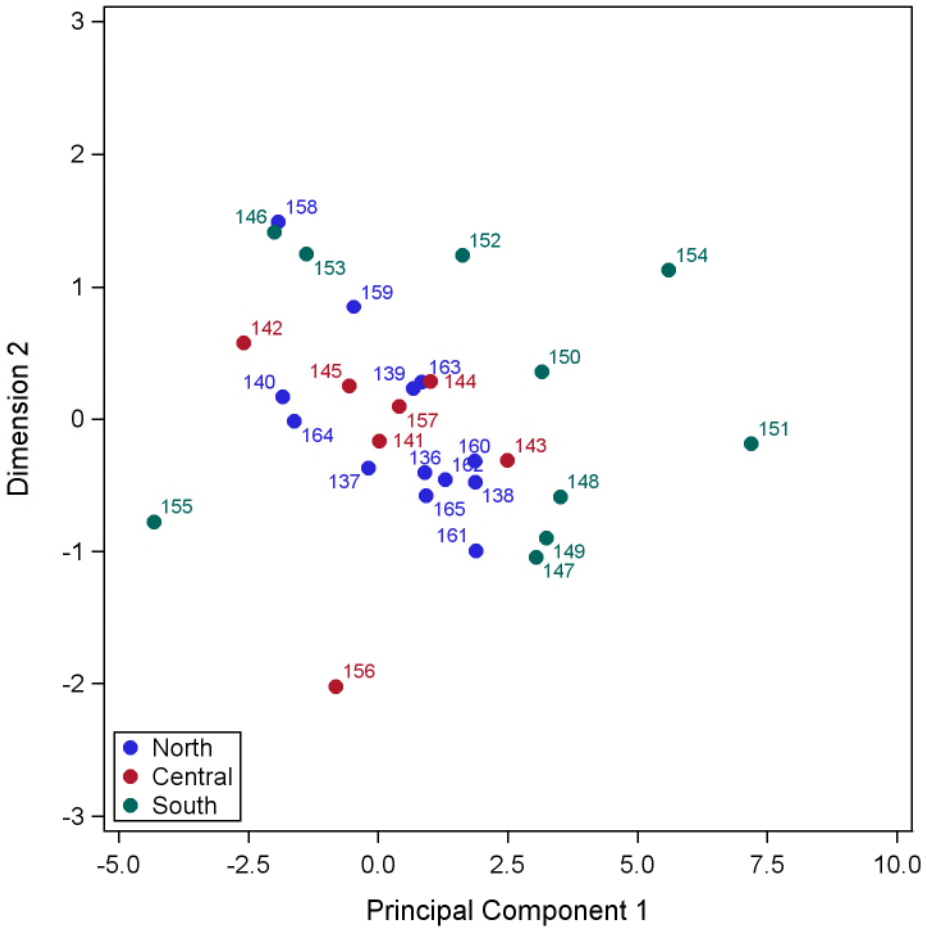
DIAMOND ALKALI SUPERFUND SITE
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BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

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FIGURE
6-14a





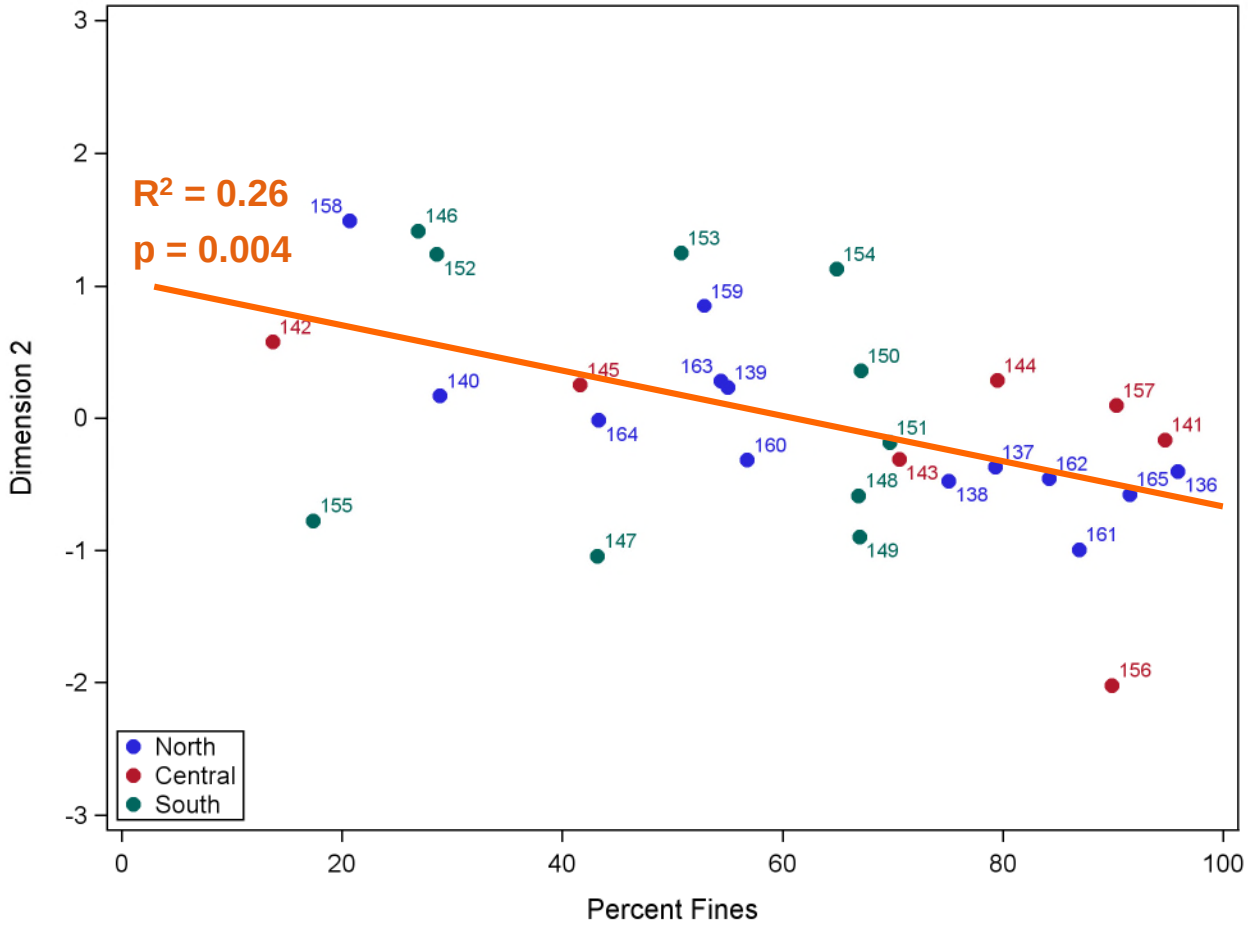
Notes:
The y-axes are the dimension scores derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix. The x-axes are scores on the first principal component for the sediment chemistry data set.

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BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

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FIGURE
6-14b



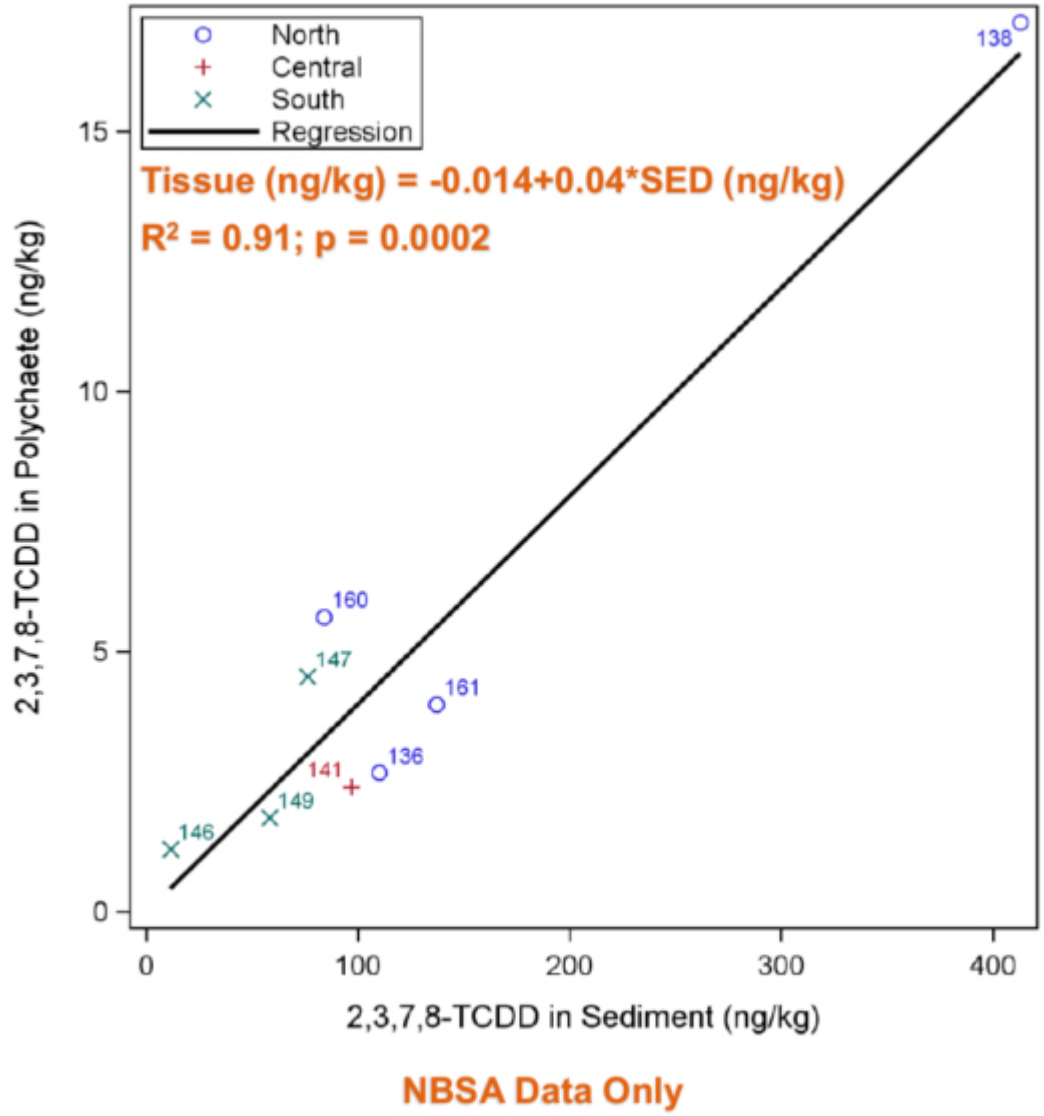
Notes:
The y-axis is the dimension score derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix. The x-axis is the percent fines (i.e. silt and clay) in the sample. The orange line is a regression line. R2 is the coefficient of determination. p is the probability value of the model and indicates the significance of percent fines as a predictor.

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NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

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FIGURE
6-14c



Notes:
ng/kg = nanograms per kilogram
PCBs = polychlorinated biphenyls

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BASELINE ECOLOGICAL RISK ASSESSMENT

SEDIMENT TO POLYCHAETE WORM TISSUE REGRESSION

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FIGURE
8-2

APPENDIX A

Sediment Quality Triad Assessment

ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
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BASELINE ECOLOGICAL RISK ASSESSMENT

APPENDIX A: SEDIMENT QUALITY TRIAD ASSESSMENT

Newark Bay Study Area

Newark, New Jersey

July 2020

CONTENTS

Acronyms and Abbreviations vi

1 INTRODUCTION 1

2 SEDIMENT QUALITY TRIAD EVALUATION 2

2.1 Benthic Invertebrate Line of Evidence 2

2.1.1 Sampling Methods 2

2.1.2 Benthic Invertebrate Community Metrics 2

2.1.3 Comparison to Reference Data 4

2.1.4 Scoring 5

2.2 Sediment Toxicity Line of Evidence 5

2.2.1 Sampling Methods 5

2.2.2 Measured Endpoints 7

2.2.3 Comparison to Reference Data 7

2.2.4 Scoring 7

2.3 Sediment Chemistry Line of Evidence 9

2.3.1 Sampling Methods 9

2.3.2 Sediment Chemistry Screen 10

2.3.3 Porewater Chemistry Screen 11

2.3.4 Other Screening Methods 11

2.3.5 Sediment and Porewater Relationship 12

2.3.6 Scoring 12

2.4 Results 13

3 STATISTICAL EVALUATION OF SQT DATA 14

3.1 Bivariate Correlation 14

3.1.1 Sediment 14

3.1.2 Porewater 14

3.1.3 Summary 15

3.2 Multivariate Analyses 15

3.2.1 Introduction 15

3.2.2 Exploratory Principal Component Analysis Sediment Chemistry 16

3.2.3 Principal Component Analysis Sediment Chemistry 19
3.2.4 Factor Analysis Sediment Chemistry 19
3.2.5 Dose Response Modeling Sediment 19
3.2.5.1 PCA Models 21
3.2.5.2 Factor Models 23
3.2.5.3 Summary 24
3.2.6 Multivariate Analyses for Porewater 24
3.2.6.1 Porewater Dose Response Models 25
3.3 Community Ordination 26
3.4 Historical Data Evaluation 27
3.5 Summary 27
4 SUMMARY OF SQT LINES OF EVIDENCE 29
4.1 Uncertainties 29
5 REFERENCES 34

TABLES

Table A-1 Benthic Invertebrate Community Data
Table A-2 Benthic Index of Biotic Integrity
Table A-3 Scoring Method for the Benthic Invertebrate Community Data
Table A-4 Benthic Invertebrate Community Scores
Table A-5 Summary of Toxicity Data for *L. plumulosus*
Table A-6 Scoring Method for the Sediment Toxicity Data
Table A-7 Sediment Toxicity Scores
Table A-8 Sediment Quality Guidelines
Table A-9 Exceedances of Sediment Quality Guidelines
Table A-10 Chemicals with No Sediment Quality Guidelines Detected in Sediment
Table A-11 Water Quality Criteria and Screening Values
Table A-12 Exceedances of Water Quality Criteria and Screening Values in Porewater
Table A-13 Chemicals Detected in Porewater with No Water Quality Criteria and Screening Values
Table A-14 Comparison to Equilibrium Partitioning Sediment and Porewater Benchmarks for Metal and PAH Mixtures

Table A-15 Scoring Method for Sediment and Porewater Chemistry

Table A-16 Sediment and Porewater Chemistry Scores

Table A-17 Sediment Quality Triad Scoring Summary

Table A-18 Chemicals with Maximum or Second Highest Concentrations at Stations 151 or 154

Table A-19 Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Table A-20 Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Table A-21 List of Potential Constituents of Concern to the Benthic Invertebrate Community

Table A-22 Correlation Matrix and Eigenvalues of the Principal Component Analysis: Sediment

Table A-23 Dose Response Models for Toxicity Endpoints: Sediment Chemistry Principal Component Analysis

Table A-24 Dose Response Models for Benthic Metrics: Sediment Chemistry Principal Component Analysis

Table A-25 Principal Component Scores and Model-Predicted Mortality in Sediment

Table A-26 Dose Response Models for Toxicity Endpoints: Sediment Chemistry Factors

Table A-27 Correlation Matrix and Eigenvalues of the Principal Component Analysis: Porewater

Table A-28 Dose Response Models for Toxicity Endpoints: Porewater Chemistry Principal Component Analysis

Table A-29 Dose Response Models for Toxicity Endpoints: Porewater Chemistry Factors

Table A-30 Dose Response Model for Benthic Metrics: Porewater Chemistry

Table A-31 Community Ordination Models

Table A-32 Spearman Rank Correlation of Sediment Chemistry, Amphipod Survival and BIC Metrics for the Historical REMAP Data

Table A-33 Summary Lines of Evidence from SQT Assessment

FIGURES

Figure A-1 SQT Sampling Locations

Figure A-2 NY/NJ Benthic Index of Biotic Integrity

Figure A-3 Density and Number of Taxa in the Benthic Invertebrate Community of the NBSA and Jamaica Bay Reference

Figure A-4 Diversity, Evenness, and Dominance in the Benthic Invertebrate Community of the NBSA and Jamaica Bay Reference

Figure A-5 Sediment Toxicity Results

Figure A-6 Ten-Day Amphipod Survival for Toxicity Tests in the NBSA and Jamaica Bay Reference

Figure A-7a Twenty-Eight-Day Amphipod Survival vs. Selected Contaminant Concentrations: 2,3,7,8-TCDD

Figure A-7b Twenty-Eight-Day Amphipod Survival vs. Selected Contaminant Concentrations: Total PCBs

Figure A-7c Twenty-Eight-Day Amphipod Survival vs. Selected Contaminant Concentrations: Total DDx

Figure A-7d Twenty-Eight-Day Amphipod Survival vs. Selected Contaminant Concentrations: Total PAHs

Figure A-7e Twenty-Eight-Day Amphipod Survival vs. Selected Contaminant Concentrations: Arsenic

Figure A-7f Twenty-Eight-Day Amphipod Survival vs. Selected Contaminant Concentrations: Mercury

Figure A-8a Exploratory Principal Component Analysis: Dioxins/Furans and PCBs

Figure A-8b Exploratory Principal Component Analysis: PAHs and Metals

Figure A-9a Principal Component Analysis of Sediment Chemistry: Loadings

Figure A-9b Principal Component Analysis of Sediment Chemistry: Scores

Figure A-10 Sediment Chemistry Principal Component Scores

Figure A-11 Factor Analysis of Sediment Chemistry

Figure A-12 Amphipod Survival (10-Day) vs. Principal Components: Sediment

Figure A-13 Probit Model of 10-Day Amphipod Mortality: Sediment

Figure A-14 Model Predicted 10-Day Amphipod Survival

Figure A-15 Amphipod Survival (28-Day) vs. Principal Components: Sediment

Figure A-16 Gompertz Model of 28-Day Amphipod Mortality: Sediment

Figure A-17 Model Predicted 28-Day Amphipod Survival

Figure A-18 Amphipod Growth vs. Principal Components: Sediment

Figure A-19 Regression Model of 28-Day Amphipod Growth: Sediment

Figure A-20 Amphipod Reproduction vs. Principal Components: Sediment

Figure A-21 Regression Model of 28-Day Amphipod Reproduction: Sediment

Figure A-22 Benthic Metrics vs. Principal Component 1: Sediment

Figure A-23 Regression Models for Benthic Metrics: Sediment

Figure A-24 Probit Factor Model for 10-Day Amphipod Mortality: Sediment

Figure A-25 Gompertz Factor Model for 28-Day Amphipod Mortality: Sediment

Figure A-26 Principal Component Analysis of Porewater Chemistry

Figure A-27 Factor Analysis of Porewater Chemistry
Figure A-28 Probit Model of 10-Day Amphipod Mortality: Porewater
Figure A-29 Probit Model of 28-Day Amphipod Mortality: Porewater
Figure A-30 Regression Model of 28-Day Amphipod Growth: Porewater
Figure A-31 Regression Model of 28-Day Amphipod Reproduction: Porewater
Figure A-32 Factor Models of 10-Day Amphipod Mortality: Porewater
Figure A-33 Gompertz Factor Model of 28-Day Amphipod Mortality: Porewater
Figure A-34 Factor Regression Models of 28-Day Amphipod Growth: Porewater
Figure A-35 Non-metric Multidimensional Scaling for Benthic Invertebrate Community
Figure A-36 Historical Amphipod Survival
Figure A-37 Toxicity and Sum of Standardized Concentrations for Historical Data

ATTACHMENTS

Attachment A-1 Jamaica Bay Reference Data
Attachment A-2 Leptocheirus plumulosus Bioassay Data
Attachment A-3 Sediment and Porewater Data Screens
Attachment A-4 Porewater vs. Sediment Concentrations
Attachment A-5 Historical SQT Data for the NBSA
Attachment A-6 SQT Scoring Uncertainty Evaluations
Attachment A-7 Multivariate Analyses Conducted by USEPA

ACRONYMS AND ABBREVIATIONS

^{o}C	degrees Celsius
α	intercept parameter
%	percent
π	probability of mortality
A. abdita	*Ampelisca abdita*
AIC	Akaike's Information Criteria
ASTM	American Society for Testing and Materials
AVS/SEM	acid volatile sulfide/simultaneously extracted metal
B-IBI	benthic index of biotic integrity
β_i	slope parameter of the *ith* predictor variable
BERA	Baseline Ecological Risk Assessment
BIC	benthic invertebrate community
C	threshold mortality
CDF	confined disposal facility
cm	centimeters
CPG	Cooperating Parties Group
CV	coefficient of variation
DDx	dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyltrichloroethane
EA	EA Engineering, Science and Technology, Inc.
ERL	effects range-low
ERM	effects range-median
F	a cumulative probability distribution function
f	fraction
FCV	final chronic value
FOD	Frequency of Detection
GLM	General Linear Model
GSH	Glenn Springs Holdings, Inc.
HMW	high molecular weight

ln(L)	log likelihood
K_{PS}	polymer-water partition constant
L	liter
L. plumulosus	*Leptocheirus plumulosus*
LMW	low molecular weight
LOE	line of evidence
LPIL	lowest practicable identification level
LPRRP	Lower Passaic River Restoration Project
LPRSA	Lower Passaic River Study Area
m^2	square meter
MDD	minimum detectable difference
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/organism/day	milligrams per organism per day
NBSA	Newark Bay Study Area
ng/kg	nanograms per kilogram
NJ	New Jersey
NJDEP	New Jersey Department of Environmental Protection
NMDS	non-metric multidimensional scaling
NOAA	National Oceanic and Atmospheric Administration
Normandeau	Normandeau Associates, Inc.
NY	New York
OC	organic carbon
ORP	oxidation-reduction potential
p	the number of parameters in the model, including the intercept
PAH	polycyclic aromatic hydrocarbon
PCA	principal component analysis
PC	principal component
PC1	first principal component
PC2	second principal component
PC3	third principal component

PCB	polychlorinated biphenyl
PE	polyethylene
PEL	probable effect level
pg/L	picograms per liter
POM	polyoxymethylene
ppt	parts per thousand
PRC	performance reference compound
R	response
R^2	coefficient of determination
REMAP	Regional Environmental Monitoring Assessment Program
QAPP	quality assurance project plan
SQuiRT	Screening Quick Reference Tables
SQT	Sediment Quality Triad
SumTU	sum of toxic units
TCDD	tetrachlorodibenzo-*p*-dioxin
TEL	threshold effect level
TOC	total organic carbon
U.S.	United States
UMBC	University of Maryland Baltimore County
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WOE	weight of evidence
WQC	water quality criteria
x_i	*ith* predictor variable
µg/kg	micrograms per kilogram

1 INTRODUCTION

This appendix provides the results of the comprehensive analyses of sediment, porewater, toxicity, and benthic invertebrate community (BIC) data collected in the Newark Bay Study Area (NBSA) in support of the assessment of risks to benthic invertebrates posed by chemical stressors in sediments.

The Sediment Quality Triad (SQT) and Porewater Sampling Program was conducted in 2015, as described in the NBSA SQT and Porewater Sampling and Analysis, Quality Assurance Project Plan (QAPP) (Tierra 2015); the NBSA SQT and Porewater Field Report (Glenn Springs Holdings, Inc. [GSH] 2017a); and the NBSA SQT and Porewater Data Report (GSH 2017b). SQT sampling was conducted at 30 locations in the NBSA (Figure A-1). Surface sediment samples at each of the 30 locations, herein referred to as the SQT stations, were collected from the top 6 inches using grab sampling techniques, and the analysis consisted of the following components: 1) surface sediment chemistry[1]; 2) porewater chemistry; 3) toxicity testing (10-day and 28-day *Leptocheirus plumulosus*); and 4) BIC taxa enumeration.

The SQT program was designed to support an effects-based, weight of evidence (WOE) assessment to evaluate risks to benthic invertebrate communities using three primary lines of evidence (LOEs): 1) sediment chemistry, 2) sediment toxicity, and 3) BIC. The approach is widely utilized by regulatory agencies, including the United States Environmental Protection Agency (USEPA) Region 2 and its partner agencies[2], as the most appropriate process currently available for assessing potential risks to benthic invertebrates. It is the approach that is being used to assess risks to benthic invertebrates for the Lower Passaic River Restoration Project (LPRRP). For consistency purposes and data comparability, this approach is also used for the NBSA.

The SQT method incorporates a combination of both quantitative and qualitative analyses to identify potential cause-and-effect relationships between two or more of the components. The approach provides information needed to identify degraded conditions and to assess the impacts of pollution-induced effects on benthic invertebrates (Tierra 2015). The specific technical approach for the SQT was developed with USEPA in an iterative and collaborative manner between 2015 and 2018.

Section 2 of this appendix describes the SQT evaluation; an objective method of comparing sediment/porewater chemistry concentrations; sediment toxicity endpoints; and BIC metrics to screening, control, or reference values with the objective of categorizing each SQT sampling station with respect to the degree of potential impact to benthic invertebrates. Section 3 of this appendix provides a quantitative assessment of effects, incorporating bivariate and multivariate statistical methods to evaluate the association of sediment and porewater chemistry with effects measures (i.e., toxicity endpoints and BIC metrics). Section 4 presents a summary of LOEs for the potential risk to the BIC in the NBSA posed by sediment contamination.

[1] During the SQT program, additional samples were collected at 13 locations (i.e., for sediment chemistry only) for a total of 43 sediment chemistry samples to support the baseline human health risk assessment.
[2] The partner agencies included the United States Army Corps of Engineers (USACE), the New Jersey Department of Environmental Protection (NJDEP), the New Jersey Department of Transportation, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Fish and Wildlife Service.

2 SEDIMENT QUALITY TRIAD EVALUATION

This evaluation was used to classify each of the 30 SQT stations with respect to the degree of potential impact. Three categories (i.e., the triad) were evaluated: BIC composition, sediment toxicity, and sediment/porewater chemistry. Each category has equal weighting in the evaluation and was assigned a score ranging from 0 (unimpacted) to 1 (most impacted). The scores for each category are summed (maximum possible score = 3), and the final score is used to categorize each station with respect to the degree of impact. Consistent with the Lower Passaic River Study Area (LPRSA) Baseline Ecological Risk Assessment (BERA) (Windward 2019) and as agreed upon with USEPA, the final scores were assigned impact categories as follows: no impact = <0.75; low impact = >0.75 and <1.5; medium impact = >1.5 and <2.25; and high impact = >2.25.

2.1 Benthic Invertebrate Line of Evidence

2.1.1 Sampling Methods

Benthic invertebrate sampling was conducted according to the methods described in the SQT and Porewater Sampling and Analysis QAPP (Tierra 2015), the SQT and Porewater Field Report (GSH 2017a), and the SQT Data Report (GSH 2017b). Normandeau Associates, Inc. (Normandeau) of Bedford, New Hampshire, conducted BIC analyses on samples collected from the 30 SQT stations. Three replicate samples were collected from each sampling station using either a petite Ponar dredge (area of 0.023 square meters [m^2]) or a standard Ponar dredge (area of 0.052 m^2). The samples were immediately sieved through a standard number 30 (600 microns) sieve on the field vessel, and the retained invertebrates were preserved with isopropyl alcohol (90%). Preserved samples were transported to Normandeau's laboratory for analysis at the end of the sampling program. Organisms were identified to the genus/species (lowest practicable) phylogenetic endpoint using dissection and compound microscopes. In addition to the taxonomic analysis, Normandeau also measured the dry-weight (shell-free) biomass of the 30 benthic invertebrate samples. Biomass for each sample was determined using Standard Methods for the Examination of Water and Wastewater: Method 209 A – Total Residue Dried at 103 to 105°C (American Public Health Association, American Water Works Association, and Water Pollution Control Federation 1980). All organisms were included in each sample weight. Shelled organisms (i.e., mollusks) had the tissue removed from the shell, and the shells were not included in the dry weight. Samples were weighed to 0.0001 grams using an analytical balance.

The taxa identified and the number of organisms per m^2 of each taxon at each SQT station are provided in Table A-1.

2.1.2 Benthic Invertebrate Community Metrics

Taxa in the BIC samples were identified to the lowest practicable identification level (LPIL) (Table A-1) in a manner consistent with other surveys performed in the New York (NY)/New Jersey (NJ) Harbor Estuary (Weisberg et al. 1998). The following six BIC metrics were calculated for each sample:

- Abundance (i.e., density): the number of organisms per m^2

- Number of taxa (i.e., number of discrete LPIL taxa)
- Shannon-Weiner Diversity Index (Shannon 1948)
- Pielou's Evenness Index (Pielou 1966)
- Swartz's Dominance Index (Swartz et al. 1985)
- NY/NJ Benthic Index of Biotic Integrity (B-IBI) (Weisberg et al. 1998)

Abundance is reported as density (organisms per m^2), which is calculated by dividing the number of organisms counted by the total sampling area of the sampling device. The number of taxa is the total number of species observed in the sample.

The Shannon-Wiener Diversity Index (Shannon 1948) is a measure of the species diversity of a sample and considers species richness and the evenness of each species within the community. The number of species (or higher order taxa, if not identified to species) and the number of individuals within each taxa are combined to calculate the Diversity Index. The index value ranges from 0 to the natural logarithm of the number of taxa in the sample. The greater the value, the greater the sample diversity and the more evenly the organisms are distributed among the taxa present. It is calculated as follows:

$$H' = -\Sigma\, p_i \ln p_i$$

Where:

H' = the Shannon-Wiener Diversity Index

ln = the natural logarithm

Σ = summation

p_i = the number of individuals within the taxon *i* divided by the total number of individuals present in the entire sample.

Pielou's Evenness Index (Pielou 1966) is related to the Shannon-Wiener Diversity Index (Shannon 1948) in that it also examines the distribution of individuals among taxa relative to an idealized distribution. Pielou's Evenness Index ranges from 0.0 to 1.0, with the higher values indicating a more even distribution of organisms among the species present in the sample. It is calculated as follows:

$$J = H' / H(max)$$

Where:

J = Pielou's Evenness Index

H' = the Shannon-Wiener Diversity Index

H(max) = the theoretical maximum value for H' if all species in the sample were equitably distributed (i.e., natural logarithm S, where S is the total number of taxa in a sample).

The B-IBI is calculated using a method derived for the saline portions of the NY/NJ Harbor Estuary (Weisberg et al. 1998). This method incorporates abundance, number of taxa, percent pollution tolerant, percent pollution sensitive, and biomass into one index using comparisons to unimpacted reference sites

(Table A-2). Threshold values of the B-IBI for the classification of impacts are as follows: 1 to <2 = impacted, 2 to <3 = slightly impacted, and 3 to 5 = unimpacted (Weisberg et al. 1998). Figure A-2 shows the B-IBI scores for the SQT stations in the NBSA.

2.1.3 Comparison to Reference Data

As agreed upon with USEPA, the reference site chosen for this evaluation is the Jamaica Bay Estuary, New York, which is physically similar to the open water habitats of the NBSA. A total of 150 SQT samples (i.e., sediment samples with co-located chemistry, toxicity [i.e.,10-day *Ampelisca abdita* bioassay], and BIC data) were collected from Jamaica Bay over of period of years (1993 through 2013) by USEPA under the Regional Environmental Monitoring Assessment Program (REMAP) and by other agencies. A screening process was conducted to select a subset of these 150 samples to represent reference conditions for the BIC. The Jamaica Bay sediment chemistry data were compared to effects range-low (ERL) and effects range-median (ERM) values (Long et al. 1995). Acceptable Jamaica Bay reference locations had three or fewer exceedances of ERLs and no exceedances of ERMs across all chemicals for which those sediment guidelines were available. In addition to meeting the chemical criteria, acceptable reference locations in Jamaica Bay were required to meet sediment toxicity criteria. Specifically, *A. abdita* survival results at Jamaica Bay reference locations were required to be ≥ 80% of the respective negative control response. For data collected prior to 2008, the screening assessment was conducted by the Cooperating Parties Group (CPG) for use as reference data for the LPRSA (Windward 2019) and resulted in 35 acceptable samples. The screening of data collected in 2008 and 2013 under REMAP was conducted by GSH for use in this SQT assessment and included an additional 24 samples. The combined dataset includes a total of 59 SQT samples from Jamaica Bay that are suitable for use as reference data in a reference envelope evaluation. Attachment A-1 provides the final Jamaica Bay BIC and toxicity reference data set (Table A-1-1); the 2008/2013 REMAP sediment chemistry screening results (Table A-1-2); the 2008/2013 REMAP toxicity screening results (Table A-1-3); the 2008/2013 REMAP density and biomass data (Table A-1-4); the 2008/2013 REMAP sediment chemistry statistics (Table A-1-5); and the sediment chemistry data for the final reference data set (Table A-1-6). A comparison of grain size, organic carbon, bottom dissolved oxygen and bottom salinity between Jamaica Bay and Newark Bay is also shown in Attachment A-1 (Table A-1-7). The mean percent silt and clay is 36% in Jamaica Bay and 56% in Newark Bay. The mean total organic carbon (TOC) is 2.5% in Jamaica Bay and 2.4 % in Newark Bay. Bottom dissolved oxygen is similar in the two estuaries with a mean range of 5 to 5.25 milligrams per liter (mg/L). Jamaica Bay is generally more saline (mean = 29 parts per thousand [ppt]) than Newark Bay (mean = 21 ppt). Probability plots comparing sediment chemistry data for the Jamaica Bay reference data set and the 30 SQT samples for selected COCs are also shown in Attachment A-1 (Figures A-1-1, A-1-2 and A-1-3).

Figures A-3 and A-4 present box plots of Jamaica Bay and NBSA BIC metrics by geographic zone along with the results of non-parametric (i.e., Kruskal-Wallis) hypothesis tests. Mean abundance in Jamaica Bay is greater than that of the NBSA; however, because abundance can either decrease or increase with degradation (Weisberg et al. 1998), inferences regarding comparability are uncertain for this metric and, therefore, no hypothesis testing was conducted. The mean number of taxa in Jamaica Bay (19) is lower than that of the NBSA (21 to 26), but the difference is not statistically significant (Figure A-3). For other metrics, including the Shannon Wiener Diversity Index, Pielou's Evenness Index, and Swartz's Dominance Index, the Jamaica Bay reference means are significantly lower than the NBSA means

(Figure A-4). This comparison indicates that the NBSA BIC are not impaired in comparison to Jamaica Bay. It should be noted that the SQT samples were collected at a depth of 0 to 15 centimeters (cm) while those in Jamaica Bay were collected at a depth of 0 to 2 cm, which adds some degree of uncertainty to the BIC comparison.

2.1.4 Scoring

Based on the BIC composition, each SQT station was assigned a score ranging from 0 (unimpacted) to 1 (most impacted) (Table A-3) based on a reference envelope approach. This approach involves the comparison of BIC metrics measured at the potentially impacted SQT stations to lower (or upper) percentiles of the distribution of metric values measured at the reference site. Four of the five BIC metrics (number of taxa, Shannon-Weiner Diversity Index, Pielou's Evenness Index, and Swartz's Dominance Index) are expected to decline in value as a result of physical and/or chemical degradation. Therefore, these metrics were compared to the 5th percentile of the Jamaica Bay reference distribution. BIC metrics that are equal to or greater than the 5th percentile of the reference distribution are considered comparable to reference. Abundance is a metric that can either decline or increase as a result of degradation (Weisberg et al. 1998). Therefore, abundance was compared to both the 5th and the 95th percentile of the Jamaica Bay reference distribution. Abundance equal to or greater than the 5th percentile and less than or equal to the 95th percentile of the Jamaica Bay reference distribution is considered comparable to reference. Metrics outside the reference envelope received a score of 1 (Table A-3). The reference percentiles were calculated using a non-parametric method based on order statistics. The equation for percentile calculation is given in Attachment A-1. For the B-IBI, a score of either 0, 0.5, or 1 was applied according to the impact categories described by the authors (Weisberg et al.1998) with respect to degree of impact (Table A-3). Each metric score was weighted equally (0.167), and the weights were multiplied by the metric score and summed such that the maximum possible score for the BIC is 1, which represents the greatest impact.

Table A-4 presents the metric values and SQT scores for each of the 30 stations. The Jamaica Bay reference envelope values are shown for each metric. For the five standardized metrics, only one value (abundance at Station 148) was outside the Jamaica Bay reference envelope. Based on the B-IBI values, 21 stations were classified as non-impacted and eight stations were classified as slightly impacted (three in the north, one in the central, and four in the south). Station 148, which is located along a bulkheaded portion of the southern shoreline of the NBSA (Figure A-1), was classified as impacted. The combined BIC SQT scores are very low for most stations, ranging from 0 to 0.08 indicating non-impacted BIC. The BIC at Station 148, with a score of 0.33, exhibited low abundance, low number of taxa, and low B-IBI score; and thus, indicated a potential impact to the BIC at that location.

2.2 Sediment Toxicity Line of Evidence

2.2.1 Sampling Methods

Sediment sampling for toxicity testing and testing methods were conducted, as described in the SQT and Porewater Sampling and Analysis QAPP (Tierra 2015), the SQT and Porewater Field Report (GSH 2017a), and the SQT and Porewater Data Report (GSH 2017b). EA Engineering, Science and Technology, Inc. (EA) conducted two toxicity tests on the sediment samples collected from the 30 SQT

stations using the amphipod *L. plumulosus*: 1) a 10-day exposure for survival and 2) a 28-day exposure for survival, growth, and reproduction. Toxicity testing was conducted using standard methods: for 10-day tests (USEPA 1994; American Society for Testing and Materials [ASTM] 2008) and for 28-day tests (USEPA 2001). Laboratory control samples were tested coincidentally with SQT samples using sediment from the Pretty Boy Reservoir in Maryland. The *L. plumulosus* were acquired from Chesapeake Cultures, located in Hayes, Virginia.

The 10-day toxicity test was conducted from October 30, 2015 through November 9, 2015. Test chambers (i.e., 1-liter beakers) were prepared using sediment samples from the 30 SQT stations and the control sample (five replicates per sample). Artificial seawater was used as the overlying water in each test chamber. After a 7-day stabilization period, the test organisms were loaded into each test chamber (20 organisms per replicate) for a 10-day exposure period. During the 10-day exposure period, the test chambers were not aerated, and the test organisms were not fed. The test chambers were visually inspected daily for abnormal organism behavior or lack of burrowing, and water quality measurements of temperature, pH, dissolved oxygen, oxidation-reduction potential (ORP), and salinity were recorded daily. At the end of the 10-day exposure period, the test organisms were retrieved from the test chambers, and the number of live organisms in each chamber was recorded. The mean percent survival of the five replicates from each station and control was calculated.

The 28-day toxicity test was conducted from October 22, 2015 through November 19, 2015; however, due to unacceptable control mortality (25%), the test was considered invalid and was re-run. A second, successful test was conducted from November 25, 2015 through December 23, 2015. Test chambers were prepared using sediment samples from the 30 SQT stations and the control sample (five replicates per sample). Artificial seawater was used as the overlying water in each test chamber. After a 7-day stabilization period, the test organisms were loaded into each test chamber (20 organisms per replicate) for a 28-day exposure period. During the 28-day exposure period, the overlying water in each test chamber was gently aerated at a rate of 100 bubbles per minute throughout the exposure period, and the organisms were fed three times a week. The test chambers were visually inspected daily for abnormal organism behavior or lack of burrowing, and water quality measurements of temperature, pH, dissolved oxygen, ORP, and salinity were recorded daily. Ammonia measurements were also recorded during the 28-day exposure period at test initiation and termination. At the end of the 28-day exposure period, the test organisms were retrieved from the test chambers, and the number of live organisms (parent and offspring) in each chamber was recorded. The organisms were then dried and weighed. The mean of the five replicates from each station and control was calculated for the following endpoints: percent survival; growth, which is the change in mass over the 28-day period in milligrams per organism per day (mg/organism/day); and reproduction, which is the number of offspring per surviving adult.

Pursuant to USEPA guidance (USEPA 2001) for hypothesis testing of toxicity results, EA used a software program called ToxCalc™ V5.0 to process the endpoint data recorded for each replicate and to conduct hypothesis testing. With the ToxCalc™ V5.0 software, replicate data for each sample were compared to the control replicate data independently. The default test is a one-sided t-test ($\alpha = 0.05$). If the data did not meet the assumption of normality, then either a parametric test on transformed data (e.g., arcsin square root transform for survival data) or a non-parametric test (Wilcoxon Rank Sum) was conducted. For parametric tests, an equal variance test was also conducted to determine whether to report the p-value for an equal variance or unequal variance (Satterthwaite) t-test. The individual ToxCalc™ output files are attached to the SQT and Porewater Data Report (GSH 2017b). A summary of the bioassay data

is found in Attachment A-2 (Table A-2-1). The minimum detectable difference (MDD) from control is given for each endpoint. For 28-day survival, several samples that had mortality less than 80% of control mortality were not found to be statistically significantly different from control. This is because of the large variance seen in the replicate data. For example, the sample from station 138 had 46% survival (57% of control). But the replicate survival varied from 0 to 95% in this sample. This variability adds uncertainty to the interpretation of this endpoint. The individual replicate data are found in Table A-2-2.

2.2.2 Measured Endpoints

The replicate means for each endpoint at each SQT station and the control are provided in Table A-5. Shaded values indicate that the mean was statistically significantly different than the control mean. Bold values indicate the value is less than the control value minus the MDD. The 10-day survival was significantly different than the control at two stations (Stations 151 and 154), which were located on subtidal flats in the southwestern portion of the NBSA (Figure A-5). The 28-day survival was significantly different than the control at six stations, two in the north (Stations 158 and 160), two in the central (Stations 141 and 143), and two in the south (Stations 151 and 154) geographic areas of the NBSA (Figure A-5).

2.2.3 Comparison to Reference Data

Figure A-6 presents box plots that compare the 10-day amphipod survival in the NBSA by geographic area and Jamaica Bay. Ten-day tests for Jamaica Bay were conducted with the amphipod *A. abdita*. Although different organisms were used in the two estuaries, both *A. abdita* and *L. plumulosus* were found to be comparable in their ability to classify sediment samples as toxic in an inter-species and interlaboratory study conducted by Schlekat et al. (1995). A comparison of median survival was conducted using the non-parametric Kruskal-Wallis Test. Survival was first adjusted to control survival as follows: Control-adjusted survival = Observed survival/Control survival. The median control-adjusted survival in the NBSA was compared to the median control-adjusted survival in Jamaica Bay. The NBSA medians were statistically significantly greater than the Jamaica Bay reference median (Figure A-6). It is important to note that the 10-day survival in the Jamaica Bay reference dataset is biased high due to the screening process. All samples with observed survival of less than 80% of control were screened from the Jamaica Bay dataset regardless of whether the sample had elevated chemistry. Therefore, the actual median control survival in Jamaica Bay, based on all samples or even just those samples that would pass the chemistry screen, is lower than that based on the 59 samples that passed the chemistry and toxicity screen. Nonetheless, even when compared to this biased high-reference dataset, the 10-day survival in the NBSA is demonstrated to be comparable to Jamaica Bay.

2.2.4 Scoring

Based on the four toxicity endpoints, each SQT station was assigned a score ranging from 0 (unimpacted) to 1 (most impacted). The sediment toxicity data comprise survival and sublethal endpoints (i.e., growth and reproduction). Criteria for assigning toxicity are well established for the survival endpoints but not for the sublethal endpoints. Criteria used for REMAP (USEPA 2003a) defined samples as toxic if the 10-day amphipod (i.e., *A. abdita*) survival rate was less than 80% of the respective control survival and as highly toxic if the 10-day amphipod (i.e., *A. abdita*) survival rate was less than 60% of the

control survival. The 80% decision criterion is consistent with the criterion in the testing manual for discharge to United States (U.S.) waters (USEPA and USACE 1998) and was also suggested by Kennedy et al. (2009) for 28-day *L. plumulosus* toxicity tests. Therefore, these criteria were adopted to define the toxicity of sediments from the NBSA based on the survival endpoints. Where survival is >80% of control and/or not significantly different from control, a score of 0 was applied (Table A-6). Survival significantly different from control and between 60 and 80% of control received a score of 0.5. Survival significantly different from control and <60% of control received a score of 1 (Table A-6).

The sublethal endpoints are subject to considerable response variability compared to the survival endpoints both in test sediments and control sediments. Eickhoff et al. (2014) subjected five control sediments to 28-day tests with *L. plumulosus* and found little variation in survival among the five control samples, which ranged from 96 to 99%. The within batch-replicate variance was also low for survival, with a mean coefficient of variation (CV) of 5.6%. However, growth and reproduction endpoints were more variable both among control samples and within batch replicates. Mean growth in control samples ranged from 0.7 to 1.8 milligrams per organism (0.025 to 0.064 mg/organism/day), and the mean CV among replicates was 30%. Reproduction had a 10-fold range within control sediments (0.8 to 8.4 juveniles per surviving adult), and the mean CV among replicates was 79%. Kennedy et al. (2009) found significant variability in control sediment for growth (CV = 56%) and reproduction (CV = 63%), as well as significant variability in an interlaboratory comparison of the growth and reproduction endpoints. *L. plumulosus* reproduction is known to be highly dependent on grain size (McDonald et al. 2010). This fact was illustrated in Kennedy et al. (2009), where it was found that a clean reference sample, which was relatively coarse-grained, had a very low response for the reproductive endpoint compared to the control (i.e., less than 10% of the control response). Based on the typical criteria used to define toxicity for survival endpoints (i.e., less than 80% of the control response), the clean reference sample would be classified as toxic based on the reproductive endpoint.

Given the large variability that can occur among control sediments for these sublethal endpoints and because there are no established control acceptability criteria for these sublethal endpoints, a simple comparison to control sediment cannot be used to judge a sediment sample as toxic. Further, high variability makes default application of decision criteria (e.g., 20% reduction compared to control) inappropriate (McDonald et al. 2010). Given these considerations, the SQT scoring for the sublethal endpoints was adjusted as compared to the survival endpoints. Where sublethal response is >70% of control and/or not significantly different from control, a score of 0 was applied (Table A-6). Sublethal response significantly different from control and between 50 and 70% of control received a score of 0.5. Sublethal response significantly different from control and <50% of control received a score of 1 (Table A-6).

The NBSA toxicity data for sublethal endpoints was also subject to high variability (Attachment A-2). The CV for 28-day survival ranged from 4% to as high as 139% with variance generally increasing as mean survival decreases. The average MDD at $\alpha = 0.05$ and $\beta = 0.20$ for this endpoint is 33%. Therefore, some stations with survival less than 80% of control were not found to be statistically significantly different than control. The uncertainty of this with respect to SQT scoring is discussed in Section 4.1.

Each toxicity endpoint score was weighted equally (0.25), and the weights were multiplied by the score and summed such that the maximum possible score for the toxicity category of the triad is 1, which represents the greatest impact.

Table A-7 presents the scoring for the four sediment toxicity endpoints at each of the 30 SQT stations. Statistical significance is depicted by shading. Twenty-eight stations had 10-day survival comparable to the laboratory control survival (90%). Only two stations, Stations 151 and 154, located near the southwestern shoreline of the NBSA (Figure A-5), exhibited acute toxicity and received the maximum SQT score of 1. Thirteen stations received a score of 0 because all of the endpoints were comparable to the control based on the scoring criteria. Fifteen stations had scores between 0 and 1 based on a comparison of chronic endpoints to laboratory control. However, in total, only five stations had 28-day survival that was both less than 80% of control and significantly different than control (Stations 151, 154, 143, 158, and 160). The 28-day survival at Station 141 (67%), while significantly different than control, was greater than 80% of control (i.e., 83% of control) and, therefore, received a score of 0 for this endpoint. Alternative scoring methods are evaluated in the uncertainty analysis.

2.3 Sediment Chemistry Line of Evidence

2.3.1 Sampling Methods

Sediment and porewater sampling were conducted according to the methods described in the SQT and Porewater Sampling and Analysis QAPP (Tierra 2015), the SQT and Porewater Field Report (GSH 2017a), and the SQT and Porewater Data Report (GSH 2017b). Sediment samples were collected from the top 6 inches of sediment using grab sampling techniques (i.e., standard or petite Ponar dredge). Samples were sent to the appropriate laboratories for chemical analyses that included dioxins/furans, polychlorinated biphenyls (PCBs: congeners and Aroclors), pesticides, semivolatile organic compounds, volatile organic compounds, petroleum hydrocarbons, butyltins, herbicides, inorganic compounds, acid volatile sulfide/simultaneously extracted metals (AVS/SEM), organic carbon, and grain size.

Sediment samples were sent to the University of Maryland Baltimore County (UMBC) where an ex-situ (i.e., laboratory) porewater passive sampler study was conducted from September 23, 2015 through November 6, 2015. Hydrophobic organic compounds were measured using polyethylene (PE) (i.e., PCB congeners, pesticides, and polycyclic aromatic hydrocarbons [PAHs]) and polyoxymethylene (POM) (i.e., dioxins/furans) passive samplers. As described in the SQT and Porewater Sampling and Analysis QAPP (Tierra 2015), PE and POM samplers were placed in test chambers containing site sediment and site water, and the sediment slurry was allowed to mix via tumbling for 30 days. PE samplers were impregnated with a set of performance reference compounds (PRCs) that provided the assessment of the extent of equilibrium achieved during the contact period. Following exposure to sediment, the PE and POM samplers were cleaned and transferred to the analytical laboratories, where the target organic compounds were extracted in solvent (acetone/ hexane [1:1 by volume]) and the concentrations in final extracts were measured. Porewater concentrations were estimated using the laboratory-reported concentrations in the PE/POM extracts, as described by Ghosh et al. (2014). A simple mass balance calculation is used to convert extract concentrations to concentrations within the PE/POM. The porewater concentration is then estimated as the ratio of the PE or POM concentration and a literature-derived polymer-water partition constant (K_{PS}). The PRCs were used to assess the extent of equilibrium achieved during the period that the samplers were in contact with the sediment. Some of the strongly hydrophobic compounds, in particular, the higher-chlorinated PCB congeners, did not achieve equilibrium during the period of contact, and a mathematical correction was performed to calculate the true equilibrium concentrations (Fernandez et al. 2009). The K_{PS} values used in the calculations were derived from

literature: PCBs and parent PAHs (Ghosh et al. 2014); alkylated PAHs (Choi et al. 2013); isomers of dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyltrichloroethane (DDx) (Fernandez et al. 2014); other pesticides (Fernandez et al. 2012); and dioxins/furans (Cornelissen et al. 2008). For all other hydrophobic organic compounds, a correlation based on the octanol-water partition coefficient was used as described in Fernandez et al. (2012).

Dialysis (i.e., diffusion) samplers were used to measure metals and other inorganics (i.e., mercury, methylmercury, dissolved organic carbon, ammonia, and total sulfide) in porewater. Ex-situ laboratory equilibrium studies were conducted in 5-gallon buckets (one bucket for each sampling location). After the buckets were allowed to reconsolidate in the laboratory for 2 weeks, dialysis samplers that contained deionized water with matching site salinity were placed in each bucket. Multiple dialysis devices were placed within the top 12 inches of sediment in each bucket to allow the final collection of 1.5 liters (L) of dialyzed porewater. The dialysis samplers were allowed to equilibrate in the sediments for a period of 2 weeks. After removal, the water sample within the dialysis was prepared and shipped to the analytical laboratory for analysis. Because inorganic porewater concentrations were measured directly by the laboratory, no additional calculations were required.

Porewater analysis included: dioxins/furans, PCB congeners, pesticides, PAHs, metals, dissolved organic carbon, ammonia, and total sulfide.

2.3.2 Sediment Chemistry Screen

Sediment chemical concentrations were compared to screening values to assess the potential for impact to the BIC. Sediment screening values were preferentially based on those published either by USEPA (2005a) or Long et al. (1995). The USEPA (2005a) developed sediment screening values for a number of chemicals based on their predicted toxicity to amphipods. For each chemical – T20, T50, and T80 – values were developed that correspond to probabilities of toxicity of 20%, 50%, and 80%, respectively. Long et al. (1995) developed sediment screening values for a number of chemicals, ERL and ERM, that correspond to threshold and probable effect concentrations. Long et al. (2006) also present a method for assessing sediment quality using an ERM quotient, which is the sum of the chemical concentrations in sediment divided by the ERMs for 25 chemicals. An ERM quotient was calculated for each SQT sample. For chemicals with a frequency of detection (FOD) greater than 25% in surface sediment, for which T20/T50 and/or ERL/ERM values were not available, threshold and median screening values were selected based on threshold effect level (TEL) or probable effect level (PEL) values for marine sediment, which are published in the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRT) (Buchman 2008). Table A-8 provides a complete list of the sediment screening values used in this evaluation. A single threshold value is reported as the maximum of the T20 and ERL values, if available, or the TEL value, if not available. A single median value is reported as the maximum of the T50 or ERM values, if available, or the PEL, if otherwise. Table A-9 presents the number of exceedances by chemical for each of the screening values presented in Table A-8 in the 30 SQT samples. The threshold values for most chemicals were exceeded at most stations. Median values were less frequently exceeded. The results of the screening for each station/analyte are provided in Attachment A-3 (Table A-3-1). Table A-10 provides a list of the chemicals for which no screening values were available.

2.3.3 Porewater Chemistry Screen

Porewater chemical concentrations were screened to assess the potential for impact to the BIC. In its derivation of equilibrium partitioning sediment benchmarks for the protection of benthic organisms, USEPA (2003b) conducted ancillary analyses that suggest that the sensitivity distribution of benthic and epibenthic organisms is not significantly different from that of pelagic organisms; therefore, water quality criteria (WQC) applied to interstitial waters should be fully protective of benthic organisms. As such, porewater screening values were preferentially based on the New Jersey acute and chronic WQC for aquatic life in saline water (NJDEP 2016). For detected compounds without WQC, acute and chronic screening values were selected form the NOAA SQuiRT tables (Buchman 2008) for marine surface waters. If marine guidelines were not available, freshwater guidelines were selected from the SQuiRT tables. Table A-11 provides a list of screening values for porewater. Table A-12 presents the number of exceedances by chemical for each of the screening values for the 30 porewater samples. Exceedances of chronic WQC were observed for PCBs and total DDx, but all other organic compound concentrations were below chronic screening values. Arsenic, copper, and zinc were infrequently detected in porewater, but where they were detected, they were often in exceedance of acute or chronic WQC. Of the five acute exceedances observed, three were for zinc, and one each was for arsenic and copper. The results of the screening for each station/analyte are provided in Attachment A-3 (Table A-3-2). Table A-13 provides a list of chemicals detected in porewater for which no screening values were available.

2.3.4 Other Screening Methods

The SQT data were also evaluated according to USEPA equilibrium sediment partitioning guidance for metal and PAH mixtures (USEPA 2003c, 2005b, 2017a). In accordance with the SQT and Porewater Sampling and Analysis QAPP (Tierra 2015), sediment samples were analyzed for AVS/SEM. Under equilibrium partitioning theory, AVS binds to divalent metals (i.e., cadmium, copper, lead, nickel, and zinc) such that they are not bioavailable in sediments and, therefore, are non-toxic to benthic organisms (USEPA 2005b). In addition, TOC contributes to the lack of bioavailability (USEPA 2005b). To evaluate the bioavailability of divalent metals, SEM concentrations are summed and the AVS concentrations are subtracted to give the value ∑SEM-AVS. If the value is negative, it is inferred that the metals are bound to the AVS in sediment and not bioavailable (USEPA 2005b). Further, ∑SEM-AVS is divided by the fraction (f) of organic carbon (OC) in the sample (∑SEM-AVS/f_{OC}). Based on toxicity experiments, when ∑SEM-AVS)/f_{OC} is less 130 micromoles per gram of OC, no toxicity is expected (USEPA 2005b). Porewater concentrations are evaluated directly by summing the concentration of each divalent metal (i.e., cadmium, copper, nickel, lead, and zinc) by its final chronic value (FCV[3]) to derive a sum of toxic units (SumTU).

For benthic invertebrates, it is believed that the narcosis mechanism determines the potency of sediment exposures to PAHs (USEPA 2003c, 2017a). Sediment was evaluated by summing the TOC-normalized concentrations divided by the benchmark for 34 PAHs (USEPA 2003c) to get the value $\sum ESBTU_{FCV}$. Porewater was evaluated by summing the concentrations divided by the FCV for 34 PAHs to derive a SumTU. When SumTU exceeds 1, there is a potential for toxicity to benthic invertebrates.

[3] The FCVs used in this calculation are those published in USEPA guidance (USEPA 2005b) and differ only slightly from the NJDEP chronic values listed in Table A-11. The only exception is lead, where the published FCV is 0.0081 mg/L and the NJDEP chronic WQC is 0.024 mg/L.

Table A-14 summarizes these evaluations. Under equilibrium partitioning theory, no toxicity is expected in any of the SQT sediment samples due to divalent metals concentrations, since all $\sum$SEM-AVS/f_{OC} values are less than 130. Table A-14 also shows the SumTU calculations for porewater metals concentrations. A sample with a SumTU greater than 1 has the potential to exhibit chronic toxicity (USEPA 2005b). Cadmium and nickel were not detected in any porewater samples, so detected SumTU concentrations are based on some combination of the detected concentrations of copper, lead, or zinc. The porewater SumTU exceeded 1 at six stations (Stations 139, 159, 163, 141, 147, and 150) (Table A-14), indicating the potential for chronic toxicity at these locations as a result of copper, lead, or zinc in the porewater.

For PAHs, the $\sum ESBTU_{FCV}$ exceeds 1 at seven stations (Table A-14), indicating the potential for toxicity due to PAHs. In porewater the PAH SumTU exceeds 1 at one station, 154, at which acute toxicity was observed. The other station for which acute toxicity was observed, 151, has a PAH SumTU very close to 1.

2.3.5 Sediment and Porewater Relationship

Bivariate plots of sediment versus porewater concentrations for selected chemicals are shown in Attachment A-4. For many of the chemicals, there was a strong association between concentrations in sediment and concentrations in porewater. For example, porewater concentrations are shown to increase with sediment concentrations for 2,3,7,8-TCDD, total PCBs and total DDx (Figure A-4-1 and A-4-2). The relationship is not as strong for mercury (Figure A-4-3). However, for PAHs, there is no relationship (Figure A-4-2), suggesting that other factors control PAH concentrations in porewater.

2.3.6 Scoring

Based on the results of the screening of sediment and porewater concentrations, each SQT station was assigned a score ranging from 0 (unimpacted) to 1 (most impacted). Sediment and porewater were scored separately and combined in an equally weighted manner to derive the final score (Table A-15).

If a sediment sample had a concentration for any chemical that exceeded the threshold value shown in Table A-8, it received a score of 0.5. If a sediment sample had a concentration for any compound that exceeded the median value shown in Table A-8 and/or its ERM quotient exceeded 1, it received a score of 1.

If a porewater sample had a concentration for any chemical that exceeded a chronic criteria or screening value shown in Table A-11, it received a score 0.5. If the SumTU of the sample exceeded 1, it received a score of 0.5, regardless of whether any individual chronic criteria were exceeded. If a porewater sample had a concentration for any chemical that exceeded an acute criteria or screening value shown in Table A-11, it received a score of 1.

Sediment and porewater scores were equally weighted to derive a final score for each station (Table A-16). For sediment concentrations, all stations received the maximum score of 1 due to exceedances of the median sediment screening values or ERM quotients exceeding 1. These sediment screening values provide little in the way of helping to distinguish among stations, most of which display little to no evidence of impact based on toxicity and BIC composition. For porewater concentrations, exceedances of chronic criteria were observed at 19 stations, 5 of which also had an exceedance of acute WQC. The metals SumTU exceeded 1 at six stations. The PAH SumTU exceeded 1 at one station, 154, where acute

toxicity was also observed. No porewater exceedances were observed at 12 stations, 11 of which received an SQT score of 0 because neither SumTU exceeded 1. The combined sediment and porewater SQT scores ranged from 0.5 to 1.

2.4 Results

Table A-17 presents the combined final scores for each station based on each category of the triad. Consistent with the LPRSA BERA (Windward 2019) and as agreed upon with USEPA, the final scores were assigned impact categories as follows: no impact = <0.75; low impact = >0.75 and <1.5; medium impact = >1.5 and < 2.25; and high impact = >2.25. Most SQT stations had scores indicating no impact (10) or low impact (18). Two stations (Stations 151 and 154) were classified as medium impact. While the BIC metrics at these stations did not indicate impact, acute toxicity and elevated chemistry were observed. In fact, these stations had the highest concentrations observed in SQT sediment and porewater samples for many chemicals (Table A-18). No stations were classified as high impact.

3 STATISTICAL EVALUATION OF SQT DATA

3.1 Bivariate Correlation

Spearman rank correlation, a non-parametric measure, was used to evaluate the strength of the association between chemical concentrations and effects measures (i.e., toxicity endpoints and BIC metrics). The Spearman rank correlation coefficient is computed with ranked data and describes the strength of the monotonic association between two variables. Correlation coefficients can range in value from -1 to 1 and the absolute value describes the strength of the association, with 0 indicating no association and 1 or -1 indicating the strongest association. Positive values indicate one variable increases with the other. Negative values indicate one variable decreases with the other. Correlation coefficients, like all statistics, are subject to indicating an association by chance where none exists, and the probability of this is a function of sample size. For a sample size of 30, Spearman correlation coefficients with an absolute value greater than 0.3 indicate a statistically significant association (α = 0.05). It is important to note that a significant association does indicate causation of observed effects, particularly when multiple correlated chemicals are present in the sediment.

3.1.1 Sediment

Table A-19 presents Spearman correlation coefficients for sediment concentrations and effects measures. All toxicity endpoints and BIC metrics (except density), as presented in this table, are expected to decrease (rather than increase) as a result of elevated chemical concentrations in which case the association would result in a negative value for Spearman correlation. All significant and negative coefficients are bold in the table (i.e., all values less than -0.3). Acute toxicity, as expressed in the 10-day survival endpoint, was observed at only two of the 30 SQT stations (Stations 151 and 154). As shown in Table A-18, many chemicals were elevated in the sediment samples from those stations, resulting in the association of 10-day survival with many chemicals in this table, including dioxins and furans, PCBs, pesticides, PAHs, and metals. Only Aroclor PCBs were significantly negatively associated with 28-day mortality. Growth was negatively associated with multiple chemicals, including dioxins and furans, PCBs, pesticides, PAHs, metals, and TOC. Reproduction was negatively associated with PCBs, pesticides, PAHs, mercury, and TOC. The number of taxa was most strongly associated with percent fines and metals but was also associated with dioxins and furans, and PCBs. Indices of diversity, evenness, and dominance are not apparently negatively associated with sediment chemistry. The NY/NJ B-IBI is negatively associated with PCBs, PAHs, and methyl mercury.

3.1.2 Porewater

Table A-20 presents Spearman correlation coefficients for porewater concentrations and effects measures. All toxicity endpoints and BIC metrics (except density), as presented in this table, are expected to decrease (rather than increase) as a result of elevated chemical concentrations in which case the association would result in a negative value for Spearman correlation. All significant and negative coefficients are bold in the table (i.e., all values less than -0.3). Acute toxicity, as expressed in the 10-day survival endpoint, was observed at only two of the 30 SQT stations (Stations 151 and 154). As shown in

Table A-18, many chemicals were elevated in the porewater samples from those stations, resulting in the association of 10-day survival with many chemicals in this table, including dioxins and furans, PCBs, pesticides, and PAHs. With the exception of mercury and a few other metals (e.g., barium, chromium, iron, manganese), the FOD in porewater was low for metals; however, arsenic (Station 151 only), barium, and mercury were detected at their highest concentrations in porewater from the acutely toxic stations. At Station 151, arsenic exceeded the acute WQC. The 28-day survival endpoint was negatively associated with multiple chemicals, including dioxins and furans, PCBs, pesticides, PAHs, arsenic, and sulfide. Growth was negatively associated with multiple chemicals, including dioxins and furans, PCBs, pesticides, and PAHs. Reproduction was negatively associated with multiple chemicals, including dioxins and furans, PCBs, pesticides, PAHs, selenium, and sulfide. Conclusions regarding correlations with arsenic and selenium need to be interpreted with caution due to the lower FOD. Benthic metrics did not show any consistent association with classes of chemicals in porewater. For example, the number of taxa was negatively associated only with chromium, a single dioxin congener (1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin), and a few PCB congeners.

3.1.3 Summary

Many chemicals, including dioxins and furans, PCBs, pesticides, PAHs, and metals, are significantly and negatively associated with toxicity endpoints in both sediment and porewater. While association does not indicate causation, there is evidence that chemical stressors may be responsible for the observed toxicity. The evidence is less clear for BIC metrics. For example, while several sediment chemical concentrations are negatively correlated with the number of taxa, this association is not seen for porewater. One explanation for this finding is that variability in BIC metrics is not a function of chemical concentrations and is mostly associated with a diverse community in which localized variability is a function of habitat. This is discussed further in the multivariate analysis sections below.

Based on the results of the SQT evaluation and the correlation analysis, a list of chemicals of potential concern to benthic invertebrates is provided in Table A-21. Chemicals on this list had exceedances of sediment and/or water quality guidelines/criteria and also were correlated with toxicity and/or BIC metrics for either sediment or porewater. Figures A-7a through A-7f show scatter plots of the 28-day survival endpoint versus sediment and porewater concentrations for a subset of the chemicals in Table A-21. In general, these graphs show that the samples with the lowest survival tend to have the highest concentrations in sediment and/or porewater of multiple chemicals, making it difficult to determine causation based on any single chemical. It is also evident that there is a lot of variation unexplained by chemical concentrations – a source of uncertainty in the interpretation of chronic endpoints. Because many individual chemicals are associated with effects measures, dose response modeling of individual chemicals would not be appropriate. Therefore, multivariate analyses were conducted to further evaluate the relationships.

3.2 Multivariate Analyses

3.2.1 Introduction

Because many chemicals are associated with effects measures, dose response modeling of individual chemicals would not be appropriate. Therefore, multivariate analyses were conducted to further evaluate

the relationships between chemicals and effects. One method of multivariate analysis is multivariate regression. In this method, multiple independent or predictor variables (e.g., chemical concentrations) can be evaluated with respect to their association with dependent or response variables (e.g., effects measures). However, when the predictor variables in a regression model are highly correlated, parameter estimates are unstable and have high standard errors – a problem referred to as collinearity or multicollinearity (Jackson 1991). A solution to this problem is to transform the predictor variables into principal components and use the principal components in subsequent modeling of the response variables (Jackson 1991). This transformation, called principal component analysis (PCA), was used to evaluate the relationships between sediment and porewater chemistry concentrations and response variables, because these chemicals are, in fact, highly correlated in the NBSA.

In PCA, a multivariate dataset is transformed using matrix algebra (i.e., orthogonal rotation) to create a new set of uncorrelated variables known as principal components (PCs), which are linear combinations of the original variables (i.e., chemical concentrations). PCs are sorted so that each, in turn, represents a smaller percentage of the variance within the dataset. These uncorrelated PCs, or some subset of them, can be used in subsequent linear modeling of response variables while avoiding the problem of multicollinearity. Another objective of PCA is to reduce the dimensionality of the dataset. When a multivariate dataset consists of many correlated variables, the structure of the dataset can be explained with fewer transformed variables (PCs). A common rule of thumb for PCA is that the first *n* principal components with eigenvalues greater than one are the most important and explain most of the variance of a multivariate dataset with correlated variables (Jackson 1991).

In addition to PCA, factor analysis was also used to evaluate the relationships between sediment and porewater chemistry concentrations and response variables. Factor analysis is a subsequent orthogonal rotation of the axes conducted to create new variables, called factors, that might be more easily interpretable than PCs. Varimax rotation was used, with the objective of having individual chemicals "load" (i.e., be strongly correlated with) a single factor and not load on any other factors. This is only achievable for multivariate datasets with simple structure, which is further described below.

PCA and factor analysis are subject to the assumptions of linear modeling, specifically that residuals are approximately normally distributed. Further, when variables that are measured in different scales and/or differ greatly in variance are combined in PCA, they are commonly rescaled by standard normalization (or other methods) so as not to give any one variable undue weight (Jackson 1991). These requirements were satisfied by conducting the PCA and factor rotation on a correlation matrix of natural logarithm transformed chemical concentrations. The PRINCOMP and FACTOR procedures in SAS© 9.4 were used to conduct the PCA and factor analysis.

3.2.2 Exploratory Principal Component Analysis Sediment Chemistry

The objective of dose response modeling of the SQT data is to be able to predict where toxicity to the BIC might be expected to occur in the NBSA. Therefore, a PCA model was developed using the entire Phase III (2014 to 2016) surface sediment dataset (n=254). Prior to conducting the PCA for sediment, exploratory analyses were conducted to determine a subset of chemicals or summed totals that could be used to represent large chemical groups and to simplify the analysis by reducing the variance introduced by chemicals that are unlikely to be causing the observed toxicity. This section describes the exploratory

analyses and how a final subset of 21 chemicals was chosen for the PCA sediment chemistry model of the NBSA.

The multivariate structure within each class of chemicals was examined using PCA. In PCA, when the input variables are highly correlated due to a single factor (i.e., some unmeasured or unmeasurable process), they will largely be explained by the first principal component (PC1) with subsequent PCs explaining either only minor other factors or just random variation. That property of PCA was used to aid in selecting either indicator chemicals or chemical summations to use in the final PCA. In multivariate analyses, all variables must have valid values. If any sample has missing values in a multivariate analysis, the entire sample is excluded. For samples with non-detect data, one-half the detection limit was substituted for non-detects. Chemicals with a FOD of less than 80% were excluded from the exploratory analyses due to the potential for adding additional unexplained variability.

A PCA of 16 dioxin and furan concentrations in sediment was conducted (Figure A-8a; left graph). Concentrations of 1,2,3,7,8,9-hexachlorodibenzofuran were excluded from the PCA due to a low FOD (61%). PC1 explains 91% of the variance of the 16 congeners indicative of the high correlation among them. The second principal component (PC2) explains 4.4% of the variance and, while it appears to represent a minor distinction among occurrences of dioxin and furan congeners, they are still highly correlated to each other. Based on this analysis, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) in sediment was chosen to be carried forward in the PCA to represent all dioxin and furan congeners. Correlation coefficients for all other congeners with 2,3,7,8-TCDD exceeded 0.8.

A PCA was conducted of PCB congeners, or co-elutions, detected at least 80% of the time in sediment (Figure A-8a; right graph). PC1 explains 86% of the variance of the 100 remaining PCB congeners/co-elutions. PC2 explains 5.2% of the variance and appears to distinguish differences in the degree of chlorination among congeners (perhaps a weathering effect). However, since PC1 explains most of the variance of the PCB congeners, total PCB congeners (a single value) was chosen to be carried forward in the PCA to represent all PCB congeners.

A PCA of 32 PAH compounds in sediment was conducted (Figure A-8b; left graph). Six PAHs (C1-naphthalene, C4-chrysene, and parent and alkylated fluorenes) were excluded due to a FOD of less than 80%. PC1 explains 85% of the variance of the 32 remaining PAHs. PC2 and the third principal component (PC3) (not shown) explain 5.6% and 4.7% of the variance, respectively, and distinguish differences in molecular weight and alkylation among the individual PAHs (Figure A-8b; left graph). This distinction suggests that high molecular weight (HMW) PAHs, for example, are more highly correlated with each other than with other PAHs. The same goes for the low molecular weight (LMW) PAHs and the alkylated PAHs. This is not surprising given that pyrogenic and petrogenic sources of PAHs in the environment have unique PAH compositions. Because of these observations, three PAH summations were used to represent PAHs in the final PCA – total HMW PAHs, total LMW PAHs, and total alkylated PAHs. Total HMW and LMW PAHs refer to parent compounds only and have been previously defined (see Section 4 of the LPRSA BERA; Windward 2019). Total alkylated PAHs is the sum of the detected concentrations of the 18 alkylated PAHs measured in Phase III sediment samples.

A PCA of 20 metals in sediment was conducted (Figure A-8b; right graph). PC1 explains 78% of the variance and represents overall metal concentrations in sediments, which are all correlated to some extent. PC2 explains 10% of the variance and is differentiating metals, such as aluminum and iron, which are commonly found in fine-grained sediments, from others (e.g., mercury), which are found at elevated

concentrations due to industrial sources in the NBSA. Most metals that are positively correlated with PC2 are also highly correlated with aluminum. This includes the following metals and their correlation coefficients (ρ) with aluminum: beryllium (0.89), cobalt (0.89), iron (0.93), manganese (0.86), thallium (0.84), titanium (0.90), and vanadium (0.95). Their strong association with aluminium indicates that the presence of these metals is most likely associated with the rock-forming minerals commonly found in fine-grained sediments (nickel is the exception and is less correlated with aluminum: $\rho = 0.77$). Metals that are negatively correlated with PC2 (e.g., arsenic, chromium, mercury), while correlated with aluminum to some degree ($0.5 < \rho < 0.7$), are found at concentrations elevated above what might be associated with rock-forming minerals and are in exceedance of available sediment quality guidelines (Table A-8). Therefore, these metals, along with nickel, were included in the final sediment chemistry PCA model.

Other chemicals included in the final PCA model were based on detection frequency and the potential for toxicity to benthic organisms as follows:

- All 34 individual petroleum hydrocarbons were detected in surface sediments at frequencies ranging from 6 to 97% of samples. Although there were no sediment screening guidelines available for total petroleum hydrocarbons, they are potentially toxic to marine invertebrates (Hobbs et al. 2018) and were, therefore, included in the PCA. Total petroleum hydrocarbons, a summation of the concentrations of all 34 individual petroleum hydrocarbons, was used to represent this class of chemicals.
- Because of the differences in toxicity, no attempt was made to combine pesticides of different classes. Based on the observations previously described, such as detection frequency, exceedances of screening criteria, and correlation to effects measures, a subset of pesticides were selected for the PCA model. Total (2,4' and 4,4') DDx was used to represent all DDx isomers. Among chlordane chemicals, alpha- and gamma-chlordane were detected most frequently and often at values greater than screening guidelines; therefore, total alpha + gamma chlordane was used to represent chlordane chemicals. Hexachlorobenzene and dieldrin, both of which have high rates of detection in sediment and were fully detected in porewater, were also included in the PCA.
- No semivolatile organic compounds were included in the final PCA model. None were significantly correlated with toxicity and the low detection frequency (which would require substitution for non-detects because no values can be missing in the PCA) would add uncertainty to the model.

A preliminary PCA was conducted with all sediment samples. It became apparent that two samples collected during the 2016 Phase III sediment sampling program in the area of the confined disposal facility (CDF) between the port channels, were multivariate outliers (NB03SED-CHM349 and NB03SED-CHM354). Chemical concentrations in the uncharacteristically sandy sediment samples from these locations were very low or non-detect, adding additional variance to the model. These samples, which are not representative of the NBSA and are more likely representative of capping material on the CDF, were excluded from further multivariate analysis. In addition, another 2016 Phase III sediment sample near the confined disposal facility (NB03SED-CHM339) was excluded because of missing pesticide data. Concentrations of other chemicals were low at this location. This left a total of 251 Phase III surface sediment samples included in the sediment chemistry PCA. Detection frequencies were high among the remaining samples and 21 chemicals (>95%). One-half the detection limit was substituted for any remaining non-detected results before the data transformations were applied.

3.2.3 Principal Component Analysis Sediment Chemistry

Table A-22 provides the correlation matrix of natural logarithm transformed chemical concentrations of the 21 chemicals selected for the PCA. This table also shows the eigenvalues of the first six PCs. PC1 explains 66.7% of the variance, and the first three PCs explain a total of 83% of the variance of the sediment chemistry dataset (Table A-22). All remaining PCs have eigenvalues less than 1. All 21 chemicals are correlated to PC1 (Figure A-9). PC2, explaining 9.4% of the variance, is correlated with chlordane, dieldrin, 2,3,7,8-TCDD, and total PCBs. PC3, explaining 6.5% of the variance, is correlated with PAHs. While PC1 explains most of the variance in overall chemical concentrations, PC2 and PC3 explain some relative differences in concentrations among the chemical groups. Because PCs are new variables that are linear combinations of the original variables (i.e., chemical concentrations), the concentration data can be used to find the value, usually referred to as the score, of each PC for each sediment sample. Because PC1 represents overall chemistry concentrations, it is useful to view in map form to see patterns of elevated chemistry. Figure A-10 presents the scores on PC1 of the Phase III surface sediment samples in the NBSA. Lower (more negative) PC1 scores indicate lower concentrations, while scores near 0 indicate median concentrations. Greater (more positive) scores indicate higher chemical concentrations, and it will be shown that PC1 is a good predictor of toxicity.

3.2.4 Factor Analysis Sediment Chemistry

In addition to PCA, factor analysis was conducted on the sediment chemistry data to determine if individual chemicals, or chemical classes, could be assigned to factors that could potentially explain the observed toxicity. Based on the outcome of the PCA, it was hypothesized that three factors would explain the variance of the multivariate dataset. Varimax rotation resulted in the factor loadings that are shown on Figure A-11. The objective of varimax rotation is to have each chemical “load” onto (i.e., be strongly correlated with) one factor and no other. This was not fully achievable for the NBSA sediment chemistry dataset; however, some chemicals loaded more strongly on individual factors. Metals were most strongly correlated to Factor 1 (Figure A-11). Pesticides, PCBs, and 2,3,7,8-TCDD were most strongly correlated to Factor 2. However, the pesticides – total DDx and hexachlorobenzene – also had significant loading on Factor 1 with metals. PAHs and total petroleum hydrocarbons were most strongly correlated to Factor 3. However, alkylated PAHs and total petroleum hydrocarbons also had significant loading on Factor 1. While simple structure is not achieved by the factor model, the factors can still be tested in dose response models to examine whether certain groups of chemicals appear to have a greater association with effects.

3.2.5 Dose Response Modeling Sediment

The objective of conducting the PCA was to create a set of variables, or PCs, that represent sediment chemical concentrations (but are uncorrelated and, therefore, are not subject to the problem of multicollinearity) to be used in a quantitative effects assessment. Linear modeling methods were used to evaluate the relationship between predictor variables (e.g., PCs, grain size) and response variables (e.g., 10-day mortality, number of taxa). Due to the nature of the response variables, two types of models were used: 1) linear/multivariate regression models – appropriate for continuous response variables (e.g., growth) and 2) binary response models – the appropriate model form for variables with only two possible outcomes (e.g., survival/mortality).

Linear regression models have the following form:

$$R = \alpha + \beta_i x_i + \varepsilon \qquad \textbf{Equation 3-1}$$

where:

R = response (e.g., growth, number of taxa)

α = intercept parameter

β_i = slope parameter of the *ith* predictor variable

x_i = *ith* predictor variable (e.g., PC1), and

ε = random error.

Competing linear regression models were compared using the adjusted coefficient of determination (R^2). The adjusted R^2 gives an indication of the ability of the model to explain the variance of the response data while penalizing the introduction of additional spurious predictors to the model. Models were fitted using the general linear model procedure (PROC GLM) in SAS© 9.4.

Survival data from the 10- and 28-day *L. plumulosus* bioassays were evaluated using linear binary response models. Because of the natural, or threshold, mortality expected during the test, as measured in the control, it was more convenient to model mortality rather than survival: (%Mortality = 100-%Survival). These models have the following form:

$$\pi = C + (1 - C)F(\alpha + \beta_i x_i) + \varepsilon \qquad \textbf{Equation 3-2}$$

where:

π = probability of mortality

C = threshold mortality (i.e., mean laboratory control mortality)

F = a cumulative probability distribution function

α = intercept parameter

β_i = slope parameter of the *ith* predictor variable

x_i = *ith* predictor variable (e.g., PC1), and

ε = random error.

The cumulative distribution function (*F*) maps the range of the linear function $(-\infty,\infty)$ onto the range of probability (0,1). Three different probability distributions were tested for each subset of model predictors: the logistic distribution, the standard normal distribution (called a probit model), and the Gompertz distribution (also called the extreme value model). Competing binary response models were compared using Akaike's Information Criteria (AIC). Given a set of candidate models, the preferred model is the one with the minimum AIC value (Akaike 1981). Binary response models were fitted using the probit procedure (PROC PROBIT) in SAS© 9.4. The PROBIT procedure calculates maximum likelihood estimates of regression parameters for binary response data, including probit, logit, and extreme value (i.e., Gompertz link) regression models. If convergence of the maximum likelihood estimates is attained, a Type III chi-square test statistic is computed for each effect parameter specified in the model, testing whether there is any contribution from any of the levels of the effect parameter. This statistic is computed as a quadratic form in the appropriate parameter estimates by using the corresponding submatrix of the

asymptotic covariance matrix estimate. The AIC is calculated from the log likelihood ln(L) for each model as follows:

$$AIC = -2 \ln(L) + 2p \qquad \textbf{\textit{Equation 3-3}}$$

where:

ln(L) = log likelihood

p = the number of parameters in the model, including the intercept

Thus, AIC rewards goodness of fit (as assessed by the likelihood function), but it also includes a penalty that is an increasing function of the number of predictors in the model.

For each response variable, the following predictors were tested: PC1, PC2, PC3, TOC, and percent fines. For BIC metrics, shear stress[4] was also tested. Predictor variables were added to each model in a stepwise (i.e. step up and step down) fashion. In addition to the adjusted R^2 and the AIC, the Type III marginal test statistic, computed for each parameter specified in the model, was examined to determine whether there was any contribution from the added predictor variable. Non-significant predictors (α = 0.05) were removed from the final models.

3.2.5.1 PCA Models

Before any model fitting was conducted, plots of the PCs and toxicity endpoints were constructed. Figure A-12 shows 10-day survival versus the three PCs, and it is apparent that there is a strong association between PC1 and 10-day survival. Table A-23 presents the details of the models tested for toxicity endpoints and the sediment chemistry PCA. For the modeled endpoint, 10-day mortality, PC1 was the only significant predictor. Among the three model forms tested, the probit model had the lowest AIC. The fitted model is depicted on Figure A-13 and shows the probability of mortality increasing with the value of PC1, which is strongly correlated to overall sediment chemical concentrations (Figure A-9). Based on this model, the predicted probability of mortality in all Phase III sediments was calculated. Predicted mortality was transformed back to survival (%Survival = 100 %Mortality), and samples for which survival is predicted to be less than 80% and/or 60% of the control survival were identified on a map (Figure A-14). These locations are labeled with their abbreviated location identifiers (i.e., station identifier). Based on the model, acute toxicity is expected in samples with a PC1 score of 5 or greater for which there are a total of 21 (8.2% of all Phase III samples) in the NBSA – three in the north geographic area and 18 in the south geographic area.

Figure A-15 shows 28-day survival versus the three PCs. This survival endpoint exhibits more variability than 10-day survival and the associations are less obvious. For this endpoint, the best model was a Gompertz model with both PC1 (overall chemistry) and PC2 (pesticides, dioxin, PCBs) as predictors (Table A-23). It had the lowest AIC of any tested model for which all parameters were significant according to the Type III statistic. This model is depicted on Figure A-16 (PC2 not shown). It was observed that 28-day mortality was much more variable than 10-day mortality and, therefore, the predictability of the model is less certain. However, based on the observed results, the model correctly

[4] Shear stress is defined as the daily maximum grain stress in dynes per square centimeter predicted by the hydrodynamic model (1995 to 2013) of the NBSA in the model grid cell in which the SQT sample was located.

predicts toxicity (or lack thereof) 83% (25 out of 30) of the time (Figure A-16; inset table). If toxicity is defined simply as 28-day observed survival significantly different from control, then six stations would be classified as toxic (Table A-5). Four of these stations (Stations 143, 151, 154, and 160) are also predicted to be toxic by the model. Two of the six were predicted to be non-toxic. Of these two, Station 141, with observed survival of 67%, was statistically significantly different from control but was not less than 80% of control. The model predicted survival for this station is 73% (90% of control), which, by definition, is not toxic. Therefore, the model agrees with the observed result for this station. The other observed toxic station for which the model predicts to be non-toxic, Station 158, shows a significant lack of agreement with the model (Figure A-16). Observed survival was 39% (i.e., 61% mortality), while the model-predicted survival was 81%. This station does not have elevated chemical concentrations for most chemicals except PAHs. In fact, total PAHs in porewater was greatest at Station 158 (Figure A-7d), which could be contributing to the observed toxicity that is not explained by sediment concentrations. In addition, there was considerable variability in replicate survival at this station, with replicate survival ranging from 0 to 75% (Attachment A-2). The model predicts three stations to be toxic that were not observed to be toxic. For two of these (Stations 138 and 149), survival was within the confidence limits predicted by the model and, had they been statistically significant compared to control, they would have been classified as toxic with an observed survival of 46% and 63%, respectively. The third station, Station 161, had a very high observed survival (96%) but had a model-predicted survival of 59%. In summary, the model correctly predicts toxicity 83% of the time. Of the five stations for which observed and predicted toxicity were not in agreement, only two stations (158 and 161) exhibited observed survival outside the range of the model confidence limits. Along with station 158, station 142 also showed significant lack of agreement with the model (Figure A-16). Although it was not statistically significantly different from control, and therefore judged non-toxic, observed survival was 53% (i.e., 47% mortality) at station 142. Model-predicted survival is 81% for this station and therefore the station was correctly predicted to be non-toxic despite the difference in observed and predicted survival. Similar to station 158, there was considerable replicate variability at this location with replicate survival ranging from 0 to 95% (Attachment A-2).

Similarly, as was done for the 10-day model, 28-day predicted probability of mortality in all Phase III sediments was calculated and transformed back to survival. Samples for which 28-day survival is predicted to be less than 80% and/or 60% of the control survival were identified on a map (Figure A-17). Chronic toxicity is predicted in 45 (17.7%) of the Phase III samples – 11 in the north geographic area, mostly in the same area where acute toxicity was predicted; five spread out in the central geographic area; and the remaining 29 in the south geographic area, mostly in the same areas where acute toxicity was predicted.

Growth versus the sediment chemistry PCs are shown on Figure A-18. Two stations (Stations 151 and 160) exhibited 100% mortality during the 28-day test. These stations are depicted with a value of 0 on the graphs for illustrative purposes, but growth and reproduction were not measured at these stations and were treated as missing values in dose response modeling. PC1 was the only significant predictor of growth (Table A-23). The fitted model is depicted on Figure A-19. Mean growth in the laboratory control sample was 0.045 mg/organism/day. Only one SQT sample met or exceeded this value (Figure A-18; Table A-5). The SQT sample with the lowest overall chemical concentrations, from Station 155, had an observed growth of 0.035 mg/organism/day. As previously discussed, the sublethal endpoints are subject to considerably more variability that is unrelated to chemical stressors. Kennedy et al. (2009) found significant variability in control sediments for growth with a CV of 56% as well as significant variability in

an interlaboratory comparison of growth. Eickhoff et al. (2014) found considerable variability in mean growth in five control sediments from the same estuary, ranging from 0.025 to 0.064 mg/organism/day. The only test acceptability criterion for control growth is that it is measurable (USEPA 2001), setting a low bar for this endpoint. Growth was measurable in all but two of the SQT samples that exhibited 100% mortality at 28 days. It is unknown and unknowable what growth rate could be achieved in the NBSA sediments in the absence of chemical stressors. However, based on the results from Station 155, it is more likely to be in the range of 0.035 mg/organism/day or less. At the median PC1 score of 0, the regression model predicted a mean growth of 0.03 mg/organism/day – a 35% reduction compared to the control but within the range of growth observed in control sediments by Eickhoff et al. (2014). At a PC1 score of 5, the threshold for prediction of acute toxicity, the regression model predicted a mean growth of 0.02 mg/organism/day – a reduction of 57% from control growth.

The reproductive endpoint versus the sediment chemistry PCs are shown on Figure A-20. The reproductive endpoint was not significantly associated with any of the predictors tested (Table A-23; Figure A-21), which is not surprising given the variability in this endpoint. Reproduction in the laboratory control (mean = 1.97 young per surviving adult) had significant replicate variability, ranging from 0.33 to 4 young per surviving adult (CV = 73%). Among the SQT samples, reproduction ranged from 0 to 1.93 (mean = 0.68 young per surviving adult) (Table A-5). As previously discussed, the reproductive endpoint is subject to considerable variability unrelated to chemical stressors. Eickhoff et al. (2014) observed mean reproduction in five control samples from the same estuary, ranging from 0.8 to 8.4 young per surviving adult with an average replicate CV of 79%. Kennedy et al. (2009) found significant variability in control sediment for reproduction with a CV of 63%, as well as significant variability in an interlaboratory comparison of reproduction. Reproduction is also known to be highly dependent on grain size (McDonald et al. 2010).

Scatter plots of each benthic metric versus PC1 are shown on Figures A-22a through A-22c. In addition, the percent tolerant and percent sensitive of total density metrics, which are part of the B-IBI calculation, are also shown versus PC1 (Figure A-22d). The detailed results of model testing for the BIC metrics are shown in Table A-24. None of the PCs was found to be a significant negative predictor for BIC metrics other than density. Density was negatively associated with PC1 (Figure A-23a). Inferences about density versus chemical concentrations are subject to uncertainty, because chemical stressors can result in both increases and decreases in this metric (Weisberg et al. 1998). The number of taxa was most associated with grain size (Table A-24; Figure A-23b), with an increasing percentage of silt and clay resulting in a decline in the number of taxa. PC1 is positively associated with evenness, a spurious finding since elevated chemistry is not expected to result in an increase in evenness. Percent fines has a significant positive association with evenness (Figure A-23c).

Table A-25 provides the PC scores and predicted mortality for 251 Phase II samples evaluated and depicted on Figures A-14 and A-17.

3.2.5.2 Factor Models

The factors described in Section 3.2.4 were also tested using the same dose response modeling methods described in Section 3.2.5 (Table A-26) in an effort to determine if any distinctions could be made as to which chemicals or chemical groups might be causing toxicity. For 10-day mortality, both Factors 1 (metals, DDx, alkylated PAHs) and 3 (PAHs, total petroleum hydrocarbons) were significantly and

positively associated with mortality (Table A-26; Figure A-24). For 28-day mortality, both Factors 1 (metals, DDx, alkylated PAHs) and 2 (pesticides, PCBs, and 2,3,7,8-TCDD) were significantly and positively associated with mortality (Table A-26; Figure A-25). These findings suggest that multiple chemicals contribute to the observed toxicity. No factor models were significant for growth or reproduction (Table A-26). These findings are consistent with the findings in the PC models, where PC1, representing elevated chemistry for all chemicals, was a significant predictor of both 10- and 28-day toxicity, and PC2 was also significant for 28-day mortality.

3.2.5.3 Summary

The PCA, factor analysis, and dose response modeling provide evidence that chemical concentrations in sediments are associated with toxicity to benthic invertebrates. The PCA-based dose response models can be used to reasonably predict where toxicity has the potential to occur in the NBSA, as shown on Figures A-14 and A-17. The factor-based dose response models confirm that multiple chemical mixtures are associated with the observed toxicity. Major findings include:

- The PCA of sediment chemistry concentrations indicates that most of the variance is explained by the first three PCs with PC1 explaining the most variance because it is representative of overall concentration and most of the chemicals are correlated with each other (Figure A-13).
- The 10-day toxicity testing resulted in only two toxic stations with low survival while all other stations had very high survival. These two stations also had the highest concentrations of many chemicals in sediment and porewater (Table A-18) resulting in an association between acute toxicity and PC1. The uncertainty with respect to estimating a threshold for acute toxicity is discussed in Section 4.1.
- The 28-day survival results were subject to considerably more variability and the relationship to chemistry, while significant, is not as strong as it is for the 10-day tests. Both PC1 and PC2 are associated with 28-day survival (Figure A-16). Two stations, 142 and 158, that showed significant departure from the model (Figure A-16) also had significant within replicate variability for this endpoint.

3.2.6 Multivariate Analyses for Porewater

PCA was also conducted using the porewater chemistry data. To be consistent with the sediment chemistry PCA, where possible, the same subset of chemicals was used in the porewater PCA:

- Porewater concentrations of 2,3,7,8-TCDD, detected in all porewater samples, were used to represent all dioxin and furan congeners.
- Most PCB congeners had high rates of detection in porewater, with 111 congeners/co-elutions having a 100% detection rate. Total PCB congeners was used to represent all PCB congeners in the PCA.
- Individual PAH concentrations are represented by two totals – total PAHs and total alkylated PAHs (both 100% detection rates). Total LMW PAHs had a FOD rate of only 50% in porewater and were, therefore, not evaluated separately from HMW PAHs as was done for sediment.
- Except for mercury, only 29 samples were analyzed for metals due to a broken dialysis bag for the sample from Station 155. Of the remaining samples, most metals had a very low FOD: antimony

(3%), arsenic (31%), cadmium (0%), copper (17%), lead (21%), nickel (0%), silver (0%), and zinc (10%). Therefore, only mercury, which was detected in 29 of 30 samples, was included in the porewater PCA model. One-half the detection limit was substituted for any non-detects.

- Total (2,4' and 4,4') DDx was used to represent all DDx isomers and was fully detected in porewater. Among chlordane chemicals, alpha- and gamma-chlordane were fully detected, with concentrations as much as 10 times greater than other chlordane chemicals; therefore, total alpha + gamma chlordane was used to represent chlordane chemicals. Hexachlorobenzene and dieldrin, both fully detected in porewater, were also included in the PCA.
- Semivolatile organic compounds and petroleum hydrocarbons were not analyzed in porewater.

Table A-27 provides the correlation matrix of the natural logarithm transformed porewater concentrations for the nine chemicals and the eigenvalues. PC1 explains 51% of the variance, and the first three PCs explain a total of 80% of the variance of the sediment chemistry dataset (Table A-27; Figure A-26). All remaining PCs have eigenvalues less than 1. All but mercury and total alpha + gamma chlordane are correlated to PC1. PC2, explaining 19% of the variance, is correlated with mercury and total alpha + gamma chlordane. PC3, explaining 10% of the variance, is correlated with mercury and PAHs. While PC1 explains most of the variance in overall chemical concentrations, PC2 and PC3 explain some relative differences in concentrations among the chemical groups.

Based on the PCA, three factors were evaluated for porewater (Figure A-27) using varimax rotation, with the objective of having chemicals strongly load (i.e., be correlated with) a single factor and no other factors. However, this was not achieved for the porewater chemistry dataset. Total PCB congeners, 2,3,7,8-TCDD, hexachlorobenzene, and dieldrin are most strongly correlated with Factor 1 (45% of the variance). PAHs are most strongly correlated to Factor 2 (35% of the variance), and mercury is most strongly correlated with Factor 3 (20% of the variance). Total DDx and alpha + gamma chlordane are correlated with all factors; although, in opposite directions in Factors 2 and 3. Total DDx is positively correlated to Factor 2 and negatively correlated to Factor 3, while the opposite is observed for alpha + gamma chlordane.

3.2.6.1 Porewater Dose Response Models

Both porewater PCs (Table A-28) and porewater factors (Table A-29) were evaluated in dose response modeling of porewater chemistry and toxicity. The modeling methods were the same as those described in Section 3.2.5 for sediment. Only PCs and factors were tested as predictors for toxicity. PC1 (and no other PCs) is significantly and positively associated with 10-day mortality (Table A-28; Figure A-28), 28-day mortality (Table A-28; Figure A-29), and growth (Table A-28; Figure A-30). Reproduction was not significantly associated with any PCs (Table A-28; Figure A-31).

Both Factors 1 (pesticides, PCBs, and 2,3,7,8-TCDD) and 2 (PAHs and DDx) were significantly and positively associated with 10-day mortality (Table A-29; Figures A-32a and A-32b); however, combining them in one model resulted in unstable parameter estimates. This indicates that both factors may be giving similar or redundant information, which makes sense given that both of the two acutely toxic stations, Stations 151 and 154, have relatively high scores on both factors. Therefore, the chemicals (or some subset of them) associated with PC1 and both Factors 1 and 2 (i.e., all except mercury and total alpha + gamma chlordane) are potentially contributing to the observed acute toxicity. Factors 1, 2, and 3

(mercury) were significantly and positively associated with 28-day mortality (Table A-29; Figure A-33), again indicating a multiple chemical effect. Factor 2 (PAHs and DDx) is significantly and negatively correlated with growth (Table A-29; Figure A-34a). When added to the model, Factor 1 improved the adjusted R^2 but was not significant (p=0.06). Despite lack of significance, the improvement in the R^2 value suggests that Factor 1 may also be negatively predictive of growth after controlling for Factor 2 (Table A-29; Figure A-34b).

Porewater PCs were also evaluated as predictors of BIC metrics (Table A-30) and were not found to be significant predictors of any BIC metrics.

3.3 Community Ordination

Benthic metrics are useful indicators of BIC health, but some information is lost in the analysis of metrics only. Therefore, community ordination was also evaluated with respect to sediment chemistry. Ordination refers to a variety of techniques used to arrange benthic samples in relation to one or more coordinate axes and to each other to provide information about their ecological similarities. Community abundance data collected over environmental gradients are typically non-linear and are better suited to non-linear methods of analysis, such as non-metric multidimensional scaling (NMDS) of a Bray-Curtis Dissimilarity Matrix (Ludwig and Reynolds 1988). Like PCA, NMDS is a method used to reduce the dimensionality of the community data, the result of which is that each BIC sample can be scored in the new smaller coordinate space. These scores can be plotted on graphs where samples near each other are judged more similar than those further away on the graph. Spatial patterns may be discernible if the BIC varies based on geographic or geomorphic location. The resulting dimensions can be regressed against other variables, such as individual chemicals, PCs, or factors, to evaluate the effects of stressors on changes in community structure.

Figures A-35a through A35e illustrate the results of the NMDS evaluation. Goodness of fit criteria indicate that the community structure can be represented in two dimensions (Figures A-35a and A-35b). The space between samples can be thought of as distances that increase with dissimilarity. For example, Stations 148 and 160 have no species in common and exhibit the maximum distance between any two stations on the graph. In this type of analysis, the dimensions are not always easily interpretable; however, dimension 2 is correlated with the number of taxa. There are no obvious geographical trends (Figure A-35a). Other spatial trends, based on geomorphic unit or USEPA Subunit, were also not apparent (Figure A-35c). Linear egression modeling was conducted to determine if the sediment chemistry PC1 was a predictor of community structure (Figure A-35d). There is no significant relationship between PC1 and dimension 1 (p=0.26) nor between PC1 and dimension 2 (p=0.38). It might appear from the graph (Figure A-35d; right graph) that a relationship between PC1 and dimension 2 would be more apparent if the two toxic stations (Stations 151 and 154) were removed from the analysis; however, the p-value of this model is still not significant (p=0.09). Other predictors for BIC dimensions were tested: PC2, PC3, TOC, and percent fines (Table A-31). The only finding was that percent fines (Figure A-35e) is a significant predictor for dimension 2 (p=0.004; R^2 = 0.26), which is not surprising given that percent fines was also the best predictor for the number of taxa.

In summary, there is no evidence of geographic spatial patterns among the benthic community structure and no apparent relationship to sediment chemistry. Sediment grain size is the best predictor of patterns in community structure.

3.4 Historical Data Evaluation

In 1993 to 1994, 1998, 2003, 2008, and 2013, USEPA, under REMAP, collected co-located sediment, toxicity (i.e., 10-day *Ampelisca abdita* survival bioassay), and BIC samples at 140 random locations in the area referred to as the Newark Bay sub-basin, which, in addition to the Bay, included stations in the Arthur Kill, Lower Passaic River, and Hackensack River (Adams 2016; USEPA 2003a). A total of 28 locations were sampled within the Newark Bay sub-basin each year of the study, and between 11 and 18 stations (sampling year dependent) were located within the NBSA boundary. See Figure 2-2 of the main BERA document for a map of the locations. Attachment 5 provides the chemistry (Table A-5-1) toxicity (Table A-5-2) and BIC data (Table A-5-3).

Table A-32 presents a Spearman correlation matrix of sediment concentrations versus survival and BIC metrics for the NBSA samples in each REMAP study. Negative correlations indicate that a chemical concentration is associated with a decrease in the metric. All metrics except proportion tolerant species are expected to decrease with degradation. The proportion tolerant species are expected to increase with degradation. Similar relationships are apparent in the REMAP data as was seen in the 2015 SQT data. For example, metals (including simultaneously extracted metals), pesticides (e.g., total DDx, chlordanes, hexachlorobenzene) and PCBs are negatively correlated (positively for proportion tolerant) with amphipod survival and BIC metrics. PAHs are negatively correlated with survival in the 1998 study but in general, associations with PAHs in sediment are not strong. This was similar to the 2015 SQT data where sediment correlations with PAHs were not strong; however, there was a stronger association with PAHs in the SQT porewater samples and toxicity and BIC metrics. The dioxin congener, 2,3,7,8-TCDD, was negatively correlated with survival in the 2003 study, but not the two other studies for which dioxins and furans were measured.

In earlier studies conducted by NOAA in two phases within the Hudson-Raritan estuary, which includes Newark Bay, 10-day *Ampelisca abdita* survival was also found to be correlated with several different chemical classes. In Phase 1 (1991), survival was significantly, negatively, and strongly correlated with PAHs. This relationship was attributed to high toxicity and PAH concentrations in samples from the East River, New York. In Phase 2 (1993) which was focused on Newark Bay and its tributaries, survival was significantly negatively correlated with PCBs, pesticides (total DDx, chlordanes, dieldrin, hexachlorobenzene), dioxins, and metals, a finding consistent with the findings for the 2015 SQT samples.

In general, these historical studies have demonstrated a decline in the probability of toxicity in the NBSA over time. Amphipod survival for the Phase 2 NOAA study and the REMAP studies are depicted on Figure A-36. In the NOAA study, 30 of 34 samples (88%) collected in the NBSA had survival less than 80% of control. In subsequent studies, the percentage of toxic samples (defined as less than 80% of control survival) was 22% (REMAP 1993/94), 54% (REMAP 1998), 9% (REMAP 2003), 9% (REMAP 2008), and 0% (REMAP 2013). In the current study, 10-day *L. plumulosus* survival less than 80% of control was seen in 2 out of 30 samples (7%). The decline in toxicity coincides with improved indicators of the health of the BIC in these studies as described in Section 2.3.1 of the main BERA document.

3.5 Summary

The statistical analysis and quantitative effects assessment demonstrated the following conclusions.

Acute toxicity is significantly correlated with chemical concentrations in sediment and porewater. The PCA evaluations demonstrated that measures of overall chemical concentrations, as represented by the first PC in both the sediment and porewater PCA, are significantly correlated with 10-day *L. plumulosus* mortality and, based on this relationship, areas where acute toxicity might occur can be reasonably predicted based on the Phase III sediment chemistry PCA model (Figure A-14). The factor analyses demonstrated that toxicity is associated with a mixture of multiple chemicals: metals, pesticides, PCBs, PAHs, and dioxins/furans. No single chemical or chemical group in the evaluation was shown to be unrelated to toxicity. It is important to note that, because of the high correlation among chemical concentrations, these findings cannot prove that all individual chemicals evaluated are causing toxicity. Acute toxicity was only observed at two of the 30 SQT stations in the NBSA. Those two stations (151 and 154) happened to have the highest concentrations in both sediment and porewater of most chemicals, including those chemicals incorporated in the multivariate analysis (Table A-18).

Chronic toxicity is also significantly correlated with chemical concentrations in sediment and porewater, as demonstrated by the PCA models. And similarly factor analysis demonstrated that toxicity is associated with a mixture of multiple chemicals: metals, pesticides, PCBs, PAHs, and dioxins/furans. Based on models of 28-day mortality, areas where chronic toxicity could potentially occur can be reasonably predicted based on the Phase III sediment chemistry (Figure A-17).

For chronic sublethal endpoints, growth, but not reproduction, is significantly negatively correlated with chemical concentrations; although there is significant variability in the sublethal responses.

With the exception of density, none of the BIC metrics or community ordination measures were significantly correlated with chemical concentrations. PC1 is a significant predictor of density ($p=0.026$; $R^2 = 0.17$); however, because density can either increase or decrease as a result of degradation (Weisberg et al.1998), this relationship is not evidence of chemical impact to the BIC.

Similar patterns of correlation between toxicity and sediment chemistry are seen in the historical SQT data from the NBSA.

4 SUMMARY OF SQT LINES OF EVIDENCE

Table A-33 summarizes the SQT LOEs based on the individual evaluations of BIC, toxicity, and sediment and porewater data and the statistical evaluations. The dose response modeling and comparisons to Jamaica Bay reference indicate that there is no apparent impact to the BIC due to chemical stressors. Multivariate analyses indicate that acute and chronic toxicity is associated with chemical mixtures in sediment and porewater. Toxicity occurred in samples with elevated concentrations of multiple chemicals: dioxins/furans; PCBs; pesticides (particularly total DDx, dieldrin, chlordane, and hexachlorobenzene); PAHs (both parent an alkylated); petroleum hydrocarbons; and most inorganics (e.g., arsenic, cadmium, chromium, copper, lead, mercury, and zinc). Areas where the dose response models predict potential toxicity are of limited extent in the NBSA and are primarily located in the southwestern subtidal flat and in a smaller area in the north in the vicinity of historically disturbed sediments.

4.1 Uncertainties

There are several uncertainties associated with this SQT assessment related to the following issues: weighting and scoring in the SQT evaluation, estimation of porewater concentrations, prediction of acute toxicity, variability in chronic toxicity endpoints, reference comparisons and the representativeness of the 30 SQT samples. These are each discussed in the following paragraphs.

The scoring in the SQT evaluation used equal weights for each category of the triad: BIC, toxicity, and sediment chemistry. Alternative scoring methods have been proposed in the literature that give less weight to data with more uncertainty, in particular, to the sediment chemistry category, because it is generally based on a comparison to screening values (i.e., T20/T50 and ERL/ERM) that have not been demonstrated to accurately predict toxicity as they were derived from field sediments with chemical mixtures. In this assessment, the sediment chemistry score is based on an equal weighting of sediment and porewater chemistry. While the sediment chemistry portion of the score is based on a comparison to screening values, the porewater chemistry portion of the score is based on exceedances of promulgated WQC, which may be a better indicator of exposure and potential impact for benthic communities. Therefore, to assess this uncertainty, the scoring was recalculated to give porewater chemistry the full weight of the sediment chemistry category score (i.e., sediment chemistry is ignored in the scoring). The result of the scoring change is that seven of the low impact stations become no impact stations for a total of 17 no impact stations. The two stations categorized as medium impact (Stations 151 and 154) remain so. The remaining 11 stations keep their low impact classification (Table A-6-1 of Attachment A-6). This alternative scoring is perhaps a better characterization of risk given the paucity of observed impacts to BIC and the low levels of observed acute toxicity. Another alternative scoring scenario was evaluated that assigned a score of 1 to any survival value less than 80% of control survival (Table A-6-2 of Attachment A-6), regardless of statistical significance. This was evaluated due to the fact that variability in the replicate data could result in MDDs that would not identify samples as toxic when survival is less than 80% of control (see Attachment A-2 for estimates of MDDs for each endpoint). The outcome of this scoring is 9 no impact stations and 19 low impact stations. The medium impact stations maintain their categorization.

While it is expected that porewater concentrations would provide better information about exposure, it is important to note the uncertainty in the measurement of porewater chemistry. Concentrations of organic compounds in porewater were obtained by ex-situ exposure of PE and POM passive samplers to sediments in a laboratory-controlled setting. PE passive samplers loaded with PRCs were used to determine the freely dissolved porewater concentrations of PCBs, PAHs, and pesticides. POM passive samplers (without PRCs) were used to measure freely dissolved concentrations of dioxins and furans. Following exposure to sediment, the PE and POM samplers were transferred to the analytical laboratories where the target organic compounds were extracted in solvent (acetone/hexane [1:1 by volume]) and the concentrations in final extracts were measured. Porewater concentrations were estimated using the laboratory-reported concentrations in the PE/POM extracts as described by Ghosh (2014). A simple mass balance calculation is used to convert extract concentrations to concentrations within the PE/POM. The porewater concentration is estimated as the ratio of the PE/POM concentration and a literature-derived K_{PS}. The PRCs were used to assess the extent of equilibrium achieved during the period that the samplers were in contact with the sediment. Some of the strongly hydrophobic compounds, in particular, the higher chlorinated PCB congeners, did not achieve equilibrium during the period of contact, and a mathematical correction was performed to calculate the true equilibrium concentrations (Fernandez et al. 2009). Uncertainty in the porewater concentrations arises from the fact that the source of the K_{PS} values are regression relationships derived in other experiments with these samplers (Ghosh 2014; Choi et al. 2013; Fernandez 2012; Cornelissen et al. 2008). Another source of uncertainty for the dioxin/furan concentrations is that PRCs were not used in the POM samplers and, therefore, no equilibrium corrections were made. There is a possibility that the dioxin/furan concentrations are biased low; however, if non-equilibrium occurred, it is more of a concern for the higher-chlorinated dioxin/furan congeners that have much lower toxicity equivalent factors compared to, for example, 2,3,7,8-TCDD. For PCBs, non-equilibrium occurred infrequently and only among the higher-chlorinated congeners (i.e., hexa-, hepta-, octa-, nona-, and deca-chlorinated congeners).

The uncertainty of K_{PS} values used in this SQT assessment is further described in the USEPA's passive sampling user's manual (USEPA/SERDP/ESTCP 2017). Estimated values of K_{PS} are expected to be accurate within 0.3 log units (i.e., a factor of 2) even for highly hydrophobic compounds. The resulting error is similar to other environmental partition coefficients. Therefore, porewater concentrations could be as much as two times greater or lower than the calculated values presented here. As an uncertainty analysis, porewater concentrations for organic chemicals were doubled and then compared to the acute and chronic values presented in Table A-11. The chronic exceedance counts increased for PCBs and DDx beyond that shown in Table A-12. For PCBs, doubling the concentrations resulted in five additional samples exceeding the chronic criteria for a total of eight out of 30. For total DDx, doubling the concentrations resulted in 15 additional samples exceeding the chronic criteria for a total of 29 out of 30. The doubling also resulted in one sample (i.e., station 154) exceeding the chronic freshwater SQuiRT value for 2,3,7,8-TCDD (Table A-11) since the estimated value changed of 9.35 picograms per liter (pg/L) exceeds 10 pg/L when doubled. No additional acute exceedances resulted from the doubling. The PAH SumTU values shown in Table A-14 can also be doubled to evaluate the uncertainty. Doubling results in one additional sample (i.e., station 151) with a PAH SumTU that exceeds 1.

Modeling of acute toxicity indicated a strong association between sediment and porewater chemistry and 10-day survival. Because there were only two stations that exhibited toxicity, there is uncertainty that the relationship is real or could have happened by chance. However, a review of the historical data shows a

clear relationship between 10-day *A. abdita* survival and sediment chemistry in the NBSA (see Section 3.4); therefore, it is very likely that the same relationship exists with *L. plumulosus* as both organisms have demonstrated ability to identify toxic sediments (Schlekat et al. 1995). There is also uncertainty in the model fitting because all but two stations had very high survival. The PC1 scores of the toxic stations, 151 and 154, are 7.3 and 5.6, respectively. The next highest PC1 score for the non-toxic samples is 3.52. There are four non-toxic stations with PC1 scores that exceed 3; therefore, it is clear that the threshold for acute toxicity is somewhere between 3.5 and 5.6. The sediment model predicts toxicity at PC1 scores exceeding 5 and identified 21 Phase III locations as potentially acutely toxic. If the true PC1 score threshold for toxicity were lower, for example, 4, then an additional 13 Phase III locations would also be classified as potentially acutely toxic for a total of 34, 13.4% of all samples. If the true PC1 score threshold for toxicity was 3.6, then an additional 16 Phase III locations would also be classified as potentially acutely toxic for a total of 37, 14.6% of Phase III samples.

There is uncertainty associated with the results of toxicity tests. Endpoint response to sediments is not necessarily indicative of contaminant effects (Kennedy et al. 2009). A reduction in endpoint values (i.e., survival, growth, number of young) compared to control could be caused by other factors, including inherent random variability that could affect both the tested samples and/or the control samples. The 10-day acute toxicity tests have control acceptability criteria that require >90% survival; therefore, control variability is tightly controlled in these tests. Nonetheless, clean reference samples have been shown to exhibit 10-day *L. plumulosus* survival less than control (Kennedy et al. 2009).

The 28-day tests are subject to more variability. In an interlaboratory comparison, Kennedy et al. (2009) found greater inconsistency among chronic endpoints as compared to acute testing results. For 28-day survival, Kennedy et al. (2009) and Eickhoff et al. (2014) found fairly low variability among laboratory control samples: within replicates, CVs ranged from 2 to 11%. However, among test sediments, toxicity classifications differed among duplicate testing results (Kennedy et al. 2009). For example, a sediment sample from Newark Bay that was tested three different times exhibited 28-day survival significantly less than control (i.e., toxic) in the first test and comparable to control in subsequent tests (i.e., non-toxic). A clean reference sample exhibited 28-day survival of 60%, which would result in classification as toxic.

The sublethal endpoints are subject to considerably more variability in both control and test sediments. There are no control acceptability requirements that control variability in these endpoints. Eickhoff et al. (2014) subjected five control sediments to 28-day tests with *L. plumulosus* and found that the growth and reproduction endpoints were more variable both among control samples and within batch replicates. Mean growth in control samples ranged from 0.7 to 1.8 milligrams per organism (0.025 to 0.064 mg/organism/day), and the mean CV among replicates was 30%. Reproduction had a 10-fold range within control sediments (0.8 to 8.4 juveniles per surviving adult), and the mean CV among replicates was 79%. Kennedy et al. (2009) found significant variability in control sediment for growth (CV = 56%) and reproduction (CV = 63%) as well as significant variability in an interlaboratory comparison of the growth and reproduction endpoints. *L. plumulosus* reproduction is known to be highly dependent on grain size (McDonald et al. 2010). This variability leads to uncertainty in the interpretation of these chronic tests.

Variability in the sublethal endpoints was also demonstrated in split sample testing conducted by the USEPA on a subset of three SQT samples (USEPA 2017b). Growth was found to be significantly different than control in samples from Stations 144, 156, and 157 (Table A-7). However, the split results indicated growth greater than control for these same sediments. This inconsistency is not unlike what has been

documented in the literature and confirms the inherent uncertainty in the interpretation of sublethal endpoints.

For the BIC comparisons to reference, there is uncertainty due to the difference in sampling depths, 2 cm for Jamaica Bay and 6 inches in the NBSA, which may cause differences in abundance and richness in the samples. Both programs incorporated three grab samples per location for taxa enumeration. In both programs, BIC samples were sieved with a 0.5 millimeter sieve.

There is uncertainty regarding the incorporation of the 2013 REMAP data from Jamaica Bay into the reference dataset. As noted in Section 2.3.1 of the BERA, there was a significant decline in the BIC metrics when 2013 REMAP data are compared to 2008 REMAP data (and prior) in the NBSA. This same pattern was also observed in Jamaica Bay. This decline affected only BIC measures, as there was no change in the incidence of toxicity. The mean chemical concentrations presented in Attachment A-1 (Table A-1-5) are similar between the two programs. It is not known why this apparent decline in BIC occurred; however, given it was observed in both estuaries, it is due to either of two possibilities: 1) a change in sampling methodology (unlikely, due to REMAP using similar methods since 1993); or 2) changes caused by a regional event. In fact, the 2013 samples were collected after a significant meteorological event called Hurricane Sandy occurred in October 2012. It is possible the storm affected the BIC. In the NBSA, these effects, if real, were short-lived, because the 2015 dataset indicated a full recovery. There are currently no available data to infer whether the BIC has rebounded in Jamaica Bay since 2013. To evaluate this uncertainty, the 2013 REMAP data were removed from the Jamaica Bay reference dataset and the reference envelope was recalculated. The recalculated values can be found in Table A-1-1. The change in the reference envelope had no impact on the scoring of the NBSA BIC data. The 5th and 95th percentiles did not change significantly enough to make a difference. All NBSA BIC metrics are within the reference envelope either way except for abundance at station 148 as noted when the entire data set is used. The removal of the 2013 data had no impact on the evaluation. There were no additional exceedances of the reference envelope nor changes in SQT scoring, and the hypothesis testing results were similar in that there was no indication the NBSA had lower mean BIC values than Jamaica Bay.

There is uncertainty regarding whether the 30 SQT stations are representative of the larger Phase III surface sediment data sets. This was evaluated in two ways, first, by comparing summary statistics of selected chemicals for the 30 SQT stations and the remaining Phase III samples (Table A-3-3 of Attachment A-3). Mean concentrations are similar for the SQT samples and the remaining samples. For example, the mean 2,3,7,8-TCDD concentration in SQT samples is 91.3 nanograms per kilogram (ng/kg) while for the remaining Phase III samples, it is 86.6 ng/kg. Other chemical concentrations compare similarly. The mean SQT versus remaining samples are as follows respectively, total PCB congeners (588 micrograms per kilogram [µg/kg], 465 µg/kg), total 2,4'- and 4,4'-DDx (98.7 µg/kg, 135 µg/kg), total PAHs (13,000 µg/kg, 12,000 µg/kg), and mercury (1.92 milligrams per kilogram [mg/kg], 2.4 mg/kg). The mean and median concentrations for other chemicals are also similar as well. The mean percent fines for the SQT samples (60.3%) is higher than for remaining Phase III data (55.5%) and mean TOC for the SQT data (40,100 mg/kg) is also higher than for the remaining data (21,400 mg/kg). This could be due in part to the finer grained samples in the SQT data set. In addition, an extreme outlier for TOC (151,000 mg/kg) occurs in the SQT data set (Station 154). With the outlier excluded, the mean TOC in the SQT data set is 36,300 mg/kg. Higher TOC may decrease the bioavailability of organic compounds. The data sets were also compared visually by plotting the principal component scores color-coded by sampling program

(Figure A-9b). The spatial pattern shown on the graph indicates that the SQT samples have a similar range and chemical composition as the remaining sediment samples. These evaluations indicate that the SQT samples are representative of the full Phase III data set and the NBSA surface sediments.

In comments to the draft BERA, the USEPA provided analyses of alternative methods of conducting PCA and multivariate analyses. These analyses are found in Attachment A-7. The analyses conducted by USEPA support the PCA approach for multivariate analyses and dose response modeling presented in this BERA as discussed in the following paragraphs.

The USEPA conducted PCA on data transformed by the “row sum of 1” transformation such that each variable represents a mass fraction of a contaminant rather than an absolute concentration. These analyses are presented in Figures 1 through 6 of Attachment A-7. Based on these analyses, the USEPA concluded “the PCA on mass fraction using the “on Correlations” method is useful to identify sources or to fingerprint and seems to reveal some structure in the data and relationships among variables, but not to identify risks associated with exposures to contaminants”.

The USEPA conducted PCA on the SQT data only (Figures 7 and 8 of Attachment A-7) and incorporated some additional pesticides (i.e., BHC and other chlordane summations) and TOC to the analysis. The results are similar to those presented in this BERA demonstrating that the PCA model is relatively insensitive to different data and variable combinations.

The USEPA conducted PCA on other subsets of the Phase III data set and also incorporated historical data (Figures 9 and 10 of Attachment A-7). The results show similar relationships as were found in the PCA presented in this BERA; specifically, the first principal component is correlated with both 10- and 28-day amphipod survival. For example, compare Figure 10 of Attachment 7 to Figure A-12 (left panel) and Figure A-15 (left panel). Again, this demonstrates that the PCA model is relatively insensitive to different data and variable combinations.

Finally, the USEPA used a simpler method than PCA for a multivariate analysis. Recognizing that PC1, in describing the largest variance, is somewhat similar to an average of the standardized chemicals, the sum of the standardized concentrations of 18 chemicals (i.e., the 18 chemicals listed in Attachment A-7 for historical data) was plotted against survival (Figure 11 of Attachment A-7) demonstrating a similar relationship as was shown in the BERA for PC1. For example, compare Figure 11 of Attachment A-7 to Figure A-12 (left panel) and Figure A-15 (left panel). Figure 12 of Attachment A-7 shows areas where the sum of standardized concentrations exceeds 5. These areas are similar to the areas for which toxicity was predicted by the PCA model (Figures A-14 and A-17). Figure 11 of Attachment A-7 also shows the historical REMAP data collected in 2003 and 2013. A similar analysis of the earlier REMAP data collected in 1993/94 and 1998 is shown in Figure A-37 indicating that there has been a relationship between sediment chemistry and 10-day amphipod survival in the NBSA historically.

5 REFERENCES

Adams, D. 2016. Overview of EPA Sediment Monitoring Activities. Presentation at the New Jersey Water Council Meeting. September 26.

Akaike, H. 1981. Likelihood of a model and information criteria. *J Econom* 16:3-14.

American Public Health Association, American Water Works Association, and Water Pollution Control Federation. 1980. Standard for Methods for the Examination of Water and Wastewater. Fifteenth Edition. Washington, D.C.

ASTM International. 2008. E-1267-03. Standard Guide for Measuring the Toxicity of Sediment-Associated Contaminants with Marine and Estuarine Amphipods.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. Office of Response and Restoration Division. Seattle, Washington. 34p.

Choi, Y., Y-M Cho, and R.G. Luthy. 2013. Polyethylene−water partitioning coefficients for parent- and alkylated-polycyclic aromatic hydrocarbons and polychlorinated biphenyls. *Environ Sci Technol* 47:6943-6950.

Cornelissen, G., I.T. Cousins, K. Wiberg, M. Tysklind, H. Holmström, and D. Broman. 2008. Black carbon-dominated PCDD/Fs sorption to soils at a former wood impregnation site. *Chemosphere* 72(10):1455-1461.

Eickhoff, C., M. Grey, J. Pickard, S. Reimer, and D. MacDonald. 2014. The Co-dependency of Growth and Reproduction: A Closer Look at the 28 day *Leptocheirus plumulosus* Survival, Growth and Reproduction Test. A presentation at the Society of Environmental Toxicology and Chemistry Annual Meeting, Vancouver, British Columbia, Canada. November.

Fernandez, L.A., C.F. Harvey, and P.M. Gschwend. 2009. Using performance reference compounds in polyethylene passive samplers to deduce sediment porewater concentrations for numerous target chemicals. *Environ Sci Technol* 43:8888-8894.

Fernandez, L.A., W. Lao, K.A. Maruya, C. White, and R.M. Burgess. 2012. Passive sampling to measure baseline dissolved persistent organic pollutant concentrations in the water column of the Palos Verdes Shelf Superfund site. *Environ Sci Technol* 46 (21):11937-11947.

Fernandez, L.A., W. Lao, K.A. Maruya, and R.M. Burgess. 2014. Calculating the diffusive flux of persistent organic pollutants between sediments and the water column on the Palos Verdes Shelf Superfund Site using polymeric passive samplers. *Environ Sci Technol* 48(7):3925-3934.

Ghosh, U., S.K. Driscoll, R.M. Burgess, M.T.O. Jonker, D. Reible, F. Gobas, Y. Choi, S.E. Apitz, K.A. Maruya, W.R. Gala, M. Mortimer, and C. Beegan. 2014. Passive sampling methods for contaminated sediments: practical guidance for selection, calibration, and implementation. *Integr Environ Assess Manag* DOI:10.1002/ieam. 1507.

GSH. 2017a. Newark Bay Study Area Sediment Quality Triad and Porewater Field Report. Revision 1. September.

GSH. 2017b. Newark Bay Study Area Sediment Quality Triad and Porewater Data Report, Revision 2. September.

Hobbs, W., J. Weakland, and C. Eickhoff, 2018. Environmental Effects-Based Concentrations for Total Petroleum Hydrocarbons (TPH): Toxicity in Marine Water and Freshwater. Washington State Department of Ecology. Olympia, Washington. Publication No. 18-03-002.

Jackson, E.J. 1991. A User's Guide to Principal Components. John Wiley & Sons, Inc.

Kennedy, A.J., J.A. Steevens, G.R. Lotufo, and T.S. Bridges. 2009. A comparison of acute and chronic toxicity methods for marine sediments. *Mar Environ Res* 68(3):118-127.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environ Manag* 19:81-97.

Long, E.R., C.G. Ingersoll and D.D. MacDonald. 2006. Calculation and uses of mean sediment quality guideline quotients: A critical review. *Environ Sci Technol* 40:1726-1736.

Ludwig, J.A. and J.F. Reynolds. 1988. Statistical Ecology: A Primer on Methods and Computing. John Wiley and Sons, New York.

McDonald, B.G., C.A. McPherson, R. DeWynter, P. Kickham, and C. Brown. 2010. Incorporation of 28-d *Leptocheirus plumulosus* toxicity data in a sediment weight-of-evidence framework. *Ecotox Environ Safe* 73:51-55.

NJDEP. 2016. New Jersey Administrative Code 7:9B Surface Water Quality Standards. October 17.

NOAA, 1995. Magnitude and Extent of Sediment Toxicity in the Hudson-Raritan Estuary. Technical Memorandum NOS ORCA 88. National Status and Trends Program for Marine Environmental Quality. National Ocean Service. Office of Ocean Resources Conservation and Assessment. Coastal Monitoring and Bioeffects Assessment Division. Silver Spring, Maryland.

Pielou, E.C. 1966. The measurement of diversity in different types of biological collections. *J Theor Biol* 13:131-144.

Schlekat, C.E., K.J. Scott, R.C. Swartz, B. Albrecht, L. Antrim, K. Doe, S. Douglas, J.A. Ferretti, D.J. Hansen, D.W. Moore, C. Mueller, and A. Tang. 1995. Interlaboratory comparison of a 10-day sediment toxicity test method using *Ampelisca abdita*, *Eohaustorius estuarius* and *Leptocheirus plumulosus*. *Environ Toxicol Chem* 14:2163-2174.

Shannon, C.E. 1948. A mathematical theory of communication. *Bell Systems Technical Journal* 27(July and October):379-423 and 623-656.

Swartz, R.C., D.W. Schultz, G.R. Ditsworth, W.A. DeBen, and F.A. Cole. 1985. Sediment Toxicity, Contamination, and Macrobenthic Communities Near a Large Sewage Outfall. In: Boyle T.T., Ed., Validation and Predictability of Laboratory Methods for Assessing the Fate and Effects of Contaminants in Aquatic Ecosystems. STP 865. American Society for Testing and Materials. Philadelphia, Pennsylvania. pp 152-175.

Tierra. 2015. Newark Bay Study Area Sediment Quality Triad and Porewater Sampling and Analysis, Quality Assurance Project Plan, Revision 2. August.

USEPA. 1994. Methods for Assessing the Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods. EPA/600/R-94/025.

USEPA. 2001. Method for Assessing the Chronic Toxicity of Marine and Estuarine Sediment-Associated Contaminants with the Amphipod *Leptocheirus plumulosus*. EPA 600/R-01/020. Office of Research and Development Western Ecology Division. Newport, OR.

USEPA. 2003a. Sediment Quality of the NY/NJ Harbor System: A 5-year Revisit (1993/1994 to 1998). EPA/902-R-03-002. Region II. Edison, New Jersey.

USEPA. 2003b. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Endrin. EPA-600-R-02-009. Office of Research and Development. Washington, D.C.

USEPA. 2003c. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Office of Research and Development. Washington, DC, USA.

USEPA. 2005a. Predicting Toxicity to Amphipods from Sediment Chemistry. EPA/600/R-04/030. National Center for Environmental Assessment. Washington, D.C.

USEPA. 2005b. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver and Zinc). EPA-600-R-02-011. Office of Research and Development. Washington, D.C.

USEPA 2017a. Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Non-ionic Organic Contaminants. EPA/600/R. Office of Research and Development. Washington, DC, USA.

USEPA. 2017b. Correspondence. Final Oversight Report: 2014-2016 Softshell Clam, Blue Crab, and Fish Oversight; 2015 Sediment Quality Triad Oversight; Newark Bay Study Area RI/FS Oversight. Prepared by Louis Berger. June 30, 2017.

USEPA/SERDP/ESTCP. 2017. Laboratory, Field, and Analytical Procedures for Using Passive Sampling in the Evaluation of Contaminated Sediments: User's Manual. EPA/600/R-16/357. Office of Research and Development, Washington, DC. https://www.epa.gov/superfund/superfund-contaminated-sediments-guidance-documents-fact-sheets-and-policies.

USEPA and USACE. 1998. Evaluation of Material Proposed for Discharge to Waters of the US – Testing Manual (Inland Testing Manual). EPA/823/B-98/004. Washington, D.C.

Weisberg, S.B., J.A. Ranasinghe, J.S. O'Connor, and D.A. Adams. 1998. A Benthic Index of Biotic Integrity (B-IBI) for the New York/New Jersey Harbor. Appendix C In: Adams, D.A., J.S. O'Connor, and S.B. Weisberg, Sediment Quality of the NY/NJ Harbor System. EPA/902-R-98-001. Region II. Edison, New Jersey.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment, Final. June 17.

TABLES



Table A-1
Benthic Invertebrate Community Data

Taxon	Mean Density (no./m²) at Sample Station																													
	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
Cnidaria																														
Actinaria																														
Actiniaria																							12.8							
Diadumene leucolena																							6.4							
Platyhelminthes																														
Polycladida																														
Stylochus ellipticus											12.8										14.5									
Nemertea																														
Tubulanidae																														
Tubulanus pellucidus											6.4	14.5						14.5					6.4				14.5			
Lineidae																														
Lineidae																			6.4											
Hoplonemertea A																														
Amphiporus bioculatus	14.5	29.0			29.0		6.4	29.0			6.4				29.0			43.5	6.4				38.5			29.0			115.9	
Annelida																														
Polychaeta																														
Lepidonotus sublevis											12.8																			
Hypereteone heteropoda	101.4	29.0	58.0	14.5	43.5		685.9	115.9		246.4	83.3	14.5		25.6	14.5	101.4	384.6	14.5	6.4	96.2			25.6		102.6	14.5			289.9	159.4
Paranaitis speciosa																							6.4							
Eumida sanguinea											51.3					14.5	19.2	29.0	6.4				32.1							
Gyptis vittata	14.5			14.5						14.5	19.2				43.5			29.0				29.0	32.1	12.8						29.0
Odontosyllis fulgurans																		43.5												
Streptosyllis websteri																	173.1													
Streptosyllis verrilli											6.4									12.8										
Salvatoria clavata																		14.5												
Nereididae					58.0																									
Neanthes arenaceodentata	14.5										6.4																			
Laeonereis culveri	14.5				942.0															25.6					346.2					
Alitta virens														6.4																
Alitta succinea					43.5		19.2	43.5			25.6						6.4	14.5	115.4				38.5		12.8					
Nephtys incisa																					14.5	14.5								
Nephtys sp													14.5																	
Glycera americana	14.5	115.9		159.4		58.0	6.4		14.5	115.9	76.9	43.5	43.5		29.0		57.7	202.9	57.7			58.0	109.0	25.6			72.5	115.9		58.0
Glycera dibranchiata																			6.4				6.4					14.5		
Glycera sp						14.5				14.5														6.4					58.0	
Goniadidae										14.5	12.8						6.4				29.0		76.9	19.2						
Glycinde solitaria			115.9	144.9		29.0	51.3	29.0	43.5	29.0	25.6				43.5		38.5	101.4			43.5		128.2	64.1			130.4	130.4		
Diopatra cuprea															43.5		51.3	43.5					6.4							
Schistomeringos annulata											12.8																			
Leitoscoloplos fragilis	275.4	376.8	579.7	391.3	173.9	492.8		14.5	115.9	1927.5		130.4	14.5		333.3	43.5	44.9	202.9	51.3	6.4		173.9		12.8		101.4	101.4	29.0		289.9
Leitoscoloplos sp	144.9	1913.0	1275.4	1710.1	869.6	724.6	121.8	768.1	14.5	420.3	692.3	768.1	188.4	179.5	304.3		801.3	362.3	160.3		434.8	391.3	461.5	589.7		87.0	391.3	971.0	347.8	681.2
Spionidae						14.5	115.4			14.5							19.2						6.4							
Polydora cornuta	58.0			29.0	14.5		57.7							25.6			6.4		12.8	12.8		14.5	32.1		70.5	14.5		72.5	58.0	
Prionospio sp																						29.0								
Spio filicornis							64.1				6.4						89.7			19.2										
Spiophanes bombyx																	6.4						6.4							
Pygospio elegans					14.5						6.4						25.6	14.5					38.5							
Streblospio benedicti	1884.1	1797.1	1159.4	840.6	1956.5	1289.9	1448.7	1550.7	159.4	3072.5	333.3	173.9		1000.0	347.8	710.1	2807.7	1652.2	102.6	916.7	14.5	29.0	2923.1	134.6	333.3	87.0	29.0		5391.3	2231.9
Scolelepis sp							51.3																							
Marenzelleria viridis					58.0		12.8													25.6										
Chaetopteridae																	6.4													
Spiochaetopterus costarum						14.5			43.5	29.0	25.6		14.5		14.5	14.5	25.6	202.9				14.5	25.6	102.6				29.0		
Cirratulidae		144.9						115.9			12.8	144.9		205.1	29.0	14.5	6.4	29.0		179.5			12.8			87.0			58.0	260.9
Tharyx acutus	14.5	87.0	58.0	72.5	14.5	115.9	6.4	115.9		87.0				230.8		14.5	12.8			525.6			51.3		6.4	130.4				898.6
Cossura longocirrata												14.5						14.5									14.5			
Capitella capitata				14.5			19.2	14.5								14.5			57.7											
Heteromastus filiformis	217.4		115.9					29.0		58.0	25.6	130.4					25.6					14.5	76.9	19.2				72.5		58.0
Mediomastus ambiseta	463.8	347.8	695.7	1594.2		217.4	750.0	797.1		1188.4	301.3	144.9		359.0	101.4	14.5	673.1	826.1	19.2	51.3	275.4	14.5	2589.7	435.9	96.2		58.0	942.0	173.9	434.8
Sabaco elongatus																		14.5												
Sabellaria vulgaris																			12.8				89.7							
Pectinaria gouldii		159.4	101.4	144.9		72.5	51.3	101.4	144.9	58.0	173.1	29.0	101.4	6.4	173.9	43.5		391.3	6.4		260.9	87.0	128.2	115.4			101.4	173.9	14.5	231.9
Ampharetidae					29.0																			6.4						
Ampharete sp											6.4																			
Ampharete oculata			115.9															14.5					25.6	44.9			14.5	29.0		
Parasabella microphthalma											6.4	14.5					12.8	43.5	38.5				25.6							
Oligochaeta																														
Oligochaeta	492.8	1420.3	811.6	376.8	87.0	115.9	653.8	739.1		347.8	102.6	478.3		1769.2	260.9	72.5	1128.2	87.0	32.1	25.6	188.4	58.0	942.3	121.8	109.0	1811.6	391.3	14.5	521.7	318.8

Table A-1
Benthic Invertebrate Community Data

Taxon	Mean Density (no./m²) at Sample Station																													
	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
Mollusca																														
Gastropoda																														
Spurwinkia salsa																										29.0				
Crepidula fornicata																	6.4		6.4											
Crepidula convexa																	6.4													
Crepidula sp											19.2												12.8							
Urosalpinx cinerea																		14.5												
Ilyanassa obsoleta		43.5			101.4		44.9	58.0		130.4				70.5	14.5	43.5	211.5		70.5	51.3	14.5				115.4	14.5			14.5	58.0
Odostomia eburnea																								6.4						
Boonea bisuturalis							6.4	14.5		14.5	6.4														51.3	29.0			14.5	29.0
Japonactaeon punctostriatus		14.5	231.9	72.5		29.0				43.5	57.7	14.5	14.5		43.5	14.5		29.0				29.0	12.8	12.8			14.5			
Acteocina canaliculata									14.5		19.2				43.5	14.5		43.5				29.0		12.8			14.5	14.5		
Haminoea solitaria		43.5	101.4	87.0				173.9	101.4	492.8	339.7		14.5		217.4	144.9	12.8	391.3	6.4	19.2		58.0	51.3						43.5
Bivalvia																														
Mulinia lateralis		72.5	72.5	58.0		58.0		14.5		130.4	83.3				87.0	43.5	38.5	101.4	6.4	6.4	275.4		19.2	64.1			43.5	58.0		14.5
Tellinidae											6.4														89.7					
Macoma balthica	420.3	43.5	14.5		594.2		12.8	29.0		14.5				166.7			19.2			115.4		58.0			859.0	87.0			550.7	130.4
Tellina agilis											12.8						12.8	14.5			14.5			12.8						
Mercenaria mercenaria										14.5	32.1					14.5	25.6	29.0		6.4			25.6							
Petricolaria pholadiformis							6.4	14.5			6.4												6.4							
Mya arenaria			115.9	304.3	14.5	217.4	25.6				51.3				14.5	231.9	25.6		12.8			29.0	2320.5	25.6	153.8			72.5	2521.7	
Lyonsia arenosa		14.5							29.0						43.5	14.5	12.8	58.0	38.5				64.1	6.4				29.0		
Lyonsia sp				14.5			6.4										6.4													
Arthropoda																														
Chelicerata																														
Limulus polyphemus																				6.4										
Crustacea																														
Eusarsiella zostericola		14.5		14.5							51.3							43.5	25.6				19.2							
Doropygus laticornis	260.9																		25.6											
Amphibalanus improvisus							12.8																							
Neomysis americana																					29.0									
Leucon americanus	87.0	14.5	43.5			14.5		14.5								29.0					144.9					29.0	14.5	14.5		753.6
Oxyurostylis smithi																					43.5							14.5		43.5
Cyathura burbancki					1449.3																				666.7				115.9	
Idoteidae																		14.5												
Synidotea laevidorsalis																										14.5				
Edotia triloba	14.5		14.5		72.5		115.4	29.0		14.5	12.8			25.6		14.5	32.1		12.8	12.8			6.4		96.2	14.5			58.0	43.5
Ampelisca abdita	347.8	956.5	202.9	144.9		217.4	6.4	87.0		144.9	6.4							58.0					83.3	121.8				43.5	173.9	1565.2
Ampithoe valida				14.5	14.5		205.1								14.5		89.7		64.1										101.4	
Microdeutopus gryllotalpa							3435.9	115.9		29.0				179.5			121.8	43.5	51.3											
Cerapus sp																					14.5									
Unciola serrata																							6.4					14.5		
Grandidierella japonica	1405.8	101.4	101.4	14.5	217.4	159.4	3237.2	855.1	29.0	173.9	25.6			2769.2	29.0	43.5	57.7	231.9	185.9	224.4		87.0	121.8		57.7	58.0		43.5	420.3	1391.3
Monocorophium acherusicum																			6.4										58.0	
Apocorophium acutum						14.5																								
Elasmopus levis																		29.0												
Gammarus mucronatus	87.0				29.0												38.5	14.5	38.5				25.6						43.5	
Gammarus sp																	12.8													
Melita nitida										29.0							19.2						6.4							
Haustorius canadensis	14.5																													
Ameroculodes edwardsi																	6.4													
Paracaprella tenuis																		43.5												
Crangon septemspinosa																										29.0				
Pagurus longicarpus																			12.8											
Dyspanopeus sayi																		14.5	38.5				12.8							
Urochordata																														
Stolidobranchia																														
Molgula manhattensis											6.4							14.5												
Total Mean Density (no./m²)	**6362.3**	**7739.1**	**5985.5**	**6231.9**	**6826.1**	**3869.6**	**11237.2**	**5869.6**	**710.1**	**8869.6**	**2788.5**	**2115.9**	**405.8**	**7019.2**	**2275.4**	**1666.7**	**7185.9**	**5594.2**	**1301.3**	**2339.7**	**1811.6**	**1217.4**	**10756.4**	**1974.4**	**3166.7**	**2666.7**	**1405.8**	**2898.6**	**11101.4**	**9724.6**
Total Taxa	**22**	**21**	**20**	**22**	**22**	**19**	**29**	**25**	**11**	**28**	**42**	**14**	**8**	**15**	**23**	**22**	**43**	**42**	**33**	**20**	**16**	**19**	**46**	**23**	**16**	**18**	**15**	**21**	**21**	**22**
Shannon Wiener Diversity Index	**2.2**	**2.1**	**2.4**	**2.2**	**2.1**	**2.1**	**2.0**	**2.3**	**2.1**	**2.1**	**2.7**	**1.9**	**1.5**	**1.8**	**2.6**	**2.2**	**2.2**	**2.7**	**3.0**	**1.9**	**2.2**	**2.4**	**2.1**	**2.3**	**2.2**	**1.5**	**2.1**	**2.0**	**1.8**	**2.4**

Acronym and Abbreviation:
no./m^2 = number per square meter

Table A-2
Benthic Index of Biotic Integrity

Station	Salinity (bottom)	Salinity Class	Grain Size (% silt/clay)	Sediment Type	Total Taxa	B-IBI Taxa Score	Total Mean Density (no./m²)	B-IBI Density Score	Pollution Indicative Species (no./m²)	% Abundance Pollution Indicative Species	B-IBI Pollution Indicative Species Score	Pollution Sensitive Species (no./m²)	% Abundance Pollution Sensitive Species	B-IBI Pollution Sensitive Species Score	Biomass	B-IBI Biomass Score	Overall B-IBI Score
North Geographic Area																	
136	22.4	polyhaline	95.9	mud	22	5	6,362.6	5	2,434.9	38.3%	3	0	0.0%	1	6.7	5	3.8
137	22.7	polyhaline	79.3	mud	21	5	7,739.1	5	3,289.9	42.5%	1	0	0.0%	1	6.4	5	3.4
138	24.52	polyhaline	75.1	mud	20	3	5,985.4	5	2,043.5	34.1%	3	115.9	1.9%	1	5.4	5	3.4
139	24.48	polyhaline	55	mud	22	5	6,231.9	5	1,318.9	21.2%	3	144.9	2.3%	1	12.5	3	3.4
140	23.7	polyhaline	28.9	sand	22	5	6,826.3	5	2,058	30.1%	3	0	0.0%	1	8.6	3	3.4
158	24.47	polyhaline	20.7	sand	46	5	10,756	3	3,916.7	36.4%	3	134.6	1.3%	1	33.9	3	3
159	24.5	polyhaline	52.9	mud	23	5	1,974.1	3	320.5	16.2%	3	89.7	4.5%	3	1.6	3	3.4
160	23.7	polyhaline	56.8	mud	16	3	3,166.8	5	512.8	16.2%	3	0	0.0%	1	14.9	3	3
161	23.14	polyhaline	86.9	mud	18	3	2,666.9	3	1,913.1	71.7%	1	0	0.0%	1	5.1	5	2.6
162	23.74	polyhaline	84.2	mud	15	3	1,405.8	1	463.8	33.0%	3	144.9	10.3%	3	0.5	1	2.2
163	23.62	polyhaline	54.4	mud	21	5	2,898.7	3	145	5.0%	5	144.9	5.0%	3	4.0	5	4.2
164	24.29	polyhaline	43.3	mud	21	5	11,101.4	3	5,971	53.8%	1	0	0.0%	1	32.2	3	2.6
165	23.68	polyhaline	91.5	mud	22	5	9,724.9	5	2,565.2	26.4%	3	0	0.0%	1	6.2	5	3.8
																Average B-IBI for North	***3.2***
Central Geographic Area																	
141	24.12	polyhaline	94.7	mud	19	3	3869.7	5	1,463.8	37.8%	3	29	0.7%	1	12.2	3	3
142	24.07	polyhaline	13.7	sand	29	5	11,237	3	2,179.4	19.4%	3	51.3	0.5%	1	2.8	5	3.4
143	25.46	polyhaline	70.6	mud	25	5	5,869.5	5	2,318.8	39.5%	3	29	0.5%	1	4.2	5	3.8
144	23.97	polyhaline	79.5	mud	11	1	710.1	1	159.4	22.4%	3	58	8.2%	3	1.3	3	2.2
145	25.53	polyhaline	41.6	mud	28	5	8,869.7	5	3,550.7	40.0%	1	29	0.3%	1	11.9	3	3
156	24.52	polyhaline	89.9	mud	16	3	1,811.8	3	478.3	26.4%	3	58	3.2%	3	1.4	3	3
157	24.32	polyhaline	90.3	mud	19	3	1,217.7	1	101.5	8.3%	5	29	2.4%	1	3.5	5	3
																Average B-IBI for Central	***3.1***
South Geographic Area																	
146	24.91	polyhaline	26.9	sand	42	5	2,787.90	5	519.2	18.6%	3	57.6	2.1%	1	6.3	5	3.8
147	24.64	polyhaline	40.5	mud	14	1	2,115.90	3	652.2	30.8%	3	0	0.0%	1	1.5	3	2.2
148	24.69	polyhaline	66.9	mud	8	1	405.8	1	0	0.0%	5	0	0.0%	1	0.5	1	1.8
149	24.63	polyhaline	67	mud	15	3	7,019.10	5	2,794.8	39.8%	3	0	0.0%	1	5.0	5	3.4
150	24.67	polyhaline	67.1	mud	23	5	2,275.50	3	695.7	30.6%	3	87	3.8%	3	2.5	3	3.4
151	24.91	polyhaline	69.7	mud	22	5	1,666.80	3	840.6	50.4%	1	14.5	0.9%	1	11.8	3	2.6
152	24.03	polyhaline	29.8	sand	43	5	7,185.50	5	3,980.8	55.4%	1	57.7	0.8%	1	5.7	5	3.4
153	24.73	polyhaline	50.8	mud	42	5	5,594.60	5	1,840.6	32.9%	3	173.9	3.1%	3	5.1	5	4.2
154	24.86	polyhaline	64.9	mud	33	5	1,301.30	1	211.6	16.3%	3	0	0.0%	1	19.2	3	2.6
155	24.71	polyhaline	17.4	sand	20	3	2,339.60	3	961.5	41.1%	1	0	0.0%	1	3.3	5	2.6
																Average B-IBI for South	***3.0***

Notes:
1. Bottom-most salinity included out of multiple-depth readings.
2. Grain size percentage from sieve size number 200 for silt/clay content.

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
no./m² = number per square meter
< = less than
% = percent

B-IBI Score:
1 to <2 = impacted
2 to <3 = slightly impacted
3 to 5 = non-impacted

Table A-3
Scoring Method for the Benthic Invertebrate Community Data

Metric	Weight	Scoring
Abundance (per m^2)	0.167	0 = Within reference envelope (≥5th percentile and <95th percentile of the Jamaica Bay reference dataset) 1 = Outside reference envelope
Richness	0.167	0 = Within reference envelope (≥5th percentile of Jamaica Bay reference dataset) 1 = Outside reference envelope (<5th percentile of Jamaica Bay reference dataset)
Shannon-Weiner diversity index	0.167	
Pielou's evenness index	0.167	
Swartz's dominance index	0.167	
NY/NJ Harbor B-IBI score	0.167	0 = unimpacted (B-IBI≥3) 0.5 = slightly impacted (2≤B-IBI<3) 1 = impacted (B-IBI<2)

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
m^2 = square meters
NY/NJ = New York/New Jersey
≥ = greater than or equal to
< = less than
≤ = less than or equal to

Table A-4
Benthic Invertebrate Community Scores

Geographic Area	Station	Total Taxa (Richness)		Total Mean Density (no./m²)		Shannon Wiener Diversity Index		Pielou's Evenness Index		Swartz's Dominance Index		Overall B-IBI		Total BIC Score (Maximum = 1)
		Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	
Jamaica Bay Reference (N=59)	**Mean**	**19**		**14165**		**1.55**		**0.60**		**3.4**		**NA**		
	5th Percentile[a]	**5**		**660-60,675**		**0.71**		**0.38**		**1**				
North	**136**	22	0	6,363	0	2.2	0	0.71	0	6	0	3.8	0	**0**
	137	21	0	7,739	0	2.1	0	0.69	0	4	0	3.4	0	**0**
	138	20	0	5,985	0	2.4	0	0.80	0	5	0	3.4	0	**0**
	139	22	0	6,232	0	2.2	0	0.71	0	5	0	3.4	0	**0**
	140	22	0	6,826	0	2.1	0	0.68	0	4	0	3.4	0	**0**
	158	46	0	10,756	0	2.1	0	0.55	0	4	0	3	0	**0**
	159	23	0	1,974	0	2.3	0	0.73	0	6	0	3.4	0	**0**
	160	16	0	3,167	0	2.2	0	0.79	0	6	0	3	0	**0**
	161	18	0	2,667	0	1.5	0	0.52	0	3	0	2.6	0.5	**0.08**
	162	15	0	1,406	0	2.1	0	0.78	0	5	0	2.2	0.5	**0.08**
	163	21	0	2,899	0	2.0	0	0.66	0	4	0	4.2	0	**0**
	164	21	0	11,101	0	1.8	0	0.59	0	3	0	2.6	0.5	**0.08**
	165	22	0	9,725	0	2.4	0	0.78	0	6	0	3.8	0	**0**
Central	**141**	19	0	3,870	0	2.1	0	0.71	0	5	0	3	0	**0**
	142	29	0	11,237	0	2.0	0	0.59	0	4	0	3.4	0	**0**
	143	25	0	5,870	0	2.3	0	0.71	0	5	0	3.8	0	**0**
	144	11	0	710	0	2.1	0	0.88	0	5	0	2.2	0.5	**0.08**
	145	28	0	8,870	0	2.1	0	0.63	0	5	0	3	0	**0**
	156	16	0	1,812	0	2.2	0	0.79	0	5	0	3	0	**0**
	157	19	0	1,218	0	2.4	0	0.82	0	8	0	3	0	**0**
South	**146**	42	0	2,788	0	2.7	0	0.72	0	8	0	3.8	0	**0**
	147	14	0	2,116	0	1.9	0	0.72	0	5	0	2.2	0.5	**0.08**
	148	8	0	**406**	1	1.5	0	0.72	0	3	0	1.8	1	**0.33**
	149	15	0	7,019	0	1.8	0	0.66	0	3	0	3.4	0	**0**
	150	23	0	2,276	0	2.6	0	0.83	0	7	0	3.4	0	**0**
	151	22	0	1,667	0	2.2	0	0.71	0	5	0	2.6	0.5	**0.08**
	152	43	0	7,186	0	2.2	0	0.58	0	5	0	3.4	0	**0**
	153	42	0	5,595	0	2.7	0	0.72	0	8	0	4.2	0	**0**
	154	33	0	1,301	0	3.0	0	0.86	0	12	0	2.6	0.5	**0.08**
	155	20	0	2,340	0	1.9	0	0.63	0	4	0	2.6	0.5	**0.08**
Averages	**All**	23	0	4771	0.03	2.2	0	0.71	0	5.3	0	3.1	0.2	0.03
	North	22	0	5911	0	2.1	0	0.69	0	4.7	0	3.2	0.1	0.02
	Central	21	0	4798	0.00	2.2	0	0.73	0	5.3	0	3.1	0.1	0.01
	South	26	0	3269	0.10	2.3	0	0.72	0	6.0	0	3.0	0.3	0.07

Table A-4
Benthic Invertebrate Community Scores

Notes:
The total BIC score is the weighted sum of the six SQT scores with each metric having equal weight (0.167
[a] Both the 5th and 95th percentile are shown for density. Shading and bolding indicates the NBSA value is less than the 5th percentile of the Jamaica Bay reference dataset. For density, shading and bolding indicates the NBSA value is either less than 5th percentile or greater than the 95th percentile of the Jamaica Bay reference dataset.

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
BIC = Benthic Invertebrate Community
NA = not applicable. B-IBI is scored according to the categories in the original reference (Weisberg et al. 1998): 0 = unimpacted (B-IBI>3); 0.5 = slightly impacted (2<B-IBI<3); 1 = impacted (B-IBI<2).
NBSA = Newark Bay Study Area
no./m² = number of organisms per square meter
SQT = sediment quality triad
> = greater than
< = less than

Reference:

Weisberg, S.B., J.A. Ranasinghe, J.S. O'Connor, and D.A. Adams. 1998. A benthic index of biotic integrity (B-IBI) for the New York/New Jersey Harbor. Appendix C in Adams, D.A., O'Connor, J.S., Weisberg, S.B. 1998. Sediment quality of the NY/NJ Harbor System. EPA/902-R-98-001. United States Environmental Protection Agency, Region 2, Edison, NJ.

Table A-5
Summary of Toxicity Data for *L. plumulosus*

Sample Identification	10-Day Percent Survival	28-Day Percent Survival	Growth Rate (mg/Organism/Day) (±S.D.)	Mean Reproduction (Young per Surviving Adult)
Control	*90*	*81*	*0.044 (±0.002)*	*1.97*
North Geographic Area				
NB03SED-TOX136	92	63	0.028 (±0.017)	**0.69**
NB03SED-TOX137	96	75	0.029 (±0.010)	**0.28**
NB03SED-TOX138	89	**46**	**0.017 (±0.012)**	**0.33**
NB03SED-TOX139	92	92	0.033 (±0.013)	**0.56**
NB03SED-TOX140	81	79	0.032 (±0.015)	**0.77**
NB03SED-TOX158	93	**39**	**0.01 (±0.013)**	**0**
NB03SED-TOX159	90	62	0.029 (±0.022)	**0.67**
NB03SED-TOX160	90	**0**	[a]	[a]
NB03SED-TOX161	95	96	0.034 (±0.007)	**0.71**
NB03SED-TOX162	92	86[b]	0.037 (±0.004)	**0.95**
NB03SED-TOX163	94	69	0.031 (±0.016)	**1.02**
NB03SED-TOX164	96	84	**0.021 (±0.009)**	**0.83**
NB03SED-TOX165	95	88	0.028 (±0.007)	**0.68**
Central Geographic Area				
NB03SED-TOX141	92	67	0.036 (±0.015)	**0.8**
NB03SED-TOX142	98	53	0.05 (±0.006)	1.93
NB03SED-TOX143	90	**30**	**0.012 (±0.007)**	**0.21**
NB03SED-TOX144	93	65	**0.021 (±0.014)**	**1.13**
NB03SED-TOX145	97	59	0.04 (±0.016)	**0.58**
NB03SED-TOX156	96	86	0.035 (±0.008)	**0.79**
NB03SED-TOX157	92	80	**0.024 (±0.016)**	**0.94**
South Geographic Area				
NB03SED-TOX146	83	84	0.029 (±0.014)	**0.6**
NB03SED-TOX147	90	79	0.035 (±0.013)	**0.28**
NB03SED-TOX148	97	92	0.032 (±0.007)	**0.84**
NB03SED-TOX149	98	63	**0.02 (±0.009)**	**0.64**
NB03SED-TOX150	89	73	0.03 (±0.019)	**0.67**
NB03SED-TOX151	**39 [36]**	**0 [0]**	[a]	[a]
NB03SED-TOX152	97	86	**0.025 (±0.014)**	**0.37**
NB03SED-TOX153	98	83	0.037 (±0.019)	**0.73**
NB03SED-TOX154	**32 [46]**	**7 [11]**	**0.001 (±0.002) [0.004 (±0.000)]**	**0.96 [0.00]**
NB03SED-TOX155	95	70[c]	0.035 (±0.017)	**0.6**

Notes:
[a] Growth rate or reproduction not calculable for samples with no surviving organisms.
[b] Survival out of 102 individuals.
[c] Survival out of 101 individuals.
Survival all out of 100 individuals, except where indicated.
Shaded cells are significantly different than the control (p=0.05).
Bolded cells indicate value is less than control minus the minimum detectable difference (MDD) for the endpoint (see Table A-2-1 in Attachment A-2 for MDDs).
[ ] Values in brackets indicate results of field duplicates.

Acronyms and Abbreviations:
mg = milligrams
S.D. = standard deviation

Table A-6
Scoring Method for the Sediment Toxicity Data

Metric	Weight	Scoring
10-day survival	0.25	0 = control-normalized survival ≥80% and/or not significantly different from control 0.5 = control-normalized survival <80% and ≥60% and significantly different from control 1 = control-normalized survival <60% and significantly different from control
28-day survival	0.25	
Growth rate	0.25	0 = control-normalized survival ≥70% and/or not significantly different from control 0.5 = control-normalized survival <70% and ≥50% and significantly different from control 1 = control-normalized survival <50% and significantly different from control
Reproduction	0.25	

Acronyms and Abbreviations:
≥ = greater than or equal to
< = less than
% = percent

Table A-7
Sediment Toxicity Scores

Geographic Area	Station	10-Day Mean Percent Survival		28-Day Mean Percent Survival		Growth Rate (mg/Organism/Day)		Mean Reproduction (Young per Surviving Adult)		Total Sediment Toxicity Score (Maximum = 1)
		Value	SQT Score	Value	SQT Score	Value	SQT Score	Value	SQT Score	
Laboratory Control		**90 (72)**		**81 (65)**		**0.044 (0.031)**		**1.97 (1.38)**		
North	136	92	0	63	0	0.028	0	**0.69**	0	**0**
	137	96	0	75	0	0.029	0.5	**0.28**	1	**0.38**
	138	89	0	**46**	0	**0.017**	1	**0.33**	1	**0.50**
	139	92	0	92	0	0.033	0	**0.56**	1	**0.25**
	140	81	0	79	0	0.032	0	**0.77**	0	**0**
	158	93	0	**39**	1	**0.01**	1	**0**	1	**0.75**
	159	90	0	62	0	0.029	0	**0.67**	0	**0**
	160	90	0	**0**	1	--	1	--	1	**0.75**
	161	95	0	96	0	0.034	0	**0.71**	0	**0**
	162	92	0	86	0	0.037	0	**0.95**	0	**0**
	163	94	0	69	0	0.031	0	**1.02**	0	**0**
	164	96	0	84	0	**0.021**	1	**0.83**	0	**0.25**
	165	95	0	88	0	0.028	0.5	**0.68**	1	**0.38**
Central	141	92	0	67	0	0.036	0	**0.8**	0	**0**
	142	98	0	53	0	0.05	0	1.93	0	**0**
	143	90	0	**30**	1	**0.012**	1	**0.21**	1	**0.75**
	144	93	0	65	0	**0.021**	1	**1.13**	0	**0.25**
	145	97	0	59	0	0.04	0	**0.58**	0	**0**
	156	96	0	86	0	0.035	0	**0.79**	0	**0**
	157	92	0	80	0	**0.024**	0.5	**0.94**	0	**0.13**
South	146	83	0	84	0	0.029	0.5	**0.6**	1	**0.38**
	147	90	0	79	0	0.035	0	**0.28**	1	**0.25**
	148	97	0	92	0	0.032	0	**0.84**	0	**0**
	149	98	0	63	0	**0.02**	1	**0.64**	0	**0.25**
	150	89	0	73	0	0.03	0	**0.67**	1	**0.25**
	151	**37.5**	1	**0**	1	--	1	--	1	**1**
	152	97	0	86	0	**0.025**	0.5	**0.37**	1	**0.38**
	153	98	0	83	0	0.037	0	**0.73**	0	**0**
	154	**39**	1	**9**	1	**0.0025**	1	**0.48**	1	**1**
	155	95	0	70	0	0.035	0	**0.6**	0	**0**
Averages	**All**	89	0.07	65	0.17	0.028	0.38	0.68	0.43	0.26
	North	92	0	68	0.15	0.027	0.38	0.62	0.46	0.25
	Central	94	0	63	0.14	0.031	0.36	0.91	0.14	0.16
	South	82	0.20	64	0.20	0.027	0.40	0.58	0.60	0.35

Notes:
The total sediment toxicity score is the weighted sum of the four SQT scores with each endpoint having equal weight (0.25).
Shaded cells are significantly different than the control (p=0.05).
Bolded cells indicate value is less than control minus the minimum detectable difference (MDD) for the endpoint (seeTable A-2-1 in Attachment A-2 for MDDs).
Field duplicate results at Stations 151 and 154 were averaged with the parent sample results.
Value in parentheses is 80% of the laboratory control for survival or 70% of the laboratory control for growth or reproduction.

Acronyms and Abbreviations:
mg = milligrams
SQT = sediment quality triad
-- Growth rate or reproduction not calculable for samples with no surviving organisms.
% = percent

Table A-8
Sediment Quality Guidelines

Chemical	Units in Dry Weight	T20	T50	T80	ERL	ERM	Threshold (Maximum of T20 and ERL)	Median (Maximum of T50 and ERM)
Dioxins/Furans								
2,3,7,8-TCDD[a]	ng/kg	--	--	--	--	--	0.85	21.5
PCBs								
Total PCBs (209 congeners)	ng/kg	35,000	370,000	3,930,000	22,700	180,000[b]	35,000	370,000
Total PCBs (9 aroclors)	µg/kg	35	370	3,930	22.7	180	35	370
Pesticides								
Dieldrin	ng/kg	830	2,900	10,000	--	8,000[b]	830	2,900
4,4'-DDD	ng/kg	2,200	19,000	160,000	--	--	2,200	19,000
4,4'-DDE	ng/kg	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000
4,4'-DDT	ng/kg	1,700	11,000	76,000	--	--	1,700	11,000
Total DDx (2,4 & 4,4)	ng/kg	--	--		1,580	46,100[b]	1,580	46,100
Chlordane[a]	ng/kg	--	--	--	--	--	2,260	4,790
gamma-BHC (lindane)[a]	ng/kg	--	--	--	--	--	320	990
PAHs								
1-Methylnaphthalene	µg/kg	21	94	430	--	--	21	94
C1-Phenanthrenes/Anthracenes	µg/kg	18	110	700	--	--	18	110
C2-Naphthalenes	µg/kg	25	130	710	--	--	25	130
2-Methylnaphthalene	µg/kg	21	130	770	70	670[b]	70	670
Acenaphthene	µg/kg	19	120	710	16	500[b]	19	500
Acenaphthylene	µg/kg	14	140	1,420	44	640[b]	44	640
Anthracene	µg/kg	34	290	2,490	85.3	1,100[b]	85.3	1,100
Benzo(a)anthracene	µg/kg	61	470	3,530	261	1,600[b]	261	1,600
Benzo(a)pyrene	µg/kg	69	520	3,910	430	1,600[b]	430	1,600
Benzo(b)fluoranthene	µg/kg	130	1110	9,410	--	--	130	1,110
Benzo(g,h,i)perylene	µg/kg	67	500	3,710	--	--	67	500
Benzo(j)fluoranthene/Benzo(k)fluoranthene	µg/kg	70	540	4,120	--	--	70	540
Biphenyl	µg/kg	17	73	310	--	--	17	73
Chrysene	µg/kg	82	650	5,190	384	2,800[b]	384	2,800
Dibenz(a,h)anthracene	µg/kg	19	110	690	63.4	260[b]	63.4	260
Fluoranthene	µg/kg	120	1030	8,950	600	5,100[b]	600	5,100
Fluorene	µg/kg	19	110	660	19	540[b]	19	540
Indeno(1,2,3-cd)pyrene	µg/kg	68	490	3,480	--	--	68	490
Naphthalene	µg/kg	30	220	1,570	160	2,100[b]	160	2,100
Perylene	µg/kg	74	450	2,770	--	--	74	450
Phenanthrene	µg/kg	68	460	3,060	240	1,500[b]	240	1,500
Pyrene	µg/kg	120	930	6,980	665	2,600[b]	665	2,600
Total HMW PAHs	µg/kg	--	--	--	1,700	9,600	1,700	9,600
Total LMW PAHs	µg/kg	--	--	--	552	3,160	552	3,160
Total PAHs	µg/kg	--	--	--	4,022	44,792	4,022	44,792
Other Organic Chemicals								
bis(2-Ethylhexyl)phthalate (DEHP)[a]	µg/kg	--	--	--	--	--	182	2,647
Metals								
Antimony	mg/kg	0.63	2.4	8.9	--	--	0.63	2.4
Arsenic	mg/kg	7.4	20	56	8.2	70[b]	8.2	70
Cadmium	mg/kg	0.38	1.4	4.9	1.2	9.6[b]	1.2	9.6
Chromium	mg/kg	49	140	410	81	370[b]	81	370
Copper	mg/kg	32	94	280	34	270[b]	34	270
Lead	mg/kg	30	94	300	46.7	218[b]	46.7	218
Mercury	µg/kg	140	480	1,700	150	710[b]	150	710
Nickel	mg/kg	15	47	150	20.9	51.6[b]	20.9	51.6
Silver	mg/kg	0.23	1.1	5.8	1	3.7[b]	1	3.7
Zinc	mg/kg	94	240	640	150	410[b]	150	410

Table A-8
Sediment Quality Guidelines

Notes:

Tp values reported in USEPA 2005. The notation Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).

ERL and ERM are values reported in Long et al. (1995).

[a] Sediment Quality Guidelines for these chemicals were selected from the National Oceanic and Atmospheric Administration Screening Quick Reference Table (SQuirT) (Buchman 2008), because Tp and effects range values were not available. The threshold value is the threshold effect level and the median value is the probable effect level for marine sediment, as reported in the SQuirT.

[b] These chemicals were included in the calculation of an ERM quotient, the sum of each chemical concentration divided by the ERM (Long et al. 2006).

Acronyms and Abbreviations:

BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
ERL = effect range-low
ERM = effect range-median
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of DDE, DDD, and DDT
USEPA = U.S. Environmental Protection Agency
µg/kg = micrograms per kilogram
-- = not available

References:

Buchman, M.F., 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. Office of Response and Restoration Division. Seattle WA. 34p.

Long ER, MacDonald DD, Smith SL, Calder FD. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environ Manag* 19:81-97.

Long, E.R., C.G. Ingersoll and D.D. MacDonald. 2006. Calculation and uses of mean sediment quality guideline quotients: A critical review. *Environ Sci Technol* 40:1726-1736.

USEPA. 2005. Predicting Toxicity to Amphipods from Sediment Chemistry. EPA/600/R-04/030. National Center for Environmental Assessment. Washington, DC.

Table A-9
Exceedances of Sediment Quality Guidelines

Chemical	Number of Exceedances in 30 SQT Samples					Number of Exceedance in 30 SQT Samples that Exceed Maximum of:	
	T20	T50	T80	ERL	ERM	T20, ERL, or TEL	T50, ERM, or PEL
Dioxins/Furans							
2,3,7,8-TCDD	--	--	--	--	--	30	26
PCBs							
Total PCBs (sum of aroclors)	29	6	0	30	15	29	6
Total PCBs (sum of 209 congeners)	30	18	1	30	24	30	18
Pesticides							
4,4-DDD	30	8	0	--	--	30	8
4,4-DDE	30	3	0	30	12	30	3
4,4-DDT	10	3	1	--	--	10	3
Dieldrin	21	3	0	.	0	21	3
Total DDx (2,4 & 4,4) Total Fraction	--	--	--	30	14	30	14
Total alpha + gamma chlordane[a]	--	--	--	--	--	25	21
Total Chlordane[a,b]	--	--	--	--	--	28	25
gamma-BHC (lindane)	--	--	--	--	--	0	0
Total BHC Compounds[c]	--	--	--	--	--	7	2
PAHs							
1-Methylnaphthalene	21	1	0	--	--	21	1
2-Methylnaphthalene	24	0	0	3	0	3	0
Acenaphthene	23	4	1	24	1	23	1
Acenaphthylene	29	12	0	27	1	27	1
Anthracene	29	7	1	23	2	23	2
Benzo(a)anthracene	30	17	1	25	5	25	5
Benzo(a)pyrene	30	22	1	24	7	24	7
Benzo(b)fluoranthene	29	9	0	--	--	29	9
Benzo(g,h,i)perylene	29	12	0	--	--	29	12
Benzo(k)fluoranthene	30	16	1	--	--	30	16
C1-Phenanthrenes/Anthracenes	29	26	9	--	--	29	26
C2-Naphthalenes	29	19	1	--	--	29	19
Chrysene	30	15	1	23	1	23	1
Dibenz(a,h)anthracene	30	19	1	27	9	27	9
Fluoranthene	30	13	1	20	2	20	2
Fluorene	23	4	0	23	1	23	1
Indeno(1,2,3-cd)pyrene	29	13	1	--	--	29	13
Naphthalene	26	1	0	3	0	3	0
Perylene	29	6	0	--	--	29	6
Phenanthrene	29	7	2	18	3	18	3
Pyrene	30	18	1	22	4	22	4
Total HMW PAHs	--	--	--	29	10	29	10
Total LMW PAHs	--	--	--	21	3	21	3
Total PAHs	--	--	--	24	1	24	1
Semivolatiles							
Biphenyl (1,1-Biphenyl)	3	0	0	--	--	3	0
bis(2-Ethylhexyl)phthalate (DEHP)	--	--	--	--	--	25	3
Metals							
Antimony	15	5	0	--	--	15	5
Arsenic	26	5	1	24	0	24	0
Cadmium	29	11	2	13	2	13	2
Chromium	27	5	0	19	1	19	1
Copper	30	18	3	29	3	29	3
Lead	30	19	3	29	5	29	5
Mercury	30	29	15	30	24	30	24
Nickel	30	9	0	25	7	25	7
Silver	30	23	0	24	2	24	2
Zinc	29	14	1	23	5	23	5

Table A-9
Exceedances of Sediment Quality Guidelines

Notes:
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).

[a] Compared TEL/PEL for chlordane (CAS Number 57-74-9).

[b] Total chlordane is the sum of alpha-chlordane, gamma-chlordane, heptachlor, heptachlor epoxide, heptachlor endo-epoxide, cis-nonachlor,

[c] Total BHC Compounds is the the sum of alpha-BHC, beta-BHC, delta-BHC, and gamma-BHC (lindane). Counts are based on a comparison to the TEL/PEL for gamma-BHC (lindane).

Acronyms and Abbreviations:

BHC = benzene hexachloride
CAS = Chemical Abstracts Service
ERL = effect range-low
ERM =effect range-median
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEL = probable effect level
SQT = sediment quality triad
TCDD = tetrachlorodibenzo-p-dioxin
TEL = threshold effect level
Total DDx = sum of DDE, DDD, and DDT
% = percent
-- = not available

Table A-10
Chemicals with No Sediment Quality Guidelines Detected in Sediment

Parameter Group	Chemical	Frequency of Detection
PCBs	Individual Aroclors (1248, 1254, 1260)	57% to 100 %
	Individual PCB Congeners (n = 131)	50% to 100%
Pesticides	Hexachlorobenzene	100%
Individual PAHs	2-Methylnaphthalene	100%
	Benzo(e)pyrene	100%
	Individual Alkylated PAHs	50% to 100%
SVOCs	4-Methylphenol	63%
	Acetophenone	55%
Petroleum Hydrocarbons	Petroleum Hydrocarbons (individual and total)	50% to 100%
Metals	Aluminum	100%
	Barium	100%
	Beryllium	100%
	Cobalt	100%
	Manganese	100%
	Selenium	100%
	Thallium	100%
	Titanium	100%
	Vanadium	100%

Note:
List includes only chemicals with a frequency of detection greater than 50%.

Acronyms and Abbreviations:
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
% = percent

Table A-11
Water Quality Criteria and Screening Values

Chemical	Units	Acute	Chronic	Source
Dioxins/Furans				
2,3,7,8- TCDD	pg/L	10000	10	NOAA-FW
PCBs				
Total PCBs (209 congeners)	ng/L	--	30	NJ WQC
Pesticides				
Aldrin	µg/L	1.3	--	NJ WQC
Dieldrin	µg/L	0.71	0.0019	NJ WQC
Endosulfan I	µg/L	0.034	0.0087	NJ WQC
Endosulfan II	µg/L	0.034	0.0087	NJ WQC
Endosulfan sulfate	µg/L	0.034	0.0087	NJ WQC
Endrin	µg/L	0.037	0.0023	NJ WQC
gamma-BHC (lindane)	µg/L	0.16	--	NJ WQC
Heptachlor	µg/L	0.053	0.0036	NJ WQC
Heptachlor epoxide	µg/L	0.053	0.0036	NJ WQC
Hexachlorobenzene	µg/L	160	129	NOAA-SW
Methoxychlor	µg/L	--	0.03	NJ WQC
Mirex	µg/L	--	0.001	NJ WQC
Total alpha + gamma chlordane[a]	µg/L	0.09	0.004	NJ WQC
Total DDx (4,4)[b]	µg/L	0.13	0.001	NJ WQC
PAHs				
2-Methylnaphthalene	ng/L	300000	--	NOAA-SW
Acenaphthene	ng/L	970000	40000	NOAA-SW
Acenaphthylene	ng/L	300000	--	NOAA-SW
Anthracene	ng/L	300000	--	NOAA-SW
Benzo(a)anthracene	ng/L	300000	--	NOAA-SW
Benzo(a)pyrene	ng/L	300000	--	NOAA-SW
Benzo(b)fluoranthene	ng/L	300000	--	NOAA-SW
Benzo(g,h,i)perylene	ng/L	300000	--	NOAA-SW
Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	300000	--	NOAA-SW
Chrysene	ng/L	300000	--	NOAA-SW
Dibenz(a,h)anthracene	ng/L	300000	--	NOAA-SW
Fluoranthene	ng/L	40000	11000	NOAA-SW
Fluorene	ng/L	300000	--	NOAA-SW
Indeno(1,2,3-cd)pyrene	ng/L	300000	--	NOAA-SW
Naphthalene	ng/L	2350000	1400	NOAA-SW
Total HMW PAHs	ng/L	300000	--	NOAA-SW
Total LMW PAHs	ng/L	300000	--	NOAA-SW
Total Alkylated PAHs	ng/L	300000	--	NOAA-SW
Total PAHs	ng/L	300000	--	NOAA-SW
Metals				
Arsenic	mg/L	0.069	0.036	NJ WQC
Cadmium	mg/L	0.04	0.0088	NJ WQC
Chromium	mg/L	1.1	0.05	NJ WQC
Copper	mg/L	0.0079	0.0056	NJ WQC
Lead	mg/L	0.21	0.024	NJ WQC
Mercury	ng/L	1800	940	NJ WQC
Nickel	mg/L	0.064	0.022	NJ WQC
Selenium	mg/L	0.29	0.071	NJ WQC
Silver	mg/L	0.0019	--	NJ WQC
Zinc	mg/L	0.09	0.081	NJ WQC

Table A-11
Water Quality Criteria and Screening Values

Notes:
[a] Published criterion is for chlordane (CAS Number 57-74-9).
[b] Published criterion is for 4,4'-dichlorodiphenyltrichloroethane (CAS Number 50-29-3).

Acronyms and Abbreviations:
BHC = benzene hexachloride
CAS = Chemical Abstracts Service
HMW = high molecular weight
LMW = low molecular weight
mg/L = milligrams per liter
ng/L = nanograms per liter
NJ WQC = New Jersey Surface Water Quality Standards, New Jersey Administrative Code, re-adopted October 17, 2016 (New Jersey Administrative Code 7:9B), for the protection of aquatic life in saline waters.
NOAA = National Oceanographic and Atmospheric Administration
NOAA-SW = Screening values reported in the NOAA SQuiRT for marine surface waters (Buchman 2008)
NOAA-FW = Screening values reported in NOAA SQuiRT for fresh surface waters, used when marine values are not available.
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/L = picograms per liter
SQuiRT = Screening Quick Reference Tables
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
µg/L = micrograms per liter
-- = not available

Reference:
Buchman, M.F., 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. Office of Response and Restoration Division. Seattle, WA. 34p.

Table A-12
Exceedances of Water Quality Criteria and Screening Values in Porewater

Chemical	Number of Detects in 30 Porewater Samples[a]	Number of Exceedances of in 30 Porewater Samples	
		Acute	Chronic
Dioxins/Furans			
2,3,7,8-TCDD	30	0	0
PCBs			
Total PCBs (209 congeners)	30	--	**3**
Pesticides			
Aldrin	20	0	--
Dieldrin	30	0	0
cis-Nonachlor[b]	29	0	0
trans-Nonachlor[b]	30	0	0
Endosulfan I	6	0	0
Endosulfan II	0	Not Detected	
Endosulfan sulfate	0	Not Detected	
Endrin	0	Not Detected	
Heptachlor	26	0	0
Heptachlor epoxide	13	0	0
Hexachlorobenzene	30	0	0
Methoxychlor	0	Not Detected	
Mirex	16	--	0
Total DDx (4,4)[c]	30	0	**14**
Total alpha + gamma chlordane[b]	30	0	0
gamma-BHC (lindane)	0	Not Detected	
PAHs			
Individual PAHs and Totals	30	0	0
Metals			
Arsenic	9	**1**	**3**
Cadmium	0	Not Detected	
Chromium	26	0	0
Copper	5	**1**	**2**
Lead	6	0	0
Mercury	29	0	0
Nickel	0	Not Detected	
Selenium	10	0	0
Silver	0	Not Detected	
Zinc	3	**3**	**3**

Notes:
Chemicals and exceedance counts in **BOLD** indicate at least one exceedance was observed.
[a] Only 29 samples were analyzed for metals due to a broken dialysis bag at station 155.
[b] Compared to published criterion for chlordane (CAS Number 57-74-9).
[c] Compared to published criterion for 4,4'-dichlorodiphenyltrichloroethane (CAS Number 50-29-3).

Acronyms and Abbreviations:
BHC = benzene hexachloride
CAS = Chemical Abstracts Service
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
-- = criteria not available

Table A-13
Chemicals Detected in Porewater with No Water Quality Criteria and Screening Values

Chemical	Frequency of Detection
Metals	
Barium	100%
Manganese	100%
Titanium	71%
Vanadium	83%

Notes:
List includes only chemicals with a frequency of detection greater than 50%.
List excludes essential metals (i.e., calcium, magnesium, potassium, and sodium).

Acronym and Abbreviation:
% = percent

Table A-14

Comparison to Equilibrium Partitioning Sediment and Porewater Benchmarks for Metal and PAH Mixtures

Geographic Area	Station	Metal Mixtures					PAH Mixtures	
		Sediment				Porewater	Sediment	Porewater
		∑SEM (µmol/g)	AVS (µmol/g)	∑SEM - AVS (µmol/g)	∑SEM - AVS/ f_{oc} (µmol/g-oc)	Sum of Toxic Units (unitless)	$\sum ESBTU_{FCV}$ (unitless)	Sum of Toxic Units (unitless)
North	136	1.7	14	-11.9	-364	<2	0.4	0.04
	137	1.4	14	-12.7	-224	<2	0.5	0.06
	138	1.5	1.2	0.31	6	<2	0.4	0.04
	139	1.5	0.8	0.66	22	2.1	1.8	0.05
	140	1.5	1.1	0.43	24	<2	0.5	0.06
	158	1.0	3.5	-2.5	-94	<2	1.1	0.33
	159	1.5	30	-28.6	-738	3.1	1.1	0.05
	160	2.8	5.8	-3.0	-110	0.89	0.7	0.07
	161	1.8	14	-12.3	-279	<2	0.4	0.04
	162	1.4	2.8	-1.4	-41	<2	1.0	0.08
	163	1.6	16	-14.0	-255	3.3	0.2	0.12
	164	1.1	2.1	-1.0	-36	<2	0.3	0.04
	165	1.4	13	-11.8	-161	<2	0.2	0.05
Central	141	1.4	14	-12.6	-391	1.2	0.1	0.03
	142	1.5	<2	<1.5	<68	<2	0.5	0.05
	143	3.1	18	-15.2	-315	<2	0.4	0.27
	144	1.9	16	-14.0	-736	<2	0.7	0.08
	145	1.8	1.1	0.7	33	<2	0.4	0.41
	156	1.2	4.2	-3.0	-95	<2	0.4	0.03
	157	1.5	16	-14.7	-573	<2	0.7	0.03
South	146	1.2	3.8	-2.6	-132	<2	0.3	0.13
	147	2.9	37	-34.0	-834	5.7	0.5	0.24
	148	3.3	25	-21.7	-835	<2	2.9	0.07
	149	3.4	21	-17.4	-287	<2	0.2	0.09
	150	1.9	7.0	-5.1	-101	5.0	3.9	0.06
	151	3.7	86	-82.2	-2000	<2	1.3	0.97
	152	2.2	5.9	-3.6	-55	0.12	0.5	0.05
	153	1.3	8.9	-7.6	-281	<2	0.3	0.04
	154	5.6	54	-48.1	-319	<2	0.4	1.30
	155	0.63	<2	<0.63	<199	NA	0.5	0.05

Notes:
Sum of toxic units is the sum of the detected concentration of each chemical in porewater divided by its final chronic value, as described in USEPA 2005 for metals and USEPA 2017 for PAHs.

Acronyms and Abbreviations:
< = not detected. The value of the detection limit is shown for sediment. The value of the sum of the toxic units based on the individual detection limits in porewater are shown for porewater (i.e., the maximum possible value of the sum of toxic units).
$\sum ESBTU_{FCV}$ = Equilibrium Partitioning Benchmark Toxic Units. It is the sum of 34 organic carbon normalized sediment PAH concentrations divided by their final chronic values as described in USEPA 2003.
AVS = acid volatile sulfide
f_{oc} = fraction of organic carbon
NA = not analyzed. This sample was not analyzed for metals due to a broken dialysis bag.
SEM = simultaneously extracted metals
USEPA = U.S. Environmental Protection Agency
∑ = sum of
µmol/g = micromoles per gram
µmol/g-oc = micromoles per gram of organic carbon

References:
USEPA. 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Office of Research and Development. Washington, DC.

USEPA. 2005. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver and Zinc). EPA-600-R-02-011. Office of Research and Development. Washington, DC.

USEPA 2017. Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Non-ionic Organic Contaminants. EPA/600/R. Office of Research and Development. Washington, DC.

Table A-15
Scoring Method for Sediment and Porewater Chemistry

Metric	Weight	Scoring
Sediment Concentration	0.5	0 = ≤T20/ERL/TEL 0.5 = >T20/ERL/TEL and ≤T50/ERM/PEL 1 = >T50/ERM/PEL or ERM Quotient >1
Porewater Concentration	0.5	0 = <chronic water quality criteria 0.5 = >chronic water quality criteria and/or the SumTU exceeds 1 1 = >acute water quality criteria

Note:
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).
The ERM Quotient is the sum of each of 25 chemical concentrations divided by the ERM as suggested in Long et al. 2006.

Acronyms and Abbreviations:
ERL = effect range-low
ERM =effect range-median
PAH = polycyclic aromatic hydrocarbons
PEL = probable effect level
SumTU = sum of toxic units as defined in USEPA guidance (2005) for metals and (2017) for PAHs.
TEL = threshold effect level
USEPA = U.S. Environmental Protection Agency
> = greater than
< = less than
≤ = less than or equal to
% = percent

Reference:
Long, E.R., C.G. Ingersoll and D.D. MacDonald. 2006. Calculation and uses of mean sediment quality guideline quotients: A critical review. *Environ Sci Technol* 40:1726-1736.
USEPA. 2005. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver and Zinc). EPA-600-R-02-011. Office of Research and Development. Washington, DC.
USEPA 2017. Developing Sediment Remediation Goals at Superfund Sites Based on Pore Water for the Protection of Benthic Organisms from Direct Toxicity to Non-ionic Organic Contaminants. EPA/600/R. Office of Research and Development. Washington, DC, USA.

Table A-16
Sediment and Porewater Chemistry Scores

Geographic Area	Station	Sediment Chemistry				Porewater Chemistry					Total Sediment/ Porewater Chemistry Score (Maximum = 1)
		Number of Compounds that Exceed Maximum of:		ERM Quotient	Sediment SQT Score	Compounds that Exceed WQC:		Sum of Toxic Units (Metals) > 1	Sum of Toxic Units (PAHs) > 1	Porewater SQT Score	
		T20, ERL or TEL	T50, ERM or PEL			Chronic	Acute				
North	136	39	5	12	1	0	0	No	No	0	**0.5**
	137	41	12	12	1	0	0	No	No	0	**0.5**
	138	40	15	20	1	1	0	No	No	0.5	**0.75**
	139	39	16	19	1	0	0	Yes	No	0.5	**0.75**
	140	29	3	6.6	1	1	0	No	No	0.5	**0.75**
	158	32	10	9.4	1	0	0	No	No	0	**0.5**
	159	37	17	17	1	1	1	Yes	No	1	**1**
	160	40	11	21	1	2	0	No	No	0.5	**0.75**
	161	42	10	16	1	0	0	No	No	0	**0.5**
	162	40	14	16	1	0	0	No	No	0	**0.5**
	163	36	4	10	1	1	0	Yes	No	0.5	**0.75**
	164	23	4	7.6	1	0	0	No	No	0	**0.5**
	165	40	9	14	1	0	0	No	No	0	**0.5**
Central	141	25	4	10	1	1	1	Yes	No	1	**1**
	142	31	1	5.1	1	0	0	No	No	0	**0.5**
	143	42	13	21	1	2	0	No	No	0.5	**0.75**
	144	39	6	15	1	1	0	No	No	0.5	**0.75**
	145	29	6	8.9	1	1	0	No	No	0.5	**0.75**
	156	36	5	9.5	1	0	0	No	No	0	**0.5**
	157	38	7	13	1	0	0	No	No	0	**0.5**
South	146	20	1	5.5	1	1	0	No	No	0.5	**0.75**
	147	42	14	18	1	2	1	Yes	No	1	**1**
	148	43	26	33	1	1	0	No	No	0.5	**0.75**
	149	36	13	20	1	1	0	No	No	0.5	**0.75**
	150	41	27	62	1	2	1	Yes	No	1	**1**
	151	42	24	67	1	3	1	No	No	1	**1**
	152	42	16	22	1	1	0	No	No	0.5	**0.75**
	153	23	1	6.7	1	0	0	No	No	0	**0.5**
	154	39	17	39	1	2	0	No	Yes	0.5	**0.75**
	155	8	0	3.3	1	1	0	No	No	0.5	**0.75**

Note:
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).

Acronyms and Abbreviations:

ERL = effect range-low
ERM =effect range-median
PAH = polycyclic aromatic hydrocarbon
PEL = probable effect level
SQT = sediment quality triad
TEL = threshold effect level
WQC = water quality criteria
> = greater than
% = percent

Table A-17
Sediment Quality Triad Scoring Summary

Geographic Area	Station	SQT Category Scores (Maximum = 1)			Total SQT Score (Maximum = 3)	Degree of Impact[a]
		Total BIC Score	Total Sediment Toxicity Score	Total Sediment Chemistry Score		
North	136	0	0	**0.5**	0.50	No Impact
	137	0	**0.38**	**0.5**	0.88	Low Impact
	138	0	**0.50**	**0.75**	1.25	Low Impact
	139	0	**0.25**	**0.75**	1.00	Low Impact
	140	0	0	**0.75**	0.75	No Impact
	158	0	**0.75**	**0.5**	1.25	Low Impact
	159	0	0	**1**	1.00	Low Impact
	160	0	**0.75**	**0.75**	1.50	Low Impact
	161	**0.08**	0	**0.5**	0.58	No Impact
	162	**0.08**	0	**0.5**	0.58	No Impact
	163	0	0	**0.75**	0.75	No Impact
	164	**0.08**	**0.25**	**0.5**	0.83	Low Impact
	165	0	**0.38**	**0.5**	0.88	Low Impact
Central	141	0	0	**1**	1.00	Low Impact
	142	0	0	**0.5**	0.50	No Impact
	143	0	**0.75**	**0.75**	1.50	Low Impact
	144	**0.08**	**0.25**	**0.75**	1.08	Low Impact
	145	0	0	**0.75**	0.75	No Impact
	156	0	0	**0.5**	0.50	No Impact
	157	0	**0.13**	**0.5**	0.63	No Impact
South	146	0	**0.38**	**0.75**	1.13	Low Impact
	147	**0.08**	**0.25**	**1**	1.33	Low Impact
	148	**0.33**	0	**0.75**	1.08	Low Impact
	149	0	**0.25**	**0.75**	1.00	Low Impact
	150	0	**0.25**	**1**	1.25	Low Impact
	151	**0.08**	**1**	**1**	2.08	**Medium Impact**
	152	0	**0.38**	**0.75**	1.13	Low Impact
	153	0	0	**0.5**	0.50	No Impact
	154	**0.08**	**1**	**0.75**	1.83	**Medium Impact**
	155	**0.08**	0	**0.75**	0.83	Low Impact

Notes:
Non-zero cells shaded and bolded.
[a] Impact categories are defined by total scores as follows: no impact (blue shading) = ≤0.75; low impact (green shading) = >0.75 and ≤1.5; medium impact (yellow shading and bold font) = >1.5 and <2.25; and high impact (none present) = >2.25.

Acronyms and Abbreviations:
BIC = Benthic Invertebrate Community
SQT = sediment quality triad
> = greater than
< = less than
≤ = less than or equal to

Table A-18
Chemicals with Maximum or Second Highest Concentrations at Stations 151 or 154

Parameter Group	Chemical	Sediment	Porewater
Dioxins/Furans	2,3,7,8-TCDD and 15 (sediment) or 16 (porewater) other 2,3,7,8 substituted dioxin/furan congeners[a]	X	X
PCBs	Total Congeners and 134 (sediment) or 136 (porewater) individual congeners	X	X
	Total and Three Individual Aroclors	X	--
Pesticides	Total DDx and 4 (sediment) or 3 (porewater) individual isomers	X	X
	Dieldrin	X	X
	Hexachlorobenzene	X	X
	Total alpha + gamma chlordane	X	
	gamma chlordane	X	X
	alpha-BHC	X	
	cis-Nonachlor	X	X
PAHs	2-Methylnaphthalene		X
	Acenaphthylene		X
	Anthracene		X
	Benzo(a)anthracene		X
	Chrysene		X
	Fluoranthene		X
	Pyrene		X
	C1-Chrysenes		X
	C1-Fluoranthenes/Pyrenes		X
	C1-Fluorenes	X	
	C1-Phenanthrenes/Anthracenes		X
	C2-Chrysenes		X
	C2-Fluoranthenes/Pyrenes		X
	C2-Fluorenes	X	X
	C2-Phenanthrenes/Anthracenes	X	X
	C3-Chrysenes	X	X
	C3-Fluoranthenes/Pyrenes	X	X
	C3-Fluorenes	X	X
	C3-Naphthalenes	X	
	C3-Phenanthrenes/Anthracenes	X	X
	C4-Chrysenes	X	X
	C4-Naphthalenes	X	X
	C4-Phenanthrenes/Anthracenes	X	X
	Total Alkylated PAHs	X	X
	Total LMW PAHs		X
	Total HMW PAHs		X
	Total PAHs		X
SVOCs	bis(2-Ethylhexyl)phthalate	X	--
Petroleum Hydrocarbons	Total and 10 Individual Petroleum Hydrocarbons	X	--
AVS-SEM	Acid volatile sulfide	X	--
	Cadmium	X	--
	Lead	X	--
	Nickel	X	--
	Zinc	X	--

Table A-18
Chemicals with Maximum or Second Highest Concentrations at Stations 151 or 154

Parameter Group	Chemical	Sediment	Porewater
Metals	Antimony	X	
	Arsenic	X	X
	Barium	X	X
	Cadmium	X	
	Chromium	X	
	Copper	X	
	Lead	X	
	Mercury	X	X
	Methyl mercury	X	X
	Selenium	X	
	Silver	X	
	Thallium	X	
	Titanium	X	
	Vanadium	X	
	Zinc	X	
Inorganics	Cyanide (total)	X	
	Phosphorus	X	
	Sulfide	X	
Herbicides	2,4,5-T	X	--

Note:
[a]Only the 17 2,3,7,8-substituted dioxin and furan congeners were analyzed.

Acronyms and Abbreviations:
2,4,5-T = 2,4,5-Trichlorophenoxyacetic acid
AVS = acid volatile sulfide
BHC = benzene hexachloride
HMW = high molecular weight
LMW = low molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SEM = simultaneously extracted metals
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
Total DDX = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
-- = not analyzed in porewater

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
Dioxins/ Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	30	100%	-0.22	-0.06	**-0.33**	-0.11	**-0.31**	**-0.43**	0.11	0.38	0.13	-0.23
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	30	100%	**-0.49**	-0.13	-0.29	0.00	-0.22	-0.20	0.15	0.30	0.07	0.06
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	30	100%	-0.27	-0.10	**-0.34**	-0.14	**-0.36**	**-0.46**	0.09	0.42	0.14	-0.27
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	30	100%	**-0.44**	-0.12	-0.29	0.03	-0.24	-0.12	0.13	0.28	0.04	0.11
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	30	100%	**-0.43**	-0.13	-0.29	-0.04	-0.20	-0.17	0.13	0.25	0.04	0.08
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	30	100%	-0.15	0.03	**-0.31**	-0.10	-0.25	-0.27	0.06	0.21	0.02	-0.12
	1,2,3,4,7,8-Hexachlorodibenzofuran	30	100%	**-0.39**	-0.06	-0.24	0.08	-0.25	-0.05	0.07	0.20	-0.02	0.11
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	30	100%	-0.30	-0.17	**-0.41**	-0.18	**-0.39**	**-0.44**	0.10	0.44	0.11	-0.28
	1,2,3,6,7,8-Hexachlorodibenzofuran	30	100%	**-0.40**	-0.12	**-0.32**	0.00	-0.27	-0.11	0.06	0.21	-0.04	0.11
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	30	100%	-0.26	-0.15	**-0.38**	-0.13	**-0.42**	**-0.43**	0.06	0.41	0.10	-0.29
	1,2,3,7,8,9-Hexachlorodibenzofuran	30	50%	**-0.42**	-0.11	0.02	0.13	-0.29	**-0.43**	-0.05	0.24	0.13	**-0.31**
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	30	100%	**-0.31**	-0.16	**-0.49**	-0.21	**-0.33**	-0.26	0.10	0.34	0.05	-0.14
	1,2,3,7,8-Pentachlorodibenzofuran	30	100%	**-0.35**	-0.13	**-0.34**	0.02	-0.30	-0.21	0.05	0.28	-0.03	0.00
	2,3,4,6,7,8-Hexachlorodibenzofuran	30	100%	**-0.33**	-0.13	**-0.39**	-0.06	-0.23	-0.09	0.07	0.19	-0.05	0.12
	2,3,4,7,8-Pentachlorodibenzofuran	30	100%	**-0.37**	-0.14	**-0.36**	-0.06	-0.27	-0.09	0.04	0.20	-0.07	0.09
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	30	100%	**-0.47**	-0.12	**-0.35**	-0.17	-0.29	-0.20	0.09	0.29	0.07	-0.15
	2,3,7,8-Tetrachlorodibenzofuran	30	100%	-0.21	-0.02	**-0.33**	-0.05	**-0.44**	**-0.37**	0.03	0.39	0.07	-0.25
PCBs	PCB 1	30	100%	-0.08	0.33	0.09	0.36	**-0.51**	**-0.58**	-0.04	0.41	0.09	**-0.37**
	PCB 10	30	67%	-0.25	0.30	0.13	0.19	**-0.46**	**-0.68**	0.13	0.50	0.22	-0.21
	PCB 103	30	83%	-0.29	-0.14	**-0.43**	-0.09	**-0.41**	**-0.39**	0.02	0.37	0.07	**-0.30**
	PCB 105	30	97%	-0.23	-0.24	**-0.49**	-0.26	-0.22	**-0.32**	0.21	0.40	0.26	-0.23
	PCB 107	30	100%	-0.26	-0.17	**-0.45**	-0.18	**-0.32**	**-0.40**	0.15	0.43	0.22	**-0.32**
	PCB 108/124	30	93%	-0.25	-0.24	**-0.49**	-0.25	-0.26	-0.29	0.15	0.36	0.19	-0.24
	PCB 11	30	100%	**-0.36**	-0.19	**-0.35**	-0.07	**-0.48**	**-0.58**	0.11	0.58	0.21	**-0.46**
	PCB 110/115	30	100%	-0.30	-0.22	**-0.51**	-0.24	-0.28	**-0.34**	0.19	0.41	0.23	-0.25
	PCB 114	30	93%	**-0.36**	-0.16	**-0.52**	-0.15	**-0.32**	**-0.38**	0.16	0.43	0.19	-0.22
	PCB 118	30	100%	-0.28	-0.22	**-0.49**	-0.24	-0.26	**-0.35**	0.20	0.42	0.23	-0.25
	PCB 12/13	30	97%	-0.20	0.09	-0.06	0.16	**-0.56**	**-0.61**	-0.03	0.51	0.14	**-0.50**
	PCB 120	30	60%	-0.12	0.08	-0.23	-0.07	**-0.47**	**-0.41**	0.03	0.41	0.02	**-0.40**
	PCB 122	29	66%	**-0.31**	-0.09	-0.16	0.02	**-0.44**	**-0.45**	0.11	0.57	0.22	**-0.34**
	PCB 123	30	87%	-0.21	-0.13	**-0.47**	-0.27	-0.24	-0.21	0.10	0.30	0.11	-0.21
	PCB 126	30	67%	0.03	0.04	-0.13	-0.07	**-0.35**	-0.18	0.02	0.20	0.04	-0.10
	PCB 127	30	47%	0.01	-0.03	-0.04	-0.15	**-0.39**	-0.22	-0.12	0.14	-0.06	-0.10
	PCB 128/166	30	100%	-0.29	-0.23	**-0.48**	-0.24	-0.24	**-0.32**	0.16	0.33	0.19	-0.23
	PCB 129/138/163	30	100%	**-0.31**	-0.24	**-0.50**	-0.22	-0.27	**-0.37**	0.18	0.39	0.21	-0.26
	PCB 130	30	100%	**-0.30**	-0.23	**-0.49**	-0.21	-0.27	**-0.36**	0.17	0.38	0.21	-0.27
	PCB 131	30	70%	-0.30	**-0.31**	**-0.46**	**-0.34**	-0.26	**-0.34**	0.12	0.32	0.14	-0.30
	PCB 132	30	100%	**-0.32**	-0.23	**-0.50**	-0.23	-0.28	**-0.37**	0.18	0.38	0.20	-0.27
	PCB 133	30	97%	-0.28	-0.20	**-0.47**	-0.20	-0.27	**-0.39**	0.17	0.37	0.21	-0.24
	PCB 134	30	97%	**-0.30**	-0.23	**-0.49**	-0.21	**-0.30**	**-0.40**	0.15	0.39	0.18	-0.29
	PCB 135/151	30	97%	**-0.31**	-0.21	**-0.50**	-0.20	-0.29	**-0.37**	0.18	0.40	0.20	-0.29
	PCB 136	30	100%	**-0.32**	-0.22	**-0.51**	-0.18	**-0.31**	**-0.39**	0.18	0.42	0.20	-0.30
	PCB 137	30	97%	-0.29	-0.29	**-0.50**	-0.28	-0.19	-0.30	0.21	0.35	0.23	-0.23

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PCBs (cont.)	PCB 139/140	30	80%	-0.24	-0.27	**-0.55**	**-0.31**	**-0.32**	**-0.37**	0.17	0.39	0.17	-0.22
	PCB 141	30	100%	-0.29	-0.22	**-0.49**	-0.24	-0.27	**-0.35**	0.15	0.34	0.16	-0.26
	PCB 144	30	97%	-0.26	-0.25	**-0.49**	-0.23	-0.26	**-0.32**	0.16	0.36	0.17	-0.28
	PCB 146	30	100%	-0.26	-0.18	**-0.48**	-0.17	**-0.31**	**-0.38**	0.14	0.37	0.18	-0.27
	PCB 147/149	30	100%	**-0.32**	-0.23	**-0.50**	-0.20	**-0.32**	**-0.39**	0.16	0.41	0.20	-0.28
	PCB 148	30	23%	0.09	0.16	-0.22	0.03	**-0.34**	-0.16	0.02	0.15	0.04	-0.06
	PCB 15	30	100%	-0.23	0.10	-0.09	0.13	**-0.50**	**-0.61**	0.11	0.56	0.22	**-0.41**
	PCB 150	30	40%	-0.04	0.08	**-0.32**	0.11	**-0.49**	**-0.38**	-0.02	0.35	0.03	-0.19
	PCB 153/168	30	100%	-0.30	-0.21	**-0.49**	-0.20	**-0.31**	**-0.39**	0.17	0.40	0.20	-0.27
	PCB 154	30	80%	-0.20	-0.09	**-0.42**	-0.16	**-0.42**	**-0.34**	0.02	0.30	0.08	**-0.31**
	PCB 155	30	67%	-0.10	0.00	-0.25	0.11	**-0.60**	**-0.42**	0.00	0.49	0.11	**-0.34**
	PCB 156/157	30	100%	-0.27	-0.23	**-0.48**	-0.24	-0.23	**-0.33**	0.18	0.35	0.21	-0.25
	PCB 158	30	100%	-0.29	-0.22	**-0.49**	-0.23	-0.25	**-0.34**	0.19	0.36	0.20	-0.25
	PCB 16	30	100%	**-0.36**	-0.14	-0.30	-0.09	**-0.48**	**-0.53**	0.05	0.51	0.15	**-0.50**
	PCB 164	30	100%	**-0.32**	-0.24	**-0.50**	-0.22	-0.26	**-0.36**	0.18	0.38	0.21	-0.25
	PCB 167	30	100%	-0.29	-0.23	**-0.48**	-0.25	-0.22	**-0.33**	0.19	0.35	0.21	-0.24
	PCB 17	30	100%	**-0.33**	-0.09	-0.25	-0.01	**-0.53**	**-0.59**	0.06	0.58	0.17	**-0.48**
	PCB 170	30	100%	**-0.31**	-0.21	**-0.49**	-0.18	-0.27	**-0.42**	0.19	0.39	0.22	-0.30
	PCB 171/173	30	100%	**-0.31**	-0.22	**-0.50**	-0.19	**-0.31**	**-0.42**	0.19	0.43	0.22	-0.27
	PCB 172	30	100%	**-0.31**	-0.21	**-0.50**	-0.17	-0.27	**-0.42**	0.22	0.42	0.24	-0.26
	PCB 174	30	100%	**-0.33**	-0.21	**-0.50**	-0.18	-0.27	**-0.43**	0.21	0.41	0.23	-0.26
	PCB 175	30	90%	**-0.32**	-0.25	**-0.51**	**-0.30**	**-0.37**	**-0.41**	0.11	0.40	0.14	**-0.36**
	PCB 176	30	93%	-0.27	-0.21	**-0.49**	-0.16	**-0.31**	**-0.41**	0.18	0.42	0.19	**-0.30**
	PCB 177	30	100%	**-0.34**	-0.21	**-0.49**	-0.15	**-0.31**	**-0.45**	0.21	0.45	0.23	-0.28
	PCB 178	30	97%	-0.25	-0.22	**-0.52**	-0.19	-0.27	**-0.41**	0.19	0.39	0.22	-0.28
	PCB 179	30	100%	**-0.30**	-0.21	**-0.49**	-0.15	**-0.31**	**-0.42**	0.18	0.41	0.20	-0.28
	PCB 18/30	30	100%	**-0.35**	-0.13	-0.29	-0.05	**-0.50**	**-0.57**	0.06	0.55	0.17	**-0.49**
	PCB 180/193	30	97%	-0.20	0.00	**-0.31**	0.00	-0.17	**-0.40**	0.15	0.28	0.11	-0.22
	PCB 181	30	27%	-0.09	0.04	-0.23	0.14	**-0.48**	**-0.38**	0.03	0.40	0.18	-0.21
	PCB 183/185	30	100%	-0.30	-0.22	**-0.49**	-0.18	-0.28	**-0.41**	0.19	0.39	0.21	-0.25
	PCB 187	30	100%	-0.28	-0.21	**-0.49**	-0.14	**-0.31**	**-0.41**	0.17	0.39	0.19	-0.26
	PCB 188	30	50%	0.16	0.03	-0.14	0.22	**-0.31**	**-0.32**	-0.06	0.13	-0.05	-0.08
	PCB 189	30	83%	-0.28	-0.25	**-0.50**	**-0.31**	**-0.34**	**-0.43**	0.08	0.33	0.13	**-0.38**
	PCB 19	30	97%	**-0.32**	-0.06	-0.26	0.04	**-0.54**	**-0.59**	0.04	0.57	0.15	**-0.47**
	PCB 190	30	100%	**-0.30**	-0.20	**-0.49**	-0.17	-0.28	**-0.44**	0.20	0.41	0.23	-0.28
	PCB 191	30	73%	-0.26	-0.25	**-0.49**	-0.27	**-0.31**	-0.27	0.10	0.26	0.13	-0.25
	PCB 194	30	100%	**-0.33**	-0.14	**-0.48**	-0.16	-0.28	**-0.49**	0.22	0.44	0.24	**-0.30**
	PCB 195	30	100%	**-0.33**	-0.13	**-0.47**	-0.16	-0.27	**-0.48**	0.24	0.44	0.27	-0.29
	PCB 196	30	97%	**-0.33**	-0.15	**-0.48**	-0.19	-0.25	**-0.47**	0.24	0.41	0.25	-0.29
	PCB 197/200	29	76%	**-0.31**	-0.24	**-0.47**	**-0.33**	-0.25	**-0.44**	0.22	0.36	0.25	**-0.32**

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PCBs (cont.)	PCB 198/199	30	100%	**-0.33**	-0.16	**-0.48**	-0.17	-0.25	**-0.49**	0.24	0.43	0.25	-0.29
	PCB 2	30	97%	-0.23	0.03	-0.22	0.10	**-0.62**	**-0.58**	-0.05	0.48	0.06	**-0.48**
	PCB 20/28	30	100%	**-0.32**	-0.06	-0.28	-0.03	**-0.47**	**-0.58**	0.08	0.54	0.17	**-0.44**
	PCB 201	30	100%	**-0.40**	-0.15	**-0.43**	-0.16	-0.29	**-0.52**	0.25	0.48	0.28	**-0.33**
	PCB 202	30	100%	**-0.33**	-0.16	**-0.43**	-0.10	**-0.31**	**-0.54**	0.21	0.49	0.23	**-0.31**
	PCB 203	30	100%	**-0.31**	-0.14	**-0.46**	-0.16	-0.25	**-0.49**	0.23	0.41	0.24	-0.29
	PCB 205	30	73%	**-0.31**	-0.19	**-0.51**	-0.17	-0.30	**-0.43**	0.19	0.39	0.16	-0.27
	PCB 206	30	97%	**-0.30**	-0.06	-0.28	0.01	-0.29	**-0.59**	0.21	0.49	0.25	**-0.34**
	PCB 207	30	90%	**-0.35**	-0.09	**-0.34**	-0.05	**-0.31**	**-0.58**	0.22	0.49	0.24	**-0.33**
	PCB 208	30	100%	**-0.33**	-0.12	-0.26	-0.01	-0.27	**-0.58**	0.23	0.51	0.29	**-0.34**
	PCB 209	30	100%	**-0.37**	-0.08	-0.30	-0.04	-0.22	**-0.54**	0.26	0.47	0.28	**-0.32**
	PCB 21/33	30	100%	**-0.36**	-0.13	**-0.35**	-0.14	**-0.42**	**-0.48**	0.07	0.48	0.16	**-0.43**
	PCB 22	30	100%	**-0.34**	-0.13	**-0.34**	-0.09	**-0.42**	**-0.52**	0.10	0.51	0.18	**-0.44**
	PCB 24	30	60%	-0.08	-0.07	-0.30	-0.08	**-0.51**	-0.29	0.03	0.36	0.13	-0.23
	PCB 25	30	100%	-0.27	0.08	-0.14	0.11	**-0.55**	**-0.66**	0.06	0.57	0.18	**-0.45**
	PCB 26/29	30	100%	-0.29	0.03	-0.17	0.07	**-0.51**	**-0.68**	0.09	0.59	0.20	**-0.45**
	PCB 27	30	100%	-0.22	0.03	-0.18	0.06	**-0.54**	**-0.61**	0.07	0.58	0.18	**-0.45**
	PCB 3	30	100%	-0.21	0.09	-0.13	0.18	**-0.56**	**-0.59**	0.00	0.49	0.12	**-0.46**
	PCB 31	30	100%	**-0.33**	-0.07	-0.29	-0.02	**-0.48**	**-0.58**	0.09	0.57	0.18	**-0.46**
	PCB 32	30	100%	**-0.34**	-0.08	-0.28	-0.01	**-0.51**	**-0.58**	0.09	0.58	0.18	**-0.44**
	PCB 34	30	83%	**-0.50**	-0.07	-0.17	0.09	**-0.40**	**-0.66**	0.16	0.62	0.31	**-0.41**
	PCB 35	30	100%	**-0.32**	-0.11	**-0.36**	-0.08	**-0.47**	**-0.60**	0.10	0.57	0.18	**-0.47**
	PCB 36	30	13%	-0.17	0.19	-0.08	0.18	**-0.53**	**-0.40**	0.09	0.47	0.14	-0.11
	PCB 37	30	100%	**-0.32**	-0.04	-0.30	-0.04	**-0.40**	**-0.54**	0.13	0.51	0.21	**-0.42**
	PCB 39	30	83%	-0.30	-0.12	**-0.31**	0.00	**-0.48**	**-0.52**	0.13	0.62	0.20	**-0.37**
	PCB 4	30	97%	-0.23	0.11	-0.11	0.17	**-0.59**	**-0.61**	0.00	0.53	0.12	**-0.46**
	PCB 40/71	30	100%	**-0.32**	-0.14	**-0.40**	-0.12	**-0.42**	**-0.49**	0.14	0.53	0.22	**-0.37**
	PCB 41	30	73%	-0.18	-0.03	-0.24	-0.10	-0.28	-0.28	-0.09	0.14	-0.06	**-0.33**
	PCB 42	30	100%	**-0.31**	-0.15	**-0.43**	-0.14	**-0.41**	**-0.46**	0.13	0.52	0.22	**-0.38**
	PCB 43	29	31%	-0.15	0.12	-0.20	0.22	**-0.54**	-0.27	0.01	0.33	-0.01	-0.04
	PCB 44/47/65	30	100%	**-0.32**	-0.16	**-0.43**	-0.14	**-0.41**	**-0.46**	0.14	0.53	0.22	**-0.36**
	PCB 45	30	100%	**-0.32**	-0.20	**-0.43**	-0.15	**-0.40**	**-0.46**	0.11	0.48	0.20	**-0.36**
	PCB 46	30	97%	**-0.31**	-0.19	**-0.42**	-0.14	**-0.40**	**-0.46**	0.10	0.48	0.19	**-0.37**
	PCB 48	30	100%	**-0.31**	-0.14	**-0.41**	-0.11	**-0.41**	**-0.47**	0.11	0.51	0.19	**-0.39**
	PCB 49/69	30	100%	**-0.30**	-0.14	**-0.41**	-0.12	**-0.43**	**-0.49**	0.13	0.52	0.21	**-0.37**
	PCB 50/53	30	100%	**-0.30**	-0.18	**-0.43**	-0.12	**-0.43**	**-0.47**	0.08	0.49	0.17	**-0.39**
	PCB 51	30	100%	**-0.36**	-0.03	**-0.38**	0.09	**-0.42**	**-0.47**	0.13	0.48	0.19	**-0.32**
	PCB 52	30	100%	**-0.31**	-0.19	**-0.46**	-0.18	**-0.41**	**-0.44**	0.12	0.49	0.20	**-0.34**
	PCB 54	30	70%	-0.26	0.01	-0.25	0.04	**-0.41**	**-0.44**	0.04	0.42	0.17	**-0.43**
	PCB 55	30	60%	**-0.39**	-0.12	-0.15	-0.03	**-0.40**	**-0.43**	0.14	0.53	0.23	**-0.34**
	PCB 56	30	100%	-0.29	-0.10	**-0.39**	-0.12	**-0.34**	**-0.44**	0.15	0.47	0.21	**-0.34**
	PCB 57	30	63%	-0.24	-0.08	-0.11	0.07	**-0.56**	**-0.43**	0.02	0.56	0.12	**-0.36**

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PCBs (cont.)	PCB 58	30	53%	-0.16	0.11	-0.29	-0.01	**-0.51**	**-0.41**	0.12	0.56	0.12	**-0.32**
	PCB 59/62/75	30	100%	-0.27	-0.12	**-0.40**	-0.10	**-0.43**	**-0.47**	0.10	0.50	0.18	**-0.38**
	PCB 6	30	97%	-0.21	0.14	-0.08	0.18	**-0.55**	**-0.64**	0.03	0.53	0.16	**-0.45**
	PCB 60	30	100%	-0.27	-0.13	**-0.41**	-0.19	**-0.34**	**-0.42**	0.14	0.45	0.22	**-0.35**
	PCB 61/70/74/76	30	100%	-0.30	-0.14	**-0.41**	-0.16	**-0.33**	**-0.44**	0.17	0.48	0.23	**-0.33**
	PCB 63	30	100%	**-0.33**	-0.12	**-0.38**	-0.12	**-0.38**	**-0.51**	0.15	0.53	0.23	**-0.38**
	PCB 64	30	100%	-0.29	-0.15	**-0.43**	-0.13	**-0.40**	**-0.46**	0.14	0.51	0.21	**-0.36**
	PCB 66	30	100%	-0.29	-0.10	**-0.39**	-0.13	**-0.34**	**-0.45**	0.16	0.48	0.22	**-0.34**
	PCB 67	30	100%	**-0.32**	-0.12	**-0.39**	-0.12	**-0.37**	**-0.47**	0.17	0.53	0.24	**-0.36**
	PCB 68	30	90%	-0.17	0.15	-0.16	0.17	**-0.54**	**-0.59**	0.04	0.50	0.14	**-0.39**
	PCB 72	30	97%	-0.21	0.07	-0.23	0.09	**-0.54**	**-0.59**	0.04	0.54	0.14	**-0.40**
	PCB 77	30	100%	-0.30	-0.10	**-0.42**	-0.17	**-0.34**	**-0.48**	0.16	0.48	0.22	**-0.37**
	PCB 79	30	63%	-0.21	0.01	-0.21	-0.13	**-0.32**	-0.24	0.18	0.40	0.26	-0.05
	PCB 8	30	100%	-0.30	0.03	-0.18	0.05	**-0.52**	**-0.56**	0.05	0.54	0.13	**-0.48**
	PCB 81	30	37%	-0.17	0.05	-0.28	-0.14	**-0.48**	**-0.34**	0.03	0.30	0.07	-0.18
	PCB 82	30	100%	-0.29	-0.20	**-0.50**	-0.24	-0.28	**-0.33**	0.19	0.42	0.23	-0.26
	PCB 83	30	87%	-0.25	-0.27	**-0.50**	-0.21	-0.28	**-0.33**	0.15	0.39	0.13	-0.29
	PCB 84	30	100%	**-0.32**	-0.27	**-0.53**	-0.24	-0.27	**-0.37**	0.20	0.44	0.23	-0.26
	PCB 85/116/117	30	100%	-0.29	-0.20	**-0.51**	-0.22	-0.29	**-0.35**	0.21	0.43	0.24	-0.25
	PCB 86/87/97/109/119/125	30	100%	-0.29	-0.24	**-0.47**	-0.25	-0.26	**-0.31**	0.16	0.38	0.20	-0.24
	PCB 89	30	83%	-0.27	-0.19	**-0.50**	-0.24	**-0.35**	**-0.36**	0.10	0.39	0.14	**-0.32**
	PCB 9	30	40%	-0.29	-0.05	-0.21	0.01	**-0.46**	**-0.51**	-0.08	0.36	0.00	**-0.44**
	PCB 90/101/113	30	100%	-0.30	-0.21	**-0.49**	-0.20	-0.29	**-0.36**	0.18	0.40	0.22	-0.27
	PCB 91	30	100%	**-0.30**	-0.21	**-0.52**	-0.19	-0.30	**-0.38**	0.20	0.44	0.23	-0.26
	PCB 92	30	97%	-0.30	-0.20	**-0.48**	-0.20	**-0.30**	**-0.38**	0.17	0.41	0.21	-0.28
	PCB 93/100	30	73%	-0.22	-0.02	**-0.36**	-0.04	**-0.47**	**-0.45**	0.14	0.47	0.21	-0.29
	PCB 94	30	60%	**-0.34**	-0.21	**-0.36**	-0.11	**-0.48**	**-0.39**	0.06	0.45	0.14	**-0.40**
	PCB 95	30	100%	-0.29	-0.27	**-0.50**	-0.24	**-0.32**	**-0.35**	0.10	0.37	0.13	-0.27
	PCB 96	30	73%	-0.19	-0.18	**-0.45**	-0.23	**-0.48**	**-0.40**	0.02	0.40	0.09	**-0.47**
	PCB 98/102	30	80%	**-0.32**	-0.18	**-0.53**	-0.22	**-0.34**	**-0.38**	0.17	0.43	0.20	**-0.37**
	PCB 99	30	100%	**-0.30**	-0.19	**-0.51**	-0.20	-0.29	**-0.37**	0.20	0.42	0.23	-0.26
	Total PCBs congener (209 specified)	30	100%	**-0.32**	-0.16	**-0.44**	-0.17	**-0.37**	**-0.45**	0.14	0.46	0.20	**-0.35**
	Total PCBs (sum of 9 Aroclors)	30	100%	**-0.54**	**-0.42**	**-0.57**	**-0.52**	0.09	-0.17	0.31	0.23	0.32	-0.02
Pesticides	2,4'-DDD	30	100%	-0.20	-0.06	**-0.36**	**-0.59**	0.01	-0.03	0.04	-0.09	-0.08	0.00
	2,4'-DDE	30	100%	**-0.39**	-0.11	**-0.39**	**-0.47**	-0.07	**-0.30**	0.26	0.31	0.25	-0.11
	2,4'-DDT	29	97%	-0.11	-0.04	**-0.46**	-0.14	-0.14	-0.06	0.00	0.00	-0.06	-0.11
	4,4'-DDD	30	100%	-0.24	-0.08	**-0.43**	**-0.62**	0.03	-0.04	0.05	-0.07	-0.07	-0.05
	4,4'-DDE	30	100%	**-0.32**	-0.20	**-0.51**	**-0.43**	-0.19	-0.26	0.17	0.31	0.16	-0.16
	4,4'-DDT	30	100%	-0.08	-0.02	**-0.34**	-0.16	-0.20	0.04	-0.23	-0.22	-0.23	-0.06
	Dieldrin	30	100%	-0.27	-0.29	**-0.31**	**-0.38**	-0.22	-0.10	0.02	0.14	0.04	-0.05
	Heptachlor endo-epoxide	30	57%	-0.17	-0.08	**-0.41**	-0.07	**-0.38**	-0.07	0.09	0.27	-0.04	0.14
	Heptachlor epoxide	30	57%	0.25	0.23	0.12	0.50	**-0.31**	0.26	**-0.33**	-0.16	**-0.36**	0.12
	Hexachlorobenzene	30	100%	**-0.46**	-0.23	**-0.50**	**-0.53**	-0.08	0.08	0.04	0.06	-0.08	-0.09
	Total BHC Compounds	30	100%	-0.20	-0.12	**-0.32**	**-0.41**	0.27	0.00	0.21	-0.10	0.08	0.20
	Total Chlordane	30	100%	-0.25	-0.18	**-0.32**	-0.20	-0.21	0.07	0.06	0.05	0.01	0.12
	Total DDx (2,4 & 4,4)	30	100%	**-0.30**	-0.12	**-0.50**	**-0.45**	-0.16	-0.19	0.07	0.16	0.04	-0.14

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
Pesticides (cont.)	Total DDx (4,4)	30	100%	**-0.30**	-0.13	**-0.52**	**-0.42**	-0.19	-0.21	0.05	0.17	0.01	-0.17
	Total alpha + gamma chlordane	30	100%	-0.27	-0.17	**-0.32**	-0.23	-0.20	0.04	0.07	0.07	0.03	0.10
	alpha-BHC	30	100%	-0.30	-0.10	-0.29	**-0.40**	0.18	-0.14	0.25	0.06	0.20	0.12
	alpha-Chlordane	30	100%	-0.19	-0.01	-0.23	-0.06	-0.25	0.04	0.00	0.03	-0.04	0.13
	beta-BHC	30	90%	-0.10	-0.05	**-0.36**	**-0.41**	0.11	0.18	-0.02	-0.19	-0.16	0.15
	cis-Nonachlor	30	100%	**-0.30**	-0.19	**-0.34**	-0.20	**-0.30**	-0.09	0.09	0.21	0.11	-0.01
	gamma-BHC (lindane)	30	50%	-0.08	0.09	0.07	0.01	-0.19	-0.19	-0.29	-0.19	-0.17	**-0.31**
	gamma-Chlordane	30	100%	**-0.30**	-0.28	**-0.38**	**-0.30**	-0.13	0.03	0.12	0.08	0.08	0.11
	trans-Nonachlor	30	100%	-0.21	-0.09	-0.26	-0.12	-0.19	0.10	0.04	0.00	0.02	0.18
PAHs	1-Methylnaphthalene	30	93%	-0.22	-0.10	**-0.33**	**-0.42**	-0.01	**-0.35**	0.17	0.27	0.16	-0.23
	2-Methylnaphthalene	30	90%	-0.01	-0.04	-0.07	-0.19	0.10	-0.26	0.19	0.24	0.16	-0.08
	Acenaphthene	30	83%	-0.23	-0.01	-0.26	**-0.30**	-0.16	**-0.43**	0.17	0.37	0.15	-0.25
	Acenaphthylene	30	97%	-0.18	0.05	-0.26	-0.25	0.07	-0.09	0.17	0.18	0.03	-0.07
	Anthracene	30	100%	-0.28	-0.03	**-0.36**	**-0.33**	-0.06	**-0.35**	0.21	0.35	0.17	-0.25
	Benzo(a)anthracene	30	100%	-0.22	0.10	-0.27	-0.28	-0.06	-0.20	0.17	0.26	0.07	-0.13
	Benzo(a)pyrene	30	100%	-0.14	0.13	-0.26	-0.23	0.00	-0.11	0.17	0.20	0.05	-0.03
	Benzo(b)fluoranthene	30	100%	-0.14	0.16	-0.19	-0.16	-0.04	-0.17	0.16	0.23	0.04	-0.05
	Benzo(e)pyrene	30	100%	-0.17	0.14	-0.26	-0.22	-0.01	-0.15	0.19	0.24	0.07	-0.05
	Benzo(g,h,i)perylene	30	100%	-0.16	0.09	-0.24	-0.28	0.09	-0.07	0.19	0.14	0.05	0.04
	Benzo(k)fluoranthene	30	100%	-0.14	0.20	-0.19	-0.18	-0.05	-0.11	0.16	0.22	0.04	0.00
	C1-Chrysenes	30	100%	-0.30	0.02	**-0.34**	**-0.33**	0.06	-0.24	0.23	0.26	0.11	-0.19
	C1-Fluoranthenes/Pyrenes	30	100%	-0.26	0.01	**-0.35**	-0.29	0.04	-0.26	0.21	0.27	0.10	-0.19
	C1-Fluorenes	30	43%	-0.25	-0.02	**-0.35**	-0.28	-0.23	**-0.46**	0.04	0.33	0.06	**-0.45**
	C1-Phenanthrenes/Anthracenes	30	97%	**-0.37**	-0.07	**-0.37**	**-0.32**	-0.08	**-0.39**	0.20	0.39	0.19	**-0.36**
	C2-Chrysenes	30	97%	-0.25	-0.06	-0.28	**-0.34**	0.18	-0.19	0.23	0.20	0.12	-0.12
	C2-Fluoranthenes/Pyrenes	30	100%	**-0.32**	-0.10	**-0.35**	**-0.40**	0.13	-0.23	0.25	0.25	0.16	-0.18
	C2-Fluorenes	30	73%	**-0.37**	-0.18	**-0.36**	**-0.31**	-0.01	**-0.36**	0.20	0.37	0.19	-0.27
	C2-Naphthalenes	30	97%	-0.23	-0.08	**-0.31**	**-0.38**	-0.01	**-0.32**	0.16	0.28	0.15	**-0.31**
	C2-Phenanthrenes/Anthracenes	30	97%	**-0.37**	-0.08	**-0.35**	**-0.35**	-0.01	**-0.37**	0.20	0.35	0.16	**-0.33**
	C3-Chrysenes	30	93%	-0.17	-0.03	-0.21	-0.26	0.18	-0.24	0.25	0.26	0.18	-0.16
	C3-Fluoranthenes/Pyrenes	30	97%	**-0.31**	-0.13	-0.29	**-0.36**	0.13	-0.25	0.22	0.27	0.15	-0.21
	C3-Fluorenes	30	80%	-0.21	-0.02	-0.22	-0.23	0.01	**-0.33**	0.08	0.23	0.05	**-0.31**
	C3-Naphthalenes	30	97%	**-0.33**	-0.13	**-0.30**	**-0.40**	-0.05	**-0.40**	0.16	0.35	0.17	**-0.39**
	C3-Phenanthrenes/Anthracenes	30	97%	-0.28	-0.09	-0.27	-0.25	0.01	**-0.35**	0.11	0.28	0.07	-0.28
	C4-Chrysenes	30	73%	-0.18	-0.10	-0.23	**-0.32**	0.17	-0.23	0.16	0.17	0.10	-0.14
	C4-Naphthalenes	30	90%	**-0.31**	-0.10	-0.20	-0.28	0.04	**-0.37**	0.14	0.30	0.16	**-0.33**
	C4-Phenanthrenes/Anthracenes	30	93%	-0.16	-0.01	-0.16	-0.14	0.11	**-0.36**	0.07	0.16	0.08	-0.22
	Chrysene	30	100%	-0.21	0.10	-0.26	-0.26	-0.04	-0.19	0.20	0.26	0.08	-0.07
	Dibenz(a,h)anthracene	30	100%	-0.17	0.13	-0.20	-0.25	0.05	-0.08	0.17	0.15	0.03	0.03
	Fluoranthene	30	100%	-0.28	0.04	-0.24	-0.28	-0.11	**-0.32**	0.16	0.30	0.10	-0.21
	Fluorene	30	80%	-0.17	0.02	-0.26	-0.27	**-0.32**	**-0.42**	0.00	0.30	0.03	**-0.32**
	Indeno(1,2,3-cd)pyrene	30	100%	-0.12	0.14	-0.21	-0.25	0.05	-0.06	0.15	0.12	0.02	0.05
	Naphthalene	30	97%	-0.01	0.06	-0.19	-0.26	0.08	0.02	0.18	0.16	0.07	0.06
	Perylene	30	100%	-0.16	0.14	-0.25	-0.16	-0.02	-0.22	0.22	0.28	0.08	-0.02
	Phenanthrene	30	100%	-0.20	0.14	-0.15	-0.16	-0.22	**-0.36**	0.09	0.29	0.09	-0.19
	Pyrene	30	100%	-0.26	0.02	**-0.34**	**-0.31**	-0.01	-0.28	0.20	0.27	0.11	-0.18

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PAHs (cont.)	Total Alkylated PAHs	30	100%	**-0.33**	-0.12	**-0.34**	**-0.36**	0.05	**-0.33**	0.22	0.33	0.18	-0.28
	Total HMW PAHs	30	100%	-0.20	0.12	-0.26	-0.25	-0.03	-0.20	0.18	0.24	0.07	-0.10
	Total LMW PAHs	30	100%	-0.25	0.00	-0.29	**-0.33**	-0.08	-0.28	0.19	0.31	0.13	-0.17
	Total PAH	30	100%	-0.22	0.09	-0.28	-0.27	-0.04	-0.21	0.18	0.25	0.09	-0.11
SVOCs	4-Methylphenol	27	63%	0.07	-0.12	-0.27	-0.24	-0.08	0.00	-0.17	-0.17	-0.25	-0.13
	Acetophenone	29	55%	0.00	0.36	-0.06	0.01	**-0.37**	0.06	-0.15	0.05	-0.22	-0.10
	Carbazole	26	42%	0.22	-0.08	0.06	0.20	-0.09	0.01	-0.10	-0.02	-0.20	0.13
	Dibenzofuran	26	38%	0.28	-0.07	0.11	0.19	-0.09	0.04	-0.12	-0.05	-0.18	0.12
	bis(2-Ethylhexyl)phthalate (DEHP)	29	90%	-0.22	-0.14	-0.20	-0.08	**-0.40**	-0.19	-0.13	0.27	-0.04	-0.25
Petroleum Hydrocarbons	Heneicosane	30	57%	0.16	0.32	0.04	0.07	-0.06	0.09	0.09	0.10	0.11	0.04
	Heptadecane	30	67%	0.00	0.03	-0.18	**-0.32**	-0.13	0.08	-0.16	-0.09	-0.15	-0.06
	Hexatriacontane	30	43%	-0.04	0.25	-0.12	0.11	-0.04	-0.04	0.01	0.06	0.01	-0.03
	N-Docosane	30	70%	0.24	0.37	0.13	0.19	0.06	0.19	-0.19	-0.15	-0.20	0.00
	N-Dotriacontane	30	73%	0.14	0.09	-0.07	0.04	0.04	0.24	-0.04	-0.01	-0.06	-0.09
	N-Hentriacontane	30	73%	0.16	0.46	-0.01	0.31	-0.06	0.10	0.09	0.05	-0.02	0.15
	N-Heptatriacontane	30	40%	-0.15	0.30	-0.02	0.03	**-0.36**	-0.23	0.00	0.31	0.05	-0.17
	N-Hexadecane	30	40%	0.09	0.40	-0.16	0.06	-0.12	-0.10	0.04	0.14	-0.04	-0.06
	N-Nonacosane	30	90%	0.11	0.11	-0.21	0.24	**-0.37**	-0.01	-0.14	0.23	-0.18	-0.23
	N-Tetracontane	30	47%	-0.07	0.11	-0.27	-0.06	0.11	0.08	0.09	0.00	0.00	0.03
	N-Tetracosane	30	67%	-0.06	0.11	-0.14	-0.11	-0.23	0.01	-0.07	0.05	0.00	-0.10
	N-Triacontane	30	70%	0.01	0.24	0.00	0.13	**-0.36**	**-0.36**	-0.04	0.34	0.11	**-0.43**
	Octacosane	30	87%	0.21	0.26	-0.04	-0.02	0.01	0.19	-0.10	-0.07	-0.16	0.08
	Octadecane	30	47%	-0.07	0.23	**-0.31**	-0.05	-0.18	-0.12	-0.04	0.13	-0.10	-0.20
	Pentacosane	30	57%	-0.10	0.25	-0.15	0.40	-0.28	**-0.34**	0.14	0.45	0.10	-0.01
	Pentatriacontane	30	53%	0.05	0.17	-0.25	0.06	-0.12	-0.05	0.07	0.20	-0.06	-0.05
	Phytane	30	40%	-0.26	0.13	-0.29	-0.02	-0.23	-0.22	-0.07	0.18	-0.06	-0.27
	Tricosane	30	97%	0.13	0.28	-0.13	0.00	-0.06	0.09	-0.07	-0.01	-0.14	0.00
	Total Petroleum Hydrocarbons (C9-C40)	30	100%	-0.05	0.19	-0.15	0.04	-0.20	-0.19	-0.07	0.21	-0.04	-0.20
Metals	Aluminum	30	100%	-0.17	0.19	0.07	0.23	**-0.47**	**-0.64**	-0.02	0.39	0.11	-0.22
	Antimony	30	100%	0.01	-0.17	-0.15	-0.05	-0.10	-0.26	-0.11	0.02	-0.03	-0.19
	Arsenic	30	100%	-0.23	-0.02	-0.29	-0.18	-0.21	**-0.43**	0.16	0.35	0.17	-0.20
	Barium	30	100%	-0.16	-0.12	-0.19	-0.14	-0.25	**-0.62**	-0.01	0.22	0.09	-0.23
	Beryllium	30	100%	-0.11	0.06	-0.03	0.10	**-0.59**	**-0.62**	-0.14	0.36	0.04	**-0.31**
	Cadmium	30	100%	**-0.37**	-0.29	**-0.51**	-0.28	**-0.35**	**-0.36**	0.03	0.34	0.09	-0.24
	Calcium	29	100%	0.01	0.06	-0.01	0.03	-0.30	**-0.40**	-0.21	0.14	-0.18	-0.25
	Chromium	30	100%	**-0.35**	**-0.31**	**-0.40**	-0.18	**-0.36**	**-0.37**	0.07	0.40	0.10	-0.12
	Cobalt	30	100%	-0.11	0.10	0.00	0.13	**-0.55**	**-0.59**	-0.11	0.34	0.07	-0.21
	Copper	30	100%	-0.26	-0.17	**-0.41**	-0.28	-0.28	**-0.39**	0.08	0.31	0.15	-0.21
	Iron	30	100%	-0.04	0.18	0.04	0.16	**-0.52**	**-0.57**	-0.14	0.31	0.01	-0.22
	Lead	30	100%	-0.15	-0.16	**-0.35**	-0.19	**-0.33**	**-0.40**	-0.03	0.27	0.08	-0.24
	Magnesium	30	100%	0.00	0.25	0.22	0.29	**-0.41**	**-0.61**	0.03	0.41	0.18	-0.09
	Manganese	30	100%	-0.12	0.19	0.11	0.28	**-0.53**	**-0.72**	-0.03	0.45	0.12	-0.24
	Mercury	30	100%	**-0.30**	-0.23	**-0.65**	**-0.37**	-0.26	-0.21	0.15	0.34	0.11	-0.20
	Methyl mercury	30	100%	-0.05	0.02	**-0.33**	-0.18	**-0.34**	-0.25	-0.20	0.07	-0.16	**-0.33**
	Nickel	30	100%	-0.16	-0.02	-0.04	0.05	**-0.40**	**-0.62**	0.11	0.47	0.31	-0.13
	Potassium	30	100%	-0.14	0.12	0.03	0.17	**-0.48**	**-0.69**	-0.02	0.43	0.11	-0.26

Table A-19
Spearman Rank Correlation of Sediment Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
Metals (cont.)	Selenium	30	100%	-0.24	-0.11	**-0.35**	-0.12	**-0.31**	**-0.44**	0.05	0.29	0.08	-0.20
	Silver	30	100%	**-0.33**	-0.17	**-0.39**	-0.13	**-0.39**	**-0.48**	0.09	0.47	0.18	-0.26
	Sodium	30	100%	0.02	0.15	-0.12	0.06	**-0.47**	**-0.34**	-0.05	0.30	-0.03	-0.06
	Thallium	30	100%	-0.05	0.07	-0.01	0.03	**-0.38**	**-0.55**	-0.03	0.26	0.08	-0.21
	Titanium	30	100%	-0.20	0.14	0.02	0.16	**-0.51**	**-0.67**	-0.01	0.43	0.14	**-0.32**
	Vanadium	30	100%	-0.23	0.05	-0.07	0.13	**-0.40**	**-0.68**	0.05	0.44	0.15	-0.22
	Zinc	30	100%	-0.20	-0.16	**-0.34**	-0.18	**-0.36**	**-0.41**	-0.03	0.28	0.07	-0.23
AVS-SEM	Acid volatile sulfide	30	93%	-0.20	-0.18	**-0.38**	-0.09	-0.23	**-0.52**	0.06	0.30	0.16	-0.15
	Cadmium	30	100%	**-0.36**	-0.29	**-0.43**	-0.28	-0.18	**-0.34**	0.03	0.24	0.12	-0.21
	Copper	30	100%	-0.11	-0.01	-0.28	-0.22	**-0.30**	-0.27	-0.01	0.29	0.06	-0.19
	Lead	30	100%	-0.16	**-0.31**	**-0.39**	-0.30	-0.16	-0.27	0.00	0.17	0.10	-0.19
	Nickel	30	100%	-0.14	-0.28	-0.06	0.06	-0.12	-0.20	0.09	0.24	0.15	0.13
	Zinc	30	100%	-0.19	-0.29	**-0.35**	-0.26	-0.14	-0.28	-0.03	0.14	0.05	-0.18
Grain Size	Percent fines	30	100%	-0.12	0.13	-0.14	0.20	**-0.48**	**-0.31**	0.17	0.46	0.20	-0.05
Ammonia		30	30%	0.29	0.12	0.04	0.16	**-0.33**	-0.11	-0.27	-0.07	**-0.30**	-0.07
Total organic carbon		30	100%	-0.09	-0.05	**-0.34**	**-0.31**	0.05	0.07	0.20	0.08	0.08	0.24

Notes:
1/2 reporting limit substituted for non-detects. Chemicals with a frequency of detection less than 30% not shown.
Correlation coefficients less than -0.3 are in bold and indicate the chemical is statistically signifcantly negatively correlated with the toxicity endpoint or benthic metric.
Shading indicates strength of association as determined by the Spearman correlation coefficient.

Acronyms and Abbreviations:

AVS = acid volatile sulfide
B-IBI = Benthic Index of Biotic Integrity
BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
N = sample size
no./m^2 = number per square meter
NY/NJ = New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SEM = simultaneously extracted metals
SVOC = semivolatile organic compound
Total DDx = sum of DDE, DDD, and DDT
% = percent

Shading
1
0.5
0
-0.5
-1

Table A-20
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
Dioxins/ Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	30	100%	**-0.31**	**-0.42**	**-0.34**	**-0.45**	0.00	-0.24	0.11	0.23	0.26	-0.26
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	30	100%	**-0.60**	**-0.33**	**-0.50**	**-0.31**	-0.13	-0.05	0.08	0.21	0.12	-0.15
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	30	100%	**-0.34**	**-0.41**	-0.23	-0.25	-0.15	-0.23	0.12	0.39	0.27	-0.23
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	30	100%	**-0.54**	-0.29	**-0.45**	-0.12	-0.14	0.00	0.05	0.18	0.05	-0.12
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	30	100%	**-0.42**	-0.16	**-0.40**	-0.05	-0.04	-0.22	0.26	0.35	0.22	-0.21
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	30	93%	**-0.40**	-0.13	-0.27	-0.08	-0.09	-0.18	0.01	0.13	0.00	**-0.39**
	1,2,3,4,7,8-Hexachlorodibenzofuran	30	100%	**-0.53**	-0.16	**-0.34**	-0.03	-0.08	0.00	0.09	0.16	0.03	-0.05
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	30	100%	**-0.49**	-0.17	**-0.31**	-0.26	-0.29	**-0.42**	0.07	0.40	0.17	**-0.37**
	1,2,3,6,7,8-Hexachlorodibenzofuran	30	100%	**-0.64**	**-0.39**	**-0.44**	-0.20	-0.04	-0.02	0.19	0.24	0.17	0.05
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	30	100%	-0.24	-0.11	-0.10	0.14	**-0.31**	**-0.51**	0.04	0.45	0.28	**-0.41**
	1,2,3,7,8,9-Hexachlorodibenzofuran	30	100%	**-0.32**	-0.06	-0.17	0.04	0.09	**-0.36**	0.29	0.31	0.17	-0.17
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	30	93%	**-0.49**	**-0.59**	**-0.38**	**-0.34**	-0.08	-0.16	0.12	0.36	0.13	-0.19
	1,2,3,7,8-Pentachlorodibenzofuran	30	100%	**-0.58**	**-0.32**	**-0.45**	-0.10	-0.22	-0.24	0.05	0.30	0.00	-0.16
	2,3,4,6,7,8-Hexachlorodibenzofuran	30	100%	**-0.57**	-0.30	**-0.39**	-0.25	-0.16	-0.29	0.14	0.35	0.20	-0.19
	2,3,4,7,8-Pentachlorodibenzofuran	30	100%	**-0.71**	**-0.44**	**-0.49**	-0.22	0.01	-0.09	0.24	0.30	0.23	0.00
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	30	100%	**-0.54**	-0.28	**-0.40**	-0.27	-0.21	-0.07	-0.03	0.20	-0.01	**-0.35**
	2,3,7,8-Tetrachlorodibenzofuran	30	100%	**-0.58**	**-0.37**	**-0.30**	-0.22	-0.11	-0.20	0.07	0.29	0.16	-0.24
PCBs	PCB 1	30	100%	-0.28	0.11	-0.03	0.08	-0.29	**-0.68**	0.16	0.56	0.25	**-0.38**
	PCB 10	30	97%	-0.23	-0.06	-0.19	-0.17	-0.29	**-0.57**	0.16	0.49	0.26	**-0.41**
	PCB 103	30	100%	-0.23	0.09	0.07	0.04	-0.19	-0.21	-0.18	0.01	-0.14	-0.13
	PCB 104	30	83%	-0.01	0.32	0.07	0.35	-0.12	0.22	-0.18	-0.15	-0.17	0.17
	PCB 105	30	100%	**-0.32**	**-0.34**	**-0.39**	**-0.38**	-0.01	-0.13	0.06	0.16	0.06	-0.27
	PCB 107	30	100%	**-0.32**	-0.29	**-0.42**	**-0.40**	-0.02	-0.15	0.08	0.17	0.07	-0.26
	PCB 108/124	30	100%	**-0.33**	**-0.36**	**-0.36**	**-0.38**	0.01	-0.14	0.06	0.14	0.05	-0.28
	PCB 11	30	100%	**-0.44**	**-0.46**	**-0.42**	**-0.39**	-0.10	-0.27	-0.03	0.21	-0.03	**-0.39**
	PCB 110/115	28	96%	-0.11	-0.26	-0.02	**-0.37**	-0.03	0.01	-0.04	0.04	-0.01	-0.07
	PCB 111	30	80%	0.14	0.42	0.08	0.02	**-0.35**	-0.09	-0.21	0.05	-0.18	-0.17
	PCB 112	30	90%	0.12	0.23	0.07	0.12	-0.24	0.09	-0.08	0.10	0.06	-0.01
	PCB 114	30	100%	**-0.32**	**-0.32**	**-0.38**	**-0.36**	-0.04	-0.17	0.07	0.19	0.07	-0.30
	PCB 118	30	100%	-0.28	**-0.33**	**-0.37**	**-0.38**	-0.01	-0.15	0.06	0.16	0.06	**-0.30**
	PCB 12/13	30	100%	**-0.50**	**-0.41**	**-0.45**	**-0.36**	-0.14	**-0.37**	0.04	0.31	0.06	**-0.33**
	PCB 120	30	100%	-0.14	-0.06	0.00	-0.18	-0.20	-0.24	-0.11	0.09	-0.08	-0.06
	PCB 121	30	77%	-0.03	0.17	0.08	0.10	-0.20	0.09	-0.18	-0.04	-0.11	0.19
	PCB 122	30	100%	**-0.32**	**-0.32**	**-0.40**	**-0.37**	-0.05	-0.16	0.03	0.14	0.02	-0.29
	PCB 123	30	100%	**-0.30**	**-0.33**	**-0.34**	**-0.35**	-0.02	-0.12	0.06	0.16	0.07	-0.26
	PCB 126	22	86%	0.00	-0.07	-0.09	-0.19	-0.28	0.08	**-0.44**	**-0.32**	**-0.39**	**-0.40**
	PCB 127	28	68%	0.03	-0.01	0.06	-0.04	0.06	0.05	-0.05	-0.10	-0.09	-0.02
	PCB 128/166	30	100%	**-0.36**	**-0.33**	**-0.38**	**-0.40**	-0.05	-0.24	0.10	0.20	0.11	-0.27
	PCB 129/138/163	30	100%	**-0.39**	-0.22	**-0.39**	**-0.35**	-0.12	-0.25	0.02	0.15	0.00	-0.28
	PCB 130	30	100%	**-0.34**	-0.27	**-0.31**	**-0.38**	-0.02	-0.20	0.07	0.13	0.08	-0.27
	PCB 131	30	100%	**-0.33**	-0.30	-0.28	**-0.36**	0.02	-0.18	0.06	0.10	0.07	-0.24
	PCB 132	28	100%	**-0.33**	-0.23	-0.28	**-0.33**	-0.07	**-0.34**	0.14	0.23	0.15	**-0.32**
	PCB 133	30	100%	**-0.41**	-0.08	**-0.37**	-0.23	-0.11	**-0.32**	0.06	0.20	0.09	**-0.33**
	PCB 134	30	100%	**-0.34**	-0.28	-0.29	**-0.37**	-0.01	-0.21	0.05	0.10	0.05	-0.25

Table A-20
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PCBs (cont.)	PCB 135/151	30	100%	**-0.36**	-0.15	-0.22	**-0.34**	-0.03	**-0.31**	0.04	0.08	0.07	**-0.31**
	PCB 136	30	100%	**-0.35**	-0.19	-0.26	**-0.33**	-0.06	**-0.31**	0.01	0.07	0.04	**-0.30**
	PCB 137	30	100%	**-0.35**	**-0.40**	**-0.33**	**-0.38**	0.00	-0.16	0.07	0.15	0.07	-0.21
	PCB 139/140	30	100%	**-0.37**	**-0.33**	**-0.34**	**-0.34**	-0.01	-0.22	0.05	0.13	0.05	-0.18
	PCB 141	30	100%	**-0.37**	-0.20	**-0.40**	**-0.40**	-0.08	-0.19	0.04	0.11	0.03	**-0.31**
	PCB 143	30	70%	0.20	-0.05	0.01	-0.14	-0.17	0.09	-0.20	-0.13	-0.18	0.06
	PCB 144	30	100%	**-0.37**	-0.19	-0.28	**-0.39**	-0.05	-0.25	0.04	0.08	0.06	**-0.31**
	PCB 146	30	100%	**-0.41**	-0.17	**-0.34**	**-0.32**	-0.09	-0.27	0.03	0.13	0.05	-0.26
	PCB 147/149	30	100%	**-0.38**	-0.25	**-0.31**	**-0.34**	-0.07	-0.26	0.02	0.10	0.03	-0.23
	PCB 148	30	93%	**-0.33**	0.15	-0.11	-0.05	0.03	-0.23	-0.08	-0.04	-0.10	-0.23
	PCB 15	30	100%	**-0.52**	**-0.42**	**-0.51**	**-0.45**	-0.05	-0.29	0.10	0.28	0.10	**-0.32**
	PCB 150	30	100%	**-0.33**	0.01	-0.30	-0.09	-0.02	-0.19	-0.02	0.06	-0.08	-0.23
	PCB 152	30	97%	**-0.36**	-0.20	**-0.40**	-0.17	-0.01	-0.10	0.09	0.13	0.07	-0.14
	PCB 153/168	30	100%	**-0.40**	-0.22	**-0.34**	**-0.33**	-0.07	-0.24	0.03	0.09	0.05	-0.22
	PCB 154	30	100%	-0.15	0.16	-0.09	0.03	-0.15	-0.15	-0.20	-0.08	-0.21	-0.21
	PCB 155	30	97%	-0.21	0.16	-0.18	0.16	**-0.33**	0.02	-0.11	0.18	-0.04	-0.05
	PCB 156/157	30	100%	**-0.39**	-0.30	**-0.36**	**-0.43**	0.02	-0.16	0.08	0.09	0.07	-0.27
	PCB 158	30	100%	**-0.38**	**-0.33**	**-0.34**	**-0.43**	0.02	-0.16	0.10	0.11	0.10	-0.21
	PCB 16	30	100%	**-0.45**	-0.28	**-0.39**	**-0.41**	-0.14	**-0.36**	0.14	0.34	0.18	**-0.31**
	PCB 162	30	70%	-0.15	**-0.59**	**-0.51**	**-0.55**	0.22	0.13	0.05	-0.10	0.00	0.01
	PCB 164	30	100%	**-0.36**	-0.26	**-0.31**	**-0.36**	0.00	-0.19	0.07	0.08	0.06	-0.22
	PCB 165	23	74%	0.05	0.38	0.18	0.12	-0.22	-0.04	0.01	0.29	0.10	-0.07
	PCB 167	30	100%	**-0.39**	-0.28	**-0.37**	**-0.38**	-0.01	-0.19	0.06	0.10	0.05	-0.23
	PCB 17	30	100%	**-0.46**	-0.26	**-0.38**	**-0.39**	-0.15	**-0.37**	0.18	0.39	0.22	**-0.30**
	PCB 170	30	100%	**-0.45**	-0.21	**-0.35**	**-0.41**	-0.06	-0.21	0.06	0.11	0.05	-0.25
	PCB 171/173	19	95%	**-0.33**	0.06	-0.17	-0.07	-0.27	**-0.38**	0.03	0.51	0.10	**-0.44**
	PCB 172	30	100%	**-0.44**	-0.22	**-0.31**	**-0.44**	-0.10	-0.23	0.04	0.13	0.06	-0.29
	PCB 174	27	100%	**-0.49**	-0.19	**-0.36**	**-0.41**	-0.16	**-0.44**	0.16	0.26	0.18	**-0.35**
	PCB 175	25	100%	**-0.40**	0.06	-0.12	-0.24	**-0.35**	**-0.44**	0.00	0.26	0.09	-0.30
	PCB 176	30	100%	**-0.45**	-0.18	**-0.37**	**-0.42**	-0.16	-0.27	-0.02	0.12	-0.01	**-0.32**
	PCB 177	25	100%	**-0.38**	0.06	-0.17	-0.25	**-0.36**	**-0.42**	0.01	0.27	0.08	**-0.35**
	PCB 178	30	100%	**-0.42**	-0.10	-0.28	**-0.33**	-0.13	-0.28	-0.01	0.14	0.03	**-0.31**
	PCB 179	30	100%	**-0.46**	-0.18	**-0.31**	**-0.36**	-0.18	**-0.31**	-0.04	0.13	-0.01	**-0.33**
	PCB 18/30	30	100%	**-0.46**	-0.30	**-0.40**	**-0.41**	-0.13	**-0.35**	0.16	0.36	0.21	-0.29
	PCB 180/193	30	100%	**-0.45**	-0.20	-0.30	**-0.42**	-0.01	-0.19	0.07	0.08	0.07	-0.23
	PCB 181	25	96%	-0.25	0.02	-0.14	-0.13	**-0.30**	-0.28	-0.07	0.18	-0.01	-0.20
	PCB 182	27	85%	-0.01	0.29	0.07	0.01	-0.24	-0.21	-0.13	0.05	-0.15	-0.21
	PCB 183/185	17	100%	**-0.47**	0.00	-0.22	-0.15	**-0.53**	**-0.42**	-0.15	0.43	-0.07	**-0.57**
	PCB 184	30	80%	-0.22	0.11	-0.01	0.03	**-0.35**	0.03	0.00	0.38	0.10	-0.12
	PCB 187	25	100%	**-0.39**	0.13	-0.09	-0.14	**-0.39**	**-0.48**	-0.04	0.27	0.06	**-0.31**
	PCB 188	30	100%	-0.08	0.12	-0.15	0.01	-0.18	-0.01	-0.24	-0.10	-0.27	-0.11
	PCB 189	30	100%	**-0.50**	-0.27	**-0.30**	**-0.32**	0.01	-0.18	0.07	0.08	0.06	-0.21
	PCB 19	30	100%	**-0.44**	-0.29	**-0.38**	**-0.38**	-0.07	**-0.34**	0.26	0.42	0.29	-0.14
	PCB 190	30	100%	**-0.45**	-0.22	-0.27	**-0.38**	-0.01	-0.22	0.06	0.07	0.06	-0.24

Table A-20
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PCBs (cont.)	PCB 191	30	100%	**-0.50**	-0.28	**-0.31**	**-0.42**	0.01	-0.22	0.10	0.12	0.13	-0.23
	PCB 194	30	100%	**-0.47**	-0.23	**-0.35**	**-0.36**	0.09	-0.17	0.20	0.14	0.19	-0.16
	PCB 195	30	100%	**-0.54**	-0.24	**-0.42**	**-0.37**	-0.02	-0.22	0.13	0.17	0.13	-0.24
	PCB 196	30	100%	**-0.46**	-0.24	**-0.30**	**-0.41**	0.06	-0.21	0.18	0.16	0.19	-0.19
	PCB 197/200	30	100%	**-0.53**	-0.24	**-0.35**	**-0.46**	-0.06	-0.27	0.07	0.17	0.09	-0.30
	PCB 198/199	30	100%	**-0.54**	-0.14	**-0.44**	**-0.38**	-0.05	**-0.36**	0.21	0.30	0.21	-0.22
	PCB 2	30	97%	**-0.32**	**-0.31**	-0.21	-0.29	-0.25	-0.13	-0.18	0.12	-0.16	-0.29
	PCB 20/28	30	100%	**-0.48**	-0.28	**-0.50**	**-0.41**	-0.10	-0.27	0.10	0.30	0.12	**-0.35**
	PCB 201	30	100%	**-0.49**	-0.25	-0.22	**-0.44**	0.06	-0.25	0.21	0.22	0.23	-0.22
	PCB 202	30	100%	**-0.53**	-0.21	**-0.33**	**-0.43**	0.08	-0.28	0.26	0.31	0.28	-0.22
	PCB 203	30	100%	**-0.50**	-0.23	-0.26	**-0.41**	0.09	-0.28	0.25	0.23	0.28	-0.18
	PCB 205	30	97%	**-0.34**	-0.28	**-0.37**	**-0.45**	0.10	-0.07	0.13	-0.02	0.04	-0.16
	PCB 206	30	100%	**-0.42**	-0.27	-0.18	**-0.41**	0.11	**-0.31**	0.33	0.29	0.36	-0.13
	PCB 207	30	97%	**-0.47**	**-0.41**	**-0.33**	**-0.54**	0.19	-0.17	0.34	0.24	0.37	-0.15
	PCB 208	30	100%	**-0.47**	-0.27	-0.19	**-0.42**	0.06	**-0.36**	0.33	0.38	0.38	-0.18
	PCB 209	30	100%	**-0.38**	**-0.37**	**-0.30**	**-0.51**	0.08	-0.25	0.26	0.23	0.29	-0.20
	PCB 21/33	30	100%	**-0.50**	**-0.34**	**-0.47**	**-0.43**	-0.12	**-0.31**	0.08	0.28	0.10	**-0.36**
	PCB 22	30	100%	**-0.48**	**-0.32**	**-0.48**	**-0.42**	-0.12	**-0.31**	0.09	0.30	0.11	**-0.33**
	PCB 23	30	57%	**-0.49**	**-0.32**	**-0.40**	-0.27	-0.07	**-0.35**	0.24	0.42	0.24	-0.21
	PCB 24	30	67%	0.01	0.10	0.29	0.01	-0.23	-0.04	-0.22	0.02	-0.23	-0.06
	PCB 25	30	100%	**-0.46**	-0.22	**-0.50**	**-0.33**	-0.15	-0.30	0.11	0.35	0.14	**-0.35**
	PCB 26/29	30	100%	**-0.51**	-0.29	**-0.52**	**-0.40**	-0.10	**-0.31**	0.18	0.37	0.18	-0.28
	PCB 27	30	100%	**-0.43**	-0.23	-0.30	**-0.38**	-0.11	**-0.39**	0.26	0.45	0.32	-0.29
	PCB 3	30	93%	**-0.43**	**-0.38**	-0.28	-0.24	-0.16	**-0.39**	-0.02	0.32	0.04	**-0.47**
	PCB 31	30	100%	**-0.50**	-0.29	**-0.45**	**-0.38**	-0.14	**-0.38**	0.12	0.35	0.15	**-0.33**
	PCB 32	30	100%	**-0.48**	**-0.31**	**-0.43**	**-0.43**	-0.09	-0.29	0.21	0.37	0.24	-0.23
	PCB 34	30	100%	**-0.48**	-0.18	**-0.45**	-0.30	-0.19	**-0.39**	0.16	0.44	0.17	**-0.33**
	PCB 35	30	100%	**-0.47**	**-0.36**	**-0.54**	**-0.47**	-0.08	-0.27	0.09	0.26	0.08	**-0.36**
	PCB 36	30	60%	0.06	-0.06	0.17	0.04	-0.11	0.04	-0.23	0.00	-0.26	-0.03
	PCB 37	30	100%	**-0.44**	**-0.40**	**-0.46**	**-0.45**	-0.06	-0.22	0.00	0.16	0.00	**-0.35**
	PCB 38	30	63%	0.03	-0.03	0.06	-0.14	-0.24	-0.02	-0.04	0.19	0.02	0.01
	PCB 39	30	100%	**-0.50**	-0.26	**-0.50**	**-0.41**	-0.11	-0.29	0.17	0.36	0.17	-0.28
	PCB 4	30	100%	**-0.50**	**-0.30**	-0.27	**-0.36**	-0.11	**-0.49**	0.32	0.54	0.35	-0.20
	PCB 40/71	30	100%	**-0.40**	-0.24	**-0.34**	**-0.32**	-0.16	**-0.32**	0.11	0.34	0.18	-0.29
	PCB 41	30	97%	**-0.43**	-0.28	**-0.39**	**-0.46**	-0.09	-0.24	0.12	0.25	0.15	**-0.35**
	PCB 42	30	100%	**-0.39**	-0.24	**-0.37**	**-0.34**	-0.17	-0.29	0.11	0.33	0.18	**-0.31**
	PCB 43	30	100%	**-0.40**	-0.23	**-0.36**	**-0.33**	-0.16	**-0.34**	0.16	0.37	0.23	-0.29
	PCB 44/47/65	30	100%	**-0.41**	-0.25	**-0.36**	**-0.34**	-0.16	**-0.33**	0.10	0.33	0.16	**-0.31**
	PCB 45	30	100%	**-0.44**	-0.27	**-0.40**	**-0.39**	-0.14	-0.26	0.11	0.31	0.17	-0.29
	PCB 46	30	100%	**-0.45**	-0.26	**-0.37**	**-0.36**	-0.17	**-0.33**	0.12	0.34	0.18	**-0.31**
	PCB 48	30	100%	**-0.43**	-0.25	**-0.39**	**-0.36**	-0.17	-0.30	0.09	0.32	0.15	**-0.32**
	PCB 49/69	30	100%	**-0.39**	-0.24	**-0.34**	**-0.33**	-0.14	**-0.32**	0.12	0.34	0.18	-0.27
	PCB 5	30	73%	-0.26	-0.14	-0.30	-0.20	-0.15	-0.22	0.08	0.33	0.11	-0.19
	PCB 50/53	30	100%	**-0.42**	-0.26	**-0.36**	**-0.30**	-0.20	**-0.36**	0.05	0.32	0.13	**-0.35**

Table A-20
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
PCBs (cont.)	PCB 51	30	97%	-0.23	-0.01	-0.15	0.07	-0.18	-0.18	-0.04	0.25	0.04	-0.21
	PCB 52	30	100%	**-0.42**	**-0.35**	**-0.33**	**-0.40**	-0.07	-0.28	0.13	0.29	0.17	-0.21
	PCB 54	30	93%	-0.23	0.08	-0.17	0.09	**-0.31**	-0.04	-0.20	-0.02	-0.17	-0.08
	PCB 55	30	90%	0.02	0.20	-0.01	-0.12	-0.29	0.10	-0.21	0.02	-0.16	-0.23
	PCB 56	30	100%	**-0.40**	-0.26	**-0.44**	**-0.40**	-0.08	-0.22	0.11	0.25	0.14	-0.30
	PCB 57	30	97%	**-0.46**	-0.28	**-0.45**	**-0.40**	-0.09	**-0.32**	0.21	0.38	0.26	**-0.36**
	PCB 58	30	90%	0.00	0.16	-0.10	-0.12	-0.23	0.03	-0.01	0.23	0.05	-0.08
	PCB 59/62/75	30	100%	**-0.37**	-0.23	**-0.32**	**-0.31**	-0.14	-0.29	0.11	0.33	0.18	**-0.31**
	PCB 6	30	97%	**-0.53**	**-0.32**	**-0.49**	**-0.35**	-0.11	**-0.37**	0.17	0.38	0.20	-0.27
	PCB 60	30	100%	**-0.38**	-0.26	**-0.41**	**-0.42**	-0.06	-0.17	0.09	0.20	0.12	**-0.31**
	PCB 61/70/74/76	30	100%	**-0.38**	-0.28	**-0.43**	**-0.42**	-0.06	-0.21	0.10	0.23	0.10	-0.28
	PCB 63	30	100%	**-0.38**	-0.21	**-0.41**	**-0.33**	-0.15	-0.29	0.08	0.29	0.13	**-0.34**
	PCB 64	30	100%	**-0.39**	-0.28	**-0.40**	**-0.36**	-0.15	-0.29	0.13	0.33	0.19	-0.29
	PCB 66	30	100%	**-0.38**	-0.25	**-0.44**	**-0.38**	-0.07	-0.21	0.08	0.22	0.11	-0.28
	PCB 67	30	100%	**-0.35**	-0.23	**-0.40**	**-0.34**	-0.15	-0.23	0.04	0.23	0.08	**-0.33**
	PCB 68	30	100%	**-0.38**	-0.14	**-0.42**	-0.20	-0.16	**-0.35**	0.09	0.35	0.14	**-0.32**
	PCB 7	30	87%	**-0.48**	**-0.31**	**-0.45**	**-0.40**	-0.14	**-0.31**	0.20	0.40	0.23	-0.28
	PCB 72	30	100%	**-0.38**	-0.17	**-0.38**	-0.25	-0.18	**-0.37**	0.12	0.40	0.18	-0.29
	PCB 73	30	83%	0.04	0.27	0.12	0.10	-0.14	0.08	-0.17	0.03	-0.14	-0.21
	PCB 77	30	100%	**-0.38**	**-0.32**	**-0.48**	**-0.43**	-0.08	-0.22	0.05	0.19	0.05	**-0.33**
	PCB 79	30	97%	-0.28	**-0.32**	**-0.36**	**-0.34**	-0.02	-0.15	0.08	0.18	0.06	-0.22
	PCB 8	30	100%	**-0.54**	**-0.30**	**-0.45**	**-0.38**	-0.11	**-0.35**	0.18	0.39	0.20	-0.27
	PCB 81	30	90%	**-0.34**	-0.28	**-0.37**	**-0.44**	-0.07	-0.18	0.02	0.15	0.03	**-0.36**
	PCB 82	30	100%	-0.27	**-0.37**	-0.23	**-0.43**	0.05	-0.12	0.12	0.14	0.13	-0.19
	PCB 83	30	100%	-0.29	**-0.30**	-0.13	**-0.36**	0.00	-0.20	0.10	0.18	0.12	-0.21
	PCB 84	30	97%	-0.11	-0.21	-0.02	-0.22	0.03	-0.05	0.11	0.21	0.16	-0.06
	PCB 85/116/117	30	100%	-0.28	**-0.36**	-0.23	**-0.42**	0.05	-0.13	0.12	0.15	0.13	-0.18
	PCB 86/87/97/109/119/125	30	100%	-0.27	**-0.39**	-0.20	**-0.41**	0.06	-0.13	0.12	0.14	0.13	-0.18
	PCB 88	30	37%	0.09	0.17	0.46	0.22	-0.15	-0.04	-0.10	0.14	-0.08	-0.01
	PCB 89	30	93%	-0.10	-0.17	-0.04	-0.25	0.00	-0.03	0.09	0.19	0.14	-0.07
	PCB 9	30	97%	**-0.51**	**-0.35**	**-0.53**	**-0.43**	-0.15	**-0.31**	0.15	0.39	0.16	**-0.41**
	PCB 90/101/113	30	100%	-0.30	**-0.34**	-0.17	**-0.40**	0.04	-0.18	0.08	0.13	0.10	-0.22
	PCB 91	30	100%	**-0.30**	**-0.32**	-0.16	**-0.34**	0.03	-0.20	0.11	0.18	0.13	-0.14
	PCB 92	30	97%	-0.22	-0.20	-0.04	-0.26	0.10	-0.18	0.06	0.06	0.04	-0.17
	PCB 93/100	30	97%	-0.04	0.24	0.18	0.22	-0.20	0.13	-0.24	-0.08	-0.19	0.06
	PCB 94	30	100%	-0.29	-0.11	-0.11	-0.20	-0.16	-0.23	-0.06	0.13	0.00	**-0.32**
	PCB 95	30	100%	**-0.31**	**-0.37**	**-0.31**	**-0.38**	0.00	-0.19	0.07	0.15	0.08	-0.23
	PCB 96	30	100%	**-0.40**	-0.21	-0.24	-0.27	-0.12	**-0.33**	0.07	0.26	0.15	**-0.32**
	PCB 98/102	30	100%	**-0.30**	-0.24	-0.15	-0.28	-0.10	-0.25	0.05	0.22	0.12	-0.23
	PCB 99	30	100%	-0.30	**-0.35**	-0.23	**-0.37**	0.03	-0.17	0.08	0.15	0.09	-0.15
	Total PCBs congener (209 specified)	30	100%	**-0.48**	-0.29	**-0.40**	**-0.40**	-0.14	**-0.34**	0.13	0.33	0.17	-0.29
Pesticides	2,4'-DDD	30	100%	-0.13	-0.11	-0.16	**-0.42**	0.30	0.02	0.07	-0.18	0.02	-0.05
	2,4'-DDE	30	100%	**-0.34**	-0.20	**-0.32**	**-0.44**	0.08	**-0.38**	0.25	0.24	0.26	-0.21
	4,4'-DDD	30	100%	-0.09	-0.17	-0.26	**-0.45**	0.29	-0.04	0.02	-0.21	0.02	-0.17

Table A-20
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
Pesticides (cont.)	4,4'-DDE	30	100%	**-0.39**	-0.19	**-0.35**	**-0.41**	0.07	**-0.36**	0.19	0.17	0.21	-0.20
	Aldrin	30	67%	0.17	0.17	0.11	-0.03	0.00	0.48	-0.18	**-0.33**	-0.13	0.26
	Dieldrin	30	100%	-0.19	**-0.38**	-0.26	**-0.38**	-0.08	0.18	-0.21	-0.17	-0.23	-0.14
	Heptachlor	30	87%	0.11	0.30	0.30	0.28	-0.19	-0.12	-0.09	0.02	0.04	0.11
	Heptachlor epoxide	30	43%	0.23	0.33	0.25	0.40	-0.02	0.42	**-0.31**	**-0.39**	**-0.34**	0.14
	Hexachlorobenzene	30	100%	**-0.36**	**-0.37**	-0.22	**-0.34**	0.06	0.12	-0.17	-0.22	-0.24	-0.24
	Mirex	28	57%	0.11	0.30	0.01	0.19	0.00	0.37	-0.03	-0.21	-0.07	0.26
	Total DDx (2,4 & 4,4) Total Fraction	30	100%	**-0.31**	-0.18	**-0.35**	**-0.44**	0.11	**-0.30**	0.16	0.11	0.17	-0.21
	Total DDx (4,4) Total Fraction	30	100%	**-0.32**	-0.17	**-0.36**	**-0.42**	0.11	-0.30	0.14	0.09	0.14	-0.19
	Total alpha + gamma chlordane	30	100%	-0.10	-0.19	-0.22	-0.10	0.11	0.37	-0.06	-0.30	-0.14	0.19
	alpha-Chlordane	30	100%	0.01	-0.02	-0.07	0.01	0.11	0.47	-0.15	**-0.39**	-0.21	0.28
	cis-Nonachlor	30	97%	-0.16	-0.13	-0.29	-0.11	-0.15	0.08	-0.10	-0.04	-0.07	-0.08
	gamma-Chlordane	30	100%	-0.24	**-0.33**	**-0.32**	-0.21	0.13	0.26	0.08	-0.14	0.01	0.13
	trans-Nonachlor	30	100%	0.10	0.04	0.00	0.17	0.09	0.49	-0.15	**-0.36**	-0.19	0.35
PAHs	Anthracene	30	47%	-0.10	**-0.32**	-0.02	-0.05	0.01	-0.22	-0.14	-0.01	-0.04	-0.28
	Benzo(a)anthracene	30	100%	-0.21	**-0.37**	-0.17	-0.30	0.05	-0.22	-0.12	0.00	-0.11	-0.28
	Benzo(a)pyrene	30	100%	-0.26	**-0.40**	**-0.40**	**-0.48**	0.40	0.31	0.10	-0.24	-0.03	0.21
	Benzo(b)fluoranthene	30	100%	**-0.32**	**-0.44**	**-0.37**	**-0.54**	0.35	0.30	0.09	-0.22	-0.04	0.19
	Benzo(e)pyrene	30	100%	-0.28	**-0.38**	-0.29	**-0.49**	0.42	0.20	0.17	-0.16	0.07	0.25
	Benzo(g,h,i)perylene	30	100%	-0.18	**-0.45**	-0.28	**-0.44**	0.45	0.20	0.14	-0.15	0.12	0.23
	Benzo(j)fluoranthene/Benzo(k)fluoranthene	30	100%	-0.21	**-0.50**	**-0.42**	**-0.53**	0.41	0.46	0.08	**-0.32**	-0.09	0.27
	C1-Chrysenes	30	100%	-0.25	**-0.37**	**-0.35**	**-0.55**	0.37	0.08	0.09	-0.11	0.04	0.06
	C1-Fluoranthenes/Pyrenes	30	100%	**-0.36**	**-0.41**	**-0.47**	**-0.55**	0.28	0.02	0.11	-0.04	0.01	0.00
	C2-Chrysenes	30	100%	-0.18	**-0.38**	-0.29	**-0.55**	0.40	0.05	0.10	-0.14	0.10	0.00
	C2-Fluoranthenes/Pyrenes	30	100%	**-0.32**	**-0.43**	**-0.41**	**-0.61**	0.35	-0.02	0.17	-0.03	0.12	0.04
	C2-Phenanthrenes/Anthracenes	30	67%	-0.25	**-0.37**	-0.19	-0.24	0.03	**-0.40**	-0.15	0.04	-0.06	**-0.40**
	C3-Chrysenes	30	100%	-0.14	**-0.45**	**-0.31**	**-0.49**	0.38	0.04	0.13	-0.07	0.16	0.02
	C3-Fluoranthenes/Pyrenes	30	100%	-0.23	**-0.44**	**-0.30**	**-0.53**	0.34	-0.06	0.14	-0.02	0.16	-0.01
	C3-Phenanthrenes/Anthracenes	30	87%	**-0.33**	-0.24	**-0.35**	**-0.31**	-0.04	**-0.51**	0.00	0.16	0.03	-0.29
	C4-Chrysenes	30	100%	-0.18	**-0.51**	**-0.30**	**-0.51**	0.37	-0.03	0.18	0.01	0.23	0.00
	C4-Phenanthrenes/Anthracenes	30	50%	**-0.36**	**-0.35**	**-0.40**	**-0.36**	0.02	**-0.41**	0.02	0.14	0.12	**-0.37**
	Chrysene	30	100%	-0.24	**-0.33**	-0.07	-0.17	0.16	-0.21	-0.10	-0.03	-0.06	-0.19
	Dibenz(a,h)anthracene	30	87%	-0.20	**-0.47**	**-0.34**	**-0.51**	0.49	0.31	0.16	-0.23	0.09	0.27
	Fluoranthene	30	100%	-0.07	**-0.34**	-0.02	-0.12	-0.06	-0.20	-0.29	-0.07	-0.24	**-0.38**
	Indeno(1,2,3-cd)pyrene	30	100%	-0.11	**-0.48**	**-0.34**	**-0.40**	0.43	0.45	0.05	**-0.30**	-0.03	0.28
	Perylene	30	57%	-0.09	**-0.47**	**-0.35**	**-0.51**	0.39	0.32	0.15	-0.25	-0.05	0.24
	Pyrene	30	100%	**-0.31**	**-0.51**	**-0.46**	**-0.54**	0.26	0.05	0.06	-0.07	-0.04	-0.01
	Total Alkylated PAHs	30	100%	-0.24	**-0.42**	-0.21	**-0.36**	0.16	-0.12	-0.12	-0.09	-0.11	-0.24
	Total HMW PAHs	30	100%	**-0.34**	**-0.51**	**-0.41**	**-0.52**	0.19	0.01	0.02	-0.03	-0.04	-0.06
	Total LMW PAHs	30	50%	-0.18	**-0.53**	**-0.34**	**-0.42**	0.28	-0.02	0.25	0.05	0.34	-0.08
	Total PAH	30	100%	**-0.31**	**-0.60**	**-0.40**	**-0.47**	0.20	0.02	0.00	-0.01	-0.02	-0.13
Metals	Arsenic	29	31%	-0.06	-0.25	-0.17	-0.29	0.10	0.02	0.19	0.00	0.10	0.22
	Barium	29	100%	-0.14	-0.10	-0.07	0.04	-0.21	**-0.48**	-0.18	0.17	-0.11	**-0.61**
	Calcium	29	100%	0.38	0.07	0.10	0.18	0.20	0.07	-0.08	-0.17	-0.17	-0.13

Table A-20
Spearman Rank Correlation of Porewater Chemistry and Benthic Effects

Parameter Group	Chemical Name	N	Frequency of Detection	Toxicity Endpoints				Benthic Invertebrate Community Metrics					
				10-Day Survival	28-Day Survival	Growth	Reproduction (Young per Surviving Adult)	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Pielou's Evenness Index	Swartz's Dominance Index	NY/NJ Harbor B-IBI
Metals (cont.)	Chromium	29	90%	0.08	0.36	0.28	0.23	**-0.35**	-0.21	**-0.33**	-0.01	-0.23	-0.23
	Iron	29	97%	0.23	0.58	0.61	0.38	-0.17	-0.08	**-0.36**	-0.17	-0.26	-0.19
	Magnesium	29	100%	0.26	0.16	0.20	0.14	0.26	-0.04	0.16	0.00	0.11	0.13
	Manganese	29	100%	0.14	0.42	0.39	0.42	-0.20	**-0.32**	-0.19	0.10	-0.17	-0.24
	Mercury	30	97%	-0.13	-0.12	-0.10	-0.03	0.23	0.26	0.16	-0.04	0.11	0.28
	Methyl mercury	30	100%	-0.04	0.04	-0.02	-0.05	0.18	0.14	0.04	-0.09	-0.01	0.00
	Potassium	29	100%	0.16	-0.23	-0.02	-0.22	0.42	0.21	0.08	-0.27	0.01	0.20
	Selenium	29	34%	**-0.33**	-0.03	-0.16	**-0.39**	0.03	-0.28	0.14	0.19	0.11	-0.08
	Sodium	29	100%	0.15	0.04	0.02	-0.16	0.28	-0.06	0.25	-0.06	0.17	0.27
	Titanium	28	71%	0.08	0.41	0.30	0.37	-0.21	-0.14	-0.16	0.03	0.00	0.05
	Vanadium	29	83%	0.12	0.35	0.47	0.28	0.00	-0.11	**-0.35**	-0.22	**-0.32**	-0.21
Miscellaneous	Ammonia	29	100%	0.11	-0.12	0.09	-0.11	0.26	0.27	-0.14	-0.27	-0.10	-0.16
	Dissolved organic carbon (DOC)	29	100%	0.19	0.04	0.12	0.09	-0.21	-0.02	-0.02	0.00	-0.07	0.22
	Sulfide	30	100%	-0.07	**-0.39**	-0.29	**-0.36**	0.25	0.23	0.21	-0.03	0.16	0.22

Notes:
1/2 reporting limit substituted for non-detects. Chemicals with a frequency of detection less than 30% not shown.
Correlation coefficients less than -0.3 are in bold.
Shading indicates strength of association as determined by the Spearman correlation coefficient.

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
N = sample size
no./m^2 = number per square meter
NY/NJ New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Total DDx = sum of DDE, DDD, and DDT
% = percent

Shading
1
0.5
0
-0.5
-1

Table A-21
List of Potential Constituents of Concern to the Benthic Invertebrate Community

Chemical	Sediment			Porewater		
	Exceed SQG	Negative Correlation with Toxicity Endpoints	Negative Correlation with BIC Metrics	Exceed WQC or Surface Water Guideline	Negative Correlation with Toxicity Endpoints	Negative Correlation with BIC Metrics
Dioxins/Furans						
2,3,7,8-TCDD and other congeners	X	X	X		X	X
PCBs						
Aroclors and Congeners	X	X	X	X	X	X
Pesticides						
Total DDx	X	X		X	X	
Dieldrin	X	X			X	
Chlordanes	X	X			X	
Hexachlorobenzene	--	X			X	
PAHs						
Total and individual PAHs	X[a]	X		X[b]	X	X
Semivolatiles						
bis(2-Ethylhexyl)phthalate	X		X	Not Analyzed		
Metals						
Antimony	X			--		
Arsenic	X		X	X	X	
Cadmium	X	X	X	Not Detected in Porewater		
Chromium	X	X	X			X
Copper	X	X		X		
Lead	X	X	X			
Mercury	X	X	X			
Nickel	X		X	Not Detected in Porewater		
Silver	X	X	X	Not Detected in Porewater		
Zinc	X	X	X	X		

Notes:
Negative correlation defined as having a Spearman correlation coefficient < -0.3.
[a] $\sum ESBTU_{FCV}$ also exceeds 1 (see Table A-14).
[b] Sum of Toxic Units for PAH mixtures exceeds 1 (see Table A-14).

Acronyms and Abbreviations:
-- = no guideline or criteria available
$\sum ESBTU_{FCV}$ = Equilibrium Partitioning Sediment Benchmark, Sum of Toxic Units for PAHs in Sediment.
BIC = benthic invertebrate community
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SQG = sediment quality guidelines (Table A-8).
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane isomers
WQC = water quality criteria (Table A-11).

Table A-22
Correlation Matrix and Eigenvalues of the Principal Component Analysis: Sediment

Chemical	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	Total HMW PAHs	Total LMW PAHs	Total Alkylated PAHs	Total PCB Congeners	2,3,7,8-TCDD	Dieldrin	Hexachloro-benzene	Total DDx (2,4 and 4,4)	Total Alpha + Gamma Chlordane	Total Petroleum Hydrocarbons
Antimony	1	0.77	0.83	0.81	0.77	0.87	0.85	0.77	0.64	0.73	0.84	0.53	0.56	0.66	0.55	0.43	0.44	0.69	0.67	0.42	0.57
Arsenic	0.77	1	0.77	0.78	0.77	0.78	0.73	0.77	0.57	0.70	0.73	0.54	0.53	0.67	0.41	0.34	0.31	0.61	0.59	0.22	0.54
Barium	0.83	0.77	1	0.85	0.80	0.88	0.84	0.79	0.73	0.80	0.83	0.51	0.51	0.62	0.58	0.45	0.45	0.69	0.74	0.47	0.53
Cadmium	0.81	0.78	0.85	1	0.89	0.90	0.82	0.88	0.63	0.90	0.83	0.54	0.57	0.69	0.74	0.68	0.62	0.83	0.82	0.56	0.60
Chromium	0.77	0.77	0.80	0.89	1	0.88	0.83	0.87	0.71	0.90	0.83	0.62	0.61	0.73	0.70	0.72	0.62	0.78	0.70	0.56	0.54
Copper	0.87	0.78	0.88	0.90	0.88	1	0.93	0.88	0.77	0.90	0.94	0.62	0.64	0.74	0.68	0.56	0.55	0.74	0.74	0.55	0.64
Lead	0.85	0.73	0.84	0.82	0.83	0.93	1	0.80	0.75	0.83	0.93	0.61	0.63	0.69	0.61	0.51	0.51	0.69	0.68	0.54	0.58
Mercury	0.77	0.77	0.79	0.88	0.87	0.88	0.80	1	0.59	0.88	0.78	0.64	0.65	0.76	0.69	0.64	0.56	0.74	0.71	0.53	0.60
Nickel	0.64	0.57	0.73	0.63	0.71	0.77	0.75	0.59	1	0.74	0.82	0.43	0.45	0.46	0.53	0.45	0.48	0.44	0.49	0.47	0.32
Silver	0.73	0.70	0.80	0.90	0.90	0.90	0.83	0.88	0.74	1	0.83	0.62	0.63	0.71	0.77	0.74	0.65	0.74	0.73	0.64	0.55
Zinc	0.84	0.73	0.83	0.83	0.83	0.94	0.93	0.78	0.82	0.83	1	0.57	0.61	0.64	0.64	0.53	0.59	0.68	0.69	0.57	0.57
Total HMW PAHs	0.53	0.54	0.51	0.54	0.62	0.62	0.61	0.64	0.43	0.62	0.57	1	0.95	0.91	0.49	0.44	0.40	0.56	0.44	0.40	0.54
Total LMW PAHs	0.56	0.53	0.51	0.57	0.61	0.64	0.63	0.65	0.45	0.63	0.61	0.95	1	0.88	0.51	0.43	0.44	0.56	0.47	0.44	0.53
Total Alkylated PAHs	0.66	0.67	0.62	0.69	0.73	0.74	0.69	0.76	0.46	0.71	0.64	0.91	0.88	1	0.54	0.49	0.40	0.71	0.59	0.39	0.63
Total PCB Congeners	0.55	0.41	0.58	0.74	0.70	0.68	0.61	0.69	0.53	0.77	0.64	0.49	0.51	0.54	1	0.84	0.79	0.76	0.76	0.75	0.42
2,3,7,8-TCDD	0.43	0.34	0.45	0.68	0.72	0.56	0.51	0.64	0.45	0.74	0.53	0.44	0.43	0.49	0.84	1	0.79	0.73	0.66	0.73	0.31
Dieldrin	0.44	0.31	0.45	0.62	0.62	0.55	0.51	0.56	0.48	0.65	0.59	0.40	0.44	0.40	0.79	0.79	1	0.66	0.63	0.84	0.34
Hexachlorobenzene	0.69	0.61	0.69	0.83	0.78	0.74	0.69	0.74	0.44	0.74	0.68	0.56	0.56	0.71	0.76	0.73	0.66	1	0.87	0.65	0.58
Total DDx (2,4 and 4,4)	0.67	0.59	0.74	0.82	0.70	0.74	0.68	0.71	0.49	0.73	0.69	0.44	0.47	0.59	0.76	0.66	0.63	0.87	1	0.68	0.50
Total Alpha + Gamma Chlordane	0.42	0.22	0.47	0.56	0.56	0.55	0.54	0.53	0.47	0.64	0.57	0.40	0.44	0.39	0.75	0.73	0.84	0.65	0.68	1	0.31
Total Petroleum Hydrocarbons	0.57	0.54	0.53	0.60	0.54	0.64	0.58	0.60	0.32	0.55	0.57	0.54	0.53	0.63	0.42	0.31	0.34	0.58	0.50	0.31	1

Eigenvalues of the Correlation Matrix			
		Variance Explained (Percent)	
Principal Component	Eigenvalue	Proportion	Cumulative
1	14.17	67%	67%
2	1.95	9%	77%
3	1.38	7%	83%
4	0.83	4%	87%
5	0.55	3%	90%

Note:
All sediment chemical concentrations were log-transformed before calculation of the Pearson Correlation Matrix.

Acronyms and Abbreviations:
HMW = high molecular weight
LMW = low molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
% = percent

Table A-23
Dose Response Models for Toxicity Endpoints:
Sediment Chemistry Principal Component Analysis

Modeled Endpoint	Model Parameters[a]	Model Form[b]	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Mortality at 10 Days	PC1	Logit	1786	<0.0001	Probit Model has best fit based on AIC. **See Figure A-13 for model details.**
		Probit	**1777**	**<0.0001**	
		Gompertz	1798	<0.0001	
	PC1, PC2	Logit	--	--	Stable parameter estimates could not be obtained.
		Probit	--	--	
		Gompertz	--	--	
	PC1, PC3	Logit	1786	PC1 (<0.0001), PC3 (0.994)	PC3 is not a significant predictor when added to the model.
		Probit	1777	PC1 (<0.0001), PC3 (0.997)	
		Gompertz	1798	PC1 (<0.0001), PC3 (0.969)	
	PC1, Percent Fines	Logit	1783	PC1 (<0.0001), Fines (0.419)	Fines is not significant.
		Probit	1775	PC1 (<0.0001), Fines (0.425)	
		Gompertz	1795	PC1 (<0.0001), Fines (0.414)	
	PC1, Log TOC	Logit	--	--	Stable parameter estimates could not be obtained.
		Probit	--	--	
		Gompertz	--	--	
Mortality at 28 Days	PC1	Logit	3625	0.039	Gompertz Model has best fit for PC1 only based on AIC.
		Probit	3634	0.044	
		Gompertz	3592	0.009	
	PC1, PC2	Logit	3443	PC1 (0.011), PC2 (0.017)	Gompertz Model has best fit based on AIC. **See Figure A-16 for model details.**
		Probit	3443	PC1 (0.015), PC2 (0.017)	
		Gompertz	**3442**	**PC1 (0.002), PC2 (0.012)**	
	PC1, PC2, PC3	Logit	3438	PC1 (0.015), PC2 (0.059), PC3 (0.575)	PC3 is not significant.
		Probit	3438	PC1 (0.021), PC2 (0.062), PC3 (0.570)	
		Gompertz	3435	PC1 (0.005), PC2 (0.059), PC3 (0.523)	
	PC1, PC2, Log TOC	Gompertz	3431	PC1 (0.055), PC2 (0.030), TOC (0.565)	TOC is not significant.
	PC1, PC2, Percent Fines	Gompertz	3382	PC1 (0.002), PC2 (0.008), Fines (0.115)	Fines is not significant.
Modeled Endpoint	**Model Parameters[a]**	**Model Form**	**Adjusted R^2**	**Type III Analysis of Effect Parameters: Parameter (p-value)**	**Notes**
Growth	**PC1**	**Linear**	**0.15**	**0.0229**	**Best growth model. See Figure A-19 for model details.**
	PC1, PC2	Linear	0.13	PC1 (0.023), PC2 (0.748)	PC2 is not significant
	PC1, PC3	Linear	0.12	PC1 (0.025), PC3 (0.994)	PC3 is not significant
	PC1, Percent Fines	Linear	0.13	PC1 (0.026), Fines (0.589)	Percent fines not significant
	PC1, log TOC	Linear	0.15	PC1 (0.386), TOC (0.334)	Log TOC is highly correlated with PC1.
Reproduction	PC1	Linear	0.02	0.230	Not significant. **See Figure A-21 for model details.**
	PC2	Linear	--	0.962	Not significant
	PC3	Linear	--	0.863	Not significant
	Percent Fines	Linear	--	0.997	Not significant
	Log TOC	Linear	--	0.217	Not significant

Notes:

[a] All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10-day mortality and 0.19 for 28-day mortality. See text for a discussion of the model forms.

[b] See text for a discussion of the model forms used.

Statistically significant models are shaded and bolded.

Acronyms and Abbreviations:

-- AIC and adjusted R^2 not estimated for models with large p-values and unstable parameter estimates.

< = less than

AIC = Akaike's information criterion

R^2 = coefficient of determination

PC = principal component

TOC = total organic carbon

Table A-24
Dose Response Models for Benthic Metrics:
Sediment Chemistry Principal Component Analysis

Benthic Metric	Model Parameters	Model Form	R^2	Adjusted R^2	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Density	**PC1**	**Linear**	**0.16**	**0.13**	**0.029**	Both PC1 and percent fines have a negative association with density. PC2 and PC3 have a positive association with density that is not significant. Shear stress has no relationship with density. **See Figure A-23a for fitted model.**
	PC1, PC2	Linear	0.24	0.18	PC1(0.036); PC2(0.115)	
	PC1, PC3	Linear	0.22	0.17	PC1(0.036); PC2(0.165)	
	Percent Fines	Linear	0.13	0.09	0.055	
	Shear (Max)	Linear	--	--	0.46	
	PC1, Fines	Linear	0.20	0.14	PC1(0.122); Fines(0.284)	
Taxa	PC1	Linear	--	--	0.139	Percent fines has a significant negative association with number of taxa. **See Figure A-23b for fitted model.**
	PC2	Linear	--	--	0.286	
	PC3	Linear	--	--	0.578	
	Percent Fines	**Linear**	**0.29**	**0.26**	**0.002**	
	Shear (Max)	Linear	--	--	0.540	
	PC1, Percent Fines	Linear	0.29	0.23	PC1(0.829); Fines(0.009)	
Shannon-Weiner Diversity Index	PC1	Linear	--	--	0.627	Diversity has no significant association to any of the covariates.
	PC2	Linear	--	--	0.784	
	PC3	Linear	--	--	0.841	
	Percent Fines	Linear	--	--	0.836	
	Shear (Max)	Linear	--	--	0.816	
Pielou's Evenness	**PC1**	**Linear**	**0.13**	**0.10**	**0.0472**	PC1 is positively associated with evenness, a spurious finding since elevated chemistry is not expected to result in an increase in evenness. Percent fines has a significant positive association with evenness. **See Figure A-23c for fitted percent fines model.**
	PC2	Linear	--	--	0.7908	
	PC3	Linear	--	--	0.972	
	Percent Fines	**Linear**	**0.26**	**0.24**	**0.0036**	
	Shear (Max)	Linear	--	--	0.583	
	PC1, Fines	Linear	0.29	0.23	PC1(0.356); Fines(0.02)	
NY/NJ Harbor B-IBI	PC1	Linear	--	--	0.153	NY/NJ Harbor B-IBI has no significant association with any of the covariates.
	PC2	Linear	--	--	0.238	
	PC3	Linear	--	--	0.664	
	Percent Fines	Linear	--	--	0.676	
	Shear (Max)	Linear	--	--	0.212	
Percent Tolerant	PC1	Linear	--	--	0.955	Percent of tolerant organisms has no significant association with any of the covariates.
	PC2	Linear	--	--	0.353	
	PC3	Linear	--	--	0.356	
	Percent Fines	Linear	--	--	0.934	
	Shear (Max)	Linear	--	--	0.153	
Percent Sensitive	PC1	Linear	--	--	0.875	Percent of sensitive organisms has no significant association with any of the covariates.
	PC2	Linear	--	--	0.179	
	PC3	Linear	--	--	0.324	
	Percent Fines	Linear	--	--	0.255	
	Shear (Max)	Linear	--	--	0.134	

Table A-24
Dose Response Models for Benthic Metrics:
Sediment Chemistry Principal Component Analysis

Notes:
Statistically significant models are shaded and bolded.

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
NY/NJ = New York/New Jersey
PC = principal component
R^2 = coefficient of determination
-- = not shown for models where overall model p-value is greater than 0.05.

Table A-25
Principal Component Scores and
Model-Predicted Mortality in Sediment

Location ID	Geographic Area	Geomorphic Unit	EPA Subunit	PC1	PC2	PC3	Predicted 10-Day Mortality	Predicted 28-Day Mortality
NB03SED122ACL	North	INTERTIDAL AREA	6	-1.555	-0.199	0.213	10%	19%
NB03SED122BCL	North	INTERTIDAL AREA	6	-2.673	0.556	0.274	10%	19%
NB03SED122CCL	North	INTERTIDAL AREA	6	-1.808	-0.269	1.198	10%	19%
NB03SED123ACL	North	INDUSTRIAL WATERFRONT	4	-2.156	1.444	0.915	10%	20%
NB03SED123BCL	North	INDUSTRIAL WATERFRONT	4	-2.414	-0.696	-0.734	10%	19%
NB03SED124CL	Central	INTERTIDAL AREA	5	-3.264	0.196	-1.374	10%	19%
NB03SED125CL	Central	SUBTIDAL FLATS	5	-2.272	-0.784	1.744	10%	19%
NB03SED127ACL	Central	INDUSTRIAL WATERFRONT	5	-4.785	1.298	-0.368	10%	19%
NB03SED127BCL	Central	SUBTIDAL FLATS	5	2.346	1.942	1.537	10%	**82%**
NB03SED129CL	South	INDUSTRIAL WATERFRONT	1	9.105	-0.395	-0.445	**96%**	**100%**
NB03SED130CL	South	INDUSTRIAL WATERFRONT	1	0.909	0.355	1.538	10%	22%
NB03SED131ACL	South	INDUSTRIAL WATERFRONT	1	-4.578	-0.362	-1.372	10%	19%
NB03SED131BCL	South	INDUSTRIAL WATERFRONT	1	-6.885	0.043	-0.402	10%	19%
NB03SED132ACL	North	INDUSTRIAL WATERFRONT	4	-0.353	0.957	-0.385	10%	22%
NB03SED132BCL	North	SUBTIDAL FLATS	4	-10.902	1.765	-1.446	10%	19%
NB03SED133CL	North	INDUSTRIAL WATERFRONT	4	0.966	-0.341	0.672	10%	20%
NB03SED134CL	South	INDUSTRIAL WATERFRONT	1	6.105	-2.116	-1.189	**48%**	27%
NB03SED135CL	South	INDUSTRIAL WATERFRONT	1	0.718	0.478	2.508	10%	22%
NB03SED136	North	INTERTIDAL AREA	4	0.930	1.324	-0.258	10%	32%
NB03SED137	North	SUBTIDAL FLATS	4	-0.188	0.920	1.264	10%	22%
NB03SED138	North	DISTURBED SUBTIDAL	4	1.924	1.909	0.691	10%	**70%**
NB03SED139	North	SUBTIDAL FLATS	6	0.652	0.748	1.795	10%	24%
NB03SED140	North	INTERTIDAL AREA	6	-1.852	2.034	0.543	10%	23%
NB03SED141	Central	SUBTIDAL FLATS	5	0.032	1.502	-1.440	10%	27%
NB03SED142	Central	INDUSTRIAL WATERFRONT	5	-2.590	0.322	0.550	10%	19%
NB03SED143	Central	SUBTIDAL FLATS	5	2.526	0.777	-0.721	11%	**41%**
NB03SED144	Central	DISTURBED SUBTIDAL	5	0.929	-0.091	-0.613	10%	21%
NB03SED145	Central	SUBTIDAL FLATS	5	-0.550	1.465	0.050	10%	24%
NB03SED146	South	TRANSITIONAL SLOPES	5	-2.074	0.188	-0.700	10%	19%
NB03SED147	South	INDUSTRIAL WATERFRONT	1	3.091	0.056	-1.174	12%	33%
NB03SED148	South	SUBTIDAL FLATS	1	3.518	-0.535	0.547	13%	28%
NB03SED149	South	INDUSTRIAL WATERFRONT	1	3.320	0.329	-1.957	12%	**42%**
NB03SED150	South	TRANSITIONAL SLOPES	1	3.144	-0.623	1.671	12%	25%
NB03SED151	South	DISTURBED SUBTIDAL	1	7.313	0.887	-1.566	**74%**	**100%**
NB03SED152	South	INTERTIDAL AREA	1	1.626	-0.223	0.154	10%	22%
NB03SED153	South	DISTURBED SUBTIDAL	1	-1.445	-0.292	-1.153	10%	19%
NB03SED154	South	DISTURBED SUBTIDAL	1	5.645	0.158	-1.108	**38%**	**88%**
NB03SED155	South	INDUSTRIAL WATERFRONT	1	-4.479	-0.278	-2.269	10%	19%
NB03SED156	Central	TRANSITIONAL SLOPES	5	-0.867	0.740	0.124	10%	20%
NB03SED157	Central	DISTURBED SUBTIDAL	5	0.406	0.969	0.253	10%	24%
NB03SED158	North	SUBTIDAL FLATS	6	-1.993	-0.103	1.697	10%	19%
NB03SED159	North	NAVIGATION CHANNEL	3	-0.483	1.053	1.327	10%	22%
NB03SED160	North	INDUSTRIAL WATERFRONT	4	1.869	1.300	-0.076	10%	**45%**
NB03SED161	North	DISTURBED SUBTIDAL	4	1.959	1.116	-0.510	10%	**41%**
NB03SED162	North	NAVIGATION CHANNEL	3	1.287	0.233	0.546	10%	23%
NB03SED163	North	NAVIGATION CHANNEL	3	0.846	0.611	-0.699	10%	24%
NB03SED164	North	INTERTIDAL AREA	6	-1.635	1.350	0.585	10%	21%
NB03SED165	North	SUBTIDAL FLATS	4	0.943	1.404	0.319	10%	34%
NB03SED166	North	INDUSTRIAL WATERFRONT	6	1.113	1.321	0.477	10%	34%
NB03SED167	North	INDUSTRIAL WATERFRONT	4	-5.661	1.003	-0.159	10%	19%
NB03SED168	North	INDUSTRIAL WATERFRONT	6	0.343	0.846	-0.289	10%	23%
NB03SED169	North	INDUSTRIAL WATERFRONT	6	-1.705	0.854	0.332	10%	20%
NB03SED170	Central	INDUSTRIAL WATERFRONT	5	0.137	1.450	1.198	10%	27%
NB03SED171	Central	INDUSTRIAL WATERFRONT	5	0.019	0.945	0.303	10%	23%
NB03SED172	Central	SUBTIDAL FLATS	5	2.942	0.515	-1.535	11%	**41%**
NB03SED173	South	SUBTIDAL FLATS	5	4.323	-0.270	-1.208	18%	**42%**
NB03SED174	South	INDUSTRIAL WATERFRONT	5	0.236	0.002	-0.883	10%	20%
NB03SED175	South	SUBTIDAL FLATS	1	-5.898	0.322	-0.838	10%	19%

Table A-25
Principal Component Scores and
Model-Predicted Mortality in Sediment

Location ID	Geographic Area	Geomorphic Unit	EPA Subunit	PC1	PC2	PC3	Predicted 10-Day Mortality	Predicted 28-Day Mortality
NB03SED176	South	TRANSITIONAL SLOPES	1	4.877	-0.437	0.247	25%	**47%**
NB03SED177	South	DISTURBED SUBTIDAL	1	-1.855	-0.115	0.329	10%	19%
NB03SED178	South	SUBTIDAL FLATS	5	1.057	-5.850	-2.702	10%	19%
NB03SED179	South	DISTURBED SUBTIDAL	1	3.722	0.409	-0.538	14%	**52%**
NB03SED180	South	SUBTIDAL FLATS	1	2.890	1.263	-0.602	11%	**67%**
NB03SED181	South	SUBTIDAL FLATS	1	-2.522	-0.064	-0.315	10%	19%
NB03SED182	South	SUBTIDAL FLATS	1	-8.083	0.889	-2.319	10%	19%
NB03SED183	South	SUBTIDAL FLATS	1	2.604	1.141	-0.367	11%	**55%**
NB03SED184	South	SUBTIDAL FLATS	1	2.617	0.953	-0.373	11%	**48%**
NB03SED185	South	SUBTIDAL FLATS	1	4.879	0.562	0.674	25%	**87%**
NB03SED186	South	SUBTIDAL FLATS	1	-8.517	0.714	-0.356	10%	19%
NB03SED187	South	DISTURBED SUBTIDAL	1	-0.158	1.629	-0.830	10%	27%
NB03SED188	South	SUBTIDAL FLATS	1	-5.896	-0.935	0.152	10%	19%
NB03SED189	South	SUBTIDAL FLATS	1	0.445	1.301	0.425	10%	28%
NB03SED190	South	SUBTIDAL FLATS	1	6.593	-1.747	-0.909	**59%**	**39%**
NB03SED191	South	DISTURBED SUBTIDAL	1	5.159	1.502	-0.468	**29%**	**100%**
NB03SED192	South	SUBTIDAL FLATS	1	-6.332	-1.161	0.313	10%	19%
NB03SED193	South	SUBTIDAL FLATS	1	-5.370	-0.936	-0.126	10%	19%
NB03SED194	South	SUBTIDAL FLATS	1	7.039	-3.527	-1.413	**68%**	21%
NB03SED195	South	SUBTIDAL FLATS	1	3.494	-2.485	-1.277	13%	20%
NB03SED196	South	SUBTIDAL FLATS	1	-5.763	-1.506	0.760	10%	19%
NB03SED197	South	SUBTIDAL FLATS	1	-6.719	-1.373	-2.373	10%	19%
NB03SED199	South	SUBTIDAL FLATS	1	8.626	-0.585	-0.985	**92%**	**100%**
NB03SED200	South	SUBTIDAL FLATS	1	-3.524	-0.950	-1.286	10%	19%
NB03SED201	South	SUBTIDAL FLATS	1	5.569	-1.649	-1.449	**36%**	29%
NB03SED202	South	SUBTIDAL FLATS	1	2.888	-4.289	-0.359	11%	19%
NB03SED203	South	SUBTIDAL FLATS	1	-0.667	-0.176	0.419	10%	19%
NB03SED204	South	SUBTIDAL FLATS	1	-6.536	-0.272	-0.306	10%	19%
NB03SED205	South	SUBTIDAL FLATS	1	-8.266	-0.423	-3.279	10%	19%
NB03SED206	South	SUBTIDAL FLATS	1	8.254	0.086	-0.847	**89%**	**100%**
NB03SED207	South	SUBTIDAL FLATS	1	6.933	-1.104	-0.752	**66%**	**69%**
NB03SED208	South	SUBTIDAL FLATS	1	6.098	-2.277	-1.337	**48%**	25%
NB03SED209	South	SUBTIDAL FLATS	1	1.420	-2.777	-0.147	10%	19%
NB03SED210	South	SUBTIDAL FLATS	1	-11.090	0.048	-2.302	10%	19%
NB03SED211	South	SUBTIDAL FLATS	1	2.684	-0.689	-0.605	11%	22%
NB03SED212	South	DISTURBED SUBTIDAL	1	4.744	-0.378	1.653	23%	**46%**
NB03SED213	South	SUBTIDAL FLATS	1	7.270	-1.014	-1.150	**73%**	**81%**
NB03SED214	South	SUBTIDAL FLATS	1	3.127	-2.343	-1.088	12%	19%
NB03SED215	South	SUBTIDAL FLATS	1	4.995	-2.095	-0.728	26%	22%
NB03SED216	South	SUBTIDAL FLATS	1	3.713	-2.710	-0.343	14%	19%
NB03SED217	South	SUBTIDAL FLATS	1	-8.966	-1.042	-2.816	10%	19%
NB03SED218	South	SUBTIDAL FLATS	1	-3.277	-1.080	1.000	10%	19%
NB03SED219	South	SUBTIDAL FLATS	1	0.583	-0.547	-0.058	10%	20%
NB03SED220	South	SUBTIDAL FLATS	1	6.341	1.799	-0.552	**53%**	**100%**
NB03SED221	South	SUBTIDAL FLATS	1	4.033	-2.239	-0.208	16%	20%
NB03SED222	South	INDUSTRIAL WATERFRONT	1	4.516	0.231	1.186	20%	**64%**
NB03SED223	South	SUBTIDAL FLATS	1	-5.958	-0.310	0.761	10%	19%
NB03SED224	South	SUBTIDAL FLATS	1	3.936	0.411	-0.019	15%	**57%**
NB03SED225	South	SUBTIDAL FLATS	1	4.482	0.469	0.359	20%	**74%**
NB03SED226	South	DISTURBED SUBTIDAL	1	1.609	0.400	0.402	10%	25%
NB03SED227	South	DISTURBED SUBTIDAL	1	-0.705	0.019	-0.224	10%	20%
NB03SED228	South	SUBTIDAL FLATS	1	1.422	-2.064	-0.263	10%	19%
NB03SED229	South	SUBTIDAL FLATS	1	-1.977	-5.178	0.995	10%	19%
NB03SED230	South	NAVIGATION CHANNEL	1	1.652	-0.011	-0.807	10%	23%
NB03SED231	South	DISTURBED SUBTIDAL	1	2.497	1.005	-0.227	11%	**48%**
NB03SED232	South	NAVIGATION CHANNEL	1	5.639	0.932	-0.489	**38%**	**100%**
NB03SED233	South	TRANSITIONAL SLOPES	1	2.876	0.011	-0.108	11%	30%
NB03SED234	South	SUBTIDAL FLATS	1	-0.889	0.265	-0.286	10%	20%

Table A-25
Principal Component Scores and
Model-Predicted Mortality in Sediment

Location ID	Geographic Area	Geomorphic Unit	EPA Subunit	PC1	PC2	PC3	Predicted 10-Day Mortality	Predicted 28-Day Mortality
NB03SED235	South	SUBTIDAL FLATS	1	5.767	-0.087	-0.268	**40%**	**82%**
NB03SED236	South	SUBTIDAL FLATS	1	-6.690	-0.003	-3.779	10%	19%
NB03SED237	South	TRANSITIONAL SLOPES	1	5.632	-0.076	-0.583	**38%**	**79%**
NB03SED238	South	SUBTIDAL FLATS	1	-2.472	0.372	-1.472	10%	19%
NB03SED239	South	TRANSITIONAL SLOPES	1	5.203	0.219	-0.841	**30%**	**81%**
NB03SED241	South	NAVIGATION CHANNEL	1	1.241	0.256	-0.744	10%	23%
NB03SED242	South	NAVIGATION CHANNEL	1	0.050	0.055	-0.803	10%	20%
NB03SED243	South	SUBTIDAL FLATS	1	1.687	-0.729	-0.913	10%	20%
NB03SED244	South	SUBTIDAL FLATS	1	0.186	0.713	-0.408	10%	22%
NB03SED245	South	INDUSTRIAL WATERFRONT	1	3.536	0.010	0.174	13%	**37%**
NB03SED246	South	DISTURBED SUBTIDAL	1	-0.281	-1.512	0.083	10%	19%
NB03SED247	South	SUBTIDAL FLATS	1	1.618	-0.895	-0.076	10%	20%
NB03SED248	South	INTERTIDAL AREA	1	2.134	0.108	-1.030	10%	26%
NB03SED249	South	SUBTIDAL FLATS	1	3.131	-0.002	0.228	12%	32%
NB03SED250	South	TRANSITIONAL SLOPES	1	2.875	0.358	-0.772	11%	**36%**
NB03SED251	South	INDUSTRIAL WATERFRONT	1	1.967	-0.055	-0.636	10%	24%
NB03SED252	South	INDUSTRIAL WATERFRONT	1	2.013	-1.446	-1.849	10%	20%
NB03SED289	North	NAVIGATION CHANNEL	3	-8.171	0.695	1.776	10%	19%
NB03SED290	North	NAVIGATION CHANNEL	3	-2.578	-3.652	2.635	10%	19%
NB03SED291	North	NAVIGATION CHANNEL	3	0.443	0.738	1.784	10%	23%
NB03SED292	North	NAVIGATION CHANNEL	3	-0.237	0.389	2.403	10%	20%
NB03SED293	North	NAVIGATION CHANNEL	3	4.381	0.705	0.245	19%	**81%**
NB03SED294	North	NAVIGATION CHANNEL	3	-0.354	0.804	1.053	10%	21%
NB03SED295	North	NAVIGATION CHANNEL	3	-0.174	-1.428	0.444	10%	19%
NB03SED300	North	NAVIGATION CHANNEL	3	1.200	0.287	-0.643	10%	23%
NB03SED307	North	SUBTIDAL FLATS	4	-4.351	-1.029	1.103	10%	19%
NB03SED308	North	SUBTIDAL FLATS	4	1.839	0.736	0.788	10%	31%
NB03SED309	North	SUBTIDAL FLATS	4	-1.108	-0.158	1.529	10%	19%
NB03SED310	North	SUBTIDAL FLATS	4	-3.122	-0.515	2.903	10%	19%
NB03SED311	North	SUBTIDAL FLATS	4	1.917	0.481	1.351	10%	28%
NB03SED312	North	SUBTIDAL FLATS	4	-0.265	2.276	0.723	10%	**37%**
NB03SED313	North	SUBTIDAL FLATS	4	0.191	0.232	1.595	10%	21%
NB03SED314	North	SUBTIDAL FLATS	4	0.641	0.136	1.463	10%	21%
NB03SED315	North	SUBTIDAL FLATS	4	2.603	0.226	1.461	11%	31%
NB03SED316	North	SUBTIDAL FLATS	4	1.780	0.619	-0.980	10%	29%
NB03SED317	North	SUBTIDAL FLATS	4	0.970	0.277	0.695	10%	22%
NB03SED318	North	SUBTIDAL FLATS	4	1.796	-0.195	-0.741	10%	22%
NB03SED319	North	SUBTIDAL FLATS	4	-0.066	0.617	-0.342	10%	21%
NB03SED320	North	SUBTIDAL FLATS	4	2.002	0.192	-0.983	10%	26%
NB03SED321	North	DISTURBED SUBTIDAL	4	4.762	1.048	0.448	23%	**97%**
NB03SED322	North	DISTURBED SUBTIDAL	4	1.742	-0.059	0.689	10%	23%
NB03SED323	North	SUBTIDAL FLATS	4	1.786	0.069	0.082	10%	24%
NB03SED324	North	SUBTIDAL FLATS	4	-0.758	0.740	0.387	10%	20%
NB03SED325	North	SUBTIDAL FLATS	4	1.707	0.550	-0.046	10%	28%
NB03SED326	North	DISTURBED SUBTIDAL	4	1.514	0.882	1.301	10%	31%
NB03SED327	North	DISTURBED SUBTIDAL	4	4.937	2.294	-0.198	26%	**100%**
NB03SED328	North	SUBTIDAL FLATS	4	0.786	0.865	0.707	10%	25%
NB03SED329	North	SUBTIDAL FLATS	4	1.240	0.770	0.034	10%	27%
NB03SED330	North	DISTURBED SUBTIDAL	4	1.584	0.709	0.925	10%	29%
NB03SED331	North	SUBTIDAL FLATS	4	5.845	2.281	-0.290	**42%**	**100%**
NB03SED332	North	SUBTIDAL FLATS	4	-1.376	0.935	0.729	10%	20%
NB03SED333	North	SUBTIDAL FLATS	4	4.044	0.814	-0.865	16%	**77%**
NB03SED334	North	DISTURBED SUBTIDAL	4	-0.613	1.091	0.976	10%	22%
NB03SED335	North	SUBTIDAL FLATS	4	0.890	1.134	0.300	10%	29%
NB03SED336	North	SUBTIDAL FLATS	4	-2.775	0.132	2.743	10%	19%
NB03SED337	North	SUBTIDAL FLATS	4	-0.018	-5.431	0.199	10%	19%
NB03SED338	Central	DISTURBED SUBTIDAL	5	2.464	1.226	-0.404	11%	**55%**
NB03SED339	Central	SUBTIDAL FLATS	5	--	--	--	--	--

Table A-25
Principal Component Scores and
Model-Predicted Mortality in Sediment

Location ID	Geographic Area	Geomorphic Unit	EPA Subunit	PC1	PC2	PC3	Predicted 10-Day Mortality	Predicted 28-Day Mortality
NB03SED340	Central	SUBTIDAL FLATS	5	-0.471	0.931	0.253	10%	21%
NB03SED341	Central	SUBTIDAL FLATS	5	2.150	0.198	-0.112	10%	27%
NB03SED342	Central	SUBTIDAL FLATS	5	0.563	-0.977	0.338	10%	19%
NB03SED343	Central	SUBTIDAL FLATS	5	-4.001	-2.250	3.728	10%	19%
NB03SED344	Central	DISTURBED SUBTIDAL	5	0.387	0.503	-0.047	10%	22%
NB03SED345	Central	SUBTIDAL FLATS	5	-0.535	-6.987	0.161	10%	19%
NB03SED346	Central	SUBTIDAL FLATS	5	-0.128	0.403	0.329	10%	20%
NB03SED347	Central	SUBTIDAL FLATS	5	0.061	0.565	-0.329	10%	21%
NB03SED348	Central	SUBTIDAL FLATS	5	0.966	0.857	0.184	10%	26%
NB03SED350	Central	SUBTIDAL FLATS	5	0.705	-7.819	0.112	10%	19%
NB03SED351	Central	SUBTIDAL FLATS	5	-0.462	0.110	0.216	10%	20%
NB03SED352	Central	SUBTIDAL FLATS	5	0.131	0.889	-0.137	10%	23%
NB03SED353	Central	SUBTIDAL FLATS	5	1.744	1.853	-0.621	10%	**63%**
NB03SED355	Central	SUBTIDAL FLATS	5	-0.473	0.826	-0.430	10%	21%
NB03SED356	Central	SUBTIDAL FLATS	5	0.308	0.910	0.340	10%	23%
NB03SED357	Central	SUBTIDAL FLATS	5	0.537	0.775	-0.021	10%	23%
NB03SED358	Central	SUBTIDAL FLATS	5	-0.153	0.725	-0.085	10%	21%
NB03SED359	Central	SUBTIDAL FLATS	5	0.282	0.641	-0.031	10%	22%
NB03SED360	Central	TRANSITIONAL SLOPES	5	0.094	0.332	-0.056	10%	21%
NB03SED361	Central	SUBTIDAL FLATS	5	0.631	0.558	-0.323	10%	23%
NB03SED362	Central	TRANSITIONAL SLOPES	5	-0.298	0.189	-0.324	10%	20%
NB03SED363	Central	SUBTIDAL FLATS	5	0.152	0.186	0.035	10%	20%
NB03SED364	Central	DISTURBED SUBTIDAL	5	0.670	0.965	-0.151	10%	26%
NB03SED365	Central	TRANSITIONAL SLOPES	5	1.306	-0.036	-0.606	10%	22%
NB03SED366	Central	DISTURBED SUBTIDAL	5	-0.270	-0.463	-0.531	10%	19%
NB03SED367	South	SUBTIDAL FLATS	5	-1.366	2.192	-5.329	10%	26%
NB03SED368	South	SUBTIDAL FLATS	5	0.269	0.366	-0.313	10%	21%
NB03SED369	South	INDUSTRIAL WATERFRONT	5	-1.321	0.701	1.115	10%	20%
NB03SED370	North	SUBTIDAL FLATS	6	-1.519	-0.658	2.507	10%	19%
NB03SED371	North	SUBTIDAL FLATS	6	4.674	-0.357	0.710	22%	**45%**
NB03SED372	North	INDUSTRIAL WATERFRONT	6	0.597	1.125	0.177	10%	27%
NB03SED373	North	SUBTIDAL FLATS	6	-2.859	0.405	1.287	10%	19%
NB03SED374	North	SUBTIDAL FLATS	6	-8.978	0.226	-0.994	10%	19%
NB03SED375	North	SUBTIDAL FLATS	6	-8.066	0.257	-2.231	10%	19%
NB03SED376	North	SUBTIDAL FLATS	6	-10.138	-0.137	-0.527	10%	19%
NB03SED377	North	SUBTIDAL FLATS	6	-9.472	-0.404	-2.450	10%	19%
NB03SED378	North	SUBTIDAL FLATS	6	-5.527	-0.972	0.558	10%	19%
NB03SED379	North	SUBTIDAL FLATS	6	-4.544	-2.173	1.328	10%	19%
NB03SED380	North	DISTURBED SUBTIDAL	6	0.191	0.543	0.647	10%	21%
NB03SED381	North	SUBTIDAL FLATS	6	-9.248	0.588	-1.712	10%	19%
NB03SED382	North	SUBTIDAL FLATS	6	-5.555	-0.223	0.352	10%	19%
NB03SED383	North	SUBTIDAL FLATS	6	6.564	1.503	0.031	**58%**	**100%**
NB03SED384	North	SUBTIDAL FLATS	6	6.401	0.981	-1.457	**54%**	**100%**
NB03SED385	North	SUBTIDAL FLATS	6	-3.780	0.620	0.481	10%	19%
NB03SED386	North	SUBTIDAL FLATS	6	-3.713	-0.612	0.876	10%	19%
NB03SED387	North	SUBTIDAL FLATS	6	-2.198	-0.719	0.215	10%	19%
NB03SED388	North	SUBTIDAL FLATS	6	-3.579	0.723	1.051	10%	19%
NB03SED389	North	SUBTIDAL FLATS	6	-5.440	0.608	-0.043	10%	19%
NB03SED390	North	SUBTIDAL FLATS	6	-4.752	-0.104	2.479	10%	19%
NB03SED391	North	SUBTIDAL FLATS	6	-1.793	0.504	1.134	10%	19%
NB03SED392	North	SUBTIDAL FLATS	6	-3.258	-0.227	0.353	10%	19%
NB03SED393	North	SUBTIDAL FLATS	6	-5.484	0.508	0.334	10%	19%
NB03SED394	North	INDUSTRIAL WATERFRONT	6	-2.558	0.906	0.822	10%	19%
NB03SED395	North	SUBTIDAL FLATS	6	-3.213	-0.491	1.117	10%	19%
NB03SED396	North	SUBTIDAL FLATS	6	-3.283	0.321	1.699	10%	19%
NB03SED397	North	SUBTIDAL FLATS	6	-0.889	-1.346	2.000	10%	19%
NB03SED398	North	SUBTIDAL FLATS	6	-3.547	0.890	0.946	10%	19%
NB03SED399	North	SUBTIDAL FLATS	6	-0.001	-2.621	1.561	10%	19%

Table A-25
Principal Component Scores and
Model-Predicted Mortality in Sediment

Location ID	Geographic Area	Geomorphic Unit	EPA Subunit	PC1	PC2	PC3	Predicted 10-Day Mortality	Predicted 28-Day Mortality
NB03SED400	North	SUBTIDAL FLATS	6	-1.996	-1.417	1.737	10%	19%
NB03SED401	North	SUBTIDAL FLATS	6	-2.621	0.975	0.873	10%	19%
NB03SED402	North	INDUSTRIAL WATERFRONT	6	-3.134	-1.390	0.764	10%	19%
NB03SED403	North	SUBTIDAL FLATS	6	1.599	-1.537	1.924	10%	19%
NB03SED404	North	SUBTIDAL FLATS	6	1.028	1.272	0.486	10%	32%
NB03SED405	North	SUBTIDAL FLATS	6	0.295	0.293	0.749	10%	21%
NB03SED406	Central	SUBTIDAL FLATS	6	0.986	-0.769	2.521	10%	20%
NB03SED407	North	SUBTIDAL FLATS	6	0.813	0.662	1.183	10%	24%
NB03SED408	North	SUBTIDAL FLATS	6	2.398	1.299	0.630	11%	**56%**
NB03SED409	North	SUBTIDAL FLATS	6	0.750	1.413	0.679	10%	32%
NB03SEDCOMP01	Central	PORT CHANNEL	2	1.517	0.253	-0.217	10%	24%
NB03SEDCOMP02	Central	PORT CHANNEL	2	1.019	0.426	0.384	10%	23%
NB03SEDCOMP03	South	PORT CHANNEL	2	0.629	0.393	-0.487	10%	22%
NB03SEDCOMP04	Central	NAVIGATION CHANNEL	2	-1.492	1.406	-2.097	10%	21%
NB03SEDCOMP05	Central	NAVIGATION CHANNEL	2	-2.560	-0.241	-0.668	10%	19%
NB03SEDCOMP06	South	NAVIGATION CHANNEL	2	-2.031	0.065	-0.290	10%	19%
NB03SEDCOMP07	South	NAVIGATION CHANNEL	2	-3.712	-0.390	-0.967	10%	19%
NB03SEDCOMP08	South	NAVIGATION CHANNEL	2	-0.663	0.254	-0.926	10%	20%
NB03SEDCOMP09	South	NAVIGATION CHANNEL	2	1.085	0.120	-0.870	10%	22%
NB03SEDCOMP10	Central	NAVIGATION CHANNEL	2	0.520	0.528	-0.160	10%	22%

Notes:
Shading and bolding indicate that sample is predicted to be toxic, which is defined as survival less than 80% of control survival.
Control mortality for 10-day endpoint is 10%. Control mortality for 28-day endpoint is 19%.
Locations NB03SED349 and NB03SED354 were excluded from the principal component analysis.
Location NB03SED339 could not be scored due to missing values for dieldrin, hexachlorobenzene, and Total Alpha * Gamma Chlordane.

Acronyms and Abbreviations:
ID = identification
PC = principal component
% = percent

Table A-26
Dose Response Models for Toxicity Endpoints: Sediment Chemistry Factors

Modeled Endpoint	Model Parameters[a]	Model Form	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Mortality at 10 Days	Factor 1	Logit	1807	0.0001	Probit has best fit for Factor 1 based on AIC.
		Probit	1804	0.0005	
		Gompertz	1812	<0.0001	
	Factor 2	Logit	1962	0.066	Factor 2 is not significant when evaluated alone.
		Probit	1960	0.063	
		Gompertz	1963	0.061	
	Factor 3	Logit	--	0.90	Factor 3 is not significant when evaluated alone.
		Probit	--	0.89	
		Gompertz	--	0.90	
	Factor 1, Factor 2	Logit	1807	Factor 1(0.087); Factor 2 (0.606)	Factor 2 is not significant when added to the model with Factor 1.
		Probit	1802	Factor 1(0.077); Factor 2 (0.278)	
		Gompertz	1813	Factor 1(0.091); Factor 2 (.922)	
	Factor 1, Factor 3	Logit	1759	Factor 1(0.009); Factor 3 (.094)	Probit model with Factor 1 and Factor 3 gives lowest AIC, best fit, however Factor 3 is not significant at alpha = 0.05. **See Figure A-24 for model details.**
		Probit	**1756**	**Factor 1(0.0069); Factor 3 (.075)**	
		Gompertz	1766	Factor 1(0.0005); Factor 3 (.075)	
Mortality at 28 Days	Factor 1	Logit	3715	0.087	Gompertz has best fit for Factor 1 based on AIC.
		Probit	3728	0.128	
		Gompertz	3693	0.051	
	Factor 2	Logit	3687	0.033	Gompertz has best fit for Factor 2 based on AIC.
		Probit	3691	0.027	
		Gompertz	3685	0.013	
	Factor 3	Logit	--	0.683	Factor 3 is not significant when evaluated alone.
		Probit	--	0.675	
		Gompertz	--	0.688	
	Factor 1, Factor 2	Logit	3439	Factor 1 (0.029); Factor 2 (0.021)	Gompertz model with Factor 1 and Factor 2 gives lowest AIC, best fit. **See Figure A-25 for model details.**
		Probit	3439	Factor 1 (0.041); Factor 2 (0.029)	
		Gompertz	**3434**	**Factor 1 (0.010); Factor 2 (0.011)**	
	Factor 1, Factor 3	Logit	--	Factor 1 (0.091); Factor 3 (0.846)	Factor 3 is not significant when added to Factor 1.
		Probit	--	Factor 1 (0.124); Factor 3 (0.858)	
		Gompertz	--	Factor 1 (0.071); Factor3 (0.722)	
	Factor 1, 2 and 3	Gompertz	--	Factor 1 (0.0008); Factor 2 (0.015); Factor 3 (0.771)	Factor 3 is not significant when added to Factors 1 and 2.

Table A-26
Dose Response Models for Toxicity Endpoints: Sediment Chemistry Factors

Modeled Endpoint	Model Parameters[a]	Model Form	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Growth	Factor 1	Linear	0.036	0.170	Factor 1 is not significant.
	Factor 2	Linear	0.025	0.206	Factor 2 is not significant.
	Factor 3	Linear	0	0.516	Factor 3 is not significant.
	Factor 1, Factor 2	Linear	0.077	Factor 1 (0.128); Factor 2 (0.152)	Not significant (p=0.14).
	Factor 1, Factor 3	Linear	0.067	Factor 1 (0.074); Factor 3 (0.181)	Not significant (p=0.16).
	Factor 1, Factor 2, Factor 3	Linear	0.089	Factor 1 (0.069); Factor 2 (0.220); Factor 3 (0.262)	Not significant (p=0.16).
Reproduction	Factor 1	Linear	--	0.584	Factor 1 is not significant.
	Factor 2	Linear	--	0.413	Factor 2 is not significant.
	Factor 3	Linear	--	0.580	Factor 3 is not significant.
	Factor 1, Factor 2	Linear	--	Factor 1 (0.534); Factor 2 (0.389)	Not significant (p=0.59).
	Factor 1, Factor 3	Linear	--	Factor 1 (0.407); Factor 3 (0.405)	Not significant (p=0.61).
	Factor 1, Factor 2, Factor 3	Linear	--	Factor 1 (0.401); Factor 2 (0.470); Factor 3 (0.491)	Not significant (p=0.68).

Notes:
[a] All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10-day mortality

Acronyms and Abbreviations:
AIC = Akaike's information criterion
PC = principal component
R^2 = coefficient of determination
-- AIC and adjusted R^2 not estimated for models with large p-values and unstable parameter estimates.
< = less than

Table A-27
Correlation Matrix and Eigenvalues of the Principal Component Analysis: Porewater

Chemical	Mercury	Total PAHs	Total Alkylated PAHs	Total PCB Congeners	2,3,7,8-TCDD	Dieldrin	Hexachloro-benzene	Total DDx (2,4 and 4,4)	Total Alpha + Gamma Chlordane
Mercury	1	0.19	0.13	0.15	0.19	0.27	0.07	-0.09	0.36
Total PAHs	0.19	1	0.87	0.46	0.48	0.35	0.58	0.50	-0.10
Total Alkylated PAHs	0.13	0.87	1	0.55	0.58	0.41	0.72	0.64	-0.10
Total PCB Congeners	0.15	0.46	0.55	1	0.66	0.78	0.62	0.62	0.03
2,3,7,8-TCDD	0.19	0.48	0.58	0.66	1	0.58	0.73	0.45	0.18
Dieldrin	0.27	0.35	0.41	0.78	0.58	1	0.66	0.36	0.44
Hexachlorobenzene	0.07	0.58	0.72	0.62	0.73	0.66	1	0.58	0.32
Total DDx (2,4 and 4,4)	-0.09	0.50	0.64	0.62	0.45	0.36	0.58	1	-0.19
Total Alpha + Gamma Chlordane	0.36	-0.10	-0.10	0.03	0.18	0.44	0.32	-0.19	1

Eigenvalues of the Correlation Matrix			
		Variance Explained (Percent)	
Principal Component	Eigenvalue	Proportion	Cumulative
1	4.56	51%	51%
2	1.68	19%	69%
3	0.95	11%	80%
4	0.66	7%	87%
5	0.44	5%	92%

Note:
All porewater chemical concentrations were log-transformed before calculation of the Pearson Correlation Matrix.

Acronyms and Abbreviations:
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
% = percent

Table A-28
Dose Response Models for Toxicity Endpoints:
Porewater Chemistry Principal Component Analysis

Modeled Endpoint	Model Parameters[a]	Model Form	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Mortality at 10 Days	PC1	Logit	1745	<0.0001	Probit model has best fit based on AIC. PC1 is positively associated with mortality. **See Figure A-28 for model details.**
		Probit	**1743**	**0.0005**	
		Gompertz	1749	<0.0001	
	PC2	Logit	--	0.552	PC2 is not significant.
		Probit	--	0.525	
		Gompertz	--	0.555	
	PC1, PC2	Logit	--	--	Parameters not significant when combined. Stable parameter estimates could not be obtained.
		Probit	--	--	
		Gompertz	--	--	
	PC3	Logit	--	0.728	PC3 is not significant.
		Probit	--	0.714	
		Gompertz	--	0.729	
	PC1,PC3	Logit	--	--	Parameters not significant when combined. Stable parameter estimates could not be obtained.
		Probit	--	--	
		Gompertz	--	--	
Mortality at 28 Days	PC1	Logit	3346	<0.0001	Probit model has best fit for PC1 based on AIC. PC1 is positively associated with mortality. **See Figure A-29 for model details.**
		Probit	**3346**	**<0.0001**	
		Gompertz	3368	<0.0001	
	PC2	Logit	--	0.988	PC2 is not significant.
		Probit	--	0.988	
		Gompertz	--	0.988	
	PC3	Logit	--	0.759	PC3 is not significant.
		Probit	--	0.763	
		Gompertz	--	0.754	
	PC1, PC2	Logit	--	PC1 (0.0004); PC2 (0.531)	PC2 is not significant when added to the model.
		Probit	--	PC1 (<0.0001); PC2 (0.568)	
		Gompertz	--	PC1 (0.0002); PC2 (0.334)	
	PC1, PC3	Logit	3331	PC1 (0.0002); PC3 (0.253)	PC3 is not significant but appears to improve model fit based on AIC criteria. Both PC1 and PC3 are positively associated with mortality.
		Probit	3331	PC1 (<0.0001); PC3 (0.2477)	
		Gompertz	3357	PC1 (<0.0001); PC3 (0.3285)	

Table A-28
Dose Response Models for Toxicity Endpoints:
Porewater Chemistry Principal Component Analysis

Modeled Endpoint	Model Parameters[a]	Model Form	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Growth	**PC1**	**Linear**	**0.24**	**0.0046**	**Best growth model based on adjusted R^2. See Figure A-30 for model details.**
	PC1, PC2	Linear	0.22	PC1 (0.007); PC2 (0.568)	PC2 is not significant when added to the model.
	PC1, PC3	Linear	0.22	PC1 (0.006); PC2 (0.681)	PC3 is not significant when added to the model.
Reproduction	PC1	Linear	0.10	0.109	Not significant. **See Figure A-31 for model details.**
	PC2	Linear	--	0.466	Not significant.
	PC3	Linear	--	0.828	Not significant.
	PC1, PC2	Linear	0.03	PC1 (0.137); PC2 (0.614)	Not significant.
	PC1, PC3	Linear	0.03	PC1 (0.111); PC3 (0.736)	Not significant.

Note:
[a] All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10-day mortality and 0.19 for 28-day mortality.

Acronyms and Abbreviations:
AIC = Akaike's information criterion
PC = principal component
R^2 = coefficient of determination
< = less than
-- no estimates obtained for AIC. R^2 not shown for models with p-value < 0.05.

Table A-29
Dose Response Models for Toxicity Endpoints:
Porewater Chemistry Factors

Modeled Endpoint	Model Parameters[a]	Model Form	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Mortality at 10 Days	Factor 1	Logit	1832	<0.0001	Probit Model has best fit based on AIC. Factor 1 is positively associated with mortality. **See Figure A-32 for model details.**
		Probit	**1821**	**<0.0001**	
		Gompertz	1839	<0.0001	
	Factor 2	Logit	1894	0.0101	Factor 2 is also significant but is not the best model based on AIC.
		Probit	1893	0.0033	
		Gompertz	1892	0.0092	
	Factor 1, Factor 2	Logit	--	Factor 1(>0.99); Factor 2 (>0.99)	Stable parameter estimates could not be obtained.
		Probit	--	Factor 1(>0.99); Factor 2 (>0.99)	
		Gompertz	--	Factor 1(>0.99); Factor 2 (>0.99)	
	Factor 3	Logit	--	>0.99	Stable parameter estimates could not be obtained.
		Probit	--	>0.99	
		Gompertz	--	>0.99	
	Factor 1, Factor 3	Logit	1818	Factor 1(<.0001); Factor 3 (0.08)	The addition of Factor 3 improves AIC; however, Factor 3 is not significant.
		Probit	1811	Factor 1(<.0001); Factor 3 (0.13)	
		Gompertz	1825	Factor 1(<.0001); Factor 3 (0.08)	
	Factor 2, Factor 3	Logit	1895	Factor 2(0.017); Factor 3 (0.79)	Not significant.
		Probit	1895	Factor 2(0.006); Factor 3 (0.91)	
		Gompertz	1893	Factor 2(0.015); Factor 3 (0.82)	
Mortality at 28 Days	Factor 1	Logit	3497	0.005	Factor 1 is significant alone.
		Probit	3501	0.004	
		Gompertz	3487	0.001	
	Factor 2	Logit	3650	0.009	Factor 2 is significant alone.
		Probit	3652	0.008	
		Gompertz	3643	0.004	
	Factor 3	Logit	--	0.577	Factor 3 is not significant when modeled alone.
		Probit	--	0.614	
		Gompertz	--	0.562	
	Factor 1, Factor 2	Logit	3361	Factor 1(0.0019); Factor 2 (0.005)	Factors 1 and 2 are significant and AIC is lower than either parameter alone.
		Probit	3361	Factor 1(0.0005); Factor 2 (0.0017)	
		Gompertz	3381	Factor 1(0.0027); Factor 2 (0.0099)	
	Factor 1, Factor 2, Factor 3	Logit	3279	Factor 1(0.001); Factor 2 (0.0004); Factor 3 (0.024)	Probit model has lowest AIC. All factors are positively associated with mortality. **See Figure A-33 for model details.**
		Probit	**3277**	**Factor 1(0.0011); Factor 2 0.0003); Factor 3 (0.028)**	
		Gompertz	3296	Factor 1(0.001); Factor 2 (0.0002); Factor 3 (0.014)	

Table A-29
Dose Response Models for Toxicity Endpoints: Porewater Chemistry Factors

Modeled Endpoint	Model Parameters[a]	Model Form	AIC	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Growth	Factor 1	Linear	0.031	0.183	Factor 1 is not significant alone.
	Factor 2	Linear	0.142	0.027	Factor 2 is significant. **See Figure A-34a for model details.**
	Factor 3	Linear	0	0.9	Factor 3 is not significant.
	Factor 1, Factor 2	Linear	0.228	Factor 1(0.06); Factor 2 (0.011)	Factor is 1 is not significant when added to Factor 2; however, the improvement in adjusted R^2 suggests that it may have an effect. Both factors are negatively associated with growth. **See Figure A-34b for model details.**
	Factor 1, Factor 2, Factor 3	Linear	0.196	Factor 1(0.065); Factor 2 (0.012); Factor 3 (0.87)	Factor 3 is not significant when added.
Reproduction	Factor 1	Linear	0.0058	0.292	Factors 1 and 2 are negatively associated with the reproductive endpoint but neither are significant.
	Factor 2	Linear	0.0064	0.288	
	Factor 3	Linear	0.00	0.568	
	Factor 1, Factor 2	Linear	0.03	Factor 1(0.209); Factor 2 (0.207)	

Note:
[a] All mortality models include a fixed threshold parameter (C) set equal to the mean mortality of the laboratory control replicates. C = 0.1 for 10-day mortality and 0.19 for 28-day mortality.

Acronyms and Abbreviations:
AIC = Akaike's information criterion
R^2 = coefficient of determination
> = greater than
< = less than
-- no estimates obtained for AIC. R^2 not shown for models with p-value < 0.05.

Table A-30
Dose Response Models for Benthic Metrics: Porewater Chemistry

Benthic Metric	Model Parameters	Model Form	R^2	Adjusted R^2	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Density	PC1	Linear	--	--	0.505	None are significant.
	PC2	Linear	--	--	0.065	
	PC3	Linear	--	--	0.340	
Taxa	PC1	Linear	--	--	0.731	None are significant.
	PC2	Linear	--	--	0.217	
	PC3	Linear	--	--	0.068	
Shannon-Weiner Diversity	PC1	Linear	--	--	0.275	None are significant.
	PC2	Linear	--	--	0.290	
	PC3	Linear	--	--	0.271	
Pielou's Evenness	PC1	Linear	--	--	0.478	None are significant.
	PC2	Linear	--	--	0.470	
	PC3	Linear	--	--	0.840	
Swartz Dominance	PC1	Linear	--	--	0.157	None are significant.
	PC2	Linear	--	--	0.134	
	PC3	Linear	--	--	0.426	
NY/NJ Harbor B-IBI	PC1	Linear	--	--	0.145	None are significant.
	PC2	Linear	--	--	0.245	
	PC3	Linear	--	--	0.277	
Percent Tolerant	PC1	Linear	--	--	0.889	None are significant.
	PC2	Linear	--	--	0.495	
	PC3	Linear	--	--	0.141	
Percent Sensitive	PC1	Linear	--	--	0.201	None are significant.
	PC2	Linear	--	--	0.274	
	PC3	Linear	--	--	0.126	

Acronyms and Abbreviations:
B-IBI = Benthic Index of Biotic Integrity
NY/NJ = New York/New Jersey
PC = principal component
R^2 = coefficient of determination
-- = not shown for models where overall model p-value is greater than 0.05.

Table A-31
Community Ordination Models

Benthic Metric	Sediment Chemistry Model Parameters	Model Form	R^2	Type III Analysis of Effect Parameters: Parameter (p-value)	Notes
Dimension 1	PC1	Linear	--	0.256	While not quite significant PC2 is negatively correlated with Dimension 1 (R^2 = 0.13).
	PC2	Linear	--	0.054	
	PC3	Linear	--	0.432	
	Shear Stress	Linear	--	0.215	
	Log TOC	Linear	--	0.601	
Dimension 2	PC1	Linear	--	0.382	Percent fines is significantly and negatively associated with Dimension 2. See **Figure A-35e** for depiction of regression model.
	PC1 (exclude stations 151 and 154)	Linear	--	0.090	
	PC2	Linear	--	0.198	
	PC3	Linear	--	0.226	
	Percent Fines	**Linear**	**0.26**	**0.004**	
	Shear Stress	Linear	--	0.075	
	Log TOC	Linear	--	0.708	

Notes:
Statistically significant models are shaded and bolded.

Acronyms and Abbreviations:
PC = principal component
R^2 = coefficient of determination
TOC = total organic carbon
-- = not shown for models where overall model p-value is greater than 0.05.

Table A-32
Spearman Rank Correlation of Sediment Chemistry, Amphipod Survival and BIC Metrics for the Historical REMAP Data

Parameter Group	Chemical Name	Nunber of Samples[a]	Frequency of Detection	10-Day Survival[c]	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Swartz's Dominance Index	Pielou's Evenness Index	Proportion Tolerant Species	Proportion Sensitive Species
REMAP 1993/94											
AVS-SEM	AVS	18	100%	-0.46	-0.17	-0.11	-0.10	-0.17	-0.16	0.32	0.37
AVS-SEM	SEM Cd	18	83%	**-0.61**	**-0.56**	-0.20	**-0.66**	**-0.51**	-0.46	0.44	0.27
AVS-SEM	SEM Cu	18	94%	-0.10	-0.30	-0.10	**-0.60**	-0.42	**-0.51**	0.07	0.19
AVS-SEM	SEM Ni	18	100%	-0.46	**-0.75**	**-0.49**	-0.46	-0.33	-0.04	0.13	0.19
AVS-SEM	SEM Pb	18	100%	-0.44	**-0.76**	**-0.48**	**-0.67**	**-0.48**	-0.27	0.17	-0.02
AVS-SEM	SEM Zn	18	100%	**-0.50**	**-0.70**	-0.44	**-0.65**	**-0.54**	-0.28	0.18	0.01
Butyltins	Dibutyltin	18	100%	-0.44	**-0.48**	-0.34	-0.26	-0.07	0.07	-0.18	-0.26
Butyltins	Monobutyltin	18	94%	-0.45	**-0.50**	-0.34	-0.35	-0.15	-0.02	-0.08	-0.25
Butyltins	Tetrabutyltin	18	44%	-0.31	0.37	0.23	0.40	0.40	0.27	-0.12	-0.21
Butyltins	Tributyltin	18	100%	**-0.76**	-0.39	-0.29	-0.32	-0.21	-0.16	0.16	0.09
Metals	Aluminum	18	100%	-0.43	**-0.61**	-0.31	**-0.64**	-0.44	-0.37	0.24	0.07
Metals	Antimony	18	100%	-0.30	**-0.61**	-0.44	-0.43	-0.27	-0.09	-0.16	-0.35
Metals	Arsenic	18	100%	**-0.49**	**-0.54**	-0.33	**-0.49**	-0.36	-0.17	0.11	-0.07
Metals	Cadmium	18	100%	-0.42	**-0.60**	-0.34	**-0.63**	**-0.49**	-0.35	0.15	-0.13
Metals	Chromium	18	100%	-0.37	**-0.73**	**-0.48**	**-0.66**	**-0.48**	-0.33	0.13	-0.20
Metals	Copper	18	100%	-0.46	**-0.63**	**-0.51**	-0.47	-0.39	-0.13	0.04	-0.27
Metals	Iron	18	100%	**-0.49**	**-0.64**	**-0.52**	-0.43	-0.30	-0.11	0.03	-0.07
Metals	Lead	18	100%	-0.42	**-0.70**	**-0.54**	**-0.57**	**-0.50**	-0.20	0.07	-0.22
Metals	Mangenese	18	100%	-0.32	-0.42	-0.17	-0.31	-0.20	-0.17	0.27	0.11
Metals	Mercury	18	100%	-0.26	**-0.63**	-0.36	**-0.54**	-0.42	-0.18	-0.05	-0.41
Metals	Nickel	18	100%	-0.43	-0.39	-0.28	-0.22	-0.06	0.00	-0.21	-0.06
Metals	Selinium	18	100%	-0.32	-0.15	-0.05	-0.22	-0.03	-0.11	-0.08	0.04
Metals	Silicon	18	100%	0.40	0.73	0.47	0.50	0.39	0.12	-0.29	0.14
Metals	Silver	18	100%	-0.28	**-0.84**	**-0.55**	**-0.55**	-0.36	-0.05	0.01	-0.05
Metals	Tin	18	100%	-0.08	**-0.50**	-0.36	-0.27	-0.26	0.02	-0.02	-0.33
Metals	Zinc	18	100%	**-0.52**	**-0.59**	-0.42	**-0.58**	**-0.49**	-0.30	0.09	-0.15
PAHs	Total HMW PAHs	18	100%	-0.12	-0.39	-0.43	-0.28	-0.17	0.02	-0.06	**-0.53**
PAHs	Total LMW PAHs	18	100%	-0.18	-0.20	-0.22	-0.21	-0.18	-0.10	0.16	-0.19
PAHs	Total PAHs	18	100%	-0.10	-0.37	-0.41	-0.26	-0.16	0.03	-0.05	**-0.53**
PCBs	Total PCB Congeners (NOAA[b])	18	100%	**-0.62**	**-0.56**	**-0.49**	**-0.51**	-0.42	-0.27	0.05	-0.09
Pesticides	Alpha-chlordane	18	100%	-0.43	**-0.72**	**-0.56**	**-0.53**	-0.40	-0.17	-0.07	-0.12
Pesticides	Dieldrin	18	100%	**-0.50**	**-0.69**	**-0.56**	-0.47	-0.39	-0.12	-0.06	-0.16
Pesticides	Heptachlor Epoxide	18	56%	-0.22	0.02	-0.23	-0.07	-0.06	-0.12	-0.01	0.21
Pesticides	Hexachlorobenzene	18	100%	-0.47	**-0.64**	**-0.55**	**-0.54**	**-0.51**	-0.25	0.27	-0.20
Pesticides	Lindane - Gamma-BHC	18	39%	-0.28	-0.11	-0.20	-0.25	-0.29	-0.21	0.07	0.16
Pesticides	Mirex	18	33%	0.27	-0.26	-0.14	-0.38	-0.41	-0.09	0.13	-0.27
Pesticides	Total Chlordane	18	100%	**-0.50**	**-0.69**	**-0.53**	**-0.49**	-0.35	-0.14	-0.09	-0.14
Pesticides	Total DDT	18	100%	-0.46	**-0.58**	-0.30	-0.41	-0.27	-0.05	-0.18	-0.24
Pesticides	Total DDx (2,4 & 4,4)	18	100%	-0.46	**-0.58**	-0.30	-0.41	-0.27	-0.05	-0.18	-0.24
Pesticides	Total DDx (4,4)	18	100%	-0.46	**-0.57**	-0.30	-0.42	-0.27	-0.06	-0.18	-0.24

Table A-32
Spearman Rank Correlation of Sediment Chemistry, Amphipod Survival and BIC Metrics for the Historical REMAP Data

Parameter Group	Chemical Name	Nunber of Samples[a]	Frequency of Detection	10-Day Survival[c]	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Swartz's Dominance Index	Pielou's Evenness Index	Proportion Tolerant Species	Proportion Sensitive Species
Pesticides	Trans-Nonachlor	18	100%	-0.43	**-0.79**	**-0.65**	-0.45	-0.27	-0.02	-0.06	-0.15
TOC	Total Organic Carbon	18	100%	-0.30	-0.18	-0.01	-0.22	-0.07	-0.10	-0.02	0.14
REMAP 1998											
Dioxins/Furans	2,3,7,8-TCDD	12	100%	-0.02	-0.42	0.05	-0.26	-0.36	-0.14	0.17	-0.10
Metals (Total)	Acid Volatile Sulfide	13	100%	-0.10	-0.25	0.00	-0.21	-0.16	-0.07	0.04	-0.04
Metals (Total)	Aluminum	13	100%	0.44	-0.52	-0.10	-0.18	-0.08	0.04	0.00	-0.28
Metals (Total)	Antimony	13	100%	-0.28	-0.25	0.36	-0.60	-0.53	-0.48	0.55	**-0.68**
Metals (Total)	Arsenic	13	100%	-0.32	-0.01	0.45	-0.62	-0.46	-0.50	0.53	-0.49
Metals (Total)	Cadmium	13	100%	-0.53	-0.13	0.44	**-0.77**	**-0.70**	-0.61	**0.67**	-0.54
Metals (Total)	Chromium	13	100%	-0.27	-0.33	0.45	**-0.74**	**-0.69**	-0.57	**0.61**	-0.59
Metals (Total)	Lead	13	100%	-0.35	-0.25	0.40	**-0.71**	-0.63	-0.57	**0.63**	-0.57
Metals (Total)	Manganese	13	100%	0.59	-0.57	-0.38	0.11	0.16	0.35	-0.35	0.05
Metals (Total)	Mercury	13	100%	-0.01	0.14	0.42	-0.31	-0.27	-0.49	0.47	**-0.74**
Metals (Total)	Nickel	13	100%	-0.40	0.01	0.36	-0.54	-0.46	-0.46	0.47	-0.32
Metals (Total)	Selenium	13	100%	-0.44	-0.08	0.44	**-0.72**	-0.62	-0.59	**0.66**	**-0.61**
Metals (Total)	Silica	13	100%	-0.41	0.61	0.08	0.17	0.10	-0.03	0.01	0.36
Metals (Total)	Silver	13	100%	-0.05	-0.52	0.20	-0.56	-0.47	-0.34	0.41	-0.51
Metals (Total)	Thallium	13	100%	-0.17	0.13	0.66	-0.60	-0.46	-0.53	0.52	-0.12
Metals (Total)	Tin	13	100%	0.04	-0.31	0.09	-0.24	-0.26	-0.27	0.33	**-0.62**
Metals (Total)	Zinc	13	100%	-0.29	-0.25	0.43	**-0.73**	**-0.65**	-0.59	**0.62**	-0.57
PAHs	Total HMW PAHs	13	100%	-0.45	0.73	0.46	0.01	0.04	-0.25	0.24	0.20
PAHs	Total LMW PAHs	13	92%	-0.42	0.77	0.43	0.05	0.08	-0.20	0.19	0.15
PAHs	Total PAHs	13	100%	-0.41	0.73	0.47	0.03	0.06	-0.24	0.22	0.15
Pesticides	Total DDx (2,4 & 4,4)	13	85%	-0.58	0.43	0.42	-0.35	-0.16	-0.37	0.44	0.00
Pesticides	Total DDx (4,4)	13	85%	-0.59	0.45	0.42	-0.34	-0.16	-0.37	0.45	0.00
REMAP 2003											
Butyl tin	Dibutyltin	11	100%	-0.31	-0.17	0.15	-0.52	-0.54	-0.63	0.31	-0.38
Butyl tin	Monobutyltin	11	91%	0.06	-0.01	0.04	-0.47	-0.34	-0.43	-0.45	-0.47
Butyl tin	Tetrabutyltin	11	45%	-0.35	-0.21	0.04	-0.27	-0.39	-0.21	0.02	-0.33
Butyl tin	Tributyltin	11	100%	-0.43	-0.08	-0.12	0.11	0.03	0.05	0.27	-0.06
Dioxins/Furans	2,3,7,8-TCDD	11	100%	-0.64	-0.31	-0.35	-0.10	-0.12	-0.09	0.27	0.02
Metals	Aluminum	11	100%	-0.37	-0.63	-0.37	-0.08	-0.20	0.23	0.32	-0.53
Metals	Antimony	11	100%	-0.53	0.03	0.21	-0.15	-0.15	-0.40	0.21	-0.22
Metals	Arsenic	11	100%	-0.41	0.32	0.33	0.02	-0.04	-0.25	-0.04	0.14
Metals	Cadmium	11	100%	**-0.92**	-0.26	-0.30	0.00	-0.02	-0.07	0.46	-0.12
Metals	Chromium	11	100%	**-0.72**	-0.17	0.01	-0.10	-0.14	-0.30	0.45	-0.27
Metals	Copper	11	100%	-0.57	-0.01	0.15	-0.19	-0.20	-0.42	0.26	-0.27
Metals	Iron	11	100%	-0.32	-0.31	-0.03	-0.38	-0.39	-0.26	0.05	-0.46
Metals	Lead	11	100%	-0.53	0.21	0.28	-0.20	-0.23	-0.57	0.50	-0.14
Metals	Manganese	11	100%	-0.43	**-0.78**	-0.56	-0.49	-0.50	0.03	0.23	-0.33
Metals	Mercury	11	100%	-0.62	0.13	0.21	0.00	-0.03	-0.32	0.25	-0.11
Metals	Nickel	11	100%	**-0.86**	-0.22	-0.21	-0.33	-0.37	-0.34	0.55	-0.16
Metals	Selenium	11	91%	-0.57	0.06	0.08	-0.16	-0.14	-0.27	0.12	-0.01

Table A-32
Spearman Rank Correlation of Sediment Chemistry, Amphipod Survival and BIC Metrics for the Historical REMAP Data

Parameter Group	Chemical Name	Nunber of Samples[a]	Frequency of Detection	10-Day Survival[c]	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Swartz's Dominance Index	Pielou's Evenness Index	Proportion Tolerant Species	Proportion Sensitive Species
Metals	Silver	11	100%	-0.64	-0.09	0.04	-0.15	-0.15	-0.33	0.37	-0.25
Metals	Tin	11	100%	**-0.74**	0.01	0.02	-0.17	-0.13	-0.44	0.36	-0.10
Metals	Zinc	11	100%	-0.60	-0.06	0.10	-0.24	-0.21	-0.45	0.26	-0.26
PAHs	Total HMW PAHs	11	100%	-0.15	0.27	0.22	-0.01	0.03	-0.44	0.22	-0.02
PAHs	Total LMW PAHs	11	100%	-0.10	0.33	0.11	0.13	0.20	-0.26	0.13	0.22
PAHs	Total PAHs	11	100%	-0.17	0.39	0.25	0.08	0.11	-0.38	0.23	0.20
PCBs	Total PCB Congeners (NOAA[b])	11	100%	-0.60	-0.16	-0.04	-0.04	-0.05	-0.22	0.35	-0.47
Pesticides	alpha-Chlordane	11	91%	**-0.78**	-0.28	-0.29	-0.08	-0.04	-0.21	0.50	-0.24
Pesticides	Hexachlorobenzene	11	27%	-0.48	0.18	0.03	0.16	0.12	-0.12	**0.62**	0.05
Pesticides	Total DDx (2,4 & 4,4)	11	100%	-0.47	-0.08	0.06	-0.13	-0.09	-0.31	0.21	-0.42
Pesticides	Total DDx (4,4)	11	100%	-0.47	-0.08	0.06	-0.13	-0.09	-0.31	0.21	-0.42
REMAP 2008											
Grain Size	Substrate - silt/clay mix	11	100%	0.11	-0.62	**-0.79**	0.19	0.22	0.46	0.20	0.39
Metals	Aluminum	11	100%	-0.28	-0.35	-0.63	0.20	-0.05	0.46	0.34	0.70
Metals	Antimony	11	91%	-0.44	-0.35	**-0.84**	0.14	0.20	0.27	0.53	0.29
Metals	Arsenic	11	100%	-0.22	-0.19	**-0.68**	-0.03	-0.05	0.12	0.27	0.11
Metals	Cadmium	11	100%	-0.28	-0.22	**-0.82**	0.11	0.17	0.22	0.42	0.20
Metals	Chromium	11	100%	-0.34	-0.47	**-0.76**	0.10	0.20	0.28	0.40	0.29
Metals	Copper	11	100%	-0.20	-0.43	**-0.74**	-0.09	0.08	0.05	0.55	0.15
Metals	Iron	11	100%	-0.31	-0.41	**-0.86**	0.31	0.16	0.55	0.36	0.50
Metals	Lead	11	100%	-0.29	-0.41	**-0.89**	0.22	0.29	0.35	0.58	0.26
Metals	Manganese	11	100%	-0.26	-0.19	-0.54	0.07	-0.15	0.30	0.08	0.36
Metals	Mercury	11	100%	-0.15	-0.43	**-0.68**	-0.02	0.17	0.06	0.55	0.11
Metals	Nickel	11	100%	-0.55	-0.07	**-0.73**	0.21	0.04	0.31	0.59	0.43
Metals	Silicon	11	100%	-0.32	0.15	-0.01	0.01	0.21	-0.25	0.58	-0.33
Metals	Silver	11	100%	-0.31	-0.33	**-0.87**	0.26	0.31	0.38	0.42	0.14
Metals	Tin	11	100%	-0.29	-0.48	**-0.74**	0.04	0.17	0.22	0.38	0.27
Metals	Zinc	11	100%	-0.40	-0.27	**-0.84**	0.27	0.21	0.40	0.57	0.43
PAHs	Total HMW PAHs	11	100%	0.16	-0.06	0.25	0.02	0.16	0.00	-0.19	0.06
PAHs	Total LMW PAHs	11	55%	0.01	-0.01	0.25	0.06	0.16	0.03	-0.12	0.10
PAHs	Total PAHs	11	100%	0.16	-0.06	0.25	0.02	0.16	0.00	-0.19	0.06
Pesticides	Total DDx (2,4 & 4,4)	11	18%	-0.08	-0.26	-0.41	-0.05	-0.16	0.09	0.55	0.42
Pesticides	Total DDx (4,4)	11	18%	-0.08	-0.26	-0.41	-0.05	-0.16	0.09	0.55	0.42
TOC	Total Organic Carbon	11	100%	-0.21	-0.59	-0.59	0.00	-0.02	0.32	0.18	0.62
REMAP 2013											
Dioxins/Furans	2,3,7,8-TCDD	11	100%	-0.19	0.29	0.02	0.20	0.26	0.25	-0.16	--
Grain Size	Substrate - silt/clay mix	11	100%	-0.22	0.44	-0.11	0.48	0.69	0.23	0.15	--
Metals	Aluminum	11	100%	-0.04	0.39	0.01	0.48	0.40	0.25	0.01	--
Metals	Antimony	11	100%	-0.11	0.58	0.18	0.57	0.55	0.10	0.07	--
Metals	Arsenic	11	100%	0.00	0.62	0.26	0.49	0.46	-0.02	0.04	--
Metals	Cadmium	11	100%	0.09	0.48	0.42	0.35	0.24	0.10	0.09	--
Metals	Chromium	11	100%	-0.19	0.41	0.05	0.46	0.41	0.25	-0.06	--
Metals	Copper	11	100%	-0.15	0.63	0.26	0.63	0.51	0.14	-0.03	--
Metals	Iron	11	100%	-0.28	0.48	0.13	0.53	0.57	0.23	0.16	--

Table A-32
Spearman Rank Correlation of Sediment Chemistry, Amphipod Survival and BIC Metrics for the Historical REMAP Data

Parameter Group	Chemical Name	Nunber of Samples[a]	Frequency of Detection	10-Day Survival[c]	Number of Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Swartz's Dominance Index	Pielou's Evenness Index	Proportion Tolerant Species	Proportion Sensitive Species
Metals	Lead	11	100%	-0.24	0.52	0.15	0.59	0.53	0.25	0.01	--
Metals	Manganese	11	100%	-0.12	0.35	-0.14	0.43	0.57	0.24	0.25	--
Metals	Mercury	11	100%	-0.49	0.13	0.14	0.25	0.18	0.44	0.05	--
Metals	Nickel	11	100%	-0.16	0.54	0.12	0.61	0.51	0.17	0.01	--
Metals	Selenium	11	100%	-0.14	0.56	0.18	0.60	0.51	0.19	0.03	--
Metals	Silver	11	100%	-0.06	0.47	0.27	0.49	0.45	0.16	0.22	--
Metals	Tin	11	100%	0.18	0.53	0.57	0.44	0.10	-0.06	0.08	--
Metals	Zinc	11	100%	-0.07	0.41	-0.04	0.50	0.49	0.18	0.14	--
PCBs	Total Aroclor PCBs	11	45%	-0.48	0.00	0.26	-0.02	-0.22	0.16	-0.45	--
Pesticides	Total DDx (2,4 & 4,4)	11	55%	0.06	-0.04	0.32	-0.14	-0.51	0.13	-0.27	--
Pesticides	Total DDx (4,4)	11	55%	-0.01	-0.05	0.26	-0.15	-0.51	0.15	-0.34	--
TOC	Total Organic Carbon	11	100%	-0.31	0.30	0.09	0.26	0.27	0.18	0.02	--

Notes:
1/2 detection limit substituted for non-detects.
Pesticides shown are DDx, chlordane and any other with a frequency of detection > 30% in a given REMAP study.
Only PAH totals are shown.
Only total PCBs are shown. PCBs were not detected in 2008.
Shading indicates strength of association as determined by the Spearman correlation coefficient.
Correlation coefficients in **bold** indicate the chemical is statistically signifcantly negatively correlated with the toxicity endpoint or benthic metric (or positively correlated for percent tolerant a metric that is expected to increase with degradation).
[a]Includes only samples collected within the boundary of the NBSA.
[b]An estimate of total PCBs used in the NOAA Status and Trends Program. It is calculated as the sum of 20 PCB congeners (PCB numbers 8, 18, 28, 44, 52, 66, 101, 105, 77, 118, 126, 128, 138, 153, 170, 180, 187, 195, 206, and 209) multiplied by two.
[c]*Ampelisca abdita* Bioassay
[d]For percent tolerant, the shading is reversed, Positive values are red and negative values are green.
REMAP Data were obtained from the following sources:
REMAP 1993 through 2003: https://archive.epa.gov/emap/archive-emap
REMAP 2008 AND 2013: https://www.waterqualitydata.us

Shading[d]
1
0.5
0
-0.5
-1

Acronyms and Abbreviations:
AVS = acid volatile sulfide
HMW = high molecular weight
LMW = low molecular weight
no./m^2 = number per square meter
NOAA = National Oceanic and Atmospheric Administration
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
REMAP = Regional Environmental Monitoring and Assessment Program
SEM = simultaneously extracted metals
TCDD = tetrachlorodibenzo-p-dioxin
TOC = Total Organic Carbon
Total DDx = sum of dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyltrichloroethane
-- No sensitive species were observed in 2013.
% = percent

Table A-33
Summary Lines of Evidence from SQT Assessment

Category	Line of Evidence	Findings	Summary
BIC	Comparison to Jamaica Bay Reference	The benthic invertebrate community compares favorably to the Jamaica Bay reference data set. Most metrics are within the reference envelope. Hypothesis testing indicates that NBSA metrics are similar or greater than Jamaica Bay reference.	There is no evidence that chemical concentrations are impacting the BIC composition in the NBSA.
	NY/NJ B-IBI	One station, 148, located along the southern shoreline had a B-IBI suggesting impact (Figure A-2). Eight others were scored as slightly impacted. Twenty-one were scored as not impacted.	
	Dose Response Modeling	Most BIC metrics were not associated with sediment chemistry. Number of taxa was most correlated with grain size. Density was negatively correlated with sediment chemistry however this metric can increase or decrease with degradation. BIC metrics were not associated with porewater chemistry.	
Acute Toxicity	Comparison to Control	Two of 30 SQT stations exhibited acute toxicity, 151 and 154 located along the southwestern shoreline (Figure A-5).	Areas of elevated chemical concentrations likely to cause acute toxicity in the NBSA are of limited areal extent (Figure A-14). Multiple chemicals are associated with acute toxicity: metals, pesticides, PCBs, PAHs and dioxins/furans. Mean amphipod survival as a percent of control in the NBSA is comparable to that of Jamaica Bay.
	Comparison to Jamaica Bay Reference	Average survival as a percent of control was comparable to reference.	
	Spearman Correlation	Multiple chemicals are elevated in sediment and porewater at stations 151 and 154. Acute toxicity is correlated with multiple chemicals in sediment and porewater: metals, pesticides, PCBs, PAHs and dioxins/furans.	
	Dose Response Modeling: PCA	Elevated chemical concentrations in sediment and porewater were significant predictors of acute toxicity. Areas of predicted acute toxicity are of limited extent. A total of 21 (8.2% of all Phase III samples) samples were predicted to have survival less than 80% of control survival in the NBSA, three in the north geographic area and 18 in the south geographic area (Figure A-14).	
	Dose Response Modeling: FA	Factor analysis demonstrated that multiple chemicals in sediment and porewater are associated with acute toxicity: metals, pesticides, PCBs, PAHs and 2,3,7,8-TCDD.	

Table A-33
Summary Lines of Evidence from SQT Assessment

Category	Line of Evidence	Findings	Summary
Chronic Toxicity	Comparison to Control	Six of 30 SQT stations exhibited 28-day survival significantly different than control, two in the north, two in the central, and two in the south geographic areas (Figure A-5). A total of 11 stations had 28-day survival less than 80% of control although only 5 of these were significantly different than control due to replicate variability. Six stations had 28-day survival less than control minus the minimum detectable difference (MDD). The MDD was 33%. Growth and reproductive endpoints were significantly different than control at 18 and 13 stations respectively.	Chronic toxicity endpoints are associated with chemical concentrations but there is more unexplained variability in the chronic endpoints. Model-predicted chronic toxicity is also of limited extent in the NBSA (Figure A-17). Multiple chemicals are associated with chronic toxicity: metals, pesticides, PCBs, PAHs and dioxins/furans.
	Spearman Correlation	Multiple chemicals in sediment and porewater are correlated with chronic toxicity endpoints: metals, pesticides, PCBs, PAHs and dioxins/furans.	
	Dose Response Modeling: PCA	Elevated chemical concentrations in sediment and porewater were significant predictors of 28-day survival although there is significant variability in this endpoint. A total of 45 (17.7% of all Phase III samples) samples were predicted to have 28-day survival less than 80% of control in the NBSA, 11 in the north, five in the central, and 29 in the south geographic areas (Figure A-17). Areas of predicted chronic toxicity in the north and south are similarly located as those where acute toxicity is predicted. Chemical concentrations in sediment and porewater were also significant predictors of growth but there was considerable unexplained variability in this endpoint.	
	Dose Response Modeling: FA	Factor analysis demonstrated that multiple chemicals in sediment and porewater are associated with chronic toxicity: metals, pesticides, PCBs, PAHs and 2,3,7,8-TCDD.	

Table A-33
Summary Lines of Evidence from SQT Assessment

Category	Line of Evidence	Findings	Summary
Sediment Chemistry	Comparisons to Sediment Quality Guidelines	Among the 30 SQT samples, there was a high frequency of exceedances (up to 100%) of threshold (i.e. T20, ERL, and PEL) sediment quality guidelines for all chemical groups: metals, pesticides, PCBs, PAHs and 2,3,7,8-TCDD (Table A-9). Exceedances of median values (i.e. T50, ERM, PEL) were less frequent but also observed in all these chemical groups (Table A-9). Fifteen samples exceeded the T80 value for mercury. These screening level guidelines were not predictive of toxicity in the NBSA and therefore provided little information about risks to benthic invertebrates.	Sediment quality guidelines were exceeded for most chemicals although these guidelines were not predictive of toxicity in the NBSA and therefore provided little information about risks to benthic invertebrates. Water quality criteria were exceeded for arsenic, copper, zinc, total PCBs and total DDx. The sum of toxic units for metals and/or PAHs in porewater exceeded 1 at some stations.
	Comparisons to Equilibrium Partitioning Sediment Benchmarks	∑SEM-AVS (µmol/g) rarely exceeded 0 and ∑SEM-AVS/f_{OC} (µmol/g-oc) was less than 130 at all SQT stations (Table A-14) indicating that toxicity is not expected due to divalent metals. For PAHs, $\sum ESBTU_{FCV}$ exceeds 1 at seven SQT stations (Table A-14) indicating the potential for toxicity due to PAHs.	
Porewater Chemistry	Comparisons to Water Quality Criteria and Guidelines	Acute water quality criteria were exceeded in five porewater samples: one for arsenic (station 151), one for copper (station 147) and three for zinc (stations 141, 150, and 159) . A total of 20 porewater samples had one or more exceedances of chronic water quality criteria that included the following chemicals: arsenic, copper, zinc, total PCBs, and total DDx.	
	Equilibrium Partitioning Toxic Units	The sum of toxic units for divalent metals exceeded 1 at six stations (Table A-14) indicating the potential of toxicity due to divalent metals in porewater. Of the divalent metals, only copper, lead and zinc were detected. The sum of toxic units for PAHs exceeded 1 at station 154 and was very close to 1 at station 151 (Table A-14), indicating the potential for toxicity due to PAHs in porewater.	

Table A-33
Summary Lines of Evidence from SQT Evaluation

Acronyms and Abbreviations:

foc = fraction of organic carbon
AVS = acid volatile sulfide
BIC = Benthic Invertebrate Community
B-IBI = Benthic Index of Biotic Integrity
ERL = effect range-low
ERM =effect range-median
FA = Factor Analysis
NBSA = Newark Bay Study Area
NY/NJ = New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCA = Principal Component Analysis
PCB = polychlorinated biphenyl
PEL = Probable Effect Level
SEM = simultaneously extracted metals
SQT = sediment quality triad
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are predicted to be toxic (e.g., 50% of the samples).
∑ = sum of
$\sum ESBTU_{FCV}$ = Equilibrium Partitioning Benchmark Toxic Units for PAHs
µmol/g = micromoles per gram
µmol/g-oc = micromoles per gram of organic carbon

FIGURES

CITY: Citrix DIV/GROUP: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00016)
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LEGEND:

- SURFACE WATER COLLECTION LOCATION

ANALYSES
- SQT/PW
- SQT/PW+BIOACCUMULATION

GEOMORPHIC AREAS
- NAVIGATION CHANNELS
- SUBTIDAL FLATS
- TRANSITIONAL SLOPES
- INTERTIDAL AREAS
- SHORELINE
- UNDERGROUND TRIBUTARY
- GEOGRAPHIC ZONE BOUNDARY

GEOMORPHIC AREAS:
- HISTORICALLY DISTURBED SUBTIDAL FLATS
- INDUSTRIAL WATERFRONT
- INTERTIDAL AREA
- NAVIGATION CHANNEL
- PORT CHANNEL
- SUBTIDAL FLATS
- TRANSITIONAL SLOPES

0 2,500 5,000 Feet
GRAPHIC SCALE

PIERSONS CREEK
CONRAIL BRIDGE REMNANTS
HACKENSACK RIVER
PASSAIC RIVER
PORT NEWARK CHANNEL
INDUSTRIAL/COMMERCIAL ACCESS AREA
LEHIGH VALLEY RAILROAD BRIDGE
NEW JERSEY TURNPIKE
ELIZABETH CHANNEL
RICHARD A RUTOWSKI PARK
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
VETERANS PARK
TRAILER PARK
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
ARTHUR KILL
KILL VAN KULL
SHOOTERS ISLAND
BAYONNE BRIDGE

140 164 163 165 162 136 161 137 138 160 159 158 139 157 141 142 156 143 144 145 155 154 153 152 151 146 150 149 148 147

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. AERIAL PHOTOS DATED 2015 (ESRI CLOUD IMAGERY).
3. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
4. THE GEOMORPHIC AREAS SHOWN ARE CONSISTENT WITH THOSE PRESENTED IN THE CSM (GSH 2019).
5. SQT REPRESENTS THREE ANALYSES: SEDIMENT CHEMISTRY, BENTHIC INVERTEBRATE COMMUNITY, AND TOXICITY TESTING WITH L. PLUMULOSUS (10-DAY AND 28-DAY). PW REPRESENTS SEDIMENT POREWATER CHEMISTRY.
6. SURFACE WATER WAS NOT A TARGETED SAMPLING MATRIX. SURFACE WATER WAS COLLECTED AND USED IN THE FIELD FACILITY FOR THE SHIPMENT OF SEDIMENT FOR POREWATER ANALYSES.
7. GEOMORPHIC AREA DESIGNATIONS FOR EACH SAMPLING LOCATION ARE BASED ON THE FIELD-COLLECTED GEOGRAPHIC COORDINATES OF THE ACTUAL SAMPLING LOCATIONS AS RECORDED DURING SEDIMENT COLLECTION ACTIVITIES. (GSH 2017)
8. REFERENCES:
   A. GSH. 2019. CONCEPTUAL SITE MODEL. NEWARK BAY STUDY AREA. REVISION 2. JANUARY.
   B. GSH. 2017. SEDIMENT QUALITY TRIAD AND POREWATER FIELD REPORT. NEWARK BAY STUDY AREA. BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT. REVISION 1. SEPTEMBER.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SQT SAMPLING STATIONS

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FIGURE
A-1

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
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LEGEND:

B-IBI SCORE

- IMPACTED (1 TO <2)
- SLIGHTLY IMPACTED (2 TO <3)
- NON-IMPACTED (3 TO 5)
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
NEWARK BAY NORTH
NEWARK BAY CENTRAL
NEWARK BAY SOUTH
NEWARK BAY
KILL VAN KULL
SHOOTERS ISLAND

164 140 163 165 162 161 137 136 138 160 159 158 139 157 141 156 142 143 144 155 154 153 152 145 151 146 150 149 148 147

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. B-IBI = BENTHIC INDEX OF BIOTIC INTEGRITY

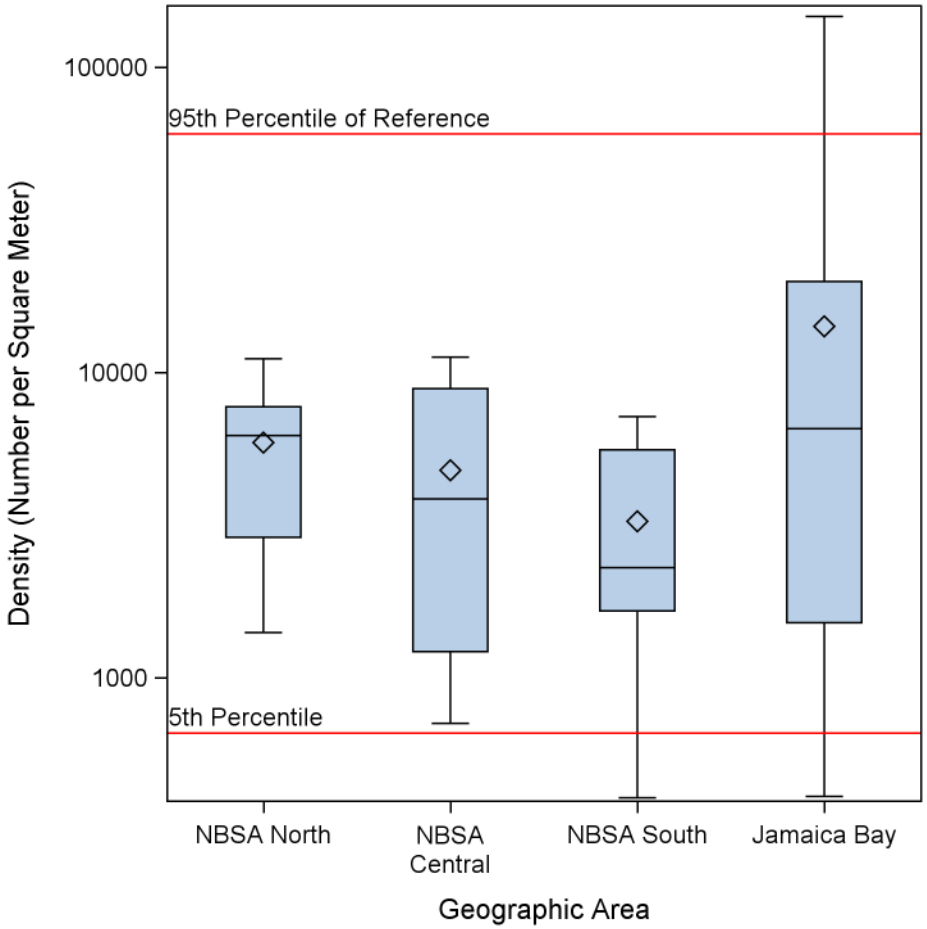
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GRAPHIC SCALE

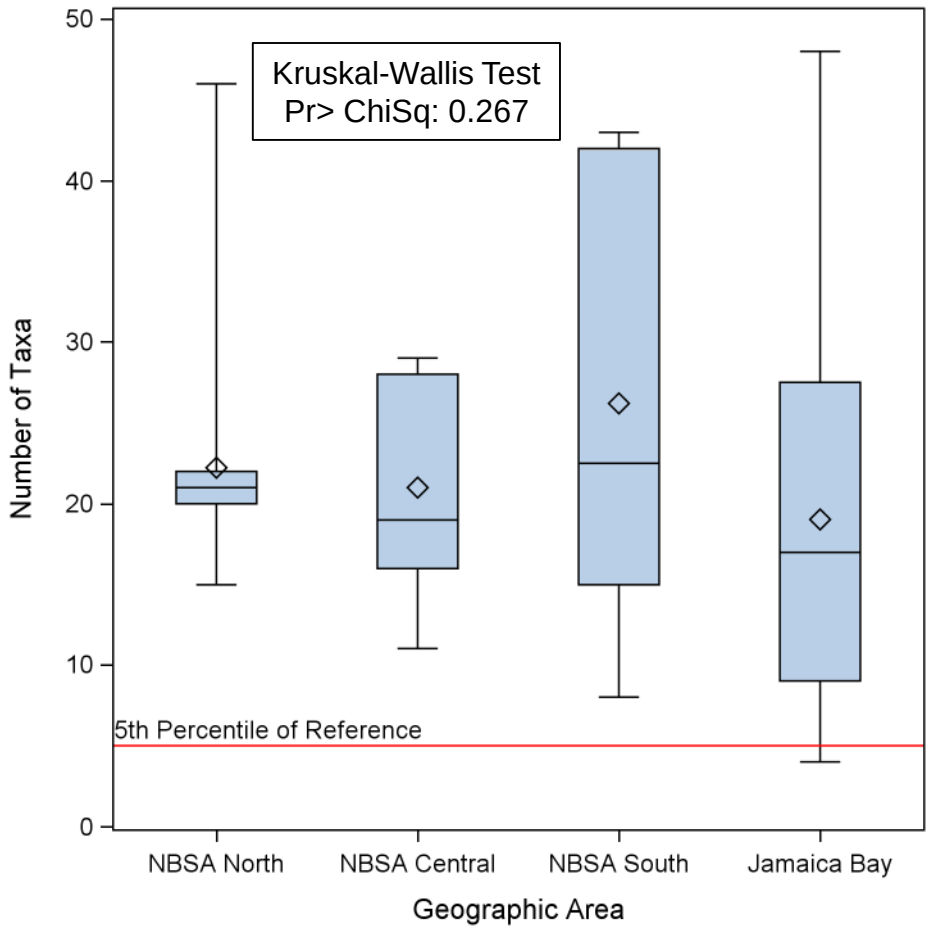
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NY/NJ BENTHIC INDEX OF BIOTIC INTEGRITY

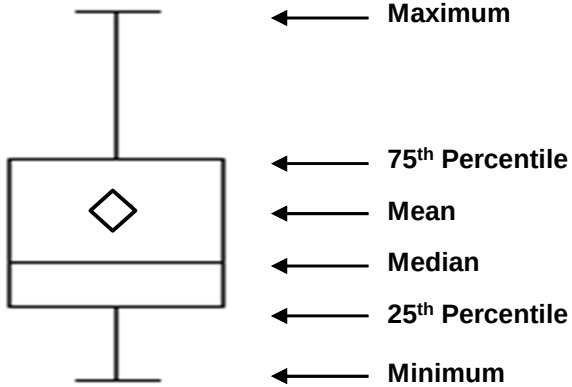
OXY Glenn Springs Holdings, Inc.
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FIGURE
A-2





Notes:
A non-parametric Kruskal-Wallis Test for differences among geographic areas was conducted for benthic metrics. Changes in density can be both positive and negative in response to disturbance, therefore testing was not conducted for density.
Pr = Probability
ChiSq = Chi-Square



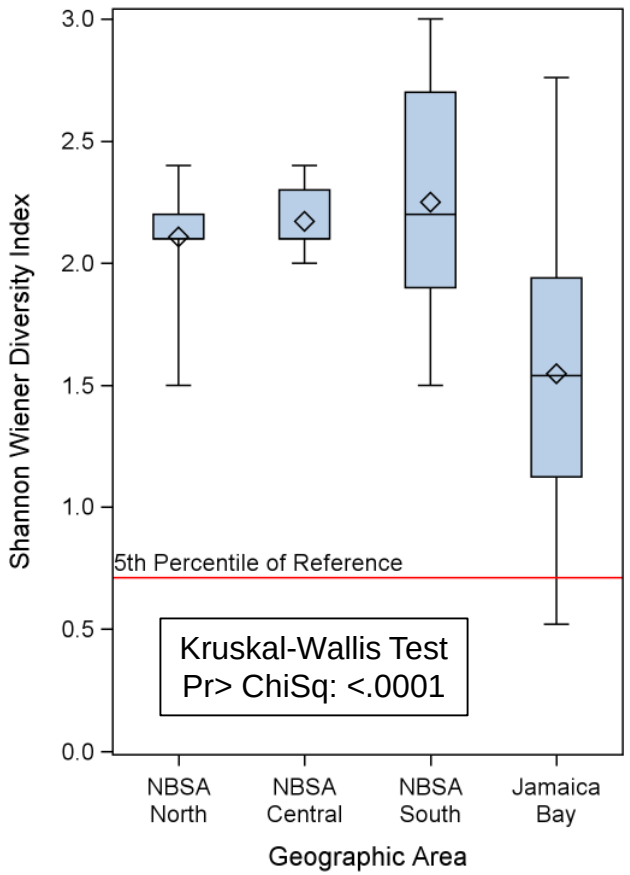
DIAMOND ALKALI SUPERFUND SITE

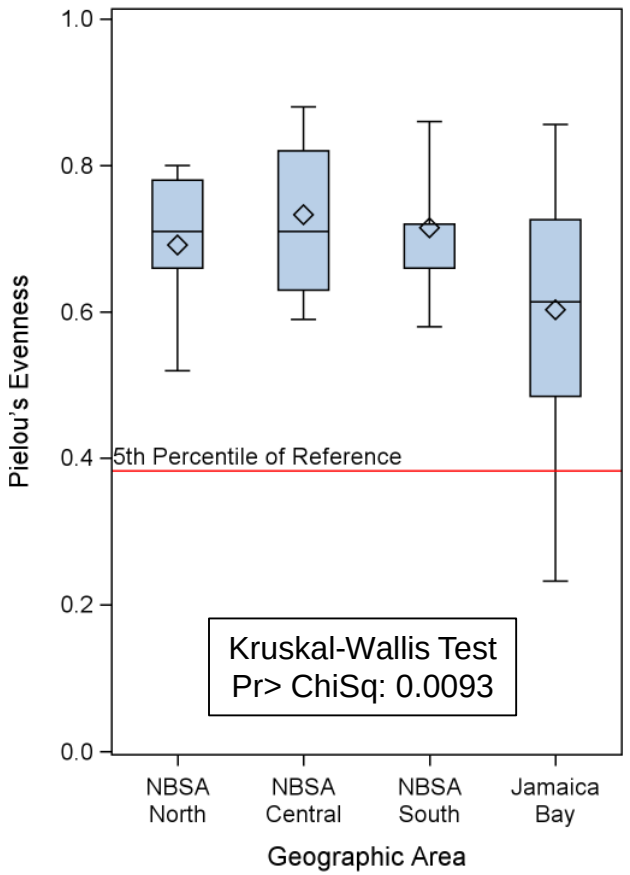
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

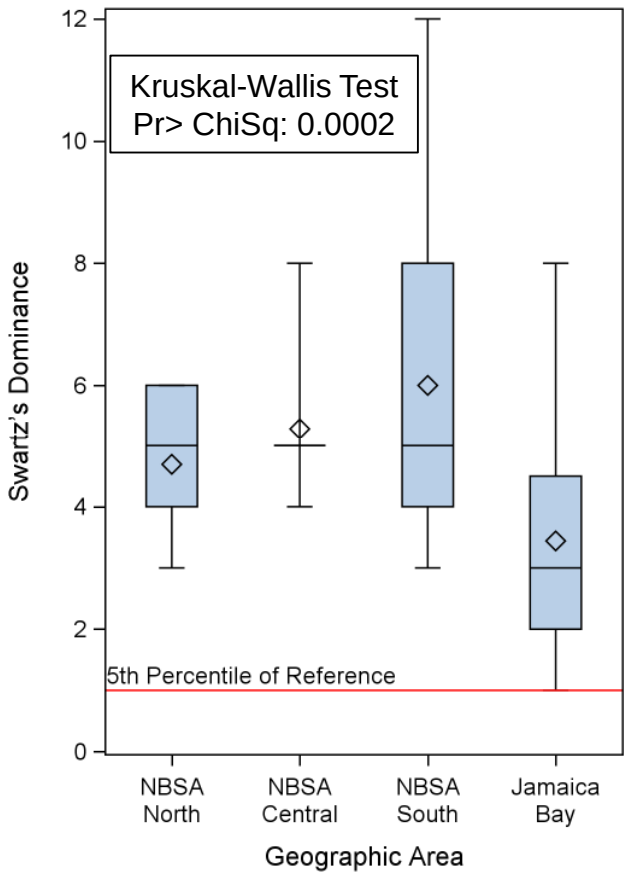
DENSITY AND NUMBER OF TAXA IN THE BENTHIC INVERTEBRATE COMMUNITY OF THE NBSA AND JAMAICA BAY REFERENCE

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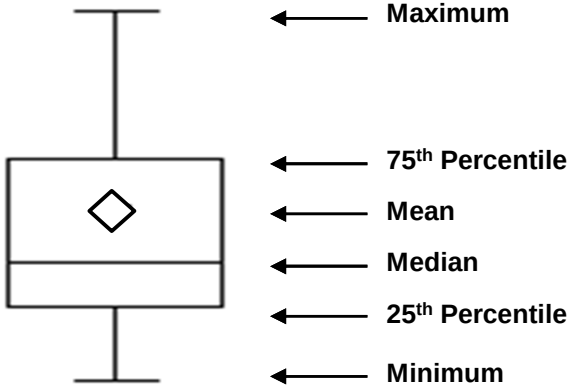
FIGURE
A-3







Notes:
A non-parametric Kruskal-Wallis Test for differences among geographic areas was conducted for benthic metrics. The NBSA metrics for all geographic areas exceed Jamaica Bay metrics for diversity, evenness, and dominance.
Pr = Probability
ChiSq = Chi-Square



DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

DIVERSITY, EVENNESS, AND DOMINANCE IN THE BENTHIC INVERTEBRATE COMMUNITY OF THE NBSA AND JAMAICA BAY REFERENCE

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-4

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00013)
T:_ENV\GSH\GIS\Task\NBSA\BERA\mxd\SedimentToxicityResults.mxd 7/21/2020 2:52:46 PM

LEGEND:

- 10-DAY SURVIVAL FOR *LEPTOCHEIRUS PLUMULOSUS*
- 28-DAY SURVIVAL FOR *LEPTOCHEIRUS PLUMULOSUS*
- SURVIVAL STATISTICALLY DIFFERENT THAN CONTROLS
- SURVIVAL NOT STATISTICALLY DIFFERENT THAN CONTROLS
- NAVIGATION CHANNEL
- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- GEOGRAPHIC ZONE BOUNDARY

PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
NEWARK BAY CDF (CELL 1S)
PERIPHERAL DITCH
SOUTH ELIZABETH CHANNEL
NEWARK BAY NORTH
NEWARK BAY CENTRAL
NEWARK BAY SOUTH
NEWARK BAY
KILL VAN KULL
SHOOTERS ISLAND

140 164 163 165 162 161 137 136 138 160 159 158 139 157 141 156 142 143 144 145 155 154 153 152 151 146 149 150 148 147

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).

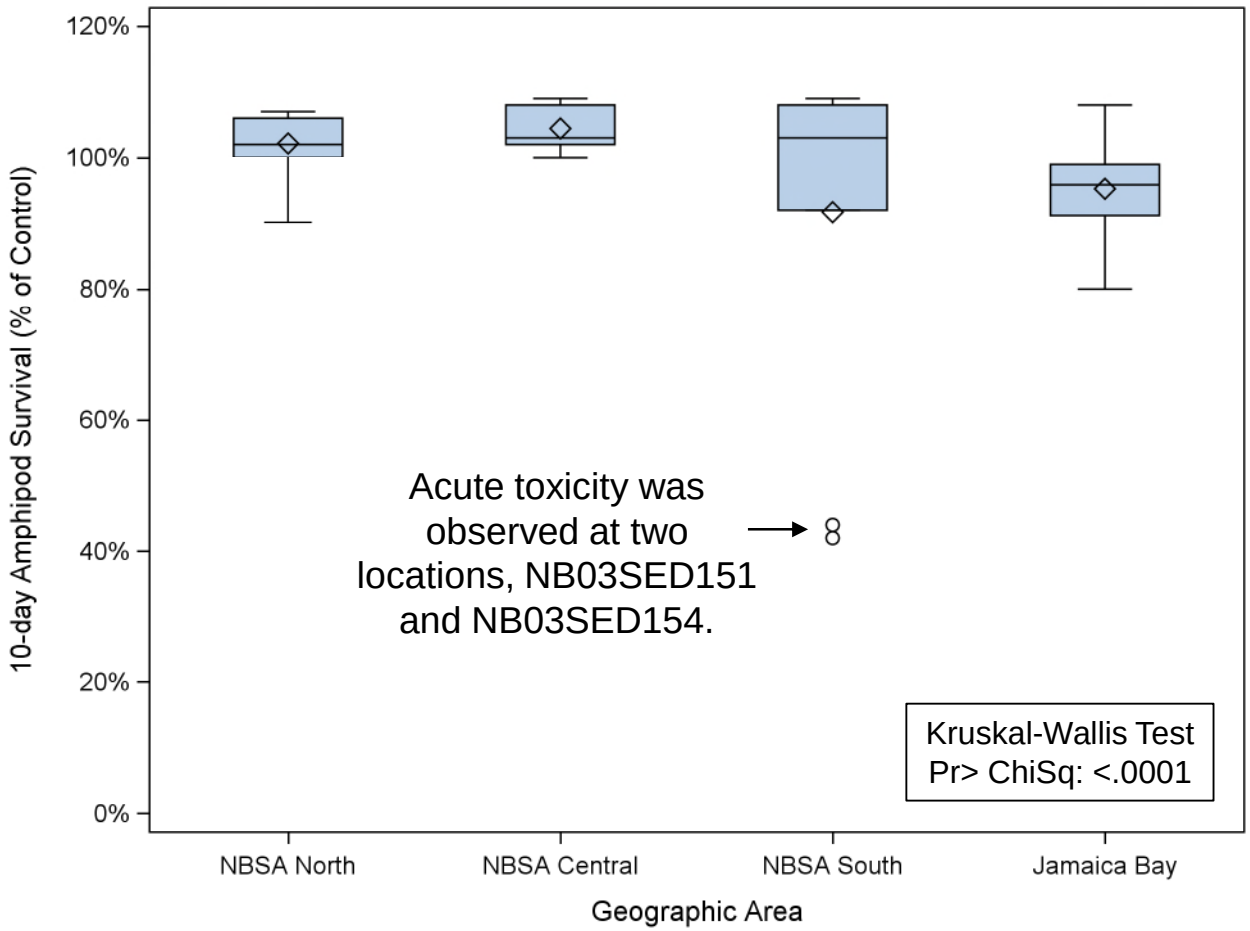
0 2,500 5,000 Feet
GRAPHIC SCALE

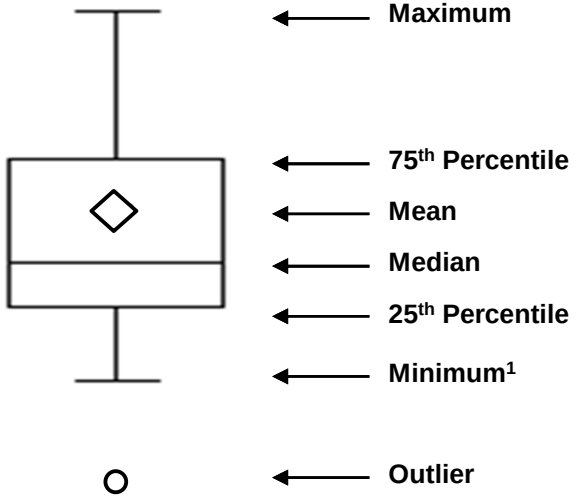
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SEDIMENT TOXICTY RESULTS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
A-5





NOTES:

A non-parametric Kruskal-Wallis Test for differences in 10-day survival, expressed as a percent of control survival, among geographic areas was conducted. Survival was greater in the NBSA geographic areas compared to reference. Tests in the NBSA were conducted using the amphipod *Leptocheirus plumulosa*. Tests in Jamaica Bay were conducted using the amphipod *Ampelisca abdita*. Pr = Probability. ChiSq = Chi-Square

[1]Minimum is the smallest value not identified as an outlier. Outliers are defined as values less than the 25th percentile minus 1.5 times the interquartile range.

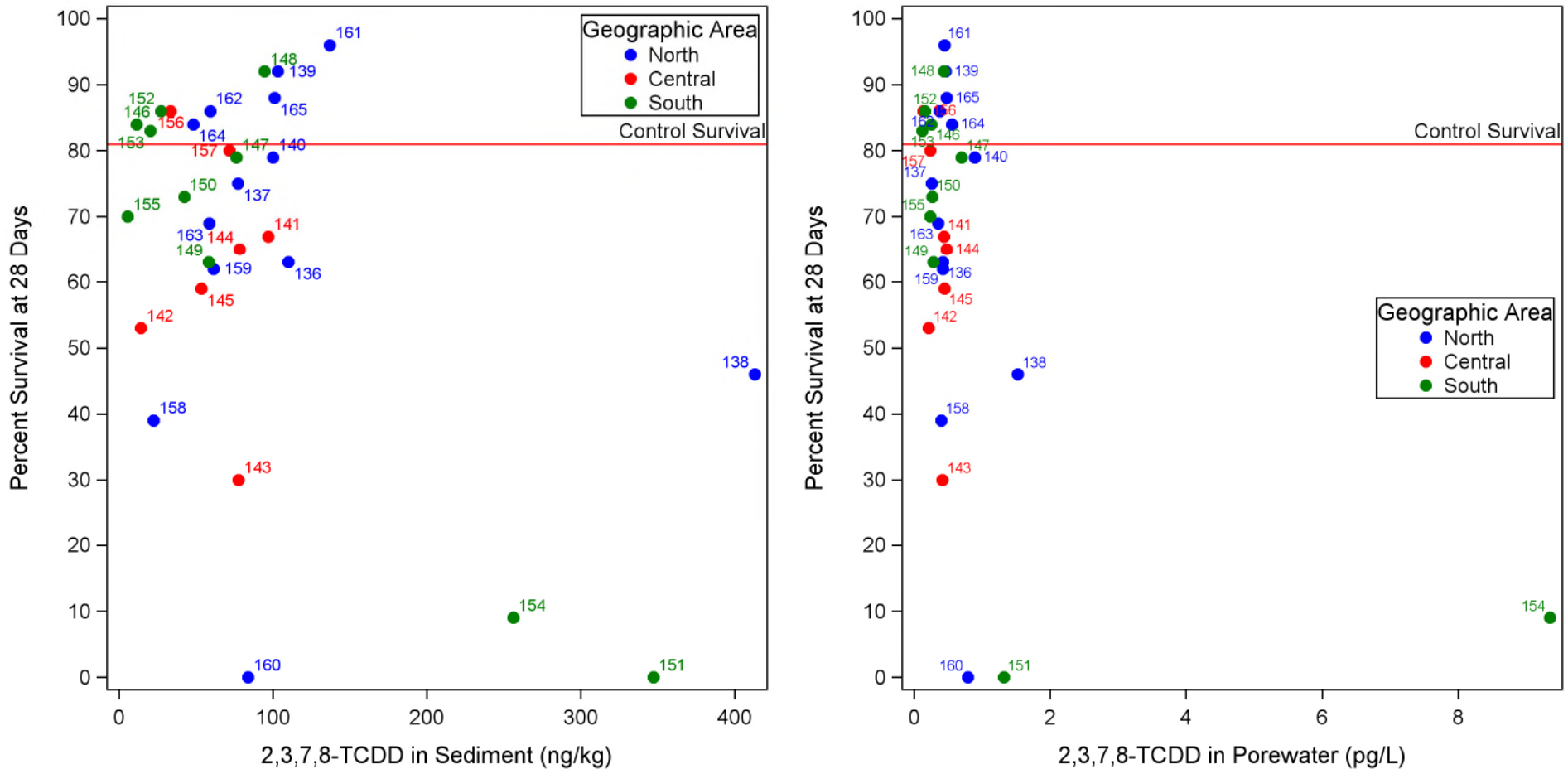
DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TEN-DAY AMPHIPOD SURVIVAL FOR TOXICITY TESTS IN THE NBSA AND JAMAICA BAY REFERENCE

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-6



NOTES:

Y-axis shows mean percent survival at 28 days for *Leptocheirus plumulosus* in 5 replicates (20 organisms per replicate) exposed in the laboratory to SQT sediment samples. The red line shows the mean survival in five laboratory control replicates. The left graph shows bulk sediment concentrations on the x-axis. The right graph shows porewater concentrations measured in the sediments on the x-axis. Observations are labeled with station numbers.

TCDD = tetrachlorodibenzo-p-dioxin
ng/kg = nanograms per kilogram
pg/L = picograms per liter

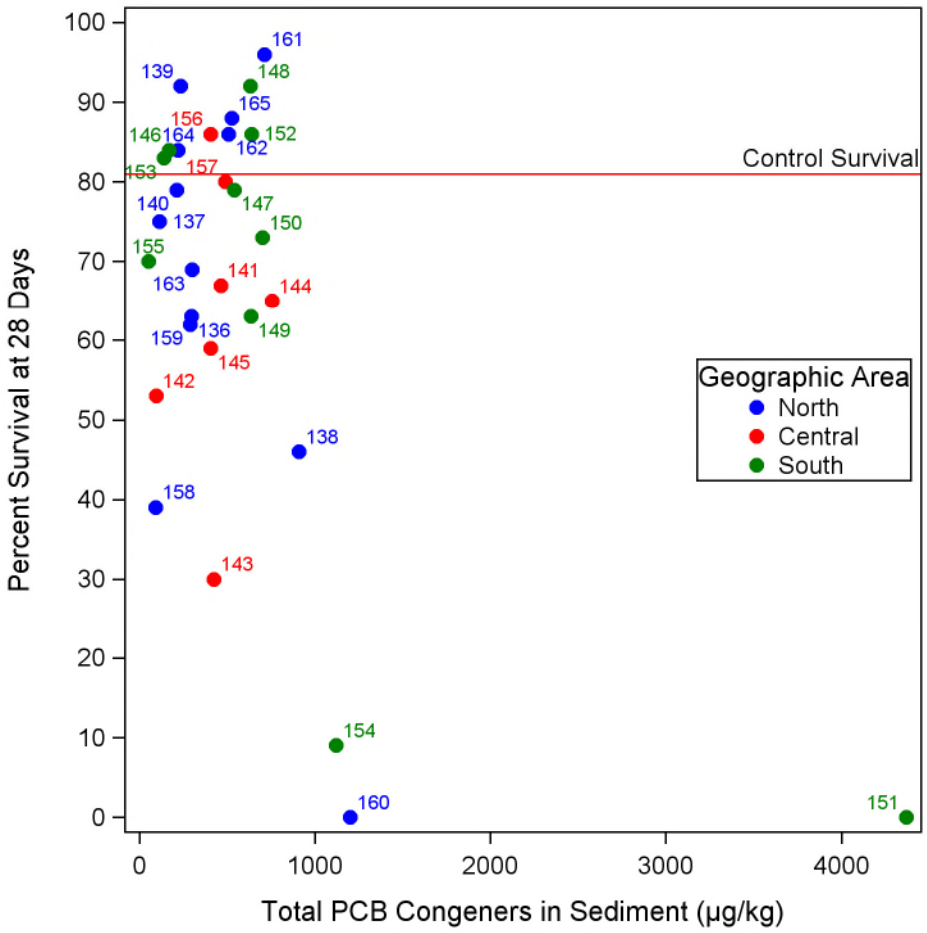
DIAMOND ALKALI SUPERFUND SITE

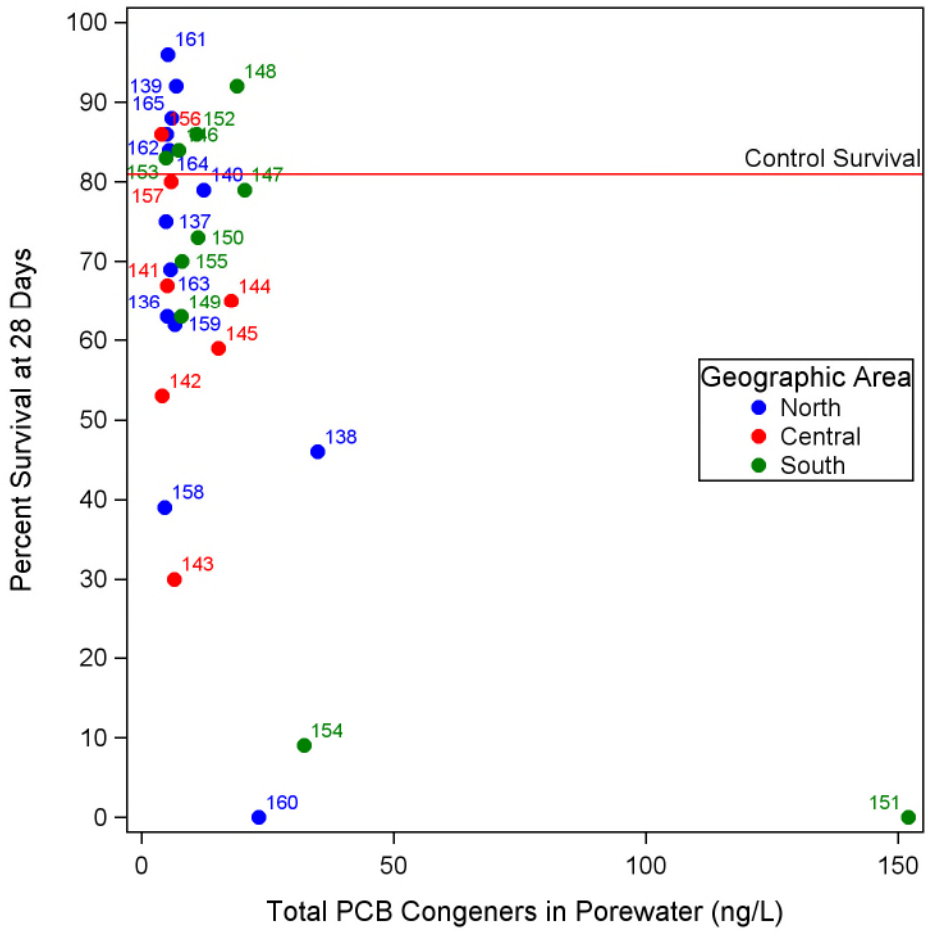
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TWENTY-EIGHT-DAY AMPHIPOD SURVIVAL VS. SELECTED CONTAMINANT CONCENTRATIONS: 2,3,7,8-TCDD

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-7a





NOTES:

Y-axis shows mean percent survival at 28 days for *Leptocheirus plumulosus* in 5 replicates (20 organisms per replicate) exposed in the laboratory to SQT sediment samples. The red line shows the mean survival in five laboratory control replicates. The left graph shows bulk sediment concentrations on the x-axis. The right graph shows porewater concentrations measured in the sediments on the x-axis. Observations are labeled with station numbers.

PCB = polychlorinated biphenyl
µg/kg = micrograms per kilogram
ng/L = nanograms per liter

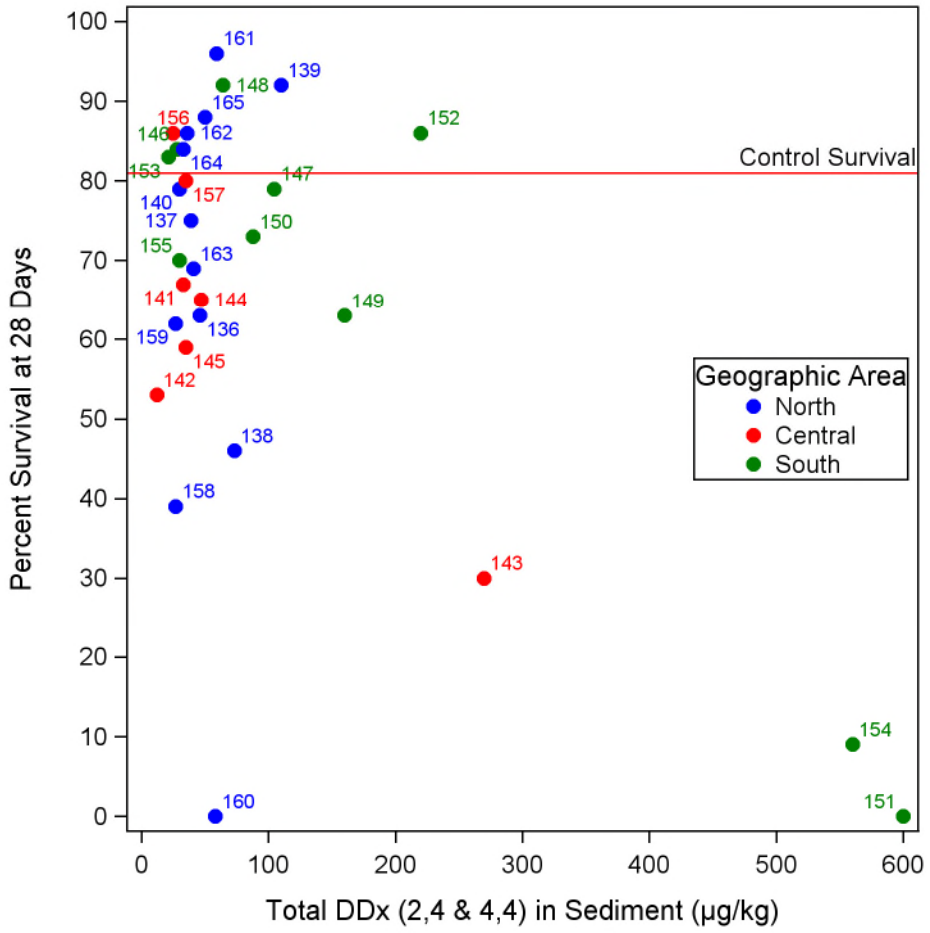
DIAMOND ALKALI SUPERFUND SITE

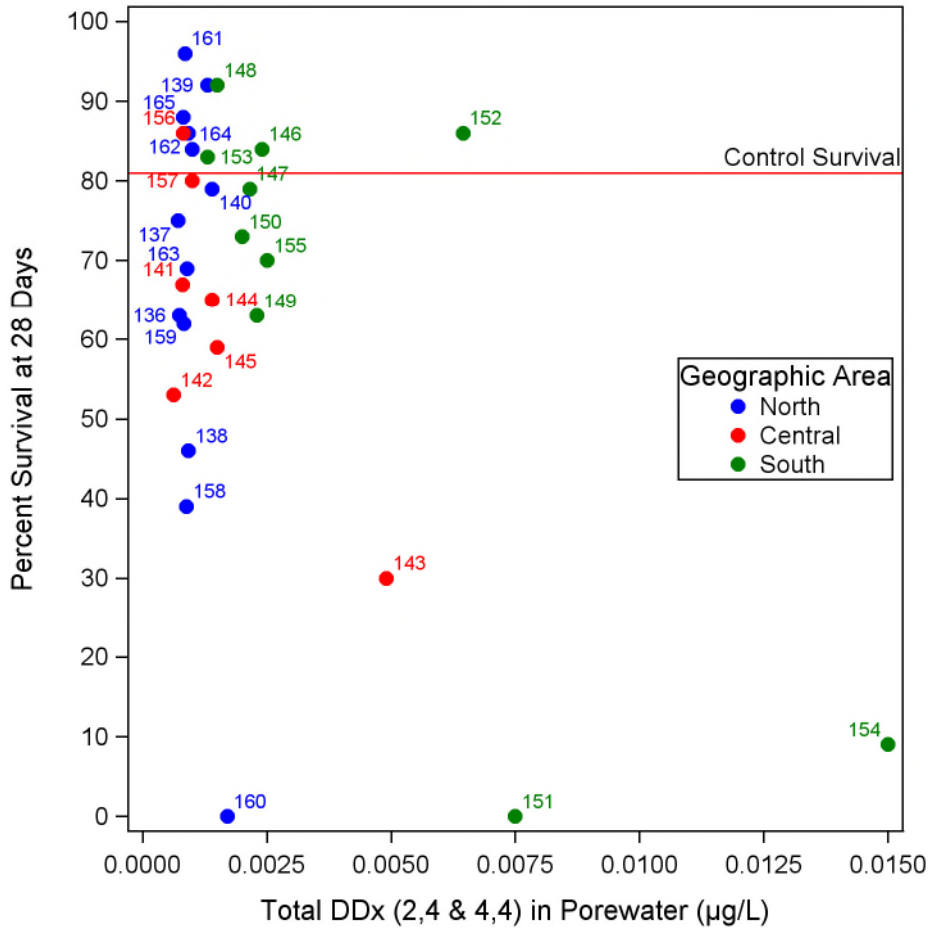
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TWENTY-EIGHT DAY AMPHIPOD SURVIVAL VS. SELECTED CONTAMINANT CONCENTRATIONS: TOTAL PCBS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-7b





NOTES:

Y-axis shows mean percent survival at 28 days for *Leptocheirus plumulosus* in 5 replicates (20 organisms per replicate) exposed in the laboratory to SQT sediment samples. The red line shows the mean survival in five laboratory control replicates. The left graph shows bulk sediment concentrations on the x-axis. The right graph shows porewater concentrations measured in the sediments on the x-axis. Observations are labeled with station numbers.

DDx = sum of 6 isomers of dichlorodiphenyltrichloroethane

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

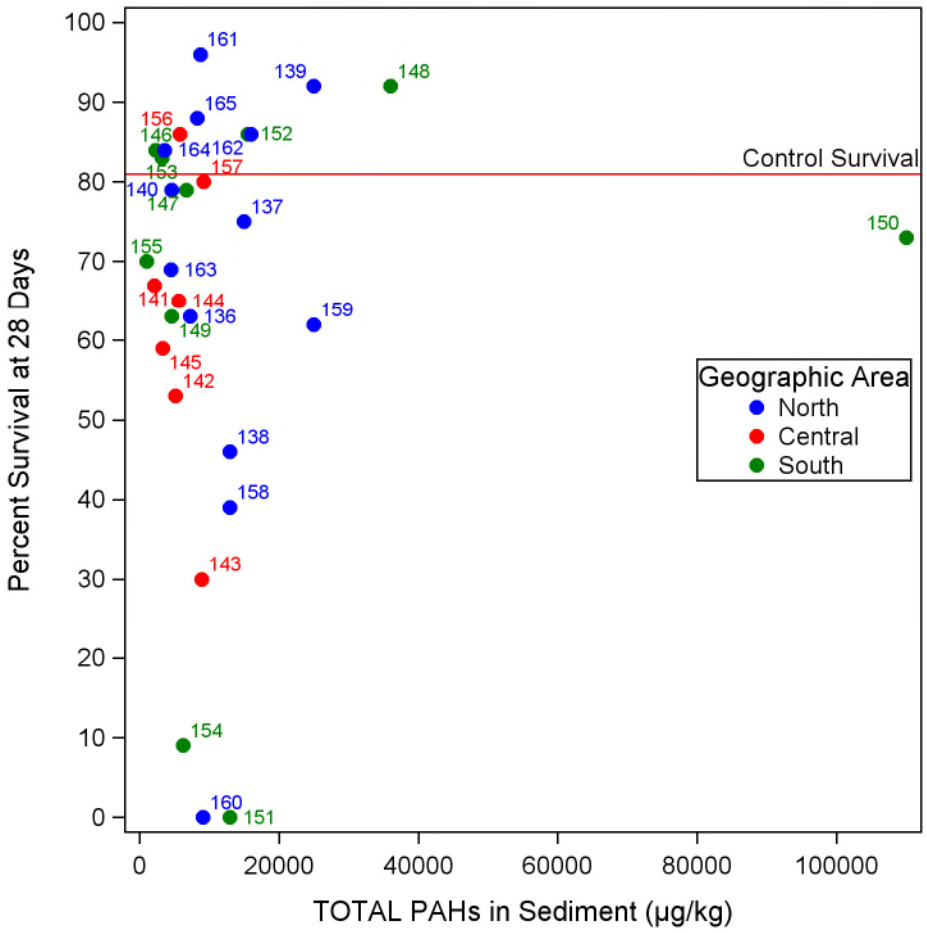
BASELINE ECOLOGICAL RISK ASSESSMENT

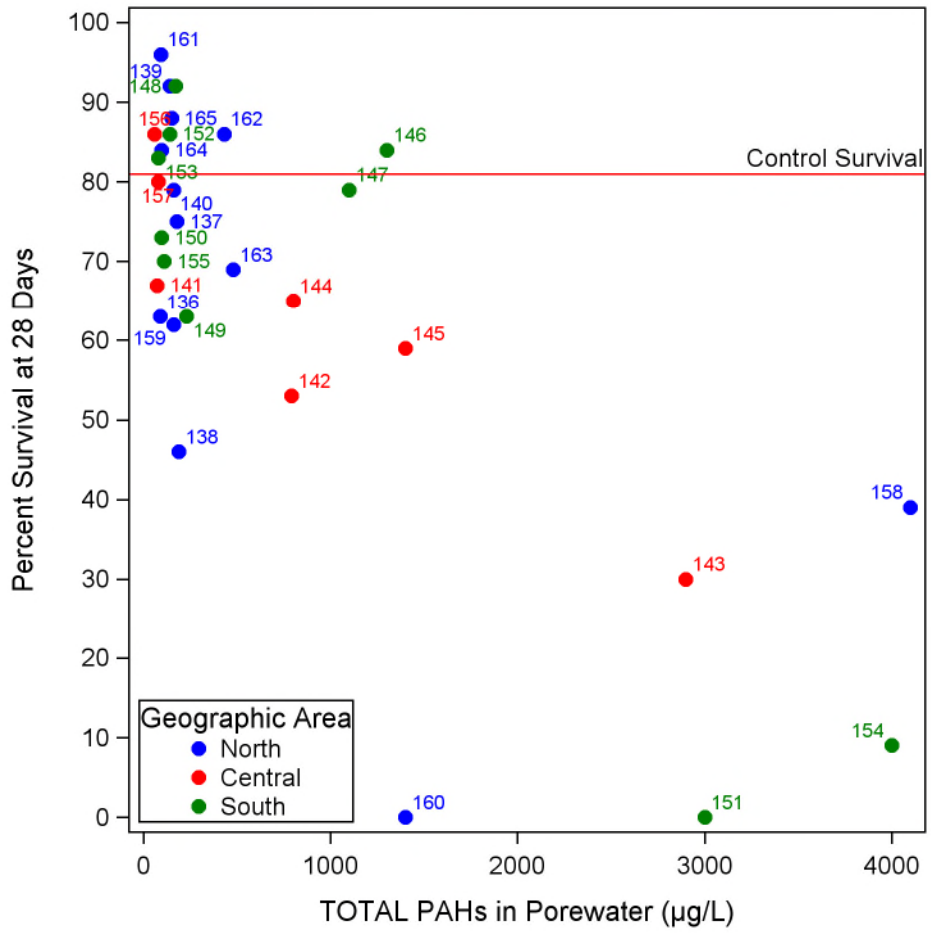
TWENTY-EIGHT DAY AMPHIPOD SURVIVAL VS. SELECTED CONTAMINANT CONCENTRATIONS: TOTAL DDX

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE

A-7c





NOTES:

Y-axis shows mean percent survival at 28 days for *Leptocheirus plumulosus* in 5 replicates (20 organisms per replicate) exposed in the laboratory to SQT sediment samples. The red line shows the mean survival in five laboratory control replicates. The left graph shows bulk sediment concentrations on the x-axis. The right graph shows porewater concentrations measured in the sediments on the x-axis. Observations are labeled with station numbers.

PAH = polycyclic aromatic hydrocarbon
µg/kg = micrograms per kilogram
µg/L = micrograms per liter

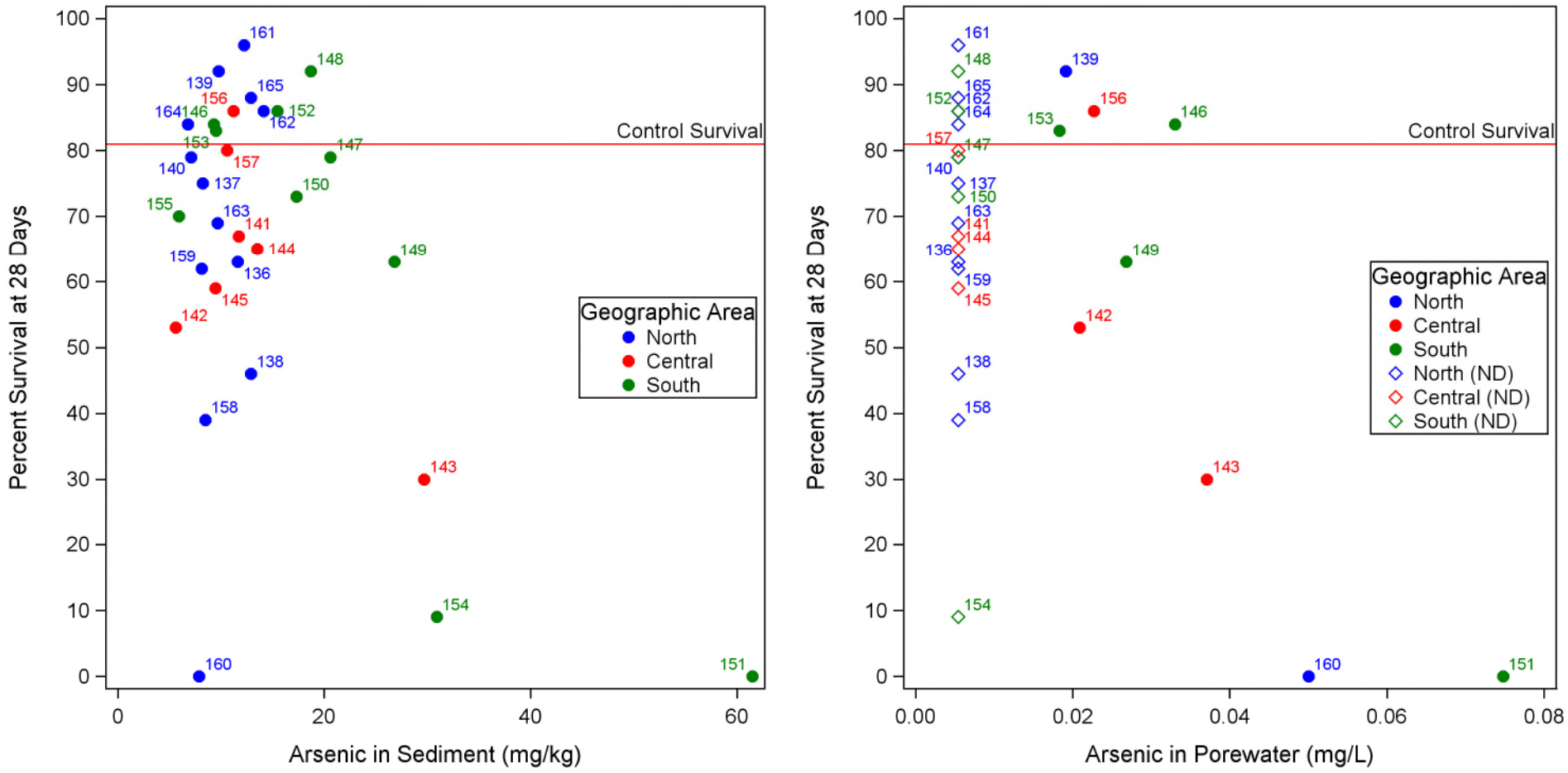
DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TWENTY-EIGHT DAY AMPHIPOD SURVIVAL VS. SELECTED CONTAMINANT CONCENTRATIONS: TOTAL PAHS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-7d



NOTES:

Y-axis shows mean percent survival at 28 days for *Leptocheirus plumulosus* in 5 replicates (20 organisms per replicate) exposed in the laboratory to SQT sediment samples. The red line shows the mean survival in five laboratory control replicates. The left graph shows bulk sediment concentrations on the x-axis. The right graph shows porewater concentrations measured in the sediments on the x-axis. Observations are labeled with station numbers.

mg/kg = milligrams per kilogram
mg/L = milligrams per liter
ND = Non-detect. Observation plotted at the value of the reporting limit.

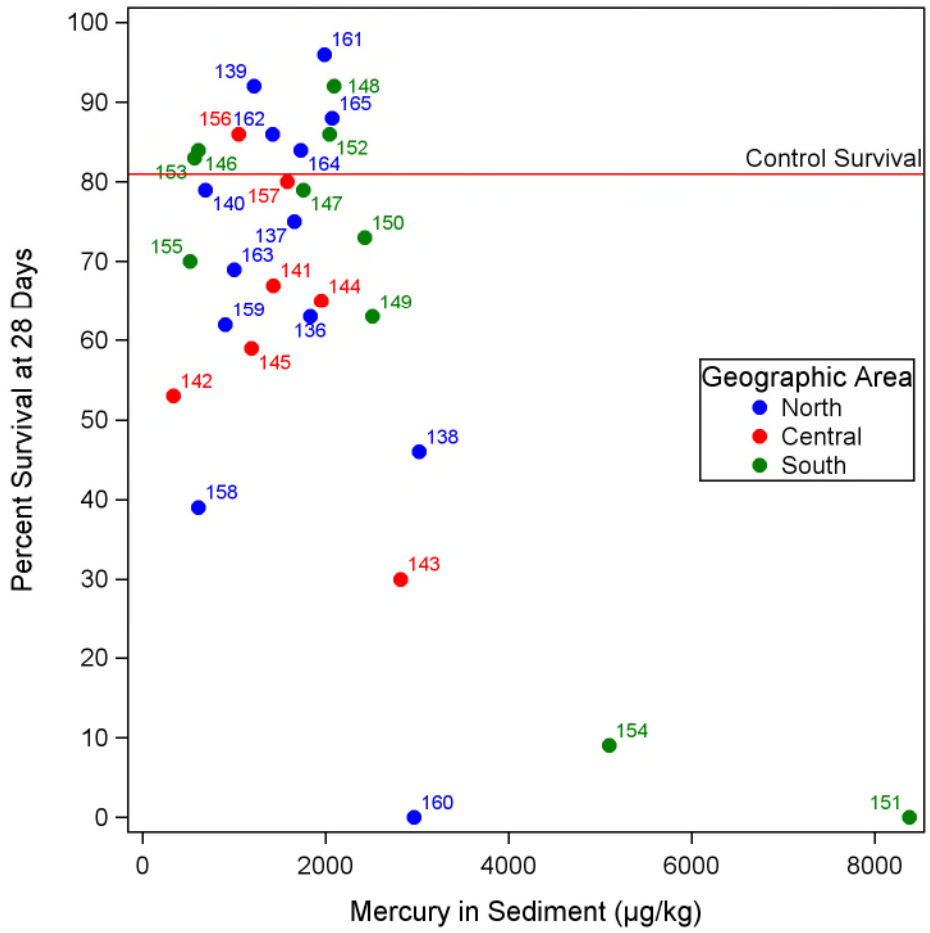
DIAMOND ALKALI SUPERFUND SITE

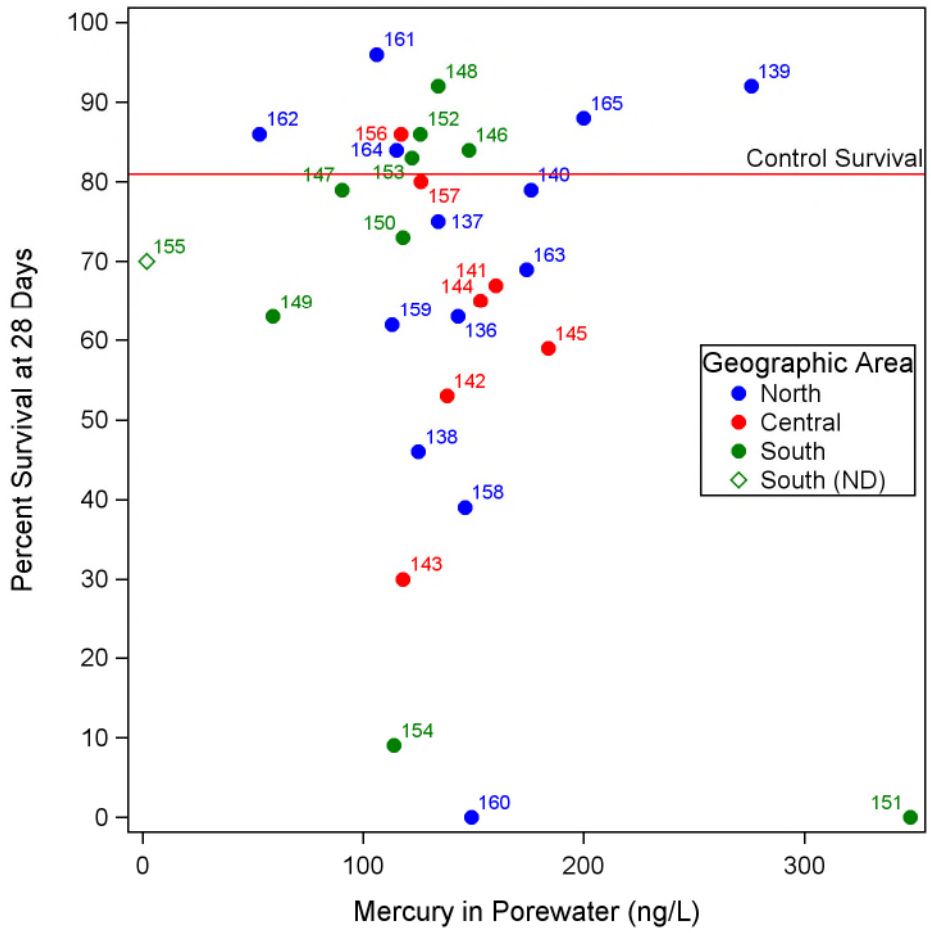
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TWENTY-EIGHT DAY AMPHIPOD SURVIVAL VS. SELECTED CONTAMINANT CONCENTRATIONS: ARSENIC

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-7e





NOTES:

Y-axis shows mean percent survival at 28 days for *Leptocheirus plumulosus* in 5 replicates (20 organisms per replicate) exposed in the laboratory to SQT sediment samples. The red line shows the mean survival in five laboratory control replicates. The left graph shows bulk sediment concentrations on the x-axis. The right graph shows porewater concentrations measured in the sediments on the x-axis. Observations are labeled with station numbers.

µg/kg = micrograms per kilogram
ng/L = nanograms per liter
ND = Non-detect. Observation plotted at the value of the reporting limit.

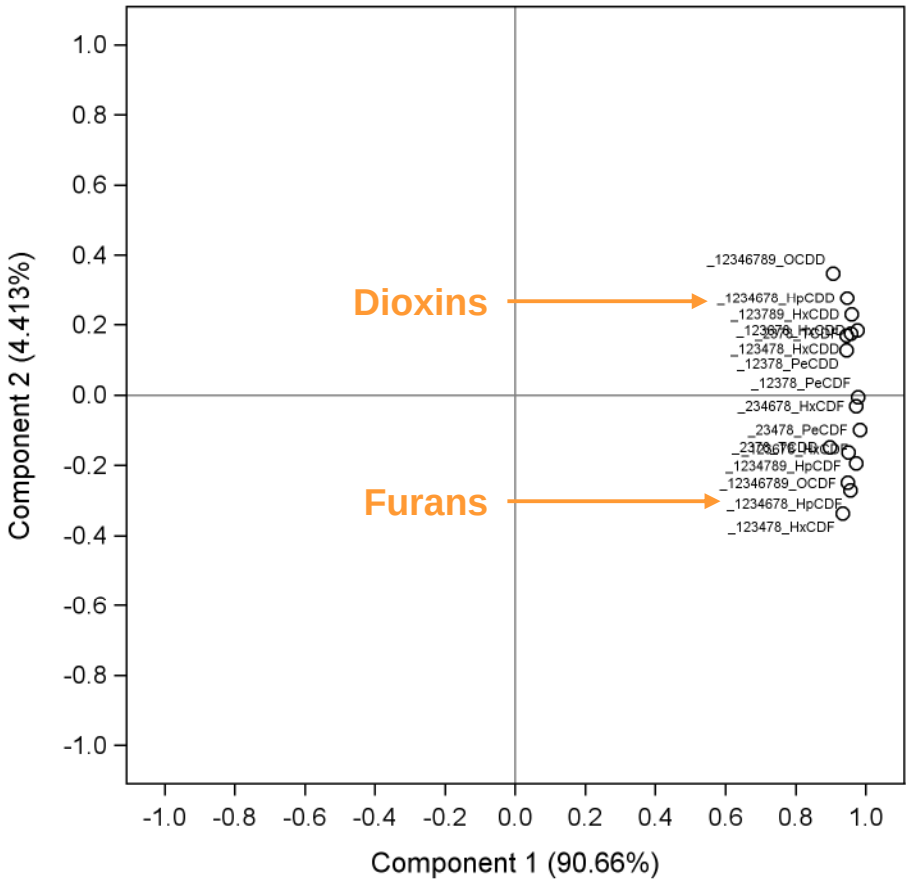
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TWENTY-EIGHT DAY AMPHIPOD SURVIVAL VS. SELECTED CONTAMINANT CONCENTRATIONS: MERCURY

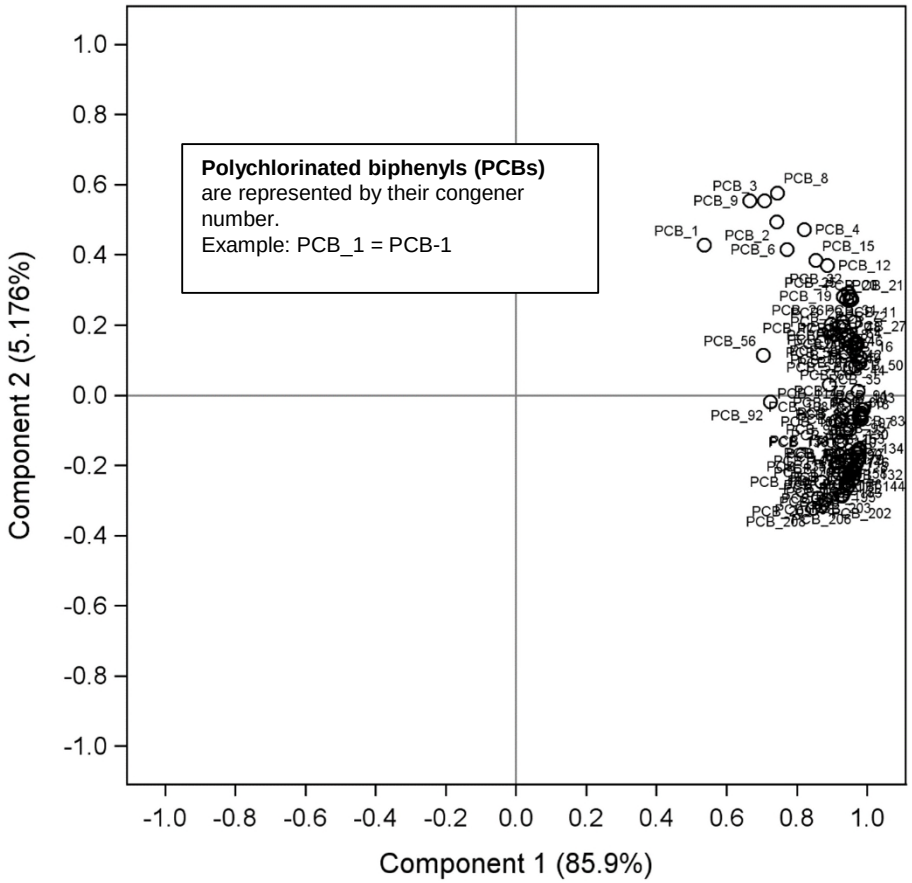
Glenn Springs Holdings, Inc.
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FIGURE
A-7f

Dioxins/Furans



PCBs



Graphs show the correlation of each individual analyte to the first and second principal components of the analyte group.

KEY TO DIOXIN AND FURAN CONGENERS

OCDF = Octachlorodibenzofuran
OCDD = Octachlorodibenzo-p-dioxin
HpCDF = Heptachlorodibenzofuran
HpCDD = Heptachlorodibenzo-p-dioxin
HpCDF = Heptachlorodibenzofuran
HxCDF = Hexachlorodibenzofuran
HxCDD = Hexachlorodibenzo-p-dioxin
HxCDF = Hexachlorodibenzofuran
HxCDD = Hexachlorodibenzo-p-dioxin

HxCDF = Hexachlorodibenzofuran
HxCDD = Hexachlorodibenzo-p-dioxin
PeCDF = Pentachlorodibenzofuran
PeCDD = Pentachlorodibenzo-p-dioxin
HxCDF = Hexachlorodibenzofuran
PeCDF = Pentachlorodibenzofuran
TCDF = Tetrachlorodibenzofuran
TCDD = Tetrachlorodibenzo-p-dioxin

Preceding numbers indicate the chlorine substitution positions for the congeners.

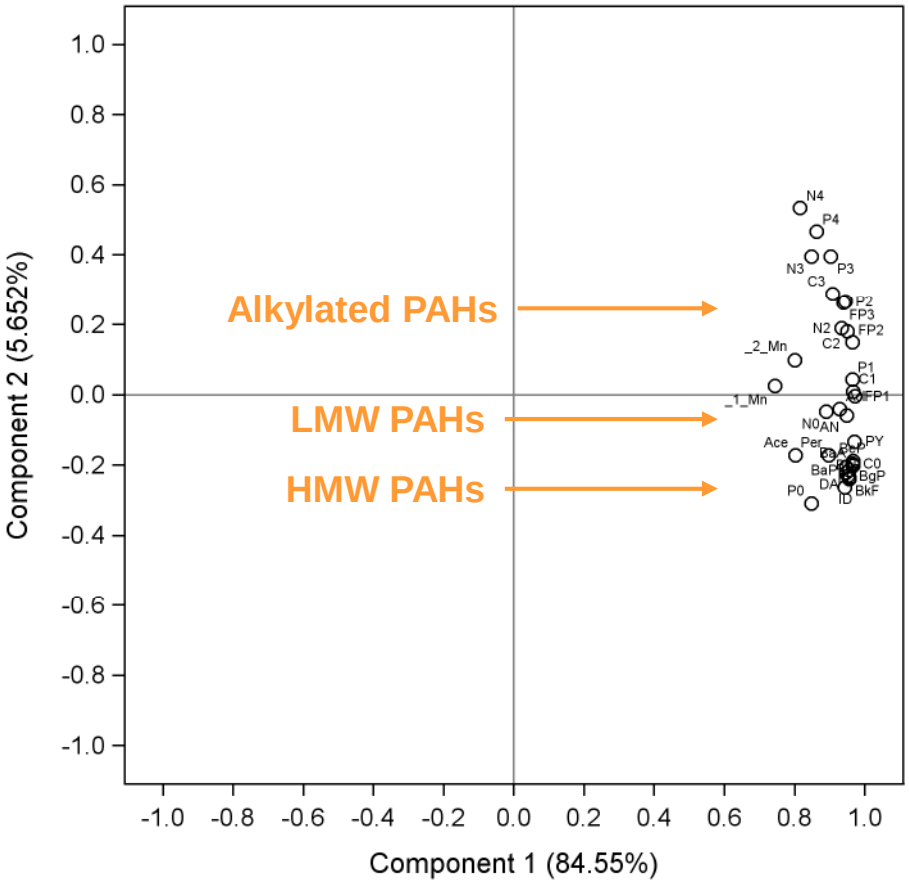
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

EXPLORATORY PRINCIPAL COMPONENT ANALYSIS: DIOXINS/FURANS AND PCBS

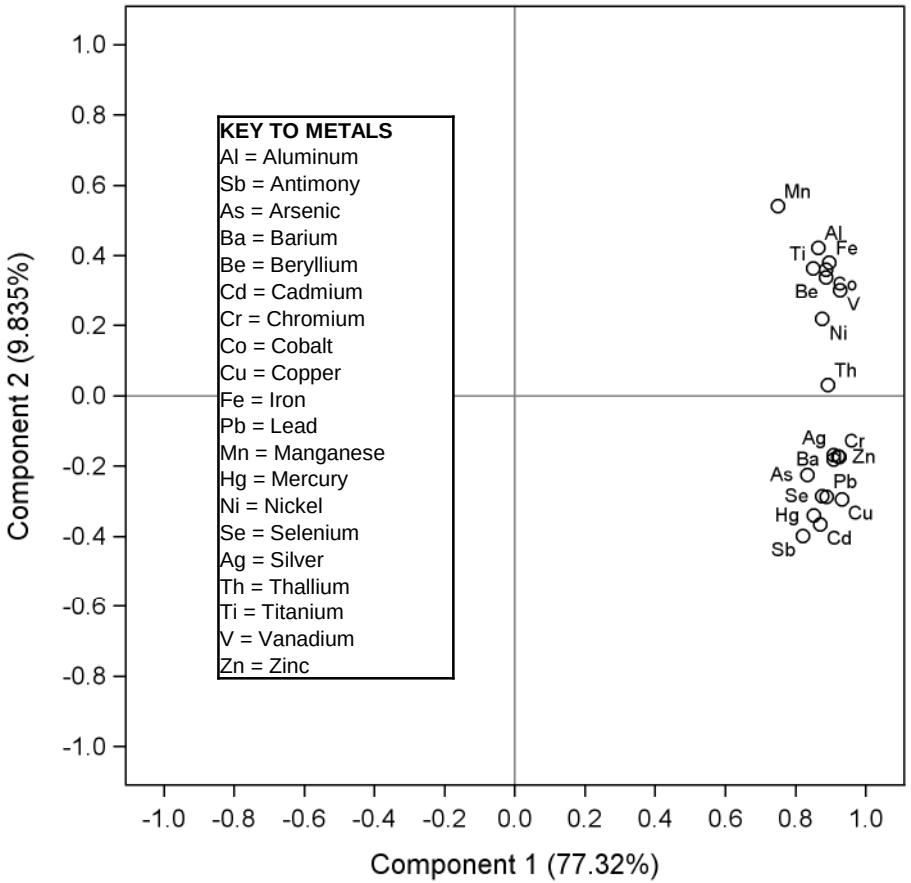
Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-8a

PAHs



Metals



Graphs show the correlation of each individual analyte to the first and second principal components of the analyte group.

KEY TO POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

_1_Mn = 1-Methylnaphthalene	BkF = Benzo(k)fluoranthene
_2_Mn = 2-Methylnaphthalene	C0 = Chrysene
Ace = Acenaphthene	DA = Dibenz(a,h)anthracene
Acl = Acenaphthylene	FL = Fluoranthene
AN = Anthracene	F0 = Fluorene
BaA = Benzo(a)anthracene	ID = Indeno(1,2,3-cd)pyrene
BaP = Benzo(a)pyrene	N0 = Naphthalene
BbF = Benzo(b)fluoranthene	Per = Perylene
BeP = Benzo(e)pyrene	P0 = Phenanthrene
BgP = Benzo(g,h,i)perylene	PY = Pyrene

Alkylated PAHs are indicated by numbers greater than 0. Example: N2 = C2-Naphthalene

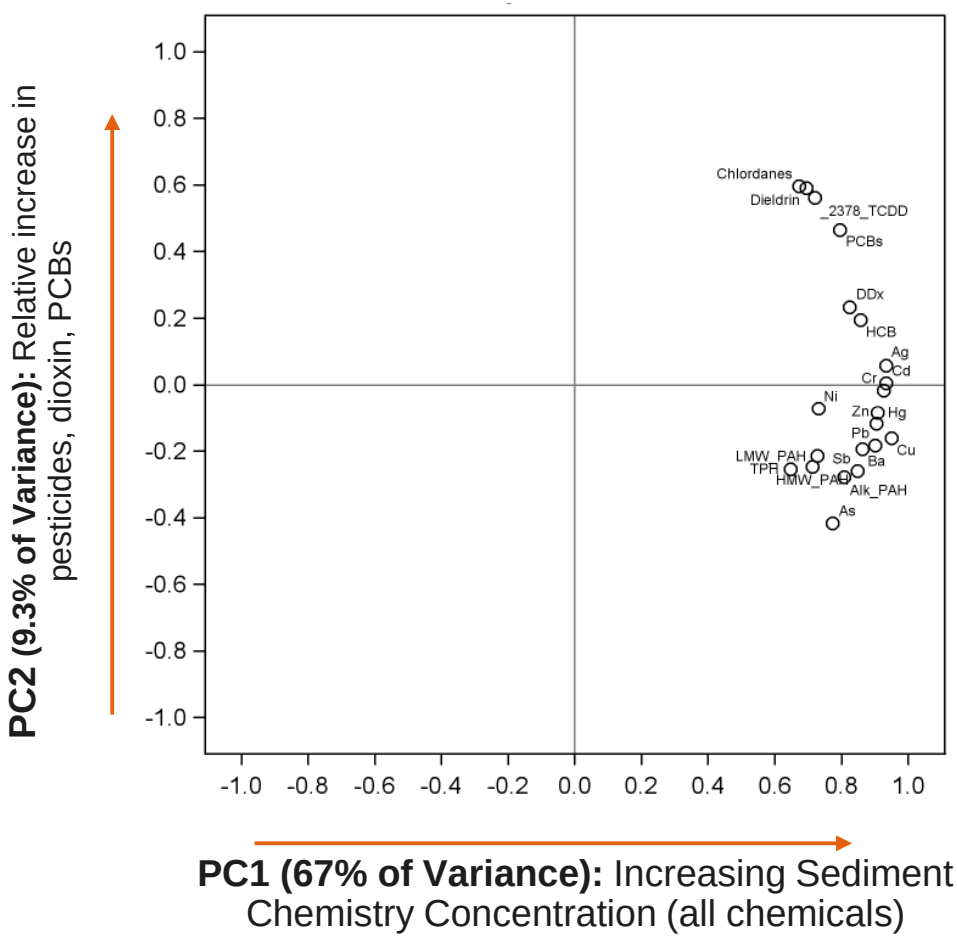
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

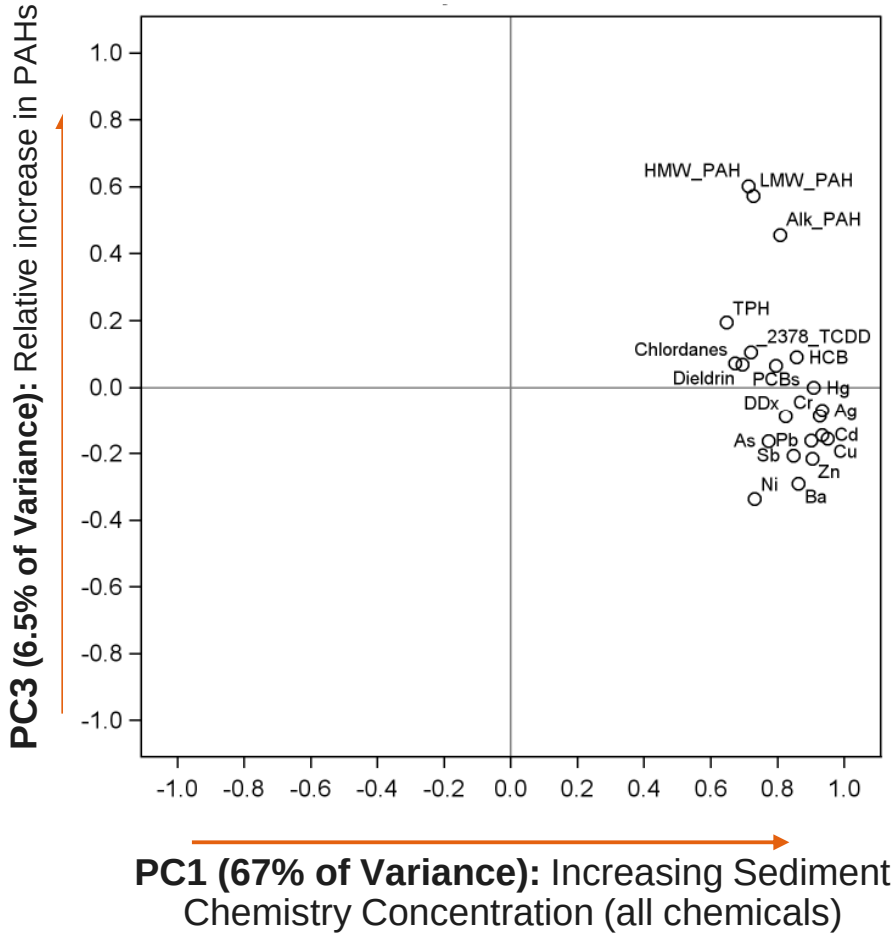
EXPLORATORY PRINCIPAL COMPONENT ANALYSIS:
PAHS AND METALS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-8b

Graphs show the correlation of each individual analyte or analyte group to the first, second and third principal components.





KEY

Sb = Antimony	_2378_TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
As = Arsenic	PCBs = Totals PCB Congeners
Ba = Barium	DDT = Total DDx (2,4' and 4,4')
Cd = Cadmium	HCB = Hexachlorobenzene
Cr = Chromium	Chlordanes = Total Alpha + Gamma Chlordane
Cu = Copper	Dieldrin = Dieldrin
Pb = Lead	LMW_PAH = Total Low Molecular Weight Polycyclic Aromatic Hydrocarbons
Hg = Mercury	HMW_PAH = Total High Molecular Weight Polycyclic Aromatic Hydrocarbons
Ni = Nickel	Alk_PAH = Total Alkylated Polycyclic Aromatic Hydrocarbons
Ag = Silver	TPH = Total Petroleum Hydrocarbons
Zn = Zinc	

DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

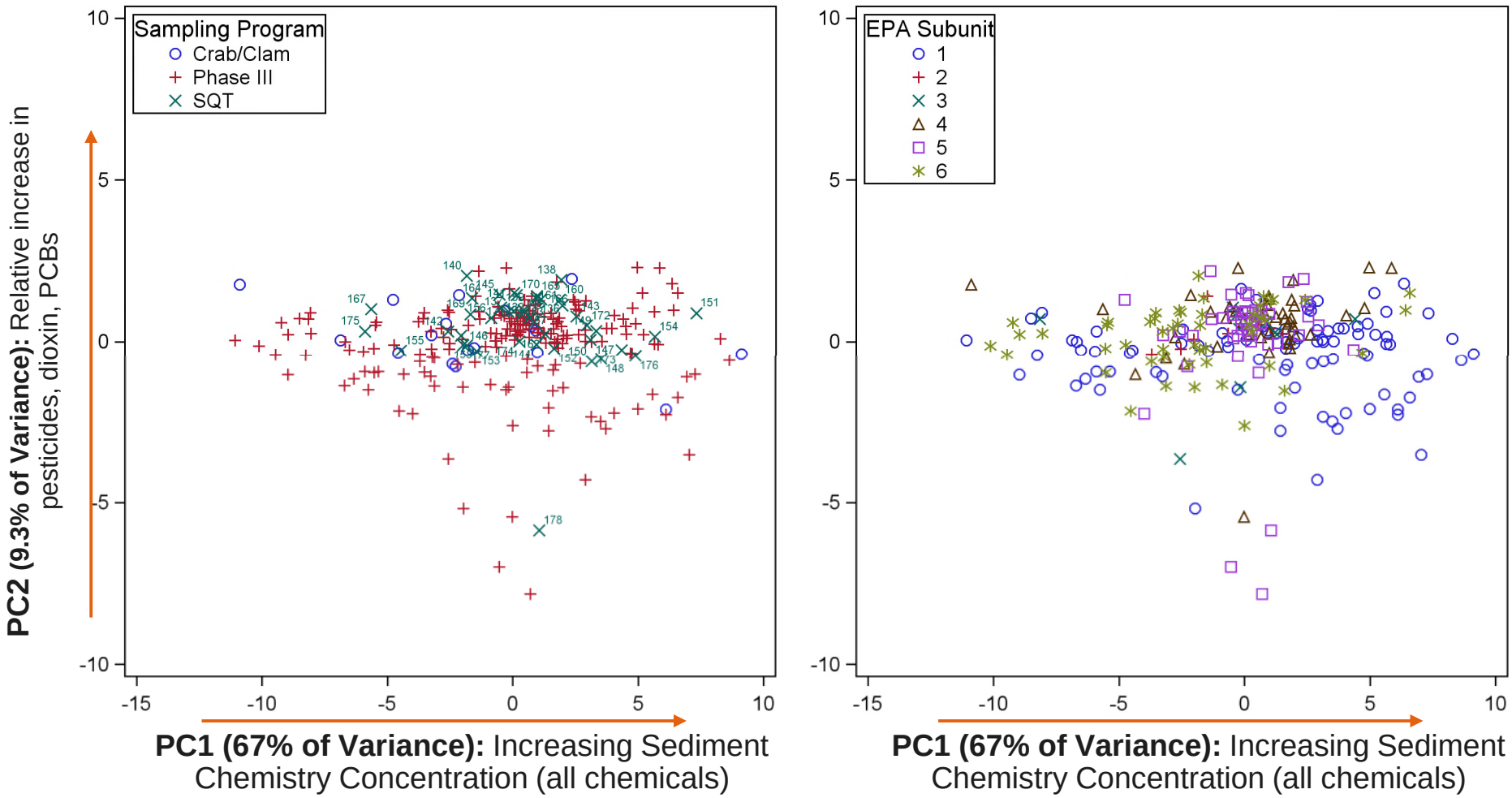
BASELINE ECOLOGICAL RISK ASSESSMENT

PRINCIPAL COMPONENT ANALYSIS OF SEDIMENT CHEMISTRY: LOADINGS

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE

A-9a



Notes:
Graphs show the scores for sediment samples on the first and second principal components. Graph on the right is color-coded by the EPA Subunits shown on Figure 4-3. Graph on the left is color-coded by sampling program:
Crab/Clam = 2014 Crab and Clam Sediment Sampling
Phase III = 2016 Surface Sediment Sampling
SQT = 2015 Sediment Quality Triad Sampling Program

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PRINCIPAL COMPONENT ANALYSIS OF SEDIMENT CHEMISTRY: SCORES

Glenn Springs Holdings, Inc.
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FIGURE
A-9b

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ldrum
GSH (B0009989.0061.00013)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-4_SedimentPrincipalComponentScores.mxd 8/27/2019 12:19:05 PM

LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

SEDIMENT CHEMISTRY PRINCIPAL COMPONENT SCORE

- < -2
- -2 TO 0
- 0 TO 2
- 2 TO 5
- > 5

0 3,000 6,000 Feet

GRAPHIC SCALE

PASSAIC RIVER
CONRAIL BRIDGE REMNANTS
PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
KILL VAN KULL
BAYONNE BRIDGE
SHOOTERS ISLAND
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

NOTES:

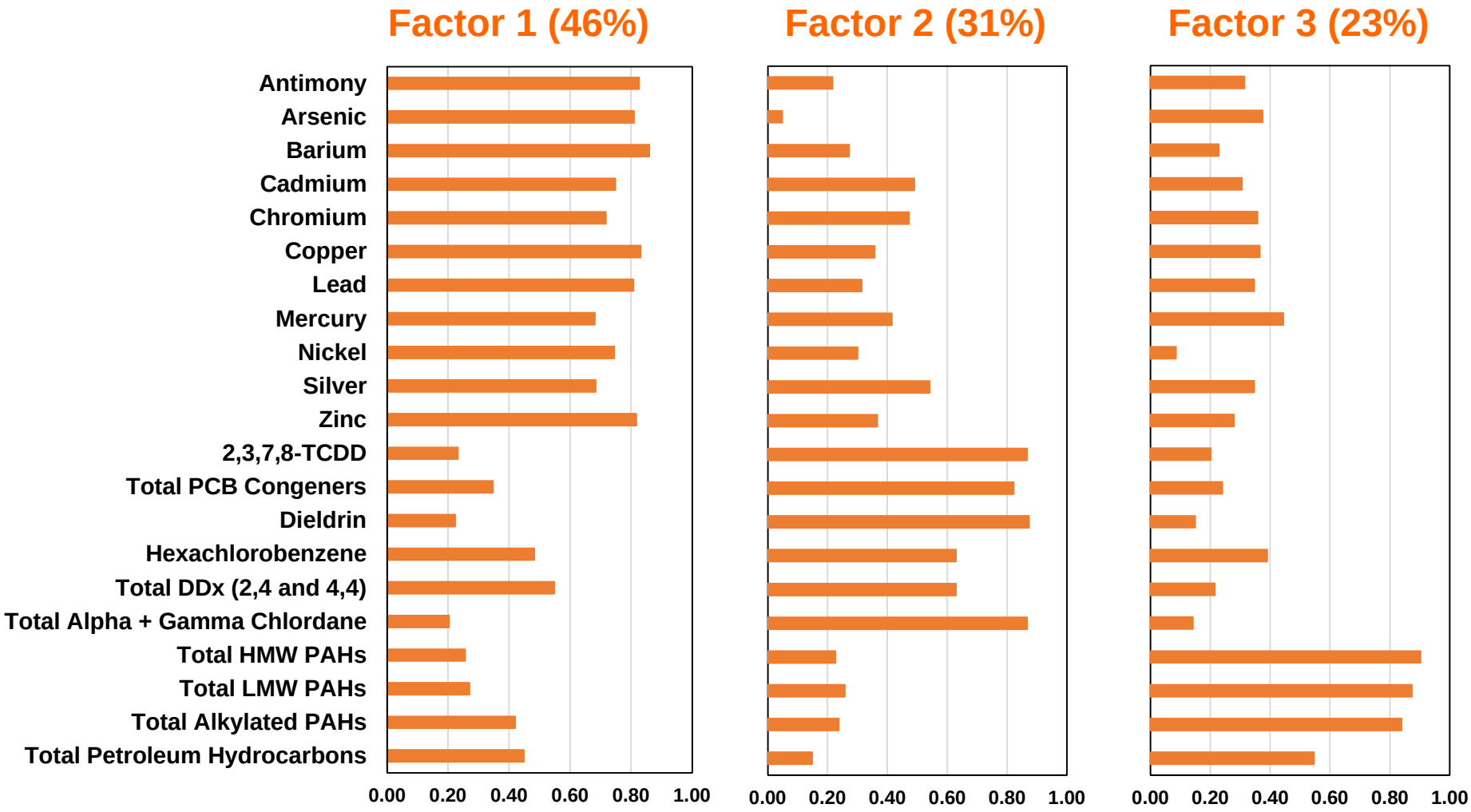
1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. BASE MAP INFORMATION AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995. PASSAIC NAVIGATION CHANNEL WAS PROVIDED BY THE USACE. ALL NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
4. FIGURE SHOWS THE SCORES FOR THE FIRST PRINCIPAL COMPONENT FOR ALL PHASE III SURFACE SEDIMENT LOCATIONS. THE PRINCIPAL COMPONENT ANALYSIS IS DESCRIBED IN SECTION 3.2 OF APPENDIX A OF THE BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE NEWARK BAY STUDY AREA.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

SEDIMENT CHEMISTRY PRINCIPAL COMPONENT SCORES

Glenn Springs Holdings, Inc.
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FIGURE
A-10



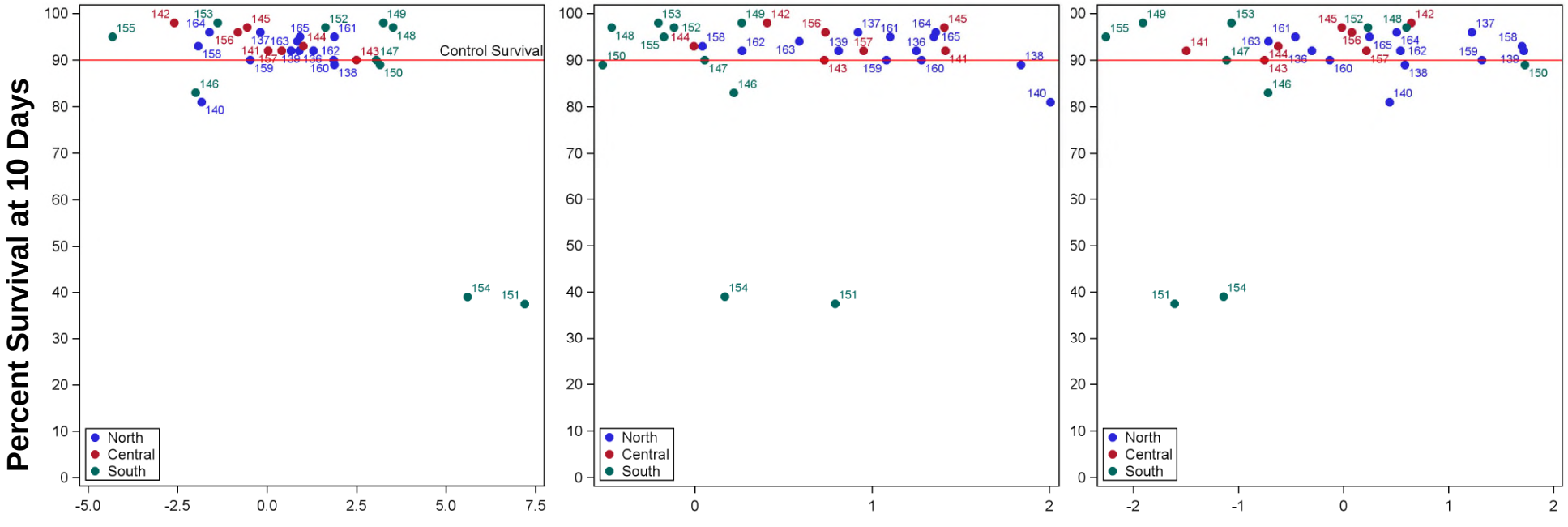
Graphs show the correlation (x-axis) of each individual analyte or analyte group to the first, second and third factors. Numbers in parentheses indicate the percent of the variance explained by the factor.
PAH = Polycyclic Aromatic Hydrocarbon
HMW = High Molecular Weight.
LMW = Low Molecular Weight.
TCDD = Tetrachlorodibenzo-p-dioxin
DDx = dichlorodiphenyldichloroethane, dichlorodiphenyldichloroethylene , and dichlorodiphenyltrichloroethane
PCB = polychlorinated biphenyl

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR ANALYSIS OF SEDIMENT CHEMISTRY

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-11



PC1: Increasing Sediment Chemistry

PC2: Relatively Greater pesticides, dioxin, PCBs

PC3: Relatively Greater PAHs

Graphs show the mean survival of five replicates of *L.plumulosus* exposed to sediments for ten days vs. the sediment chemistry principal component scores of the sediment sample. Observations are labeled by station name and color-coded by geographic unit.

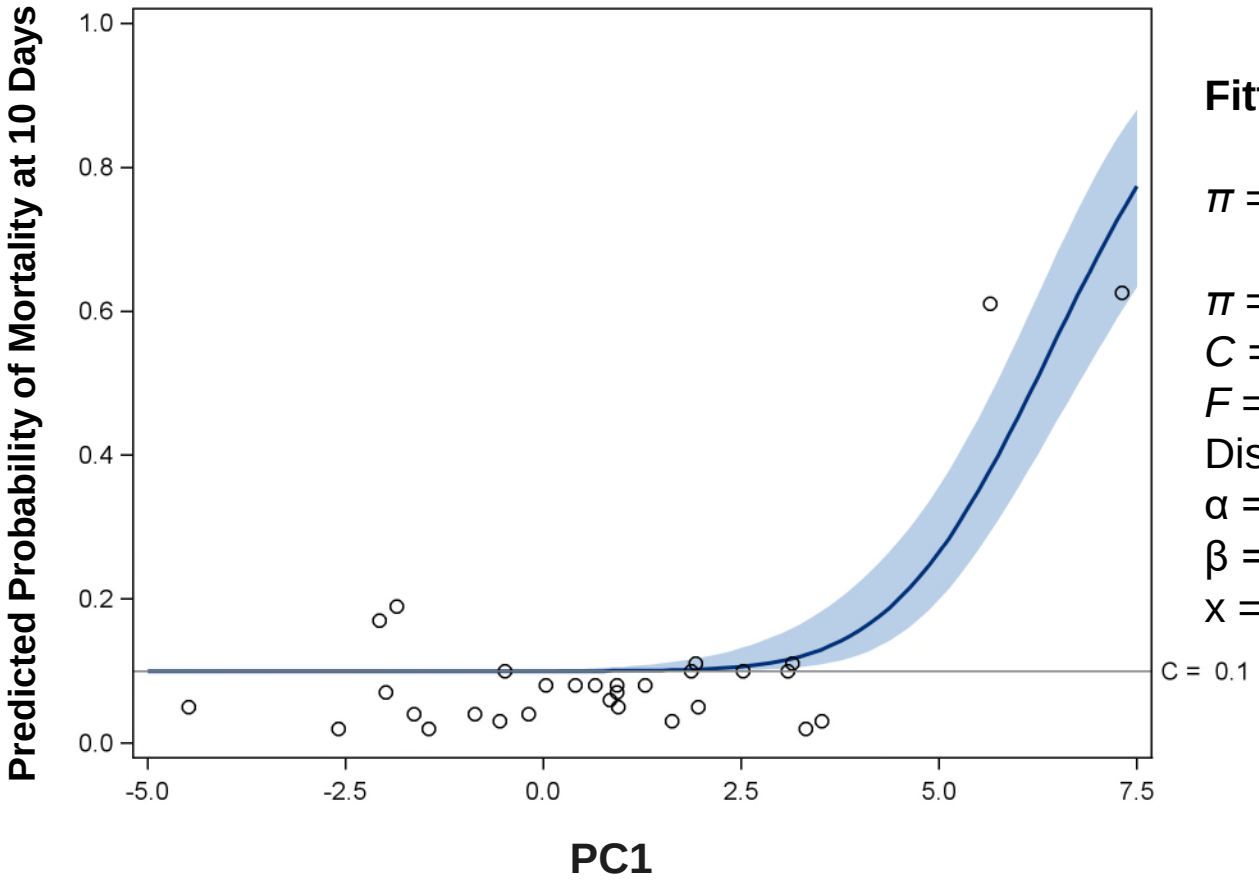
DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION BASELINE ECOLOGICAL RISK ASSESSMENT

AMPHIPOD SURVIVAL (10-DAY) VS. PRINCIPAL COMPONENTS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-12



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -4.0444
β = 0.6288
x = PC1 Score

Blue shading represents 90% confidence limits of the fitted probit model.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT MODEL OF 10-DAY AMPHIPOD MORTALITY: SEDIMENT

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A subsidiary of Occidental Petroleum

FIGURE
A-13

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ksinsabaugh
GSH (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\Fig6-6_AmphipodSurvival_10day.mxd 4/8/2019 9:38:24 AM

LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

MODEL PREDICTED 10 DAY AMPHIPOD SURVIVAL

- > 80% OF CONTROL
- 60 - 80% OF CONTROL
- < 60% OF CONTROL

0 3,000 6,000 Feet

GRAPHIC SCALE

PASSAIC RIVER
PIERSONS CREEK
CONRAIL BRIDGE REMNANTS
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
KILL VAN KULL
SHOOTERS ISLAND
BAYONNE BRIDGE
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

383 384 331 190 154 191 199 194 206 201 207 213 208 220 151 235 134 129 237 239 232

NOTES:

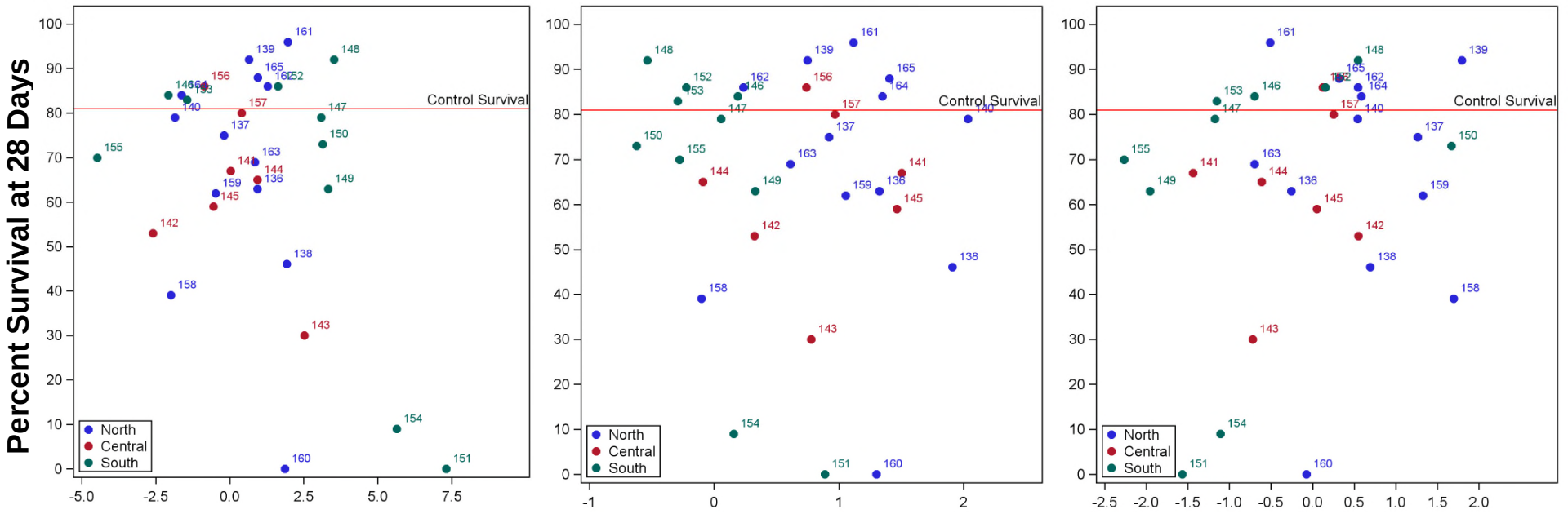
1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. BASE MAP INFORMATION AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995. PASSAIC NAVIGATION CHANNEL WAS PROVIDED BY THE USACE. ALL NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
4. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

MODEL PREDICTED 10-DAY AMPHIPOD SURVIVAL

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-14



PC1: Increasing Sediment Chemistry

PC2: Relatively Greater Pesticides, Dioxin, PCBs

PC3: Relatively Greater PAHs

Graphs show the mean survival of five replicates of *L.plumulosus* exposed to sediments for 28 days vs. the sediment chemistry principal component scores of the sediment sample. Observations are labeled by station name and color-coded by geographic unit.

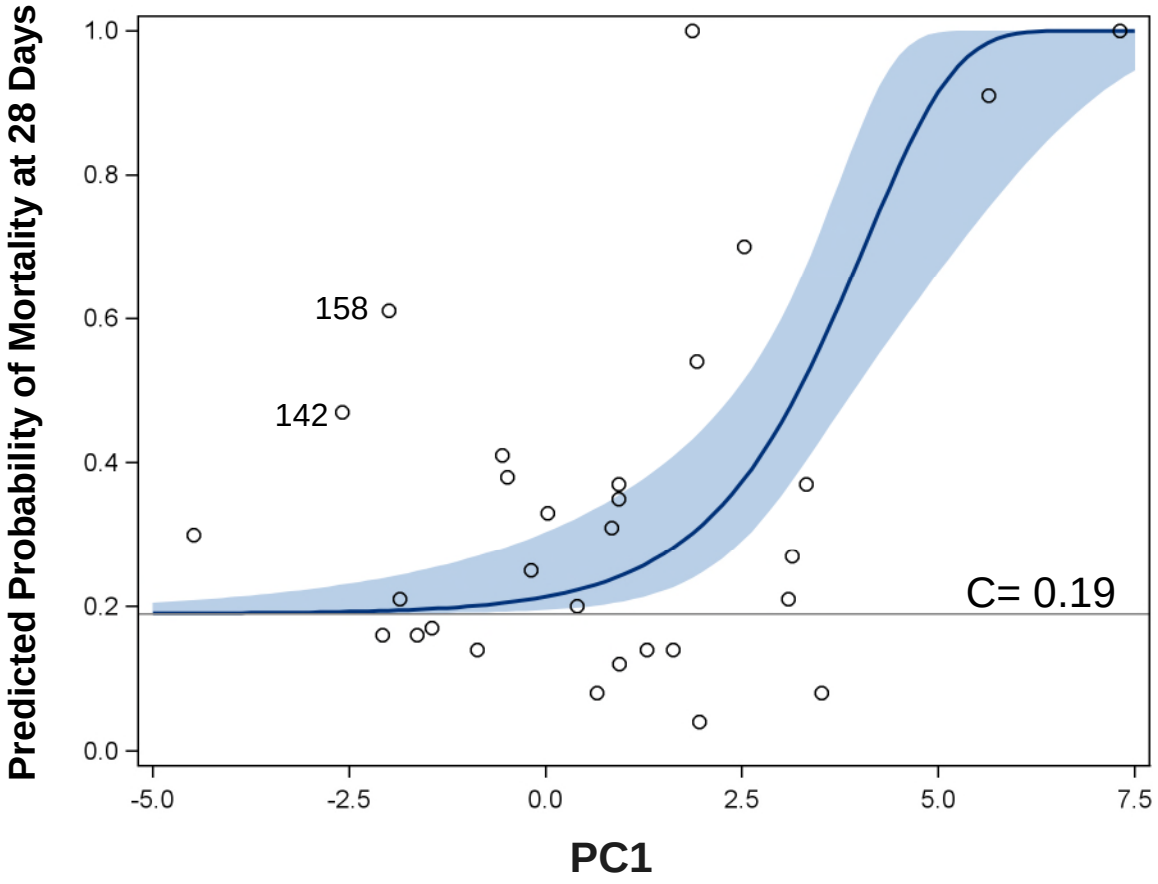
DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

AMPHIPOD SURVIVAL (28-DAY) VS. PRINCIPAL COMPONENTS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-15



Fitted Gompertz Model:

$\pi = C+(1-C)F(\alpha + \beta_i x_i)$

π = Probability of mortality at 28 days
C = 0.19 (i.e. control mortality)
F = Cumulative Gompertz Distribution Function
α = -4.4644
β_1 = 0.8683
x_1 = PC1 Score
β_2 = 1.4585
x_2 = PC2 Score

Blue shading represents 90% confidence limits of the fitted Gompertz model. PC2 not shown. Selected observations labeled with station name.

Comparison of Observed and Predicted Toxicity		Predicted Toxic	
		Yes	No
Observed Toxic	Yes	4	2
	No	3	21

Note: Observed toxicity in this table is defined as statistically significantly different from control

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION BASELINE ECOLOGICAL RISK ASSESSMENT

GOMPERTZ MODEL OF 28-DAY AMPHIPOD MORTALITY: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-16

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: ldrum
GSH (B0009989.0061.00016)
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LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

MODEL PREDICTED 28 DAY AMPHIPOD SURVIVAL

- > 80% OF CONTROL
- 60 - 80% OF CONTROL
- < 60% OF CONTROL

0 3,000 6,000 Feet
GRAPHIC SCALE

PASSAIC RIVER
PIERSONS CREEK
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
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CONRAIL BRIDGE REMNANTS
KILL VAN KULL
BAYONNE BRIDGE
SHOOTERS ISLAND
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

371 293 312 321 161 138 327 160 333 383 331 384 338 408 353 143 127B 172 173 179 184 183 180 154 190 185 191 199 206 207 212 213 222 151 220 224 225 245 235 129 237 176 239 149 250 231 232

NOTES:

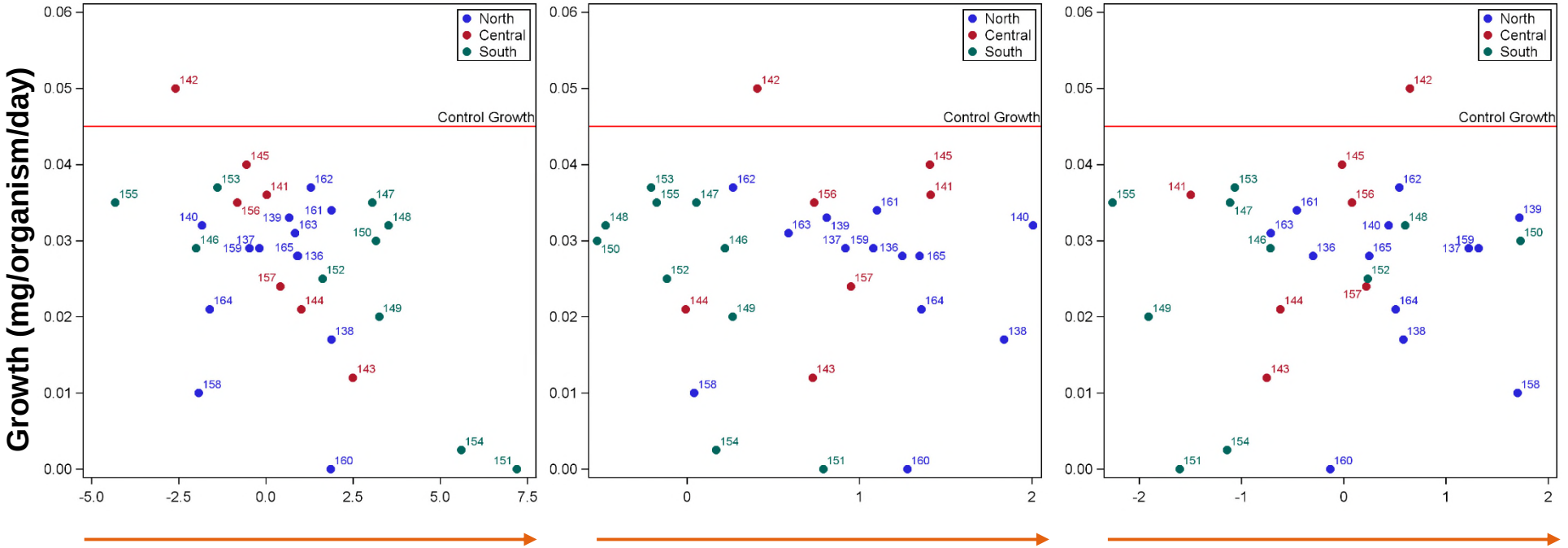
1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
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DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

MODEL PREDICTED 28 DAY AMPHIPOD SURVIVAL

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-17



PC1: Increasing Sediment Chemistry

PC2: Relatively Greater pesticides, dioxin, PCBs

PC3: Relatively Greater PAHs

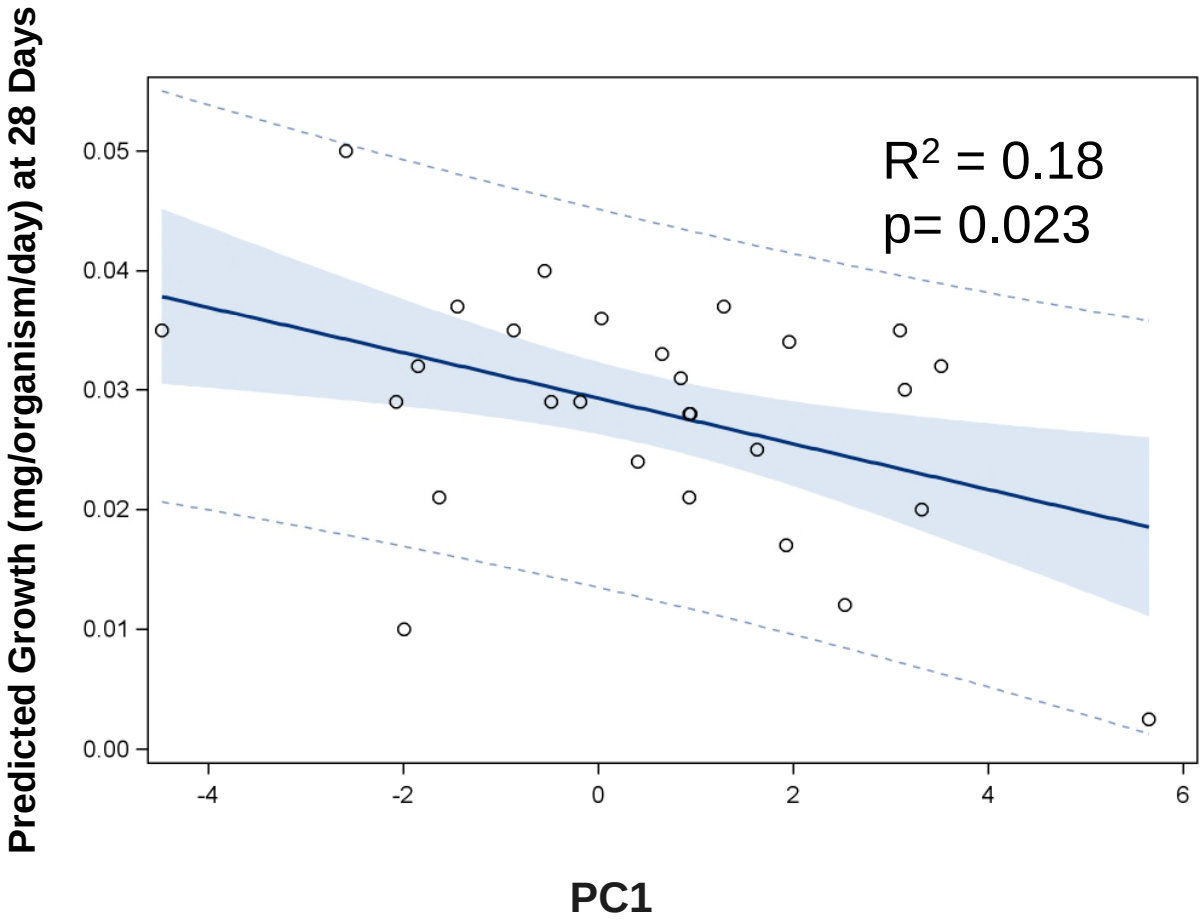
Graphs show the mean growth of five replicates of *L.plumulosus* exposed to sediments for 28 days vs. the sediment chemistry principal component scores of the sediment sample. Observations are labeled by station name and color-coded by geographic unit. Growth could not be measured at stations with full mortality (i.e. 151 and 160) and are plotted as 0 on the graph.
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

AMPHIPOD GROWTH VS. PRINCIPAL COMPONENTS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-18



Fitted Regression Model:

$G = \alpha + \beta x$

G = Growth after 28 days (mg/organism/day)
α = 0.02930
β = -0.001906
x = PC1 Score

Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.
Growth could not be estimated at stations with 100% mortality, 151 and 160, and those are not included in the regression model.

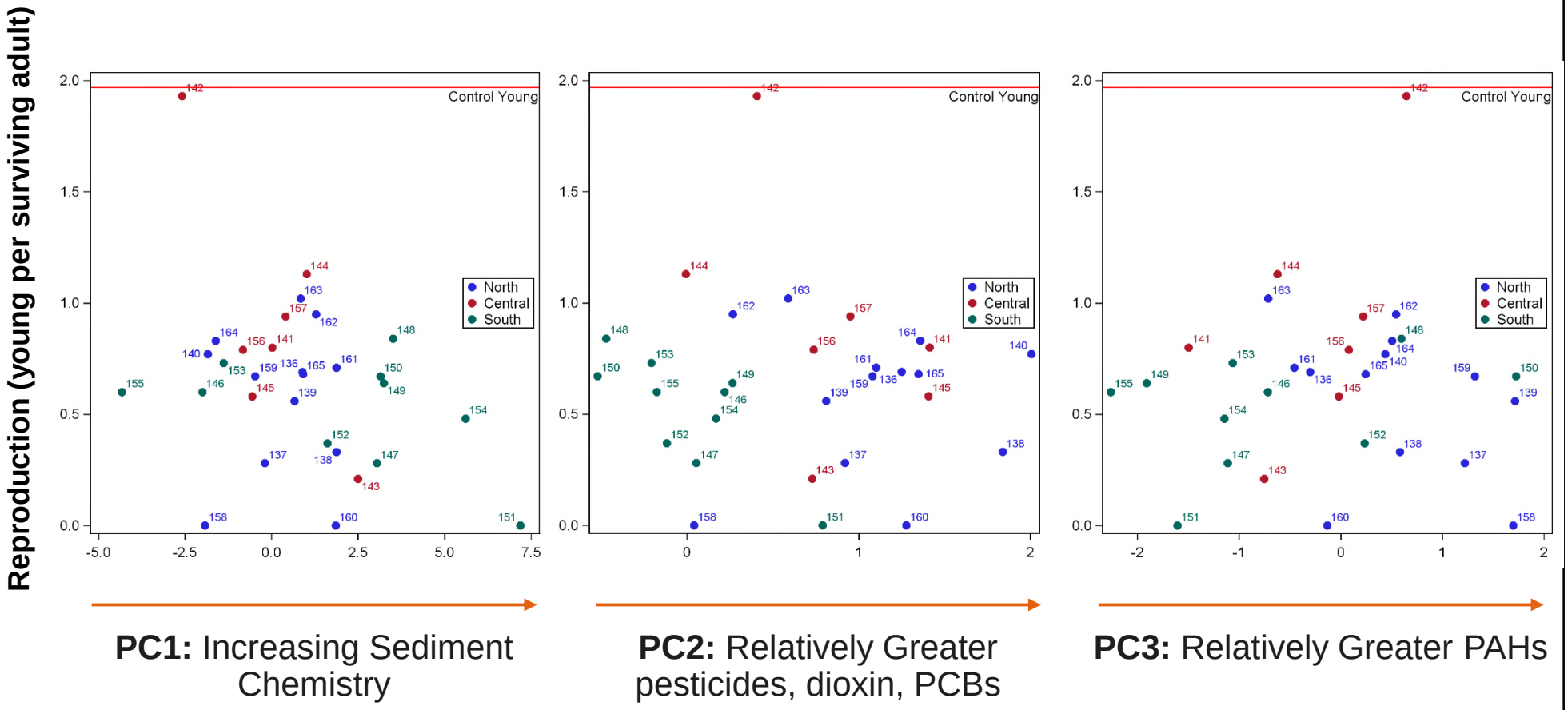
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODEL OF 28-DAY AMPHIPOD GROWTH: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-19



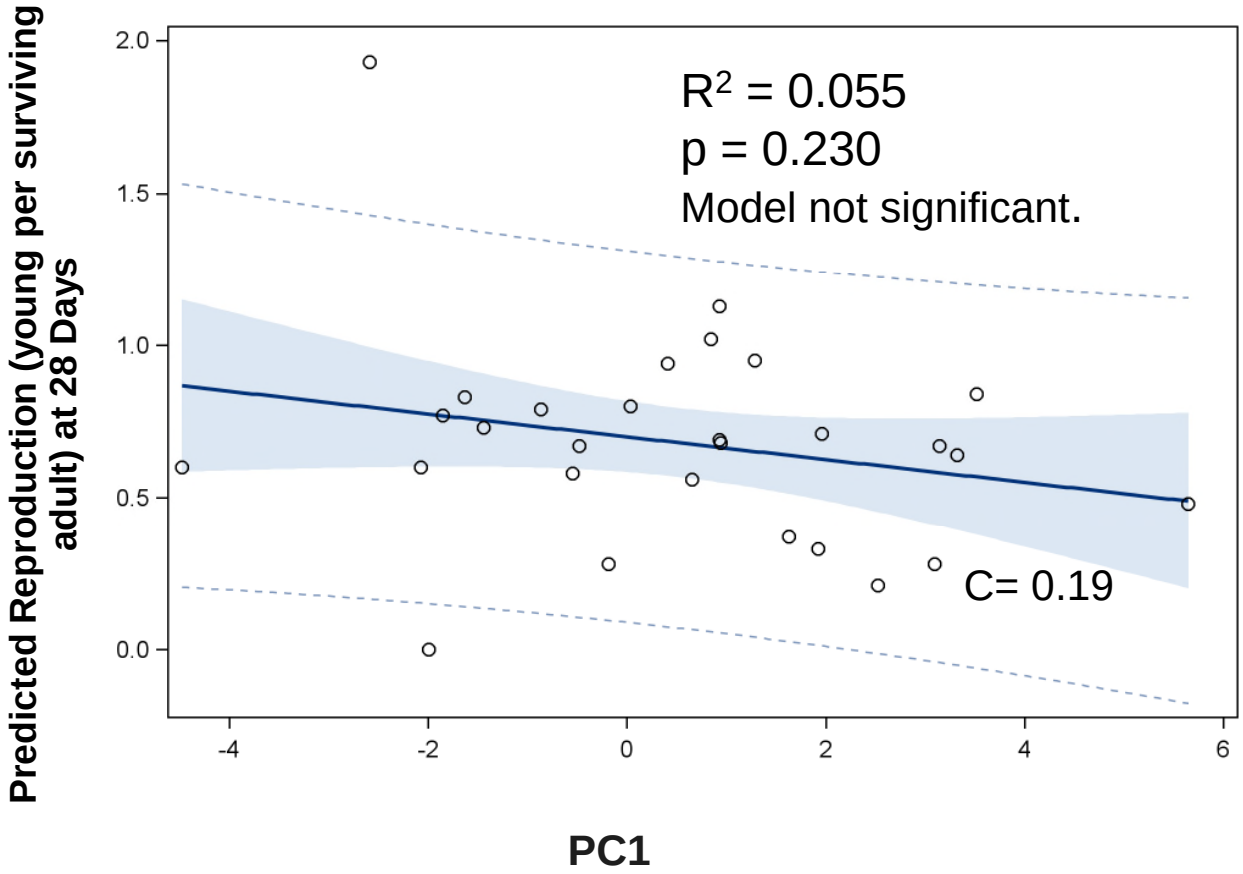
Graphs show the mean reproduction of five replicates of *L.plumulosus* exposed to sediments for 28 days vs. the sediment chemistry principal component scores of the sediment sample. Observations are labeled by station name and color-coded by geographic unit. Reproduction cannot be assessed stations with full mortality (i.e. 151 and 160) and are plotted as 0 on the graph.
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

AMPHIPOD REPRODUCTION VS. PRINCIPAL COMPONENTS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-20



Fitted Regression Model:

$R = \alpha + \beta x$

R = Young per Adult
α = 0.7010
β = -0.0374
x = PC1 Score

Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.

Reproduction could not be estimated at stations with 100% mortality, 151 and 160, and those are not included in the regression model.

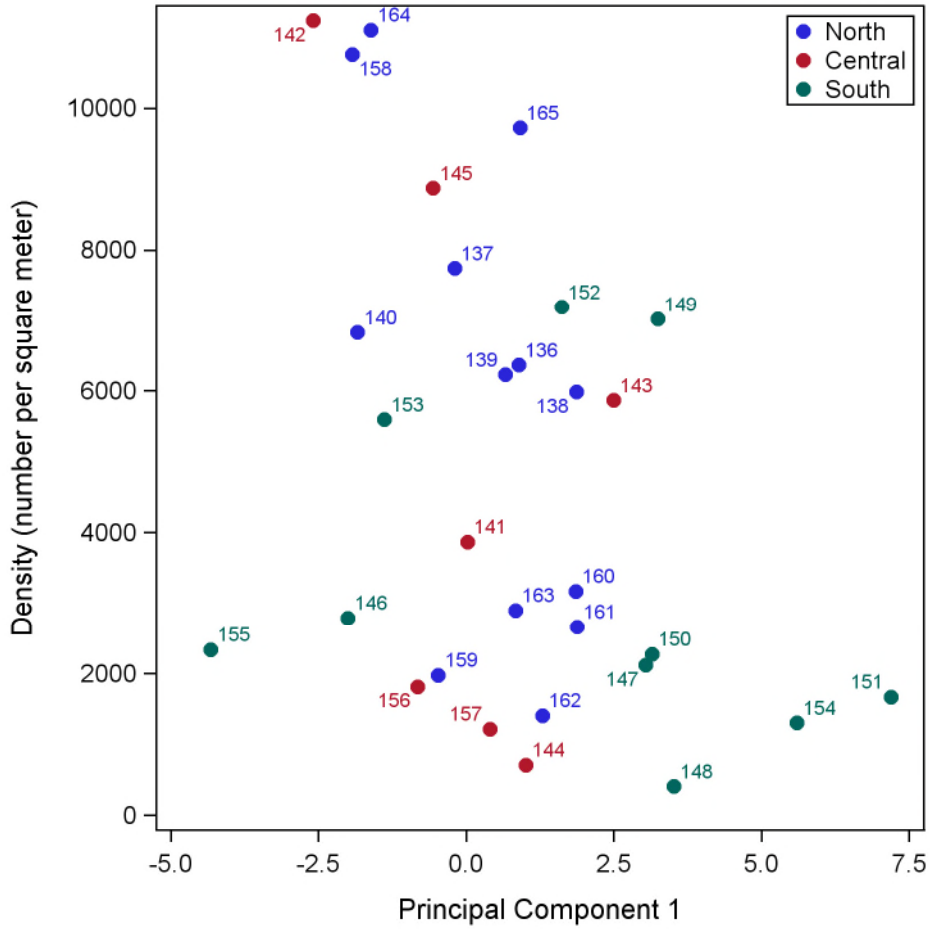
PC = Principal Component

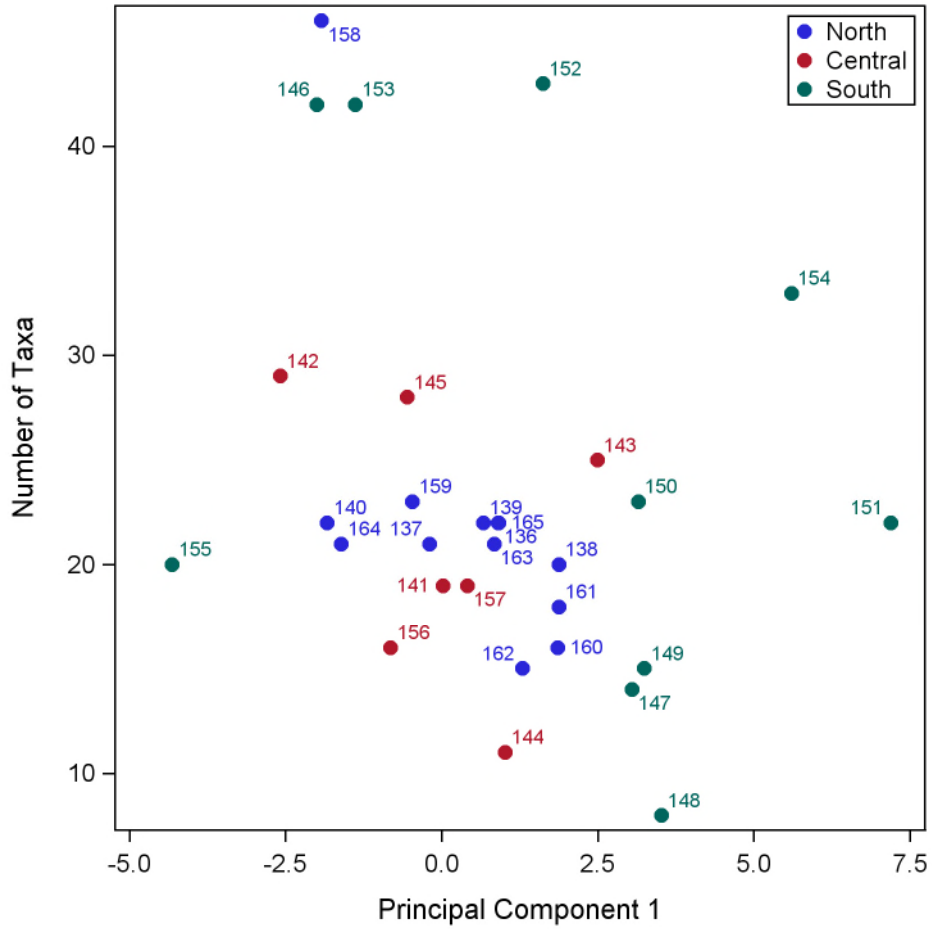
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODEL OF 28-DAY AMPHIPOD REPRODUCTION: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-21





DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

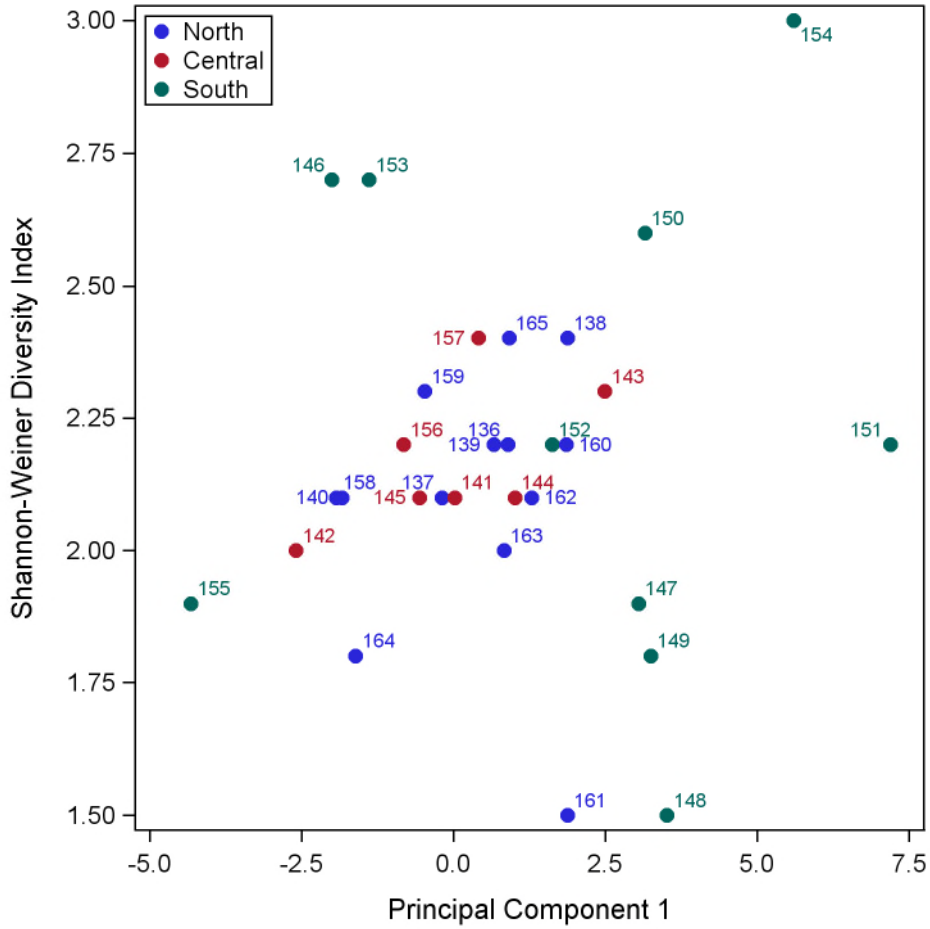
BASELINE ECOLOGICAL RISK ASSESSMENT

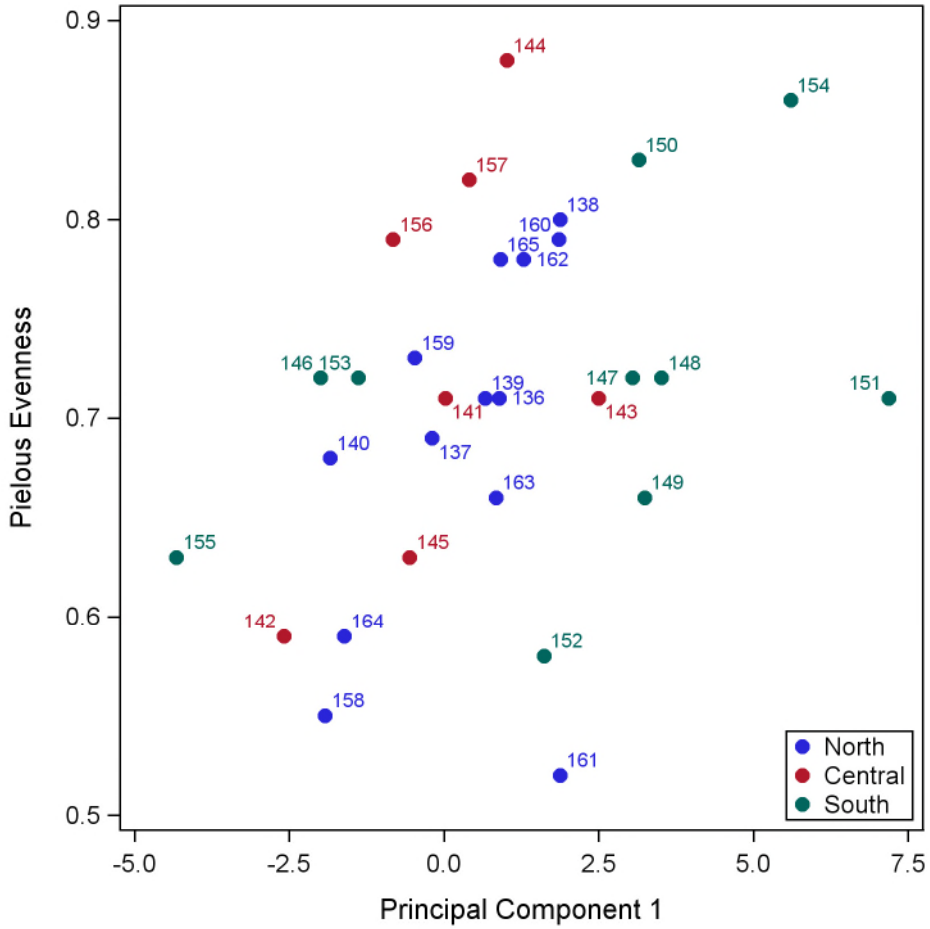
BENTHIC METRICS VS. PRINCIPAL COMPONENT 1: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE

A-22a





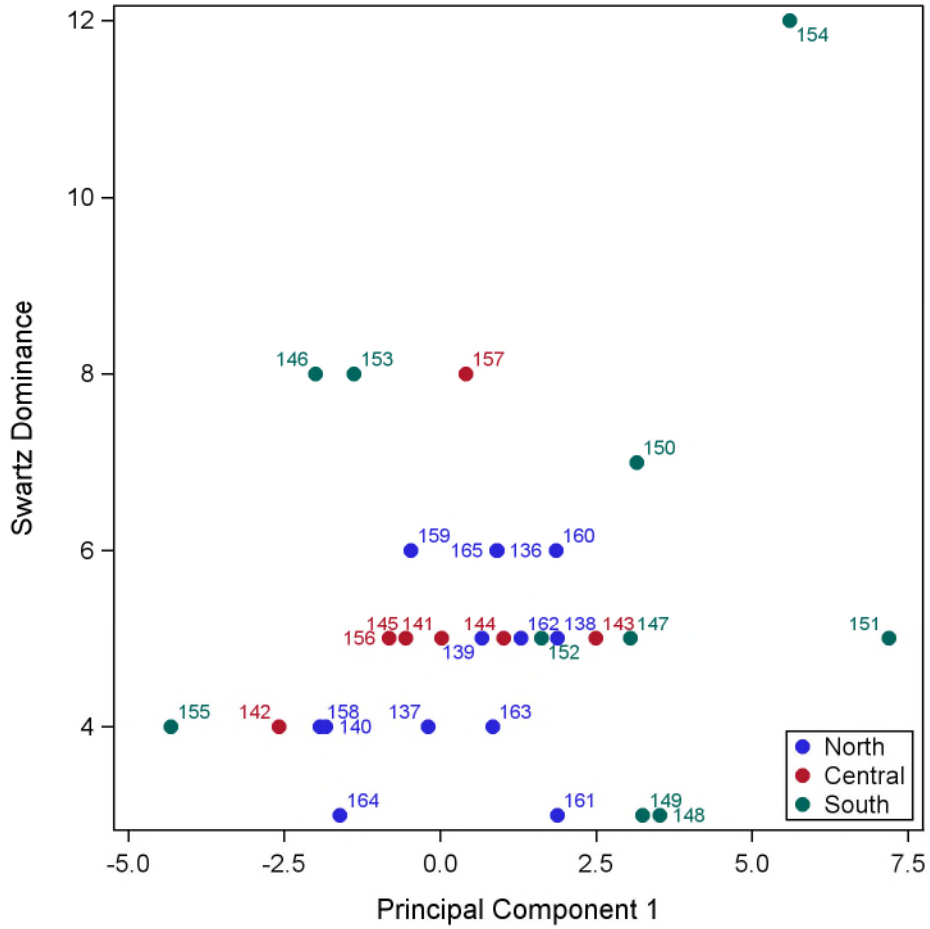
DIAMOND ALKALI SUPERFUND SITE

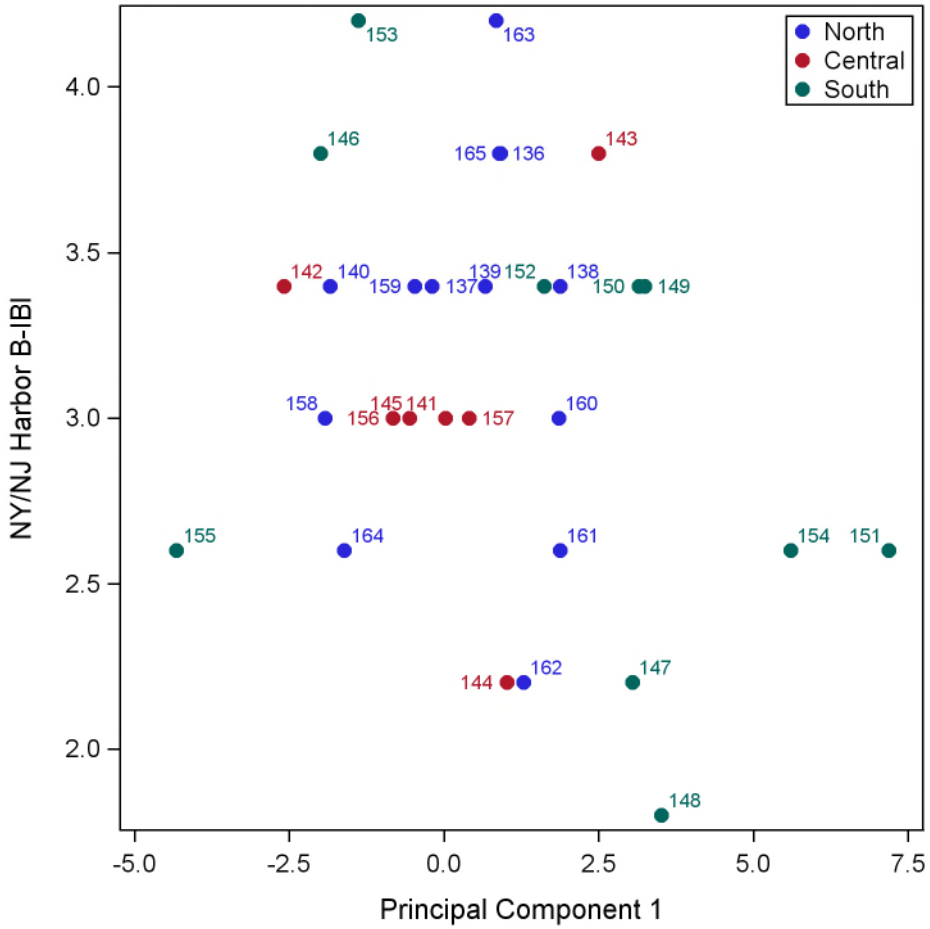
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

BENTHIC METRICS VS. PRINCIPAL COMPONENT 1: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-22b





DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

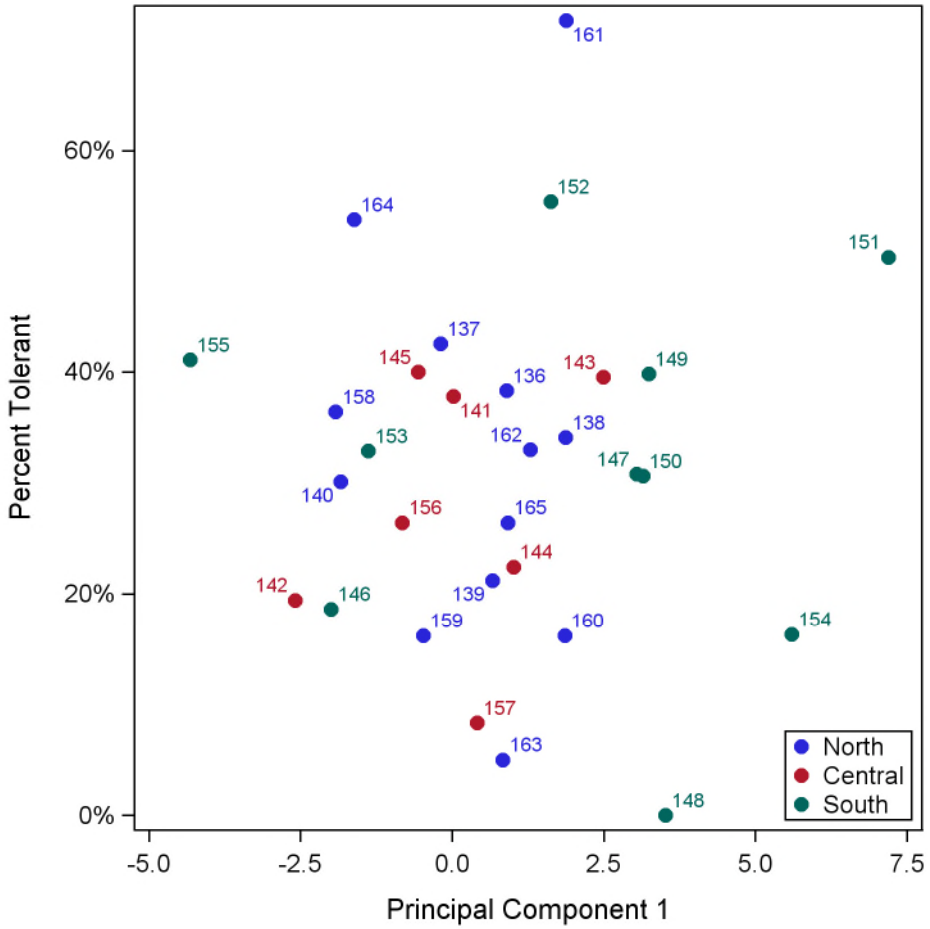
BASELINE ECOLOGICAL RISK ASSESSMENT

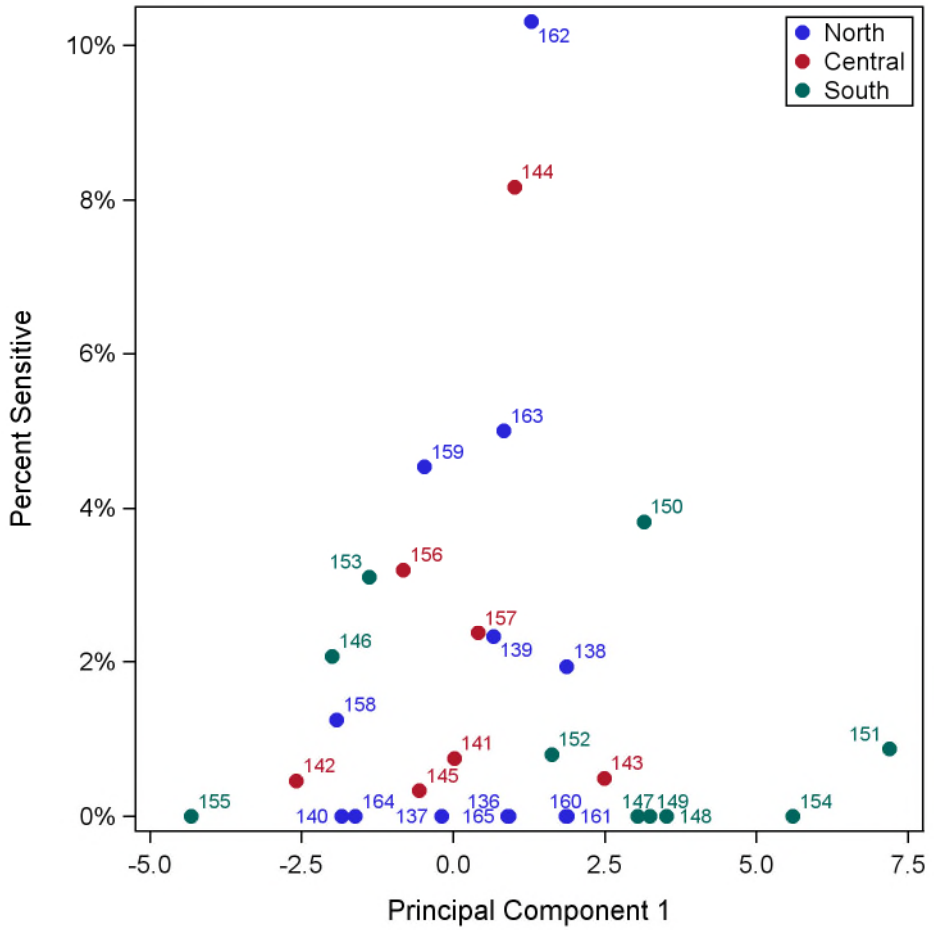
BENTHIC METRICS VS. PRINCIPAL COMPONENT 1: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE

A-22c





DIAMOND ALKALI SUPERFUND SITE

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

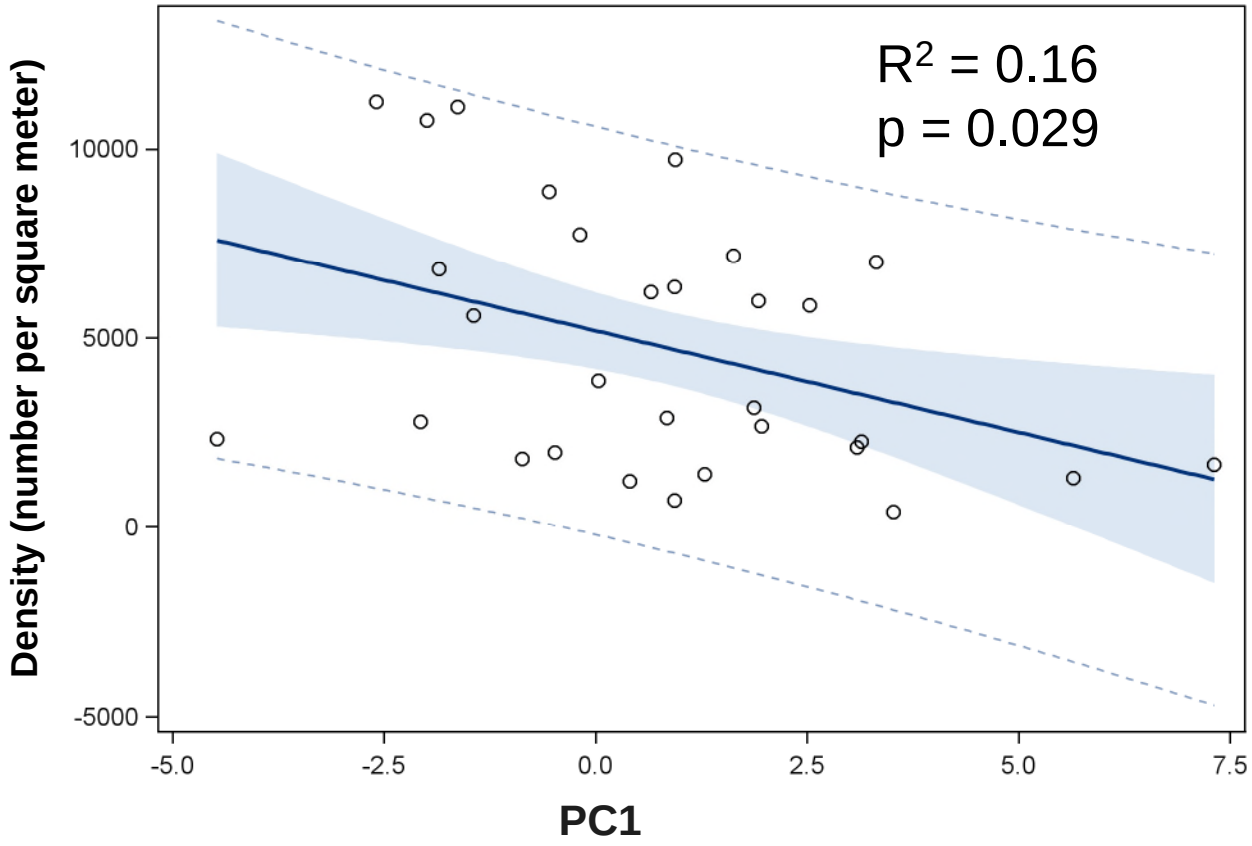
BASELINE ECOLOGICAL RISK ASSESSMENT

BENTHIC METRICS VS. PRINCIPAL COMPONENT 1: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE

A-22d



Fitted Regression Model:

$D = \alpha + \beta x$

D = Density (number of organisms per square meter)
α = 5196
β = -536.4
x = PC1 Score

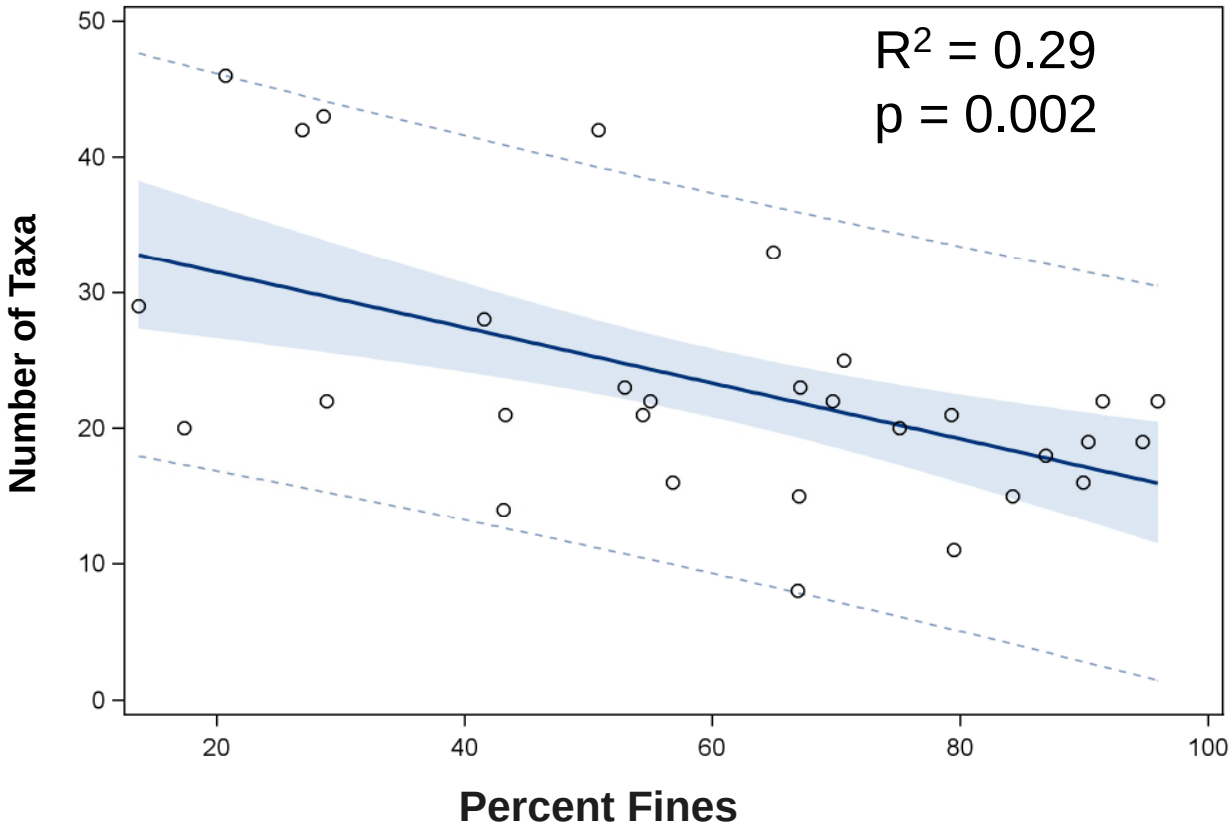
Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODELS FOR BENTHIC METRICS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-23a



Fitted Regression Model:

$T = \alpha + \beta x$

T = Number of Taxa
α = 35.6
β = -0.205
x = Percent Fines

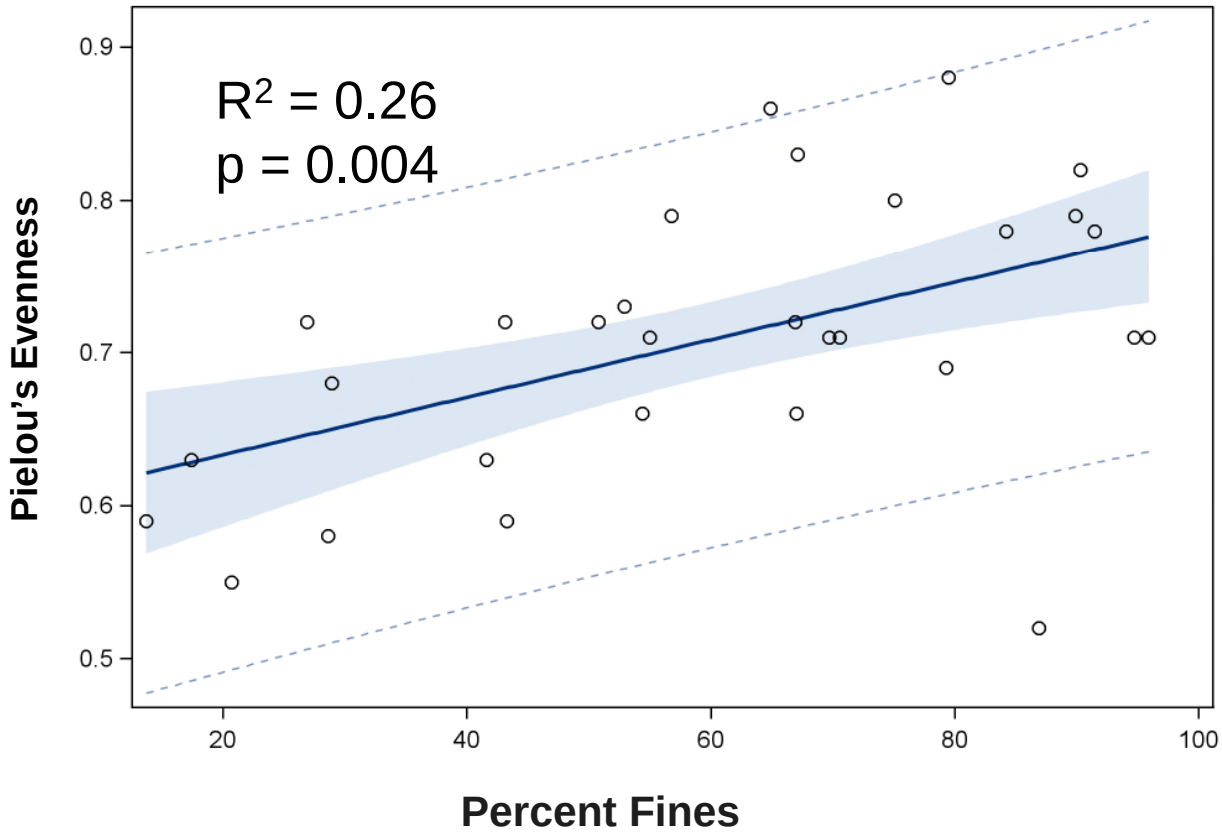
Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODELS FOR BENTHIC METRICS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-23b



Fitted Regression Model:

$E = \alpha + \beta x$

T = Pielou's Evenness
$\alpha = 0.596$
$\beta = 0.00188$
x = Percent Fines

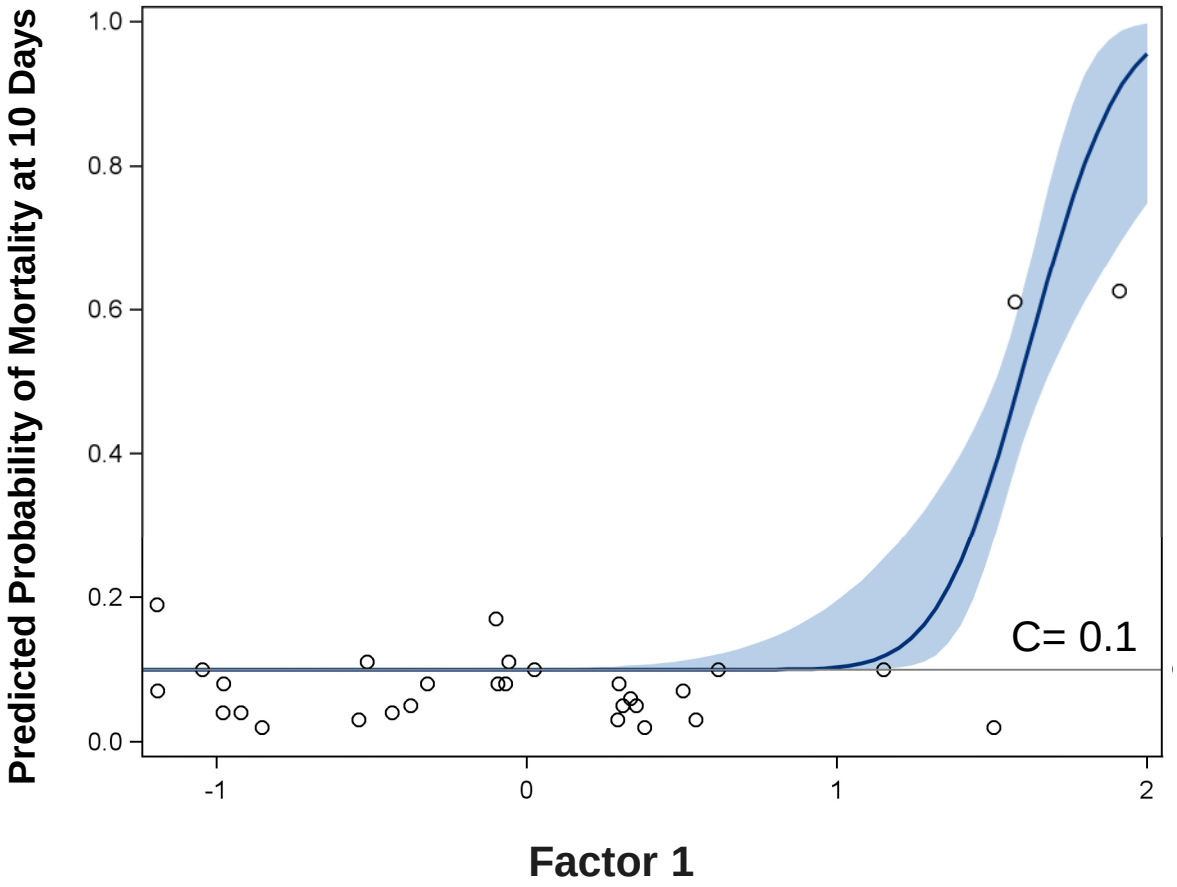
Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODELS FOR BENTHIC METRICS: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-23c



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta_i x_i)$

π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -6.747
β_1 = 4.360
x_1 = Factor 1 Score
β_2 = 2.561
x_2 = Factor 3 Score

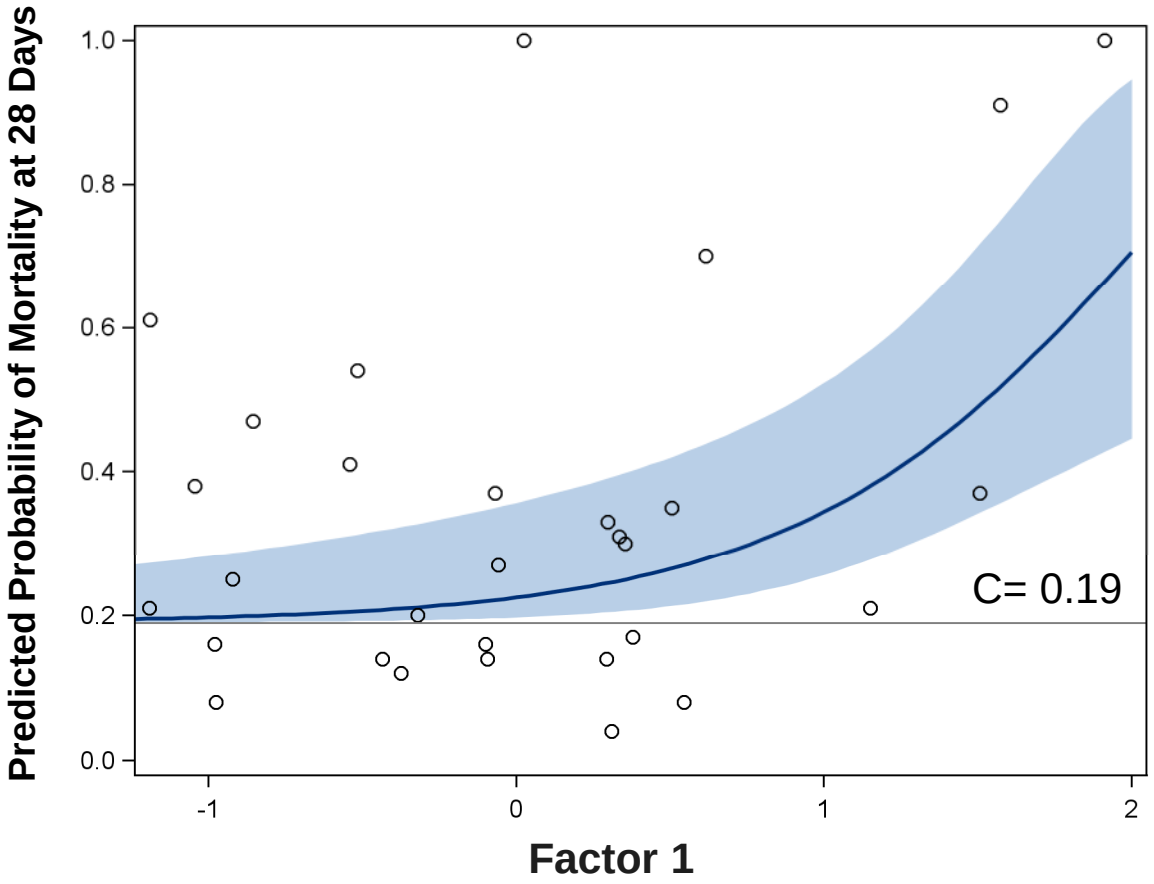
Blue shading represents 90% confidence limits of the fitted probit model. Factor 3 not shown.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT FACTOR MODEL FOR 10-DAY AMPHIPOD MORTALITY: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-24



Fitted Gompertz Model:

$\pi = C+(1-C)F(\alpha + \beta_i x_i)$

π = Probability of mortality at 10 days
C = 0.19 (i.e. control mortality)
F = Cumulative Gompertz Distribution Function
α = -5.046
β_1 = 1.566
x_1 = Factor 1 Score
β_2 = 3.897
x_2 = Factor 2 Score

Blue shading represents 90% confidence limits of the fitted probit model. Factor 2 not shown.

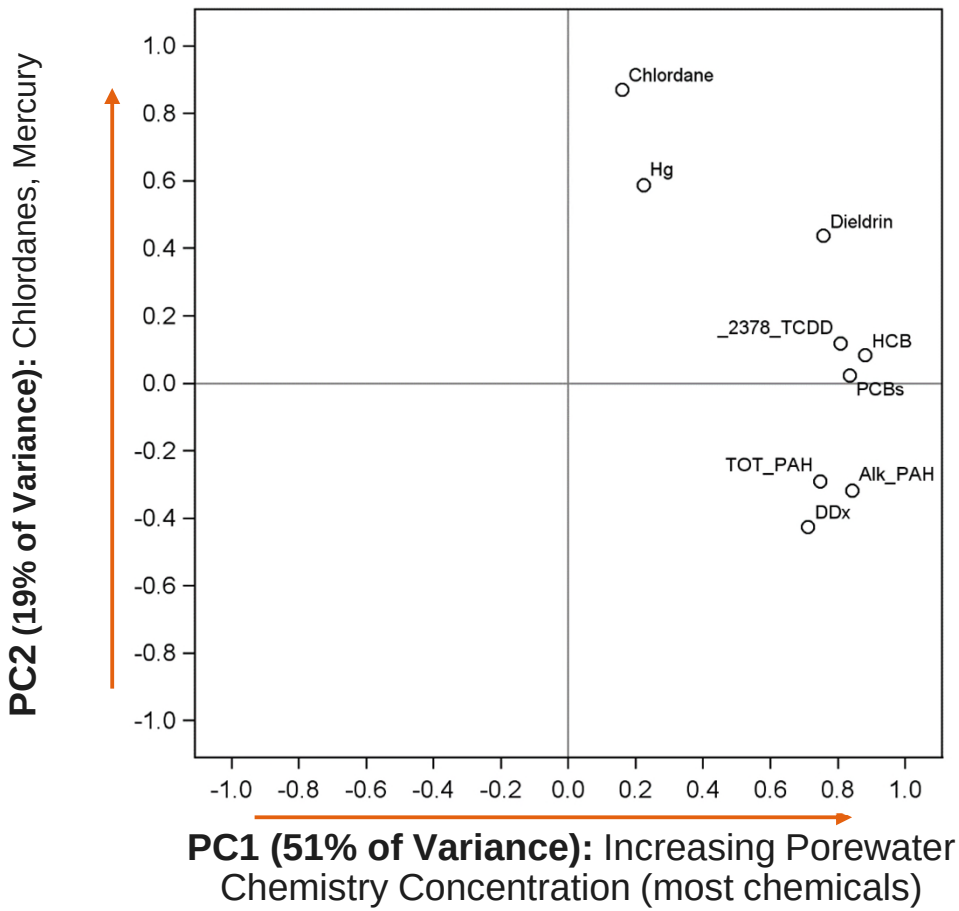
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

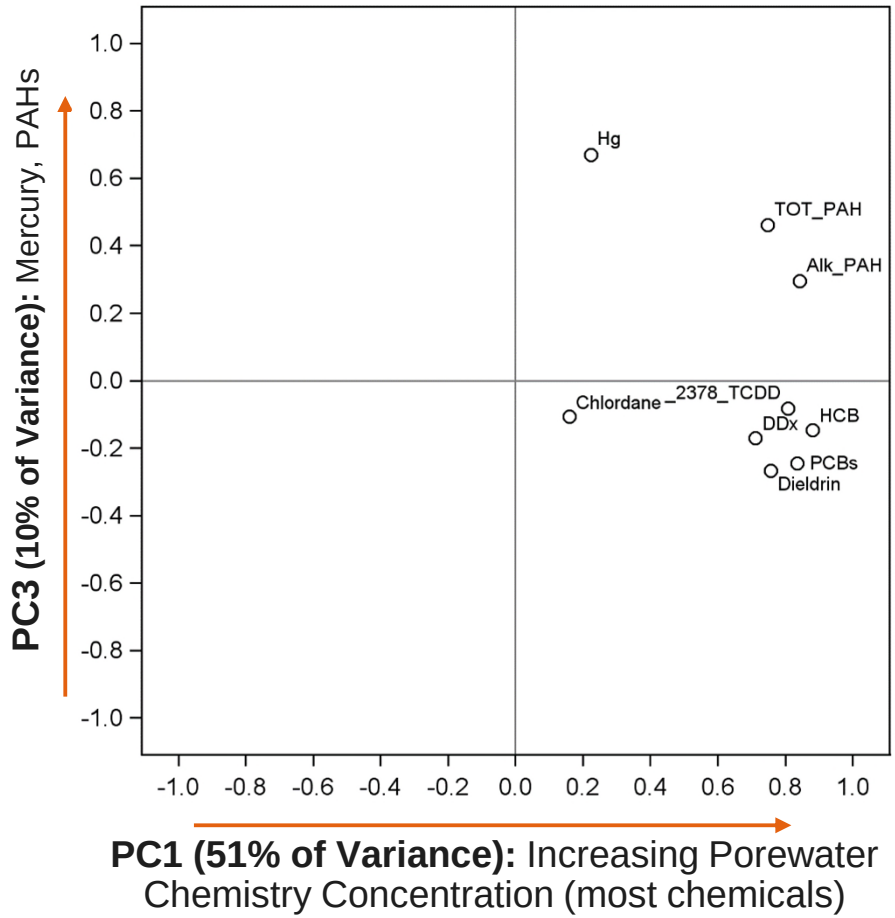
GOMPERTZ FACTOR MODEL FOR 28-DAY AMPHIPOD MORTALITY: SEDIMENT

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-25

Graphs show the correlation of each individual analyte or analyte group to the first, second and third principal components.





KEY
_2378_TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
PCBs = Totals PCB Congeners
DDx = Total DDx (2,4' and 4,4')
HCB = Hexachlorobenzene
Chlordane = Total Alpha + Gamma Chlordane
Dieldrin = Dieldrin
TOT_PAH = Total Polycyclic Aromatic Hydrocarbons
Alk_PAH = Total Alkylated Polycyclic Aromatic Hydrocarbons
Hg = Mercury

PC = Principal Component

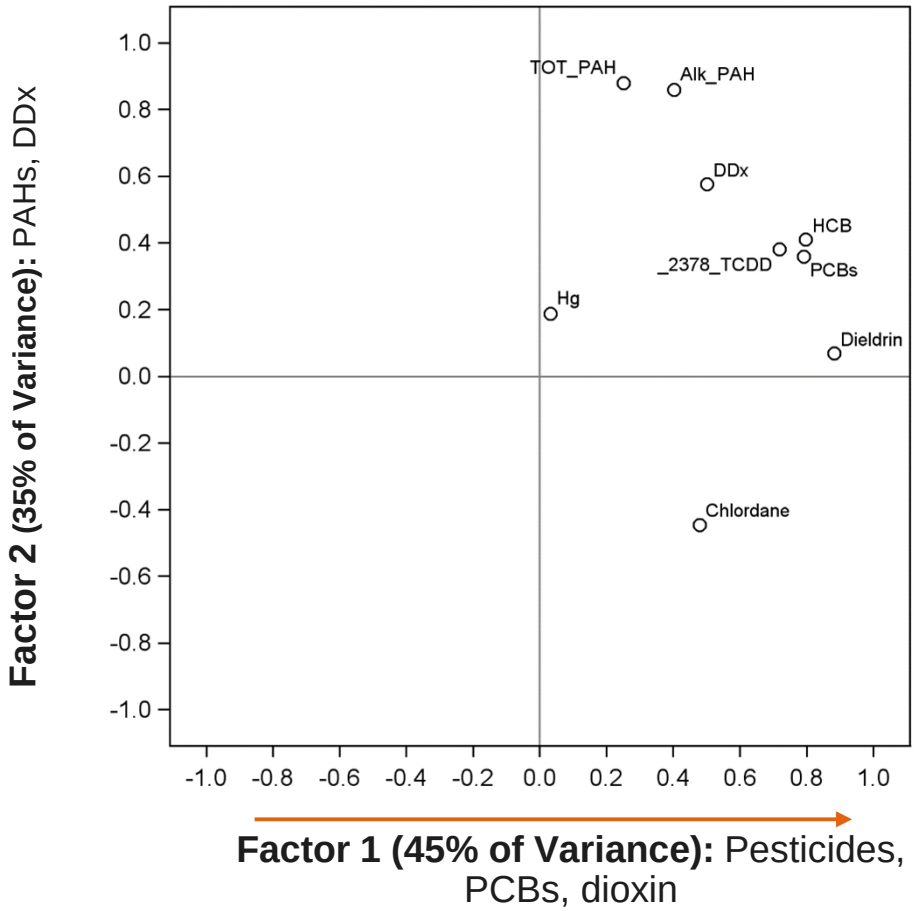
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

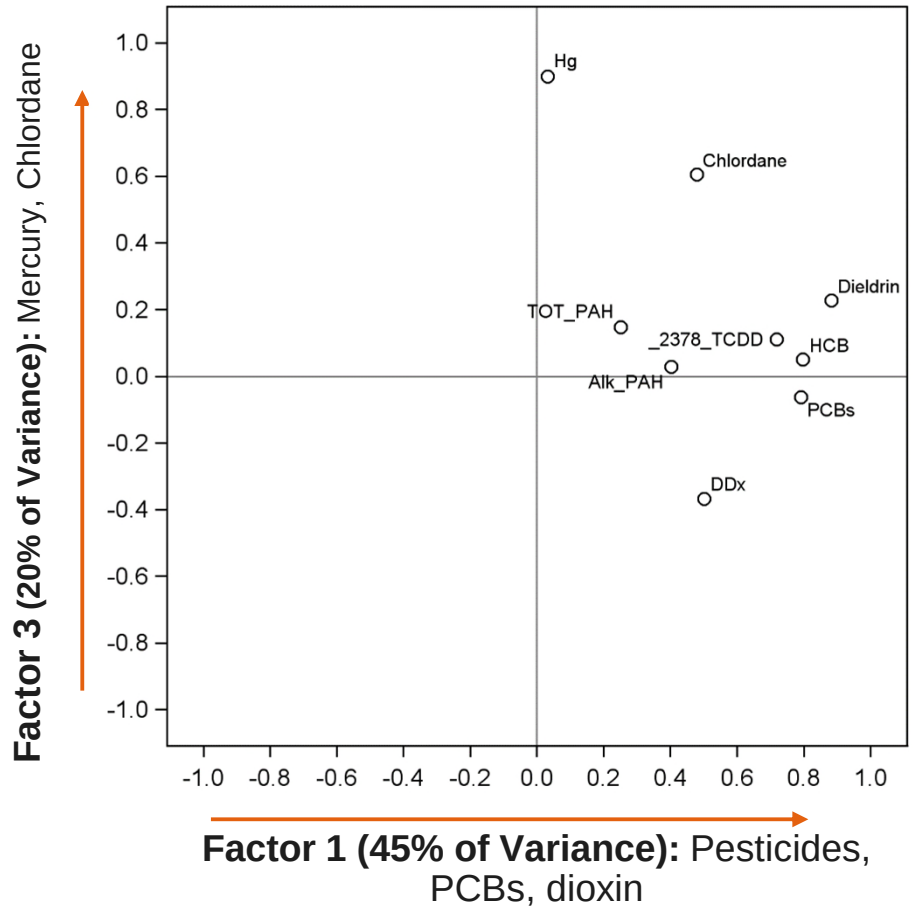
PRINCIPAL COMPONENT ANALYSIS OF POREWATER CHEMISTRY

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-26

Graphs show the correlation of each individual analyte or analyte group to the first, second and third principal components.





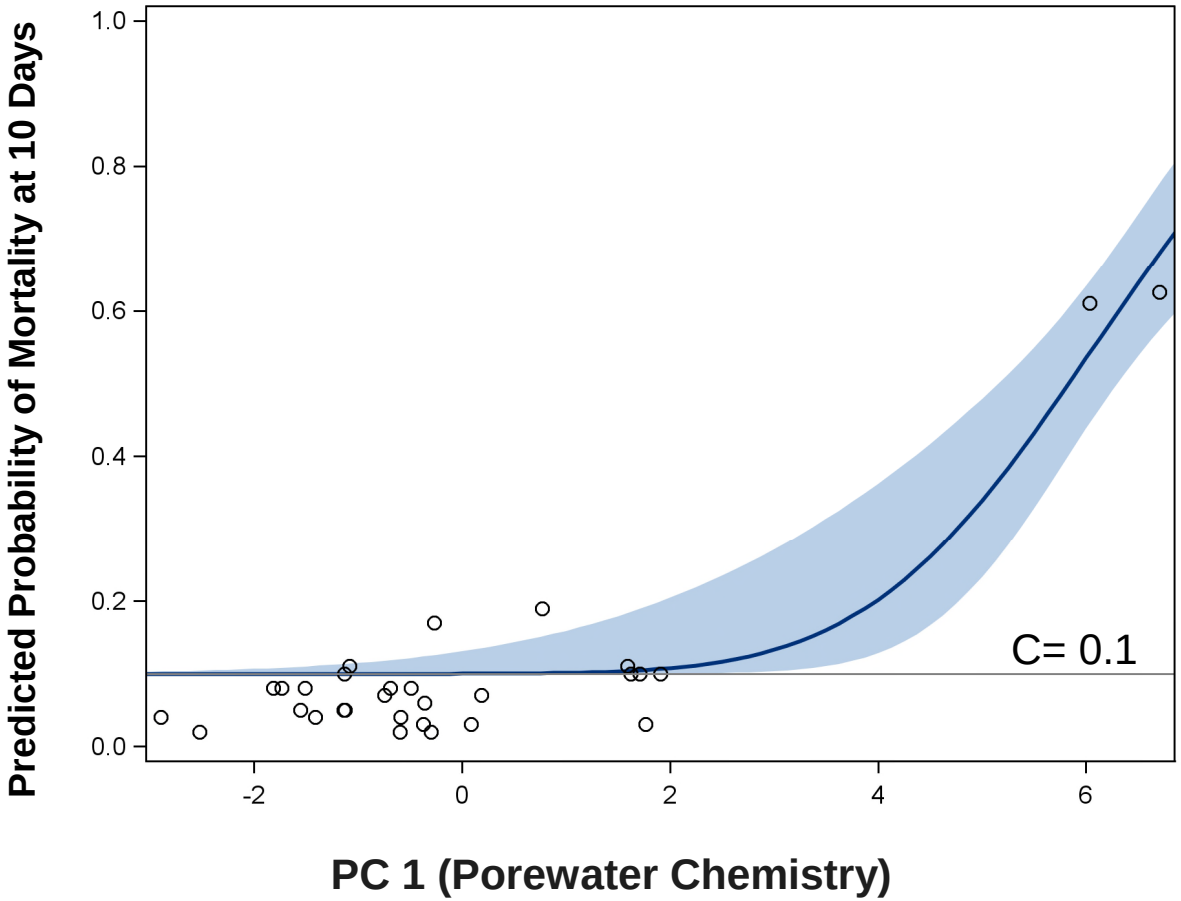
KEY
_2378_TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
PCBs = Totals PCB Congeners
DDx = Total DDx (2,4' and 4,4')
HCB = Hexachlorobenzene
Chlordane = Total Alpha + Gamma Chlordane
Dieldrin = Dieldrin
TOT_PAH = Total Polycyclic Aromatic Hydrocarbons
Alk_PAH = Total Alkylated Polycyclic Aromatic Hydrocarbons
Hg = Mercury

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR ANALYSIS OF POREWATER CHEMISTRY

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-27



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -3.537
β = 0.5826
x = PC 1 Score

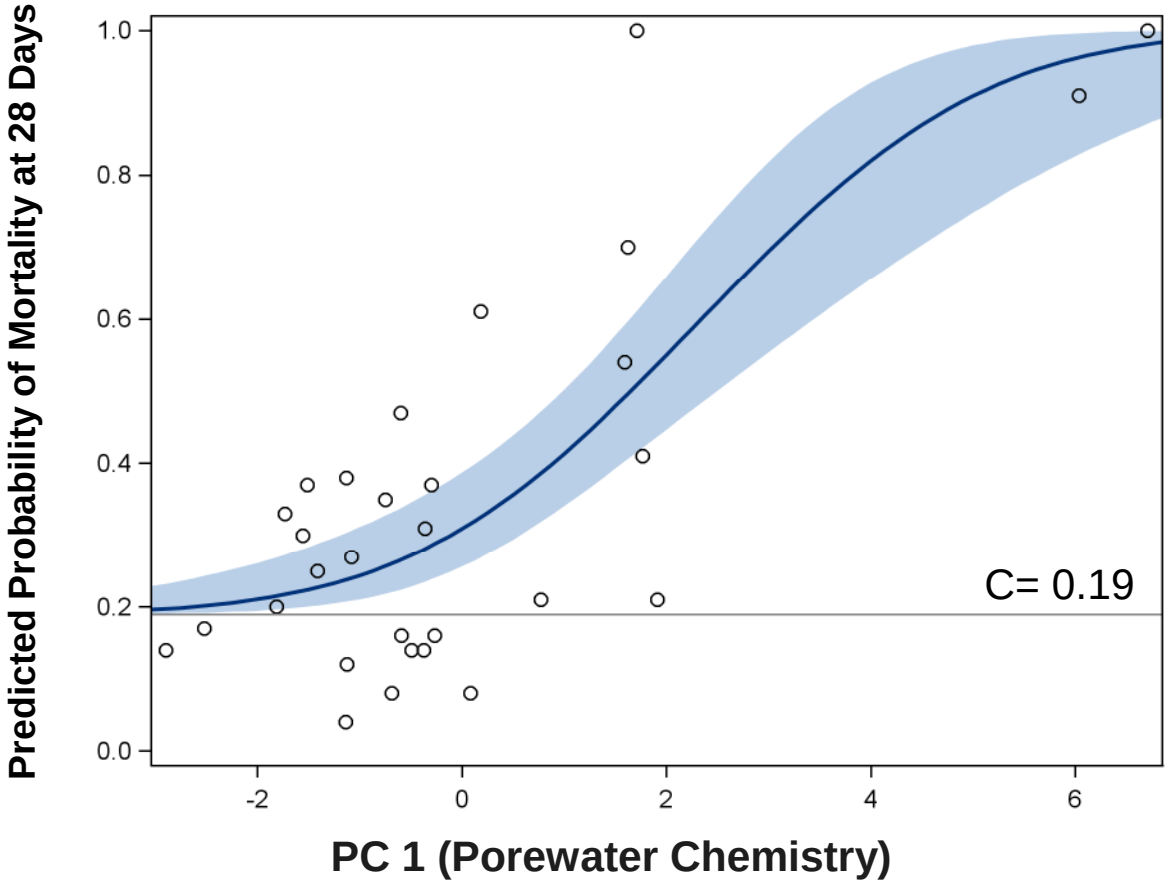
Blue shading represents 90% confidence limits of the fitted probit model.
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT MODEL FOR 10-DAY AMPHIPOD MORTALITY: POREWATER

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-28



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

π = Probability of mortality at 10 days
C = 0.19 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -1.0460
β = 0.4530
x = PC 1 Score

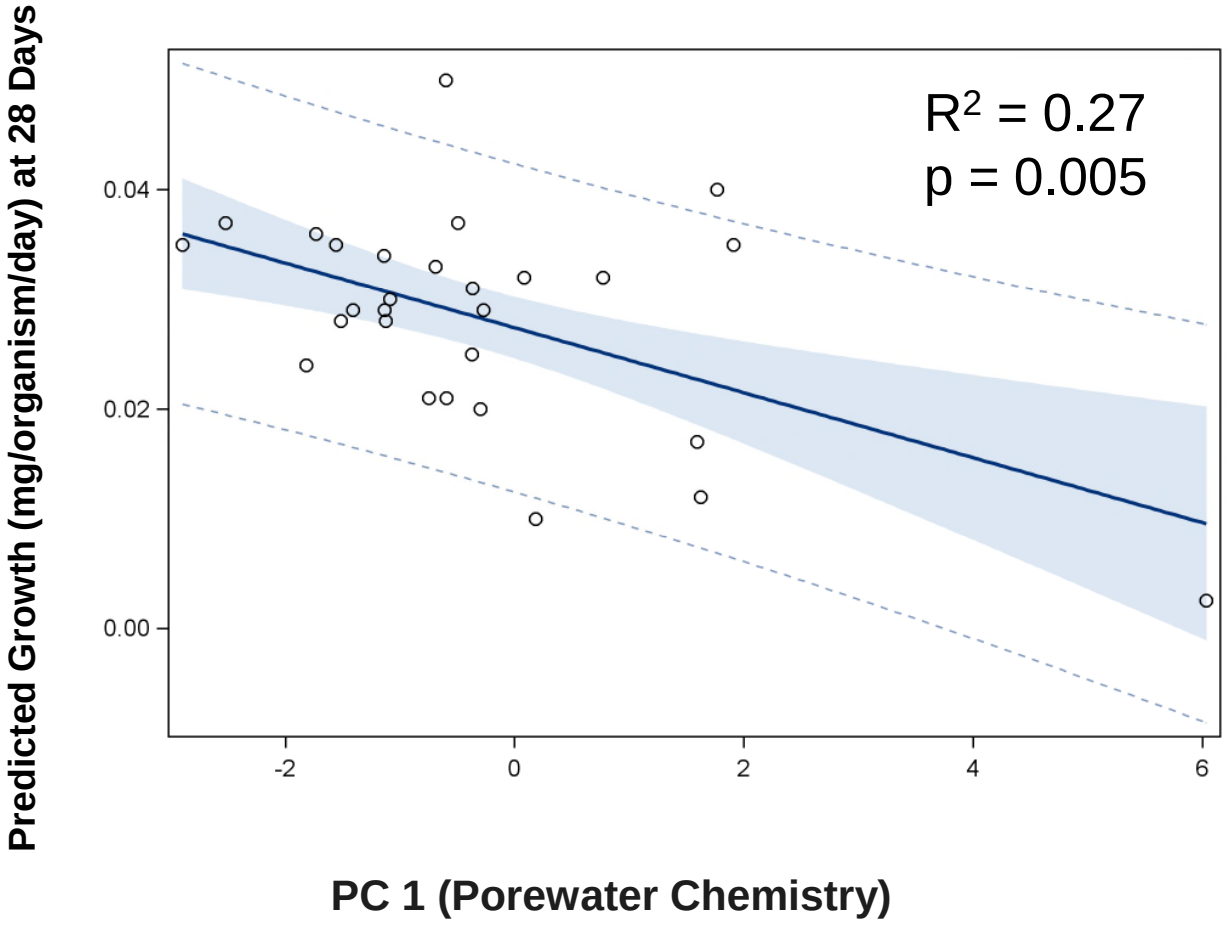
Blue shading represents 90% confidence limits of the fitted probit model.
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT MODEL FOR 28-DAY AMPHIPOD MORTALITY: POREWATER

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-29



Fitted Regression Model:

$G = \alpha + \beta x$

G = Growth after 28 days (mg/organism/day)
α = 0.0274
β = -0.00296
x = PC1 Score

Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.

Growth could not be estimated at stations with 100% mortality, 151 and 160, and those are not included in the regression model.

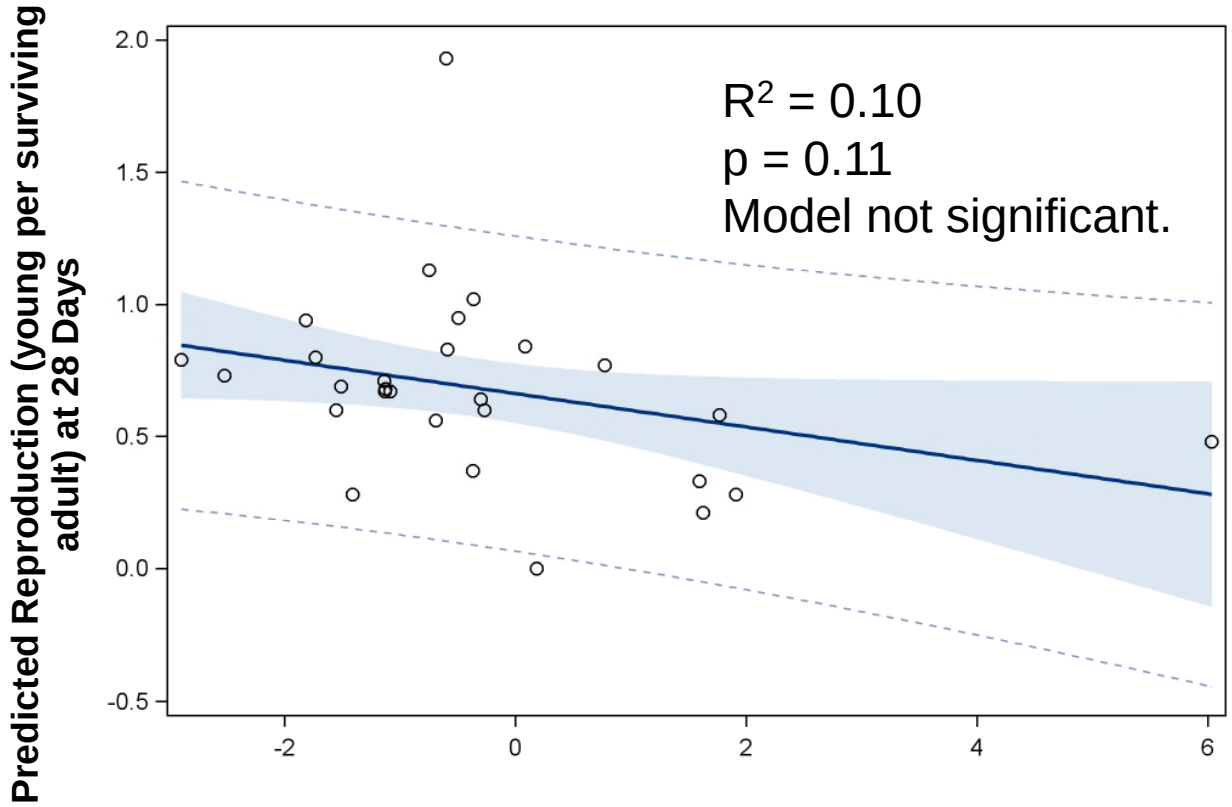
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODEL OF 28-DAY AMPHIPOD GROWTH: POREWATER

Glenn Springs Holdings, Inc.
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FIGURE
A-30



Fitted Regression Model:

$R = \alpha + \beta x$

R = Young per Adult
α = 0.6624
β = -0.06321
x = PC1 Score

Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.

Reproduction could not be estimated at stations with 100% mortality, 151 and 160, and those are not included in the regression model.

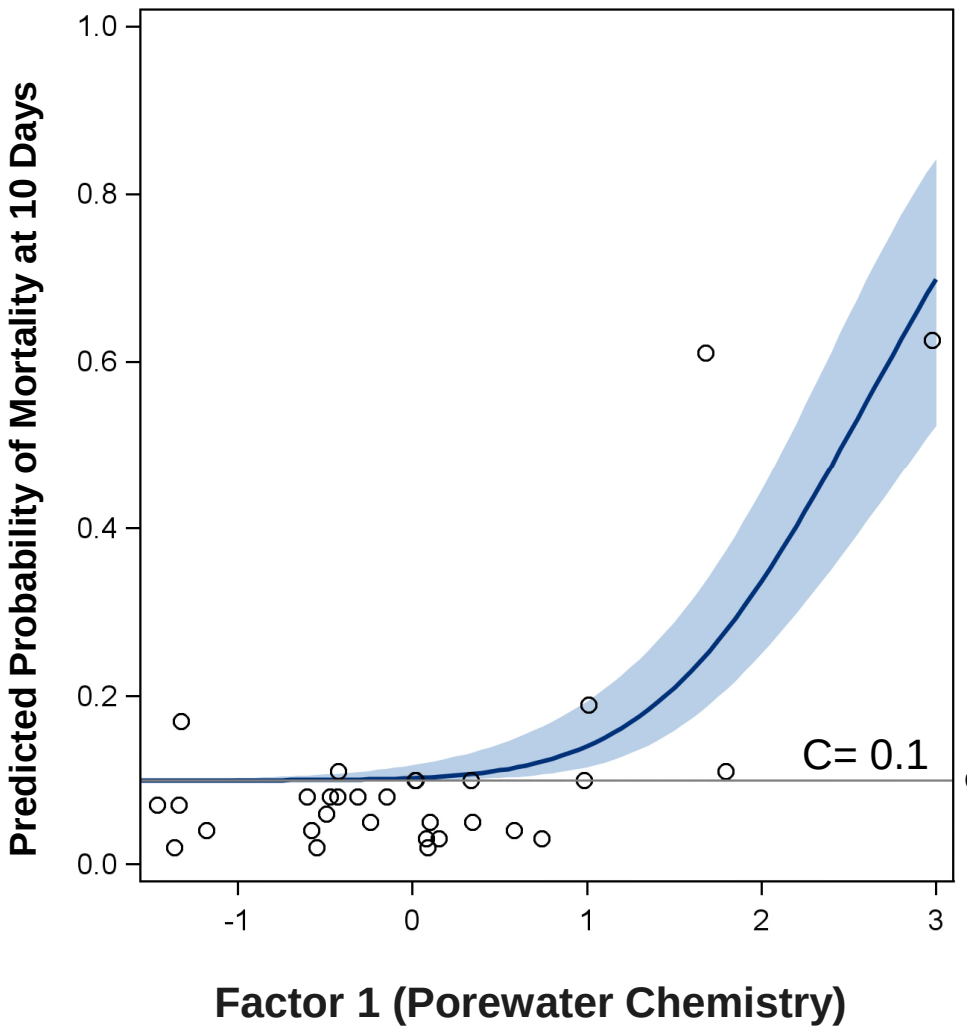
PC = Principal Component

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

REGRESSION MODEL OF 28-DAY AMPHIPOD REPRODUCTION: POREWATER

Glenn Springs Holdings, Inc.
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FIGURE
A-31



Blue shading represents 90% confidence limits of the fitted probit model.

Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

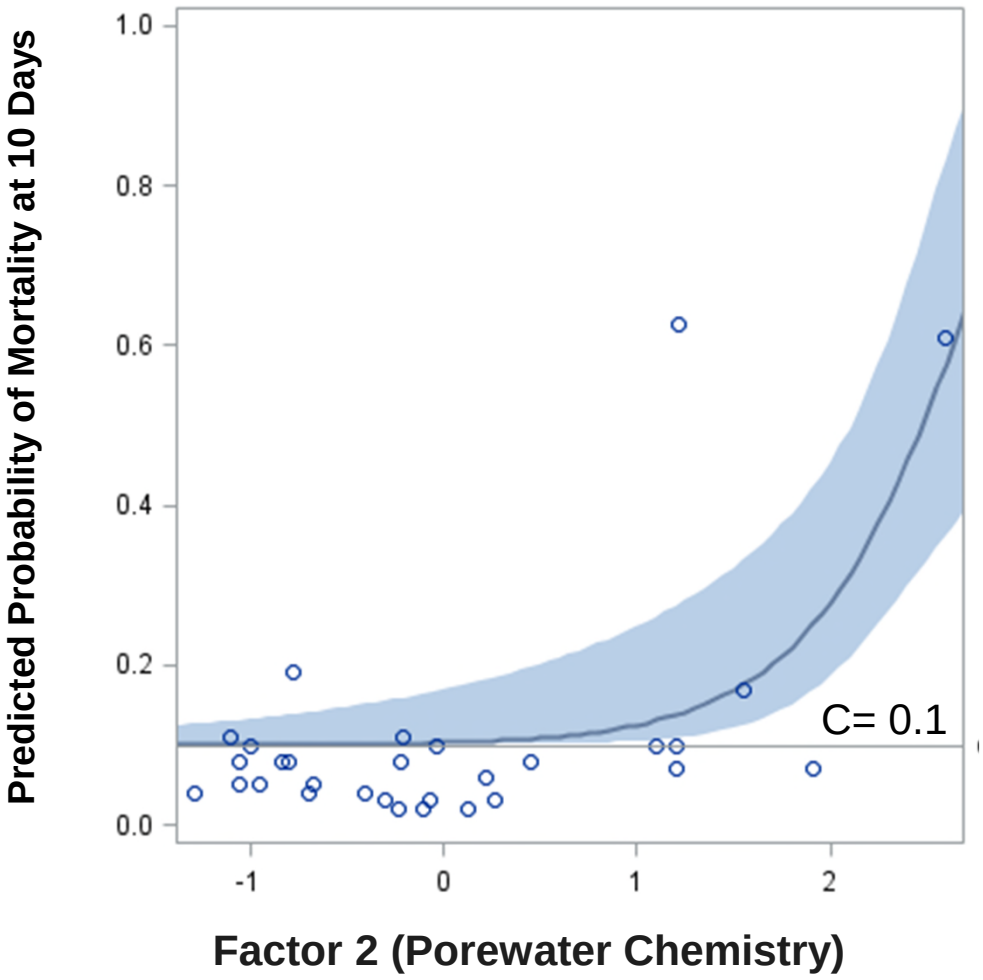
π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -2.753
β = 1.0599
x = Factor 1 Score

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR MODELS FOR 10-DAY AMPHIPOD MORTALITY: POREWATER

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-32a



Blue shading represents 90% confidence limits of the fitted probit model.

Fitted Gompertz Model:

$\pi = C+(1-C)F(\alpha + \beta x)$

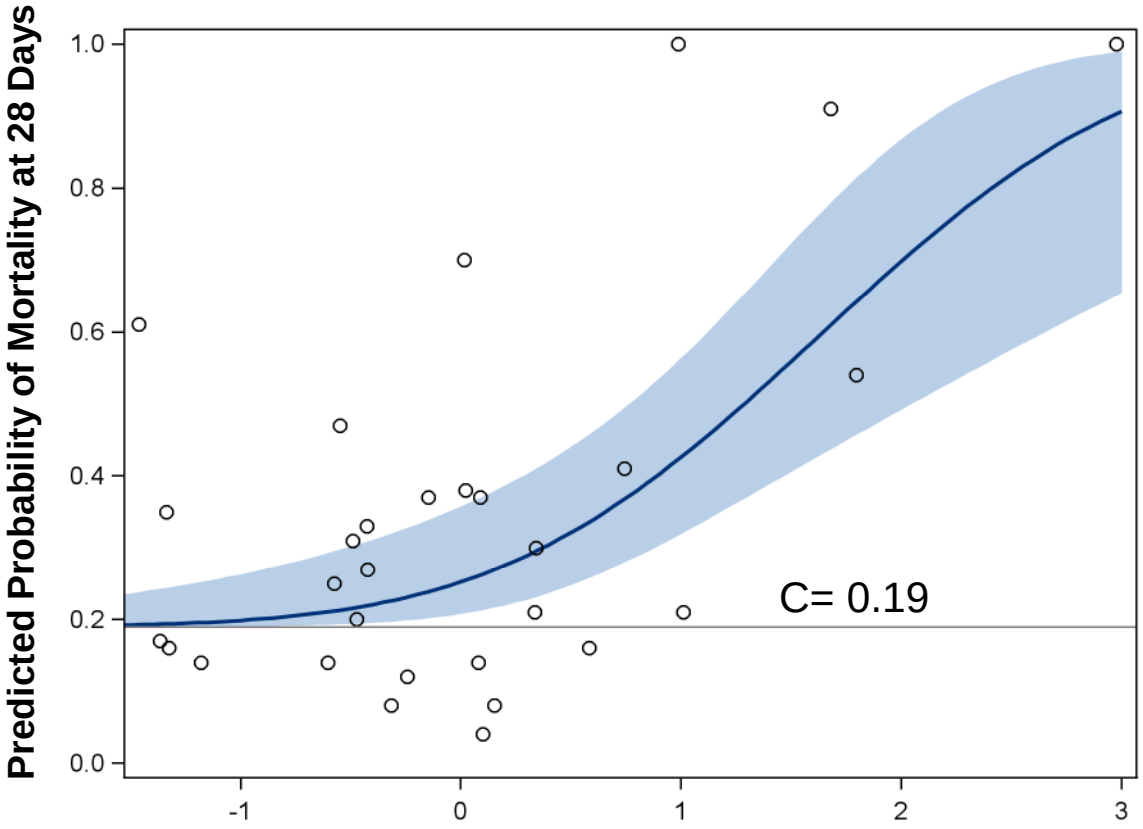
π = Probability of mortality at 10 days
C = 0.1 (i.e. control mortality)
F = Cumulative Standard Normal Distribution Function
α = -5.615
β = 2.0549
x = Factor 2 Score

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR MODELS FOR 10-DAY AMPHIPOD MORTALITY: POREWATER

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-32b



Fitted Probit Model:

$\pi = C+(1-C)F(\alpha + \beta_i x_i)$

π = Probability of mortality at 10 days
C = 0.19 (i.e. control mortality)
F = Cumulative Gompertz Distribution Function
α = -1.4231
β_1 = 0.8745
x_1 = Factor 1 Score
β_2 = 0.8622
x_2 = Factor 2 Score
β_3 = 1.0554
x_3 = Factor 3 Score

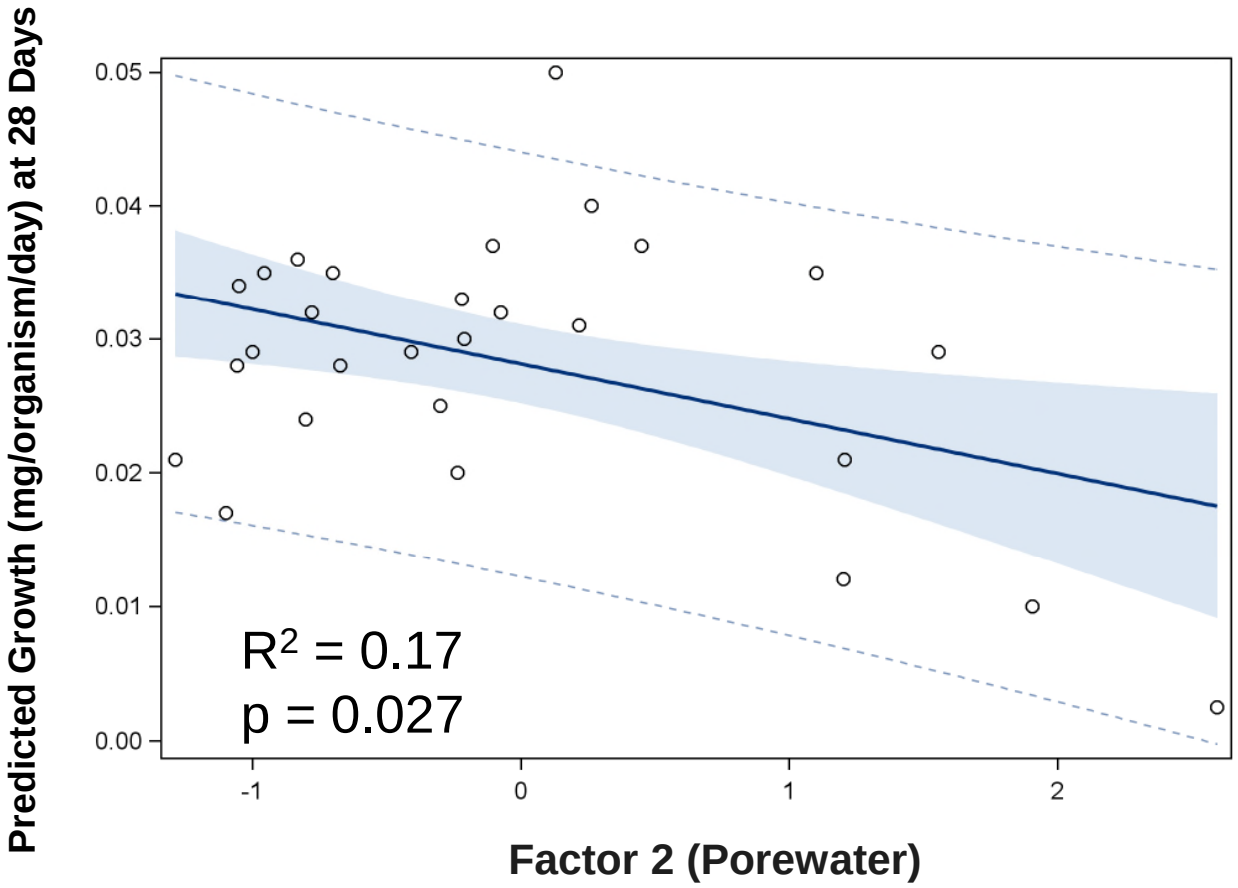
Blue shading represents 90% confidence limits of the fitted Gompertz model. Factors 2 and 3 not shown.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

PROBIT FACTOR MODEL FOR 28-DAY AMPHIPOD MORTALITY: POREWATER

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-33



Fitted Regression Model:

$G = \alpha + \beta x$

G = Growth after 28 days (mg/organism/day)
α = 0.02813
β = -0.004095
x = Factor 2 Score

Blue shading represents 90% confidence limits of the fitted regression model. Dotted lines indicate 90% prediction limits of the fitted model.

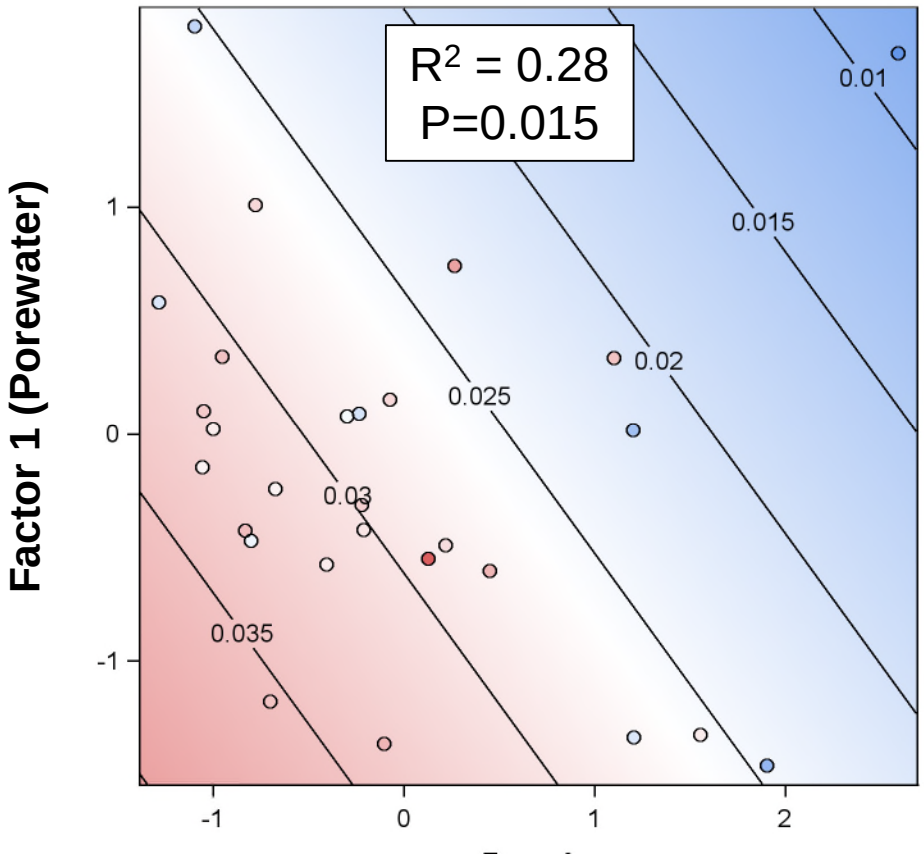
Growth could not be estimated at stations with 100% mortality, 151 and 160, and those are not included in the regression model.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR REGRESSION MODELS OF 28-DAY AMPHIPOD GROWTH: POREWATER

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

FIGURE
A-34a



Fitted Regression Model:

$G = \alpha + \beta_i x_i$

G = Growth after 28 days (mg/organism/day)
α = 0.02754
β_1 = -0.004020
x_1 = Factor 1 Score
β_2 = -0.004643
x_2 = Factor 2 Score

Contours are predicted growth (mg/organism/day) at 28 days.

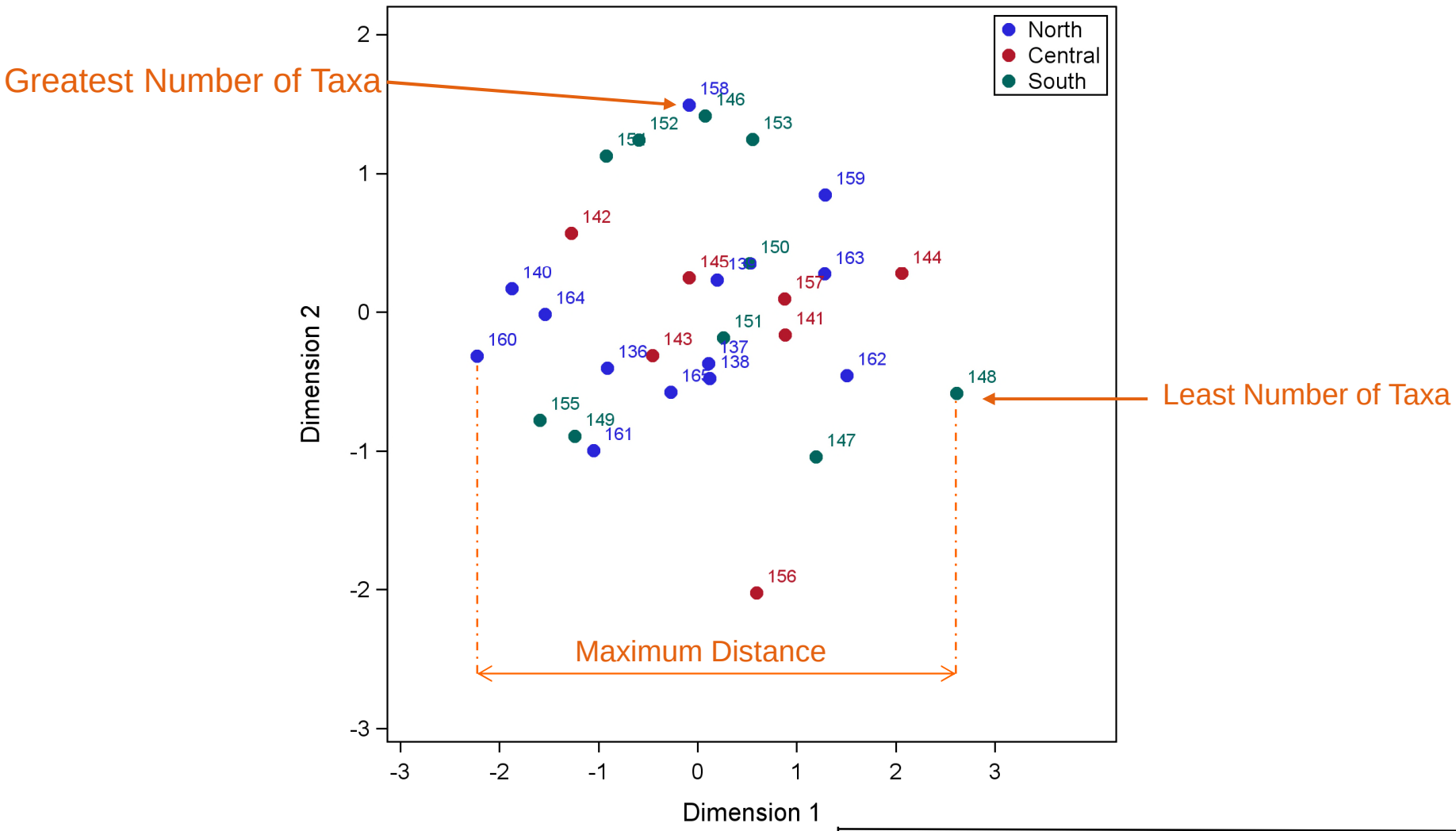
Growth could not be estimated at stations with 100% mortality, 151 and 160, and those are not included in the regression model.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

FACTOR REGRESSION MODELS OF 28-DAY AMPHIPOD GROWTH: POREWATER

Glenn Springs Holdings, Inc.
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FIGURE
A-34b



Notes:
Graph show the dimension scores derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix. Stations closer together are more similar in composition than stations further apart on the graph. The double arrow line shows the maximum distance between stations.

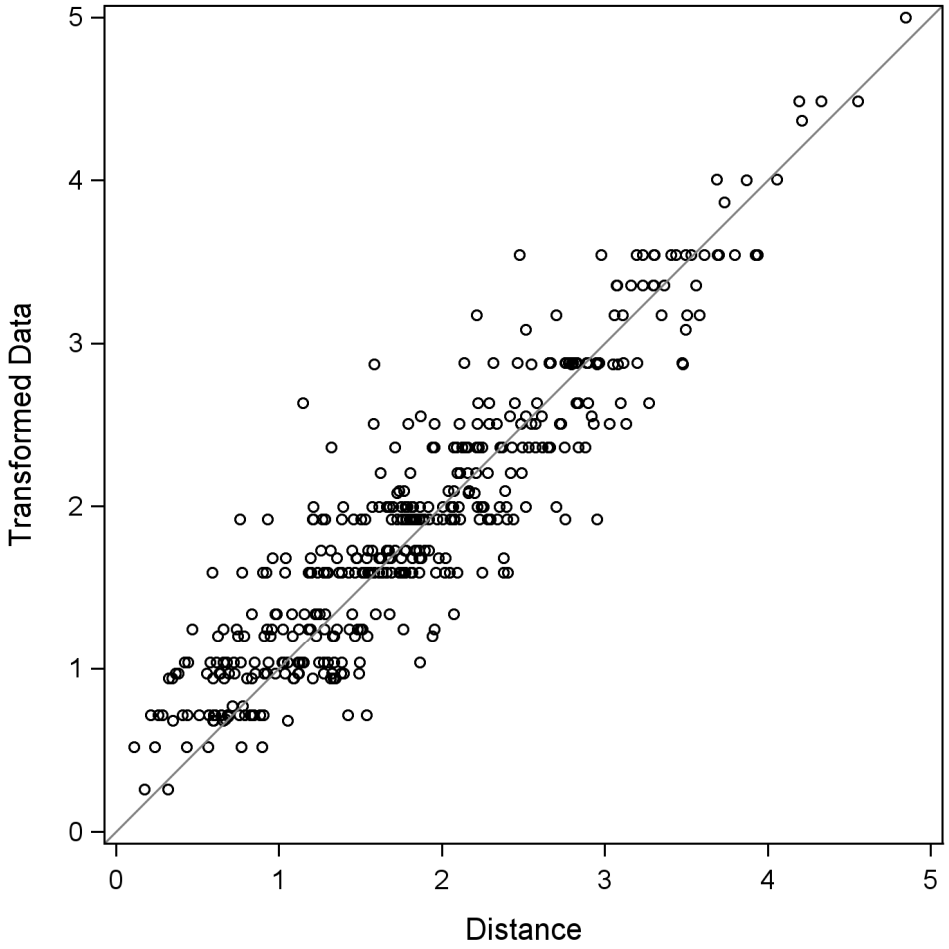
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

Glenn Springs Holdings, Inc.
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FIGURE
A-35a

Fit Plot for Two Dimensional Solution



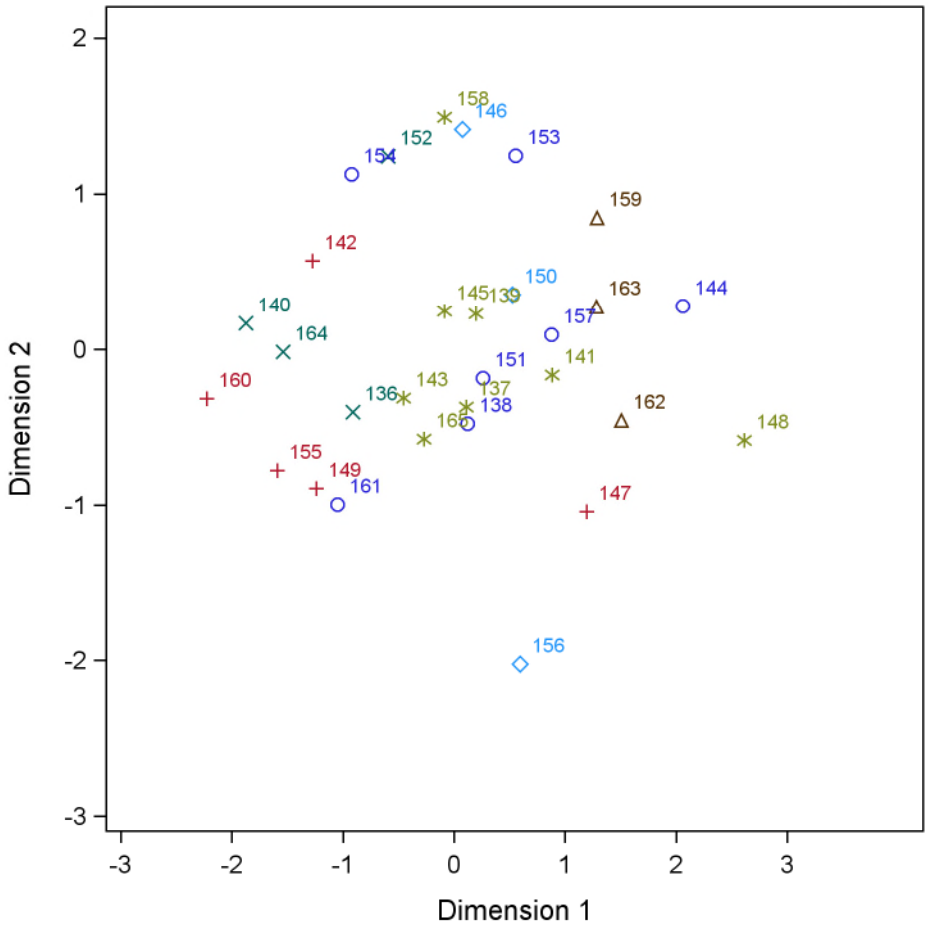
Notes:
Graph shows the transformed data (vertical axis) versus the distance from the model (horizontal axis). If the model fits perfectly, all points lie on a diagonal line from lower left to upper right. The vertical departure of each point from this diagonal line represents the residual of the corresponding observation.

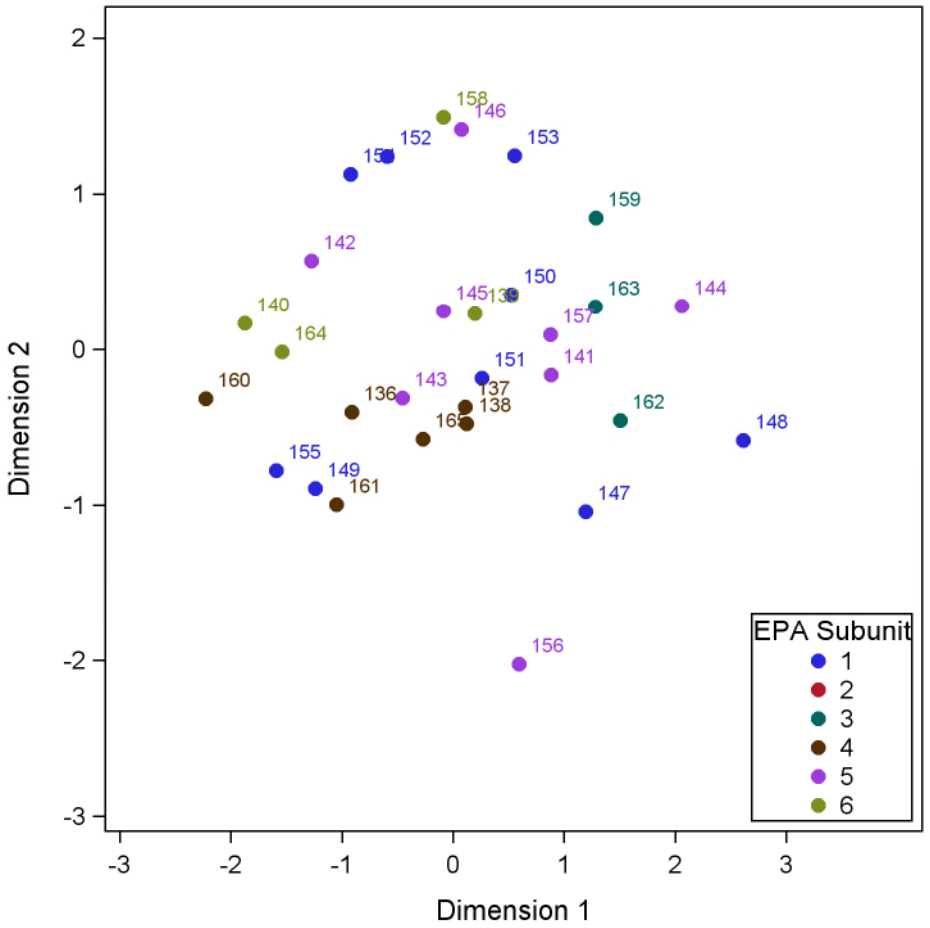
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

Glenn Springs Holdings, Inc.
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FIGURE
A-35b





Geomorphic Unit
- HISTORICALLY DISTURBED SUBTIDAL FLATS
- INDUSTRIAL WATERFRONT
- INTERTIDAL AREA
- NAVIGATION CHANNEL
- PORT CHANNEL
- SUB-TIDAL FLATS
- TRANSITIONAL SLOPES

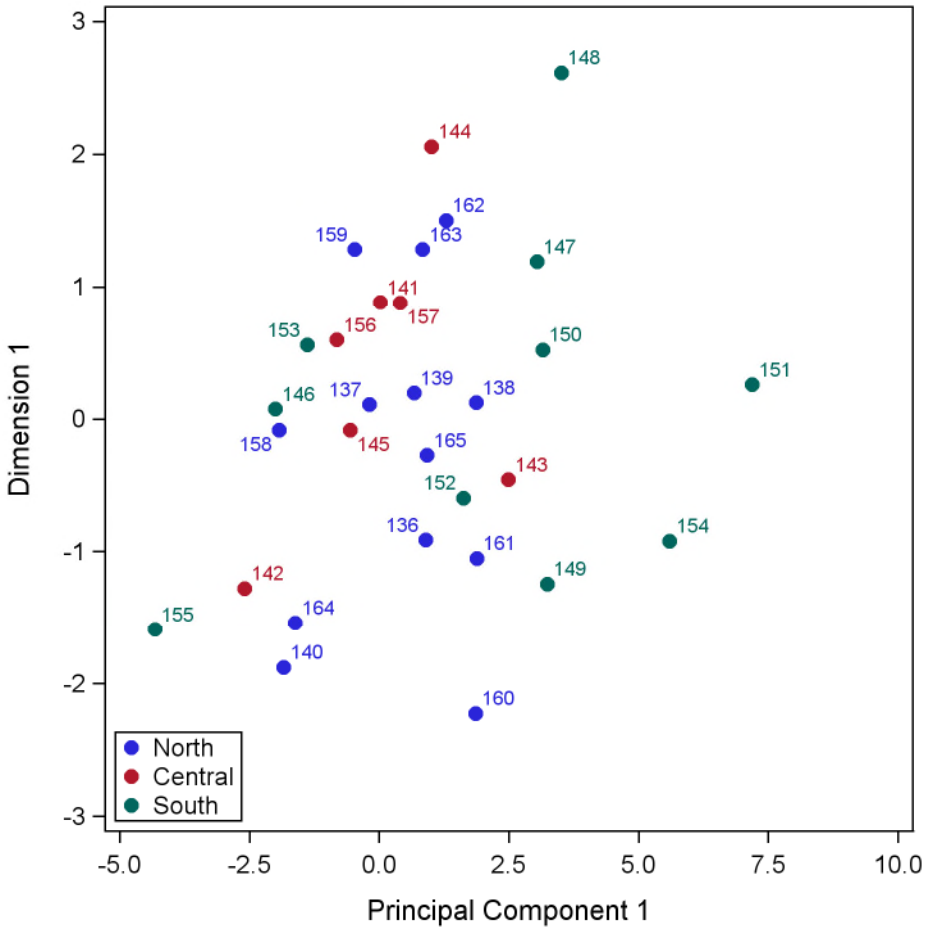
Notes:
Graph show the dimension scores derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix.

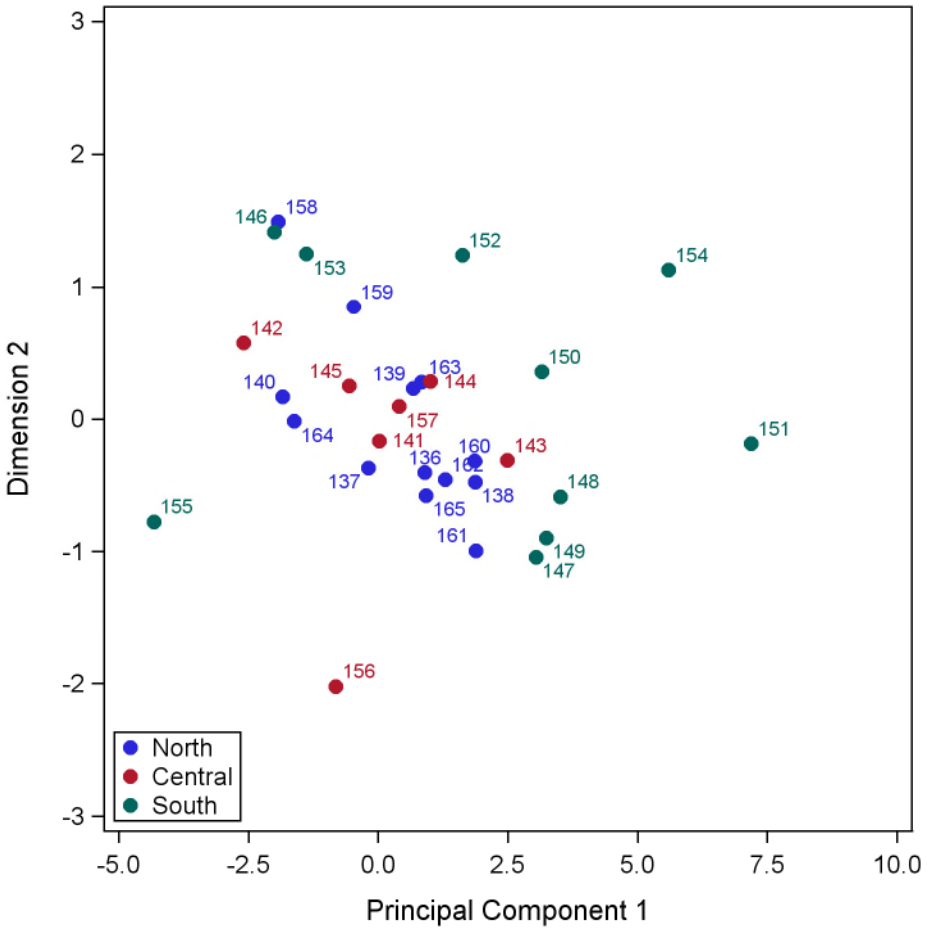
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

Glenn Springs Holdings, Inc.
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FIGURE
A-35c





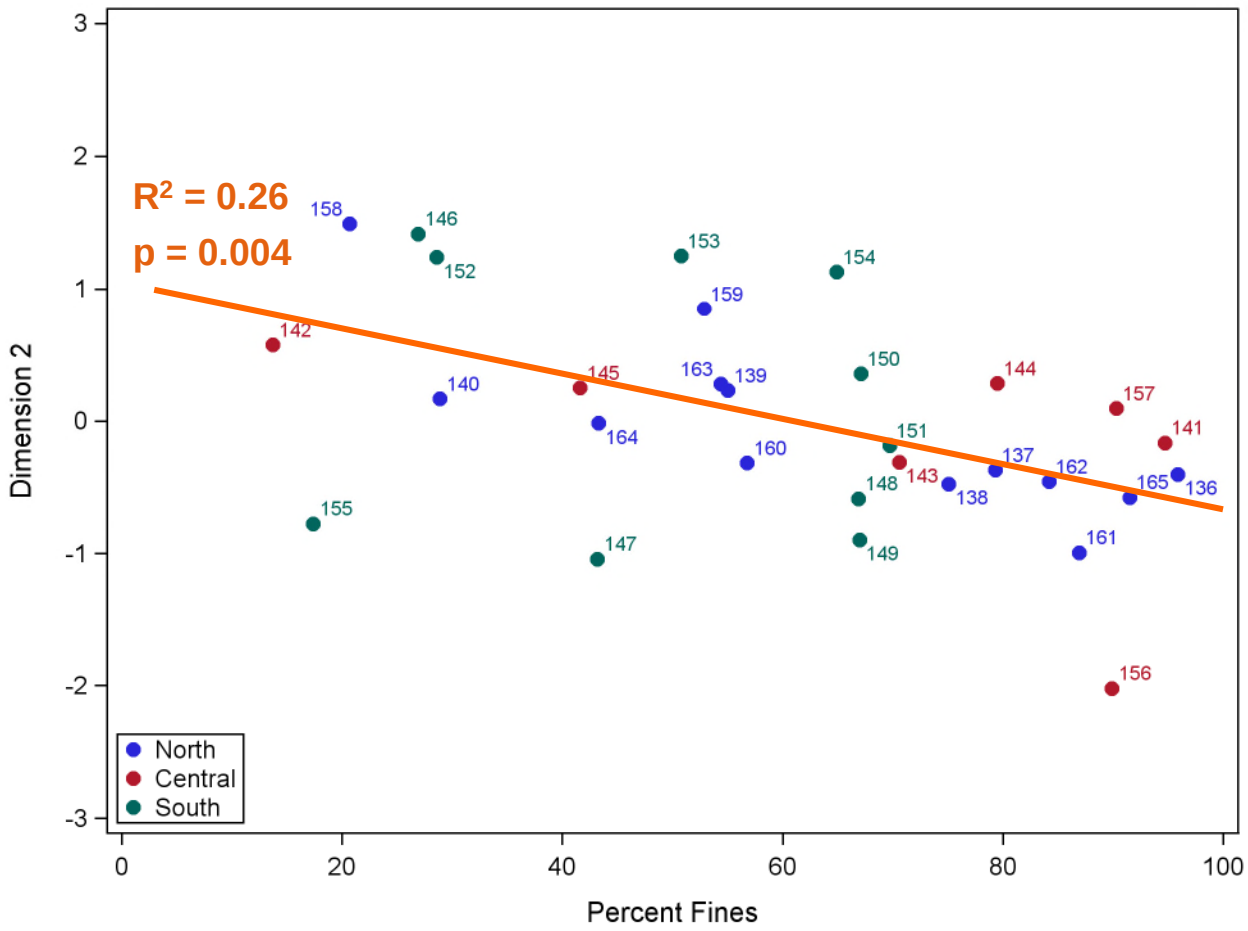
Notes:
The y-axes are the dimension scores derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix. The x-axes are scores on the first principal component for the sediment chemistry data set.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

Glenn Springs Holdings, Inc.
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FIGURE
A-35d



Notes:
The y-axis is the dimension score derived for each SQT station based on ordination of the benthic invertebrate community data using non-metric multidimensional scaling on a Bray-Curtis dissimilarity matrix. The x-axis is the percent fines (i.e. silt and clay) in the sample. The orange line is a regression line. R2 is the coefficient of determination. p is the probability value of the model and indicates the significance of percent fines as a predictor.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

NON-METRIC MULTIDIMENSIONAL SCALING FOR BENTHIC INVERTEBRATE COMMUNITY

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FIGURE
A-35e

City: Citrix Div/Group: IM/DV Created By: K. Sinsabaugh Last Saved By: Idrum
GSH (B0009989.0061.00016)
Z:\GISProjects_ENV\GSH\GIS\Task\NBSA\BERA\mxd\2019\FigA-36_HistoricalAmphipodSurvival.mxd 8/29/2019 2:38:20 PM

LEGEND:

- SHORELINE
- UNDERGROUND TRIBUTARY
- NEWARK BAY STUDY AREA BOUNDARY
- NAVIGATION CHANNEL
- HISTORICALLY DISTURBED SUBTIDAL FLATS

***AMPELISCA ABDITA* SURVIVAL AS A PERCENT OF CONTROL SURVIVAL**

- > 80% OF CONTROL
- 60 - 80% OF CONTROL
- < 60% OF CONTROL

- NOAA 1993
- USEPA (1993/1994)
- USEPA 1998
- USEPA 2003
- USEPA 2008
- USEPA 2013

0 3,000 6,000 Feet
GRAPHIC SCALE

PASSAIC RIVER
PIERSONS CREEK
CONRAIL BRIDGE REMNANTS
PORT NEWARK CHANNEL
ELIZABETH CHANNEL
NEWARK LIBERTY INTERNATIONAL AIRPORT
PERIPHERAL DITCH
NEWARK BAY CDF (CELL 1S)
SOUTH ELIZABETH CHANNEL
ELIZABETH RIVER
KILL VAN KULL
BAYONNE BRIDGE
SHOOTERS ISLAND
GOETHALS BRIDGE
ARTHUR KILL
PRALLS ISLAND

NOTES:

1. HORIZONTAL DATUM: NEW JERSEY STATE PLANE COORDINATE SYSTEM, NAD83.
2. SHORELINE IS DIGITIZED FROM AERIAL PHOTO DATED JULY 2002 (INTRASEARCH, ENGLEWOOD, CO).
3. BASE MAP INFORMATION AND NEWARK BAY NAVIGATION CHANNEL IS FROM NOAA CHARTS 12331, 12333, AND 12337, DATED MAY 4, 1995. PASSAIC NAVIGATION CHANNEL WAS PROVIDED BY THE USACE. ALL NAVIGATION CHANNEL BOUNDARIES SHOWN ARE APPROXIMATE. CHANNEL DREDGING AND DEEPENING AS PART OF THE HARBOR DEEPENING PROJECT IS ON-GOING; CONTACT USACE TO REFERENCE THE MOST CURRENT CHANNEL BOUNDARIES.
4. THE NEWARK BAY STUDY AREA BOUNDARY PRESENTED WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I, II, AND III SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.

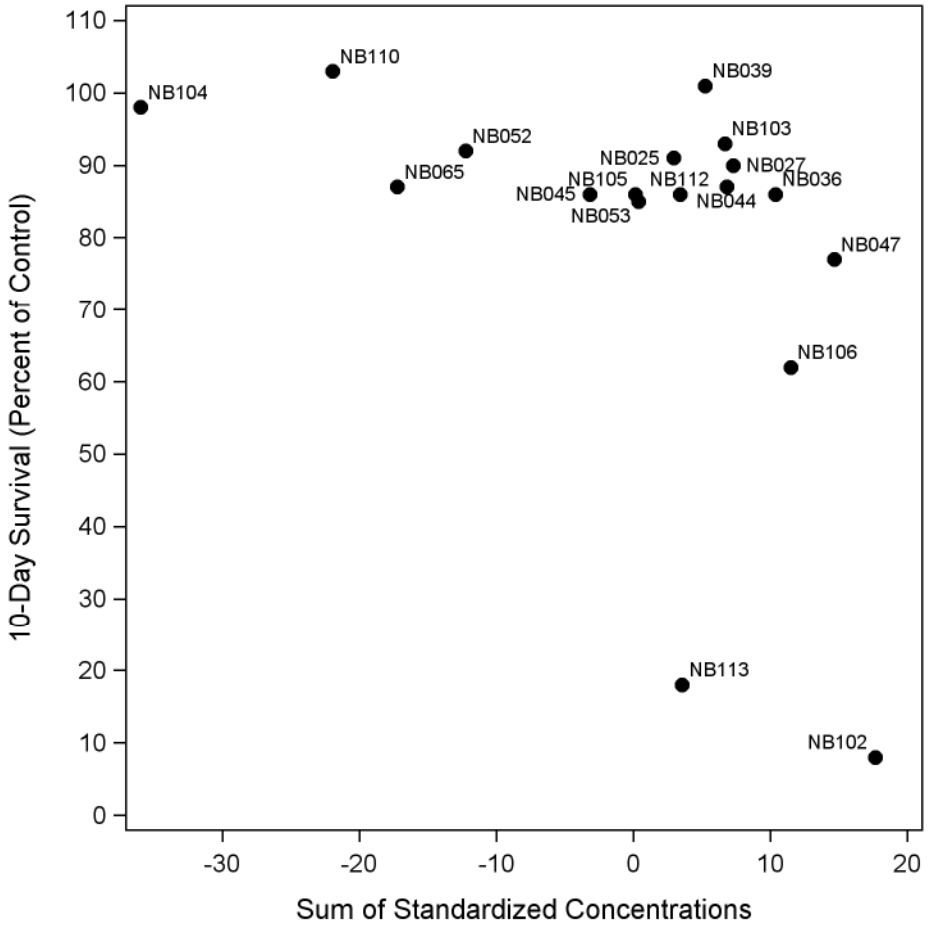
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

HISTORICAL AMPHIPOD SURVIVAL

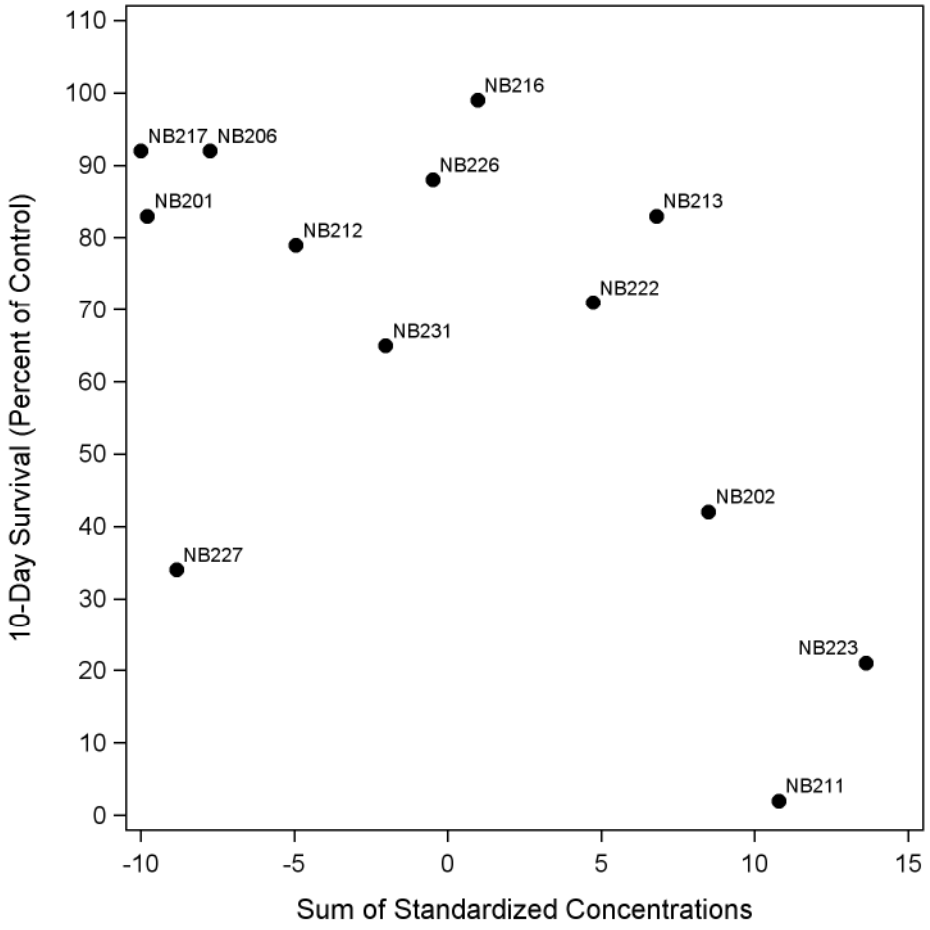
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FIGURE
A-36

USEPA 1993-94



USEPA 1998



Notes:

Sum of standardized concentrations: the sediment concentrations of 18 chemicals were first transformed by natural logarithm, then standardized and summed by location. Only NBSA stations are shown.

The data were collected by the United States Environmental Protection Agency (USEPA) in 1993/94 and in 1998 (USEPA 2003).

Reference:

USEPA. 2003. Sediment Quality of the NY/NJ Harbor System: A 5-year Revisit (1993/1994–1998). EPA/902-R-03-002. U.S. Environmental Protection Agency, Region II, Edison, New Jersey.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

TOXICITY AND SUM OF STANDARDIZED CONCENTRATIONS FOR HISTORICAL DATA

Glenn Springs Holdings, Inc.
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FIGURE
A-37

ATTACHMENT A-1

Jamaica Bay Reference Data

Table A-1-1
Jamaica Bay Reference Dataset

Study	Location ID	Abundance (per m^2)	Taxa Richness	Shannon-Wiener H'	Pielou's J'	Swartz's Dominance Index	*A. abdita* Survival (% of control)	Source
REMAP 1993	2200_26_JB002	2,875	18	2.17	0.750	5	96	Windward 2019[a]
REMAP 1993	2200_26_JB006	35,500	35	1.61	0.455	2.5	91	Windward 2019[a]
REMAP 1993	2200_26_JB022	25,113	23.5	1.53	0.485	2.5	104	Windward 2019[a]
REMAP 1993	2200_26_JB026	37,663	42.5	2.38	0.636	5.5	108	Windward 2019[a]
REMAP 1993	2200_26_JB031	44,825	28.5	1.56	0.467	2	92	Windward 2019[a]
REMAP 1993	2200_26_JB042	6,075	25	1.94	0.601	4	103	Windward 2019[a]
REMAP 1994	2200_27_JB104	5,663	7.5	0.80	0.382	1.5	80	Windward 2019[a]
REMAP 1994	2200_27_JB108	6,888	20	1.54	0.515	2.5	96	Windward 2019[a]
REMAP 1994	2200_27_JB110	32,713	21	1.46	0.484	2.5	99	Windward 2019[a]
REMAP 1994	2200_27_JB112	22,488	29	1.85	0.551	4.5	98	Windward 2019[a]
REMAP 1994	2200_27_JB113	33,125	27.5	1.40	0.421	2	95	Windward 2019[a]
REMAP 1994	2200_27_JB114	67,788	34	2.25	0.637	6	97	Windward 2019[a]
REMAP 1994	2200_27_JB115	21,500	41	2.76	0.754	8	94	Windward 2019[a]
REMAP 1994	2200_27_JB119	14,050	21.5	1.57	0.512	2.5	98	Windward 2019[a]
REMAP 1994	2200_27_JB120	20,375	22	1.41	0.453	2.5	100	Windward 2019[a]
REMAP 1998	2200_56_JB031	15,325	25	2.00	0.621	4.5	96	Windward 2019[a]
REMAP 1998	2200_56_JB041	146,750	44	1.52	0.401	3	93	Windward 2019[a]
REMAP 1998	2200_56_JB042	7,425	26.5	1.98	0.608	4	101	Windward 2019[a]
REMAP 1998	2200_56_JB043	22,588	47	2.42	0.628	7	89	Windward 2019[a]
REMAP 1998	2200_56_JB201	1,513	13.5	2.05	0.792	4.5	93	Windward 2019[a]
REMAP 1998	2200_56_JB205	963	11	1.87	0.813	4.5	86	Windward 2019[a]
REMAP 1998	2200_56_JB210	6,563	20.5	1.66	0.550	3	88	Windward 2019[a]
REMAP 1998	2200_56_JB212	675	6.5	1.00	0.539	1.5	100	Windward 2019[a]
REMAP 1998	2200_56_JB214	60,675	24	0.71	0.232	1	94	Windward 2019[a]
REMAP 1998	2200_56_JB217	7,625	20.5	1.85	0.612	4	100	Windward 2019[a]
REMAP 1998	2200_56_JB219	850	10.5	1.96	0.855	5	101	Windward 2019[a]
REMAP 1998	2200_56_JB222	6,700	12	0.92	0.398	1	94	Windward 2019[a]
NCA Program NY/NJ Harbor 2000	2300_M0_NY-0029-A	660	17	0.92	0.744	6	96	Windward 2019[a]
NCA Program NY/NJ Harbor 2001	2300_M1_NY-0032-A	18,830	48	0.90	0.536	4	99	Windward 2019[a]
NCA Program NY/NJ Harbor 2002	2300_M2_NY-0029-A	675	7	0.52	0.614	2	90	Windward 2019[a]
NCA Program NY/NJ Harbor 2003	2300_M3_NY03-0236	11,900	28	1.08	0.745	6	87	Windward 2019[a]
REMAP 2003	JB317	19,990	34	2.46	0.697	7	91	Windward 2019[a]
REMAP 2003	JB319	480	8.5	1.78	0.856	4	90	Windward 2019[a]
REMAP 2003	JB322	21,300	30.5	2.07	0.608	4.5	81	Windward 2019[a]
REMAP 2003	JB386	410	8	1.75	0.850	4	89	Windward 2019[a]

Table A-1-1
Jamaica Bay Reference Dataset

Study	Location ID	Abundance (per m^2)	Taxa Richness	Shannon-Wiener H'	Pielou's J'	Swartz's Dominance Index	*A. abdita* Survival (% of control)	Source
Region 2 2008 NY/NJ Harbor Sampling	JB401	7,650	13	0.99	0.385	2	103	Water Quality Portal[b]
Region 2 2008 NY/NJ Harbor Sampling	JB406	7,650	13	1.12	0.437	2	97	Water Quality Portal[b]
Region 2 2008 NY/NJ Harbor Sampling	JB415	18,000	23	1.61	0.512	3	91	Water Quality Portal[b]
Region 2 2008 NY/NJ Harbor Sampling	JB468	15,750	32	1.52	0.440	3	88	Water Quality Portal[b]
Region 2 2008 NY/NJ Harbor Sampling	JB481	15,225	27	2.04	0.620	5	91	Water Quality Portal[b]
Region 2 2008 NY/NJ Harbor Sampling	JB486	10,050	30	2.35	0.691	6	100	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB401	1,200	7	1.56	0.802	3	98	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB405	2,800	10	1.56	0.676	3	92	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB406	3,050	10	0.77	0.332	1	97	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB409	1,900	10	1.45	0.631	3	98	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB410	875	4	0.69	0.499	1	90	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB415	1,125	8	1.51	0.726	3	100	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB416	1,975	12	1.55	0.622	3	97	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB417	1,350	10	1.93	0.838	5	95	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB419	1,900	5	0.71	0.443	1	97	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB422	1,300	5	0.99	0.615	2	94	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB454	1,775	12	2.02	0.815	5	96	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB458	2,075	9	1.27	0.577	3	99	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB459	2,650	10	1.35	0.586	2	96	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB464	2,450	10	1.45	0.631	3	102	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB466	1,850	7	1.50	0.770	3	99	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB467	1,525	8	1.33	0.638	2	96	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB480	1,525	4	0.95	0.688	2	95	Water Quality Portal[b]
Region 2 2013 NY/NJ Harbor Sampling	JB481	1,575	6	1.45	0.808	3	102	Water Quality Portal[b]
5th Percentile (All 59 samples)		**660**	**5.0**	**0.71**	**0.38**	**1.00**		
5th Percentile (Exclude 2013 samples)		**660**	**7.5**	**0.80**	**0.38**	**1.50**		
95th Percentile (All 59 samples)		**60,675**						
95th Percentile (Exclude 2013 samples)		**60,675**						

Table A-1-1
Jamaica Bay Reference Dataset

Notes:

[a] Jamaica Bay data were screened for use as an estaurine reference for the Lower Passiac River Study Area (Windward 2019; Appendix B)

[b] Sediment chemistry, toxicity, and benthic invertebrate community data were downloaded from the Water Quality Portal (National Water Quality Monitoring Council 2019) - a cooperative service sponsored by the United States Geological Survey (USGS), the United States Environmental Protection Agency (USEPA), and the National Water Quality Monitoring Council that integrates publicly available water-quality data from the USGS National Water Information System (NWIS) database and the USEPA STOrage and RETrieval (STORET) data warehouse. The benthic invertebrate community (BIC) metrics were calcuated from the individual species counts for each station.

Acronyms and Abbreviations:

ID = Identification
NCA = National Coastal Assessment
NY/NJ = New York/New Jersey
per m^2 = per square meter
REMAP = Regional Environmental Monitoring and Assessment Program
% = percent

References:

National Water Quality Monitoring Council. 2019. Water Quality Portal. Available online at https://www.waterqualitydata.us/. Accessed on April 10, 2019.
Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment, Final.

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Arsenic	1.1	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Chromium	2.4	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Copper	0.95	No	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Lead	3	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Mercury	0.01	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Nickel	1.9	No	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Silver	0.48	No	ppm	1	3.7	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Metals	Zinc	6.9	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Pesticides	Total DDx (2,4 & 4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Pesticides	Total DDx (4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	Pesticides	p,p'-DDE	1.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	2-Methylnaphthalene	12	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Acenaphthene	12	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Acenaphthylene	12	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Anthracene	12	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Benz[a]anthracene	12	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Benzo[a]pyrene	12	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Chrysene	12	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Dibenz[a,h]anthracene	12	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Fluoranthene	12	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Fluorene	12	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Naphthalene	12	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Phenanthrene	12	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Pyrene	12	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PAHs	Total PAHs	12	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB401	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Arsenic	11	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Cadmium	1.6	Yes	ppm	1.2	9.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Chromium	47	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Copper	100	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Lead	81	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Mercury	0.47	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Nickel	22	Yes	ppm	20.9	51.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Silver	5.9	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB403	Metals	Zinc	230	Yes	ppm	150	410	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Pesticides	Total DDx (2,4 & 4,4)	5.2	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Pesticides	Total DDx (4,4)	5.2	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	Pesticides	p,p'-DDE	5.2	No	ppb	2.2	27	Yes	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	2-Methylnaphthalene	65	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Acenaphthene	65	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Acenaphthylene	65	No	ppb	44	640	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Anthracene	65	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Benz[a]anthracene	65	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Benzo[a]pyrene	65	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Chrysene	65	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Dibenz[a,h]anthracene	65	No	ppb	63.4	260	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Fluoranthene	65	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Fluorene	65	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Naphthalene	65	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Phenanthrene	65	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Pyrene	65	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PAHs	Total PAHs	65	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB403	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Arsenic	12	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Cadmium	1.3	Yes	ppm	1.2	9.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Chromium	57	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Copper	73	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Lead	75	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Mercury	0.65	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Nickel	22	Yes	ppm	20.9	51.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Silver	5.8	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB404	Metals	Zinc	160	Yes	ppm	150	410	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Pesticides	Total DDx (2,4 & 4,4)	4.5	Yes	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Pesticides	Total DDx (4,4)	3	Yes	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	Pesticides	p,p'-DDE	2.8	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	2-Methylnaphthalene	33	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Acenaphthene	33	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Acenaphthylene	33	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Anthracene	33	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Benz[a]anthracene	33	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Benzo[a]pyrene	33	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Chrysene	33	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Dibenz[a,h]anthracene	33	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Fluoranthene	33	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Fluorene	33	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Naphthalene	33	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Phenanthrene	33	No	ppb	240	1,500	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Pyrene	33	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PAHs	Total PAHs	33	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Arsenic	4.5	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Cadmium	0.41	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Chromium	21	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Copper	19	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Lead	27	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Mercury	0.23	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Nickel	8.3	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Silver	2.3	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Metals	Zinc	59	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Pesticides	Total DDx (2,4 & 4,4)	1.6	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Pesticides	Total DDx (4,4)	1.6	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	Pesticides	p,p'-DDE	1.6	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	2-Methylnaphthalene	18	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Acenaphthene	18	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Acenaphthylene	18	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Anthracene	18	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Benz[a]anthracene	18	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Benzo[a]pyrene	18	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Chrysene	18	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Dibenz[a,h]anthracene	18	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Fluoranthene	18	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Fluorene	18	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Naphthalene	18	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Phenanthrene	18	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Pyrene	18	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PAHs	Total PAHs	18	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Arsenic	0.93	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Chromium	5.8	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Copper	6.6	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Lead	18	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Mercury	0.01	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Nickel	2.5	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Silver	0.92	Yes	ppm	1	3.7	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Metals	Zinc	26	Yes	ppm	150	410	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB406	Pesticides	Total DDx (2,4 & 4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Pesticides	Total DDx (4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	Pesticides	p,p'-DDE	1.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Chrysene	16	Yes	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Fluoranthene	16	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Pyrene	15	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PAHs	Total PAHs	62	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Arsenic	16	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Cadmium	1.4	Yes	ppm	1.2	9.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Chromium	51	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Copper	100	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Lead	120	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Mercury	0.48	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Nickel	22	Yes	ppm	20.9	51.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Silver	5	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB407	Metals	Zinc	230	Yes	ppm	150	410	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Pesticides	Total DDx (2,4 & 4,4)	3.2	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Pesticides	Total DDx (4,4)	3.2	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	Pesticides	p,p'-DDE	3.2	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	2-Methylnaphthalene	38	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Acenaphthene	38	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Acenaphthylene	38	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Anthracene	38	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Benz[a]anthracene	57	Yes	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Benzo[a]pyrene	60	Yes	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Chrysene	51	Yes	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Dibenz[a,h]anthracene	38	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Fluoranthene	83	Yes	ppb	600	5,100	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Fluorene	38	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Naphthalene	38	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Phenanthrene	38	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Pyrene	77	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PAHs	Total PAHs	503	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB407	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Arsenic	11	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Cadmium	1.1	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Chromium	52	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Copper	74	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Lead	78	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Mercury	0.58	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Nickel	20	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Silver	4.2	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB409	Metals	Zinc	160	Yes	ppm	150	410	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Pesticides	Total DDx (2,4 & 4,4)	3.4	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Pesticides	Total DDx (4,4)	3.4	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	Pesticides	p,p'-DDE	3.4	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	2-Methylnaphthalene	41	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Acenaphthene	41	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Acenaphthylene	41	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Anthracene	41	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Benz[a]anthracene	41	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Benzo[a]pyrene	41	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Chrysene	41	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Dibenz[a,h]anthracene	41	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Fluoranthene	47	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Fluorene	41	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Naphthalene	41	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Phenanthrene	41	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Pyrene	42	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PAHs	Total PAHs	89	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Arsenic	1.9	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Cadmium	0.28	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Chromium	12	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Copper	5.8	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Lead	9.4	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Mercury	0.08	Yes	ppm	150	710	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Nickel	7.3	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Silver	1.7	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Metals	Zinc	35	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Pesticides	Total DDx (2,4 & 4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Pesticides	Total DDx (4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	Pesticides	p,p'-DDE	1.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Chrysene	13	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Fluoranthene	13	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Pyrene	13	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PAHs	Total PAHs	13	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Arsenic	1.3	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Chromium	6	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Copper	1.5	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Lead	7.2	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Mercury	0.04	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Nickel	1.9	No	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Silver	0.77	Yes	ppm	1	3.7	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Metals	Zinc	17	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Pesticides	Total DDx (2,4 & 4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Pesticides	Total DDx (4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	Pesticides	p,p'-DDE	1.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Chrysene	13	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Fluoranthene	13	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Pyrene	13	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PAHs	Total PAHs	13	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Arsenic	6.7	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Cadmium	0.42	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Chromium	32	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Copper	38	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Lead	42	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Mercury	3.2	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Nickel	14	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Silver	3	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Metals	Zinc	90	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Pesticides	Total DDx (2,4 & 4,4)	2.4	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Pesticides	Total DDx (4,4)	2.4	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	Pesticides	p,p'-DDE	2.4	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	2-Methylnaphthalene	26	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Acenaphthene	26	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Acenaphthylene	26	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Anthracene	26	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Benz[a]anthracene	26	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Benzo[a]pyrene	26	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Chrysene	26	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Dibenz[a,h]anthracene	26	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Fluoranthene	26	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Fluorene	26	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Naphthalene	26	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Phenanthrene	26	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Pyrene	26	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PAHs	Total PAHs	26	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB416	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Arsenic	2.8	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Chromium	12	Yes	ppm	81	370	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Copper	11	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Lead	16	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Mercury	0.13	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Nickel	4.6	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Silver	1.3	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Metals	Zinc	36	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Pesticides	Total DDx (2,4 & 4,4)	1.5	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Pesticides	Total DDx (4,4)	1.5	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	Pesticides	p,p'-DDE	1.5	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	2-Methylnaphthalene	17	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Acenaphthene	17	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Acenaphthylene	17	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Anthracene	17	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Benz[a]anthracene	17	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Benzo[a]pyrene	17	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Chrysene	17	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Dibenz[a,h]anthracene	17	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Fluoranthene	20	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Fluorene	17	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Naphthalene	17	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Phenanthrene	17	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Pyrene	20	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PAHs	Total PAHs	58	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Arsenic	8.7	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Cadmium	1.1	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Chromium	38	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Copper	49	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Lead	51	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Mercury	0.43	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Nickel	15	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Silver	3.8	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB419	Metals	Zinc	120	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Pesticides	Total DDx (2,4 & 4,4)	2.7	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Pesticides	Total DDx (4,4)	2.7	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	Pesticides	p,p'-DDE	2.7	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	2-Methylnaphthalene	32	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Acenaphthene	32	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Acenaphthylene	32	No	ppb	44	640	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Anthracene	32	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Benz[a]anthracene	32	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Benzo[a]pyrene	32	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Chrysene	32	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Dibenz[a,h]anthracene	32	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Fluoranthene	32	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Fluorene	32	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Naphthalene	32	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Phenanthrene	32	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Pyrene	32	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PAHs	Total PAHs	32	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Arsenic	3.5	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Cadmium	0.28	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Chromium	15	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Copper	13	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Lead	19	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Mercury	0.14	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Nickel	7.7	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Silver	1.7	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Metals	Zinc	41	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Pesticides	Total DDx (2,4 & 4,4)	1.5	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Pesticides	Total DDx (4,4)	1.5	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	Pesticides	p,p'-DDE	1.5	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	2-Methylnaphthalene	17	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Acenaphthene	17	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Acenaphthylene	17	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Anthracene	17	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Benz[a]anthracene	17	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Benzo[a]pyrene	17	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Chrysene	17	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Dibenz[a,h]anthracene	17	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Fluoranthene	17	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Fluorene	17	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Naphthalene	17	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Phenanthrene	17	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Pyrene	17	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PAHs	Total PAHs	17	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Arsenic	11	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Cadmium	1	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Chromium	50	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Copper	56	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Lead	64	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Mercury	0.53	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Nickel	20	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Silver	5	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB423	Metals	Zinc	130	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Pesticides	Total DDx (2,4 & 4,4)	3	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Pesticides	Total DDx (4,4)	3	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	Pesticides	p,p'-DDE	3	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	2-Methylnaphthalene	33	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Acenaphthene	33	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Acenaphthylene	33	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Anthracene	33	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Benz[a]anthracene	33	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Benzo[a]pyrene	33	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Chrysene	33	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Dibenz[a,h]anthracene	33	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Fluoranthene	33	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Fluorene	33	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Naphthalene	33	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Phenanthrene	33	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Pyrene	33	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PAHs	Total PAHs	33	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Arsenic	6.8	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Cadmium	0.58	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Chromium	31	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Copper	34	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Lead	40	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Mercury	0.31	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Nickel	13	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Silver	3.6	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Metals	Zinc	85	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Pesticides	Total DDx (2,4 & 4,4)	2.2	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Pesticides	Total DDx (4,4)	2.2	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	Pesticides	p,p'-DDE	2.2	No	ppb	2.2	27	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	2-Methylnaphthalene	24	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Acenaphthene	24	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Acenaphthylene	24	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Anthracene	24	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Benz[a]anthracene	26	Yes	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Benzo[a]pyrene	24	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Chrysene	24	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Dibenz[a,h]anthracene	24	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Fluoranthene	33	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Fluorene	24	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Naphthalene	24	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Phenanthrene	24	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Pyrene	30	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PAHs	Total PAHs	89	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Arsenic	1.9	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Chromium	8.5	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Copper	4.4	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Lead	9.7	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Mercury	0.06	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Nickel	3.3	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Silver	1.1	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Metals	Zinc	25	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Pesticides	Total DDx (2,4 & 4,4)	1.3	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Pesticides	Total DDx (4,4)	1.3	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	Pesticides	p,p'-DDE	1.3	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Chrysene	13	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Fluoranthene	19	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Pyrene	18	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PAHs	Total PAHs	51	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Arsenic	1.5	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Chromium	6.2	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Copper	2.5	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Lead	7	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Mercury	0.05	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Nickel	2.2	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Silver	0.72	Yes	ppm	1	3.7	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Metals	Zinc	21	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Pesticides	Total DDx (2,4 & 4,4)	9.4	Yes	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Pesticides	Total DDx (4,4)	6.9	Yes	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	Pesticides	p,p'-DDE	3	Yes	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Chrysene	13	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Fluoranthene	13	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Pyrene	13	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PAHs	Total PAHs	13	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Arsenic	6.9	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Cadmium	0.5	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Chromium	26	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Copper	34	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Lead	41	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Mercury	0.21	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Nickel	11	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Silver	2.8	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Metals	Zinc	88	Yes	ppm	150	410	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB464	Pesticides	Total DDx (2,4 & 4,4)	2.1	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Pesticides	Total DDx (4,4)	2.1	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	Pesticides	p,p'-DDE	2.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	2-Methylnaphthalene	24	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Acenaphthene	24	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Acenaphthylene	24	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Anthracene	24	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Benz[a]anthracene	24	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Benzo[a]pyrene	24	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Chrysene	24	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Dibenz[a,h]anthracene	24	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Fluoranthene	24	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Fluorene	24	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Naphthalene	24	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Phenanthrene	24	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Pyrene	24	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PAHs	Total PAHs	24	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Arsenic	2.2	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Chromium	11	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Copper	8.3	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Lead	14	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Mercury	0.1	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Nickel	3.9	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Silver	1.3	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Metals	Zinc	34	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Pesticides	Total DDx (2,4 & 4,4)	1.3	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Pesticides	Total DDx (4,4)	1.3	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	Pesticides	p,p'-DDE	1.3	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	2-Methylnaphthalene	17	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Acenaphthene	17	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Acenaphthylene	17	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Anthracene	17	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Benz[a]anthracene	17	Yes	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Benzo[a]pyrene	17	Yes	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Chrysene	17	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Dibenz[a,h]anthracene	17	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Fluoranthene	19	Yes	ppb	600	5,100	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Fluorene	17	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Naphthalene	17	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Phenanthrene	17	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Pyrene	29	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PAHs	Total PAHs	82	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Arsenic	9.1	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Cadmium	0.68	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Chromium	42	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Copper	51	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Lead	55	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Mercury	0.5	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Nickel	17	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Silver	3.7	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Metals	Zinc	110	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Pesticides	Total DDx (2,4 & 4,4)	2.9	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Pesticides	Total DDx (4,4)	2.9	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	Pesticides	p,p'-DDE	2.9	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	2-Methylnaphthalene	33	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Acenaphthene	33	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Acenaphthylene	33	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Anthracene	33	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Benz[a]anthracene	33	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Benzo[a]pyrene	33	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Chrysene	33	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Dibenz[a,h]anthracene	33	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Fluoranthene	33	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Fluorene	33	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Naphthalene	33	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Phenanthrene	33	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Pyrene	33	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PAHs	Total PAHs	33	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Arsenic	3.3	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Cadmium	0.4	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Chromium	17	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Copper	17	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Lead	22	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Mercury	0.17	Yes	ppm	150	710	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Nickel	6.3	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Silver	1.7	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Metals	Zinc	52	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Pesticides	Total DDx (2,4 & 4,4)	1.6	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Pesticides	Total DDx (4,4)	1.6	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	Pesticides	p,p'-DDE	1.6	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	2-Methylnaphthalene	17	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Acenaphthene	17	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Acenaphthylene	17	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Anthracene	17	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Benz[a]anthracene	17	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Benzo[a]pyrene	17	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Chrysene	17	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Dibenz[a,h]anthracene	17	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Fluoranthene	27	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Fluorene	17	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Naphthalene	17	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Phenanthrene	17	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Pyrene	24	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PAHs	Total PAHs	51	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Arsenic	9.3	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Cadmium	0.72	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Chromium	37	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Copper	67	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Lead	56	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Mercury	0.37	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Nickel	16	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Silver	3.7	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Metals	Zinc	120	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Pesticides	Total DDx (2,4 & 4,4)	2.8	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Pesticides	Total DDx (4,4)	2.8	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	Pesticides	p,p'-DDE	2.8	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	2-Methylnaphthalene	29	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Acenaphthene	29	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Acenaphthylene	29	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Anthracene	29	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Benz[a]anthracene	29	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Benzo[a]pyrene	29	No	ppb	430	1,600	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Chrysene	29	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Dibenz[a,h]anthracene	29	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Fluoranthene	29	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Fluorene	29	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Naphthalene	29	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Phenanthrene	29	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Pyrene	29	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PAHs	Total PAHs	29	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB471	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Arsenic	15	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Cadmium	2.9	Yes	ppm	1.2	9.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Chromium	77	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Copper	390	Yes	ppm	34	270	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Lead	290	Yes	ppm	46.7	218	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Mercury	0.73	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Nickel	34	Yes	ppm	20.9	51.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Silver	5.8	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB472	Metals	Zinc	670	Yes	ppm	150	410	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB472	Pesticides	Total DDx (2,4 & 4,4)	27	Yes	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Pesticides	Total DDx (4,4)	27	Yes	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	Pesticides	p,p'-DDE	7.2	Yes	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	2-Methylnaphthalene	43	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Acenaphthene	43	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Acenaphthylene	43	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Anthracene	43	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Benz[a]anthracene	220	Yes	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Benzo[a]pyrene	270	Yes	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Chrysene	300	Yes	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Dibenz[a,h]anthracene	68	Yes	ppb	63.4	260	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Fluoranthene	600	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Fluorene	43	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Naphthalene	43	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Phenanthrene	160	Yes	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Pyrene	510	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PAHs	Total PAHs	3148	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	PCBs (Aroclors)	Total PCBs	13	Yes	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Arsenic	9.3	Yes	ppm	8.2	70	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Cadmium	1.6	Yes	ppm	1.2	9.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Chromium	53	Yes	ppm	81	370	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Copper	120	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Lead	130	Yes	ppm	46.7	218	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Mercury	0.68	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Nickel	22	Yes	ppm	20.9	51.6	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Silver	5.5	Yes	ppm	1	3.7	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB474	Metals	Zinc	250	Yes	ppm	150	410	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Pesticides	Total DDx (2,4 & 4,4)	18	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Pesticides	Total DDx (4,4)	18	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	Pesticides	p,p'-DDE	18	No	ppb	2.2	27	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	2-Methylnaphthalene	250	No	ppb	70	670	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Acenaphthene	250	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Acenaphthylene	250	No	ppb	44	640	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Anthracene	250	No	ppb	85.3	1,100	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Benz[a]anthracene	250	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Benzo[a]pyrene	250	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Chrysene	250	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Dibenz[a,h]anthracene	250	No	ppb	63.4	260	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Fluoranthene	330	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Fluorene	250	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Naphthalene	250	No	ppb	160	2,100	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Phenanthrene	250	No	ppb	240	1,500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Pyrene	360	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PAHs	Total PAHs	690	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Arsenic	4.6	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Cadmium	0.6	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Chromium	24	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Copper	30	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Lead	35	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Mercury	0.27	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Nickel	9.5	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Silver	2.7	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Metals	Zinc	78	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Pesticides	Total DDx (2,4 & 4,4)	1.8	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Pesticides	Total DDx (4,4)	1.8	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	Pesticides	p,p'-DDE	1.8	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	2-Methylnaphthalene	21	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Acenaphthene	21	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Acenaphthylene	21	No	ppb	44	640	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Anthracene	21	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Benz[a]anthracene	33	Yes	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Benzo[a]pyrene	30	Yes	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Chrysene	59	Yes	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Dibenz[a,h]anthracene	21	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Fluoranthene	220	Yes	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Fluorene	21	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Naphthalene	21	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Phenanthrene	120	Yes	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Pyrene	160	Yes	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PAHs	Total PAHs	668	Yes	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Arsenic	1.5	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Chromium	5.1	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Copper	1.3	Yes	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Lead	7.1	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Mercury	0.03	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Nickel	1.9	No	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Silver	0.82	Yes	ppm	1	3.7	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Metals	Zinc	13	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Pesticides	Total DDx (2,4 & 4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Pesticides	Total DDx (4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	Pesticides	p,p'-DDE	1.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Chrysene	13	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Fluoranthene	13	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Pyrene	13	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PAHs	Total PAHs	13	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Arsenic	1	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Cadmium	0.29	No	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Chromium	2.3	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Copper	0.96	No	ppm	34	270	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Lead	2.9	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Mercury	0.01	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Nickel	1.9	No	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Silver	0.48	No	ppm	1	3.7	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Metals	Zinc	6	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Pesticides	Total DDx (2,4 & 4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Pesticides	Total DDx (4,4)	1.1	No	ppb	1.58	46.1	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	Pesticides	p,p'-DDE	1.1	No	ppb	2.2	27	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	2-Methylnaphthalene	13	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Acenaphthene	13	No	ppb	16	500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Acenaphthylene	13	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Anthracene	13	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Benz[a]anthracene	13	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Benzo[a]pyrene	13	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Chrysene	13	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Dibenz[a,h]anthracene	13	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Fluoranthene	13	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Fluorene	13	No	ppb	19	540	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Naphthalene	13	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Phenanthrene	13	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Pyrene	13	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PAHs	Total PAHs	13	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB486	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Arsenic	5.7	Yes	ppm	8.2	70	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Cadmium	0.89	Yes	ppm	1.2	9.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Chromium	27	Yes	ppm	81	370	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Copper	45	Yes	ppm	34	270	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Lead	40	Yes	ppm	46.7	218	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Mercury	0.25	Yes	ppm	150	710	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Nickel	12	Yes	ppm	20.9	51.6	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Silver	3.5	Yes	ppm	1	3.7	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Metals	Zinc	97	Yes	ppm	150	410	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Pesticides	Total DDx (2,4 & 4,4)	1.8	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Pesticides	Total DDx (4,4)	1.8	No	ppb	1.58	46.1	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	Pesticides	p,p'-DDE	1.8	No	ppb	2.2	27	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	2-Methylnaphthalene	20	No	ppb	70	670	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Acenaphthene	20	No	ppb	16	500	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Acenaphthylene	20	No	ppb	44	640	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Anthracene	20	No	ppb	85.3	1,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Benz[a]anthracene	20	No	ppb	261	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Benzo[a]pyrene	20	No	ppb	430	1,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Chrysene	20	No	ppb	384	2,800	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Dibenz[a,h]anthracene	20	No	ppb	63.4	260	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Fluoranthene	20	No	ppb	600	5,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Fluorene	20	No	ppb	19	540	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Naphthalene	20	No	ppb	160	2,100	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Phenanthrene	20	No	ppb	240	1,500	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Pyrene	20	No	ppb	665	2,600	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PAHs	Total PAHs	20	No	ppb	4,000	45,000	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB487	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Arsenic	1.3	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Cadmium	0.025	No	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Chromium	8.1	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Copper	2.4	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Lead	6.8	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Mercury	0.01	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Nickel	5	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Zinc	7.5	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Acenaphthene	1.2	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Acenaphthylene	1.4	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Anthracene	1.2	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Benz[a]anthracene	6.1	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Benzo[a]pyrene	5.8	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Chrysene	8.7	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Dibenz[a,h]anthracene	1.4	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Fluoranthene	6.5	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Naphthalene	2.3	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Phenanthrene	3	Yes	ppb	240	1,500	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Pyrene	12	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PAHs	Total PAHs	68	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Arsenic	11.4	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Cadmium	1.2	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Chromium	86.3	Yes	ppm	81	370	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Copper	68.5	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Lead	80	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Mercury	0.72	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Nickel	28.8	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Silver	1.2	Yes	ppm	1	3.7	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Metals	Zinc	197.7	Yes	ppm	150	410	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	2-Methylnaphthalene	4.9	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Acenaphthene	3.1	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Acenaphthylene	6	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Anthracene	12.4	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Benz[a]anthracene	41.3	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Benzo[a]pyrene	58.6	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Chrysene	51.9	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Dibenz[a,h]anthracene	17.7	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Fluoranthene	92.8	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Fluorene	5.5	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Naphthalene	10.1	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Phenanthrene	37.3	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Pyrene	84.2	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PAHs	Total PAHs	642.6	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB403	PCBs (Aroclors)	Total PCBs	7.1	Yes	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Arsenic	16.9	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Cadmium	1.6	Yes	ppm	1.2	9.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Chromium	103.5	Yes	ppm	81	370	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Copper	69	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Lead	78.7	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Mercury	0.88	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Nickel	32.2	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Silver	1.5	Yes	ppm	1	3.7	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Metals	Zinc	189.4	Yes	ppm	150	410	Yes	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB404	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	2-Methylnaphthalene	3.2	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Acenaphthene	1	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Acenaphthylene	1.9	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Anthracene	4.5	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Benz[a]anthracene	16.3	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Benzo[a]pyrene	24.2	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Chrysene	18.8	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Dibenz[a,h]anthracene	7.4	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Fluoranthene	24.1	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Fluorene	1.7	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Naphthalene	7	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Phenanthrene	9.7	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Pyrene	25.1	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PAHs	Total PAHs	219.5	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Arsenic	4.7	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Cadmium	0.2	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Chromium	25.9	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Copper	18.2	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Lead	17.1	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Mercury	0.11	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Nickel	7.3	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Silver	0.7	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Metals	Zinc	43.1	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	2-Methylnaphthalene	6.3	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Acenaphthene	14.5	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Acenaphthylene	6.5	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Anthracene	38.7	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Benz[a]anthracene	161.4	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Benzo[a]pyrene	170.3	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Chrysene	131.3	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Dibenz[a,h]anthracene	68	Yes	ppb	63.4	260	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Fluoranthene	257	Yes	ppb	600	5,100	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Fluorene	16.7	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Naphthalene	12.3	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Phenanthrene	119.7	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Pyrene	228.3	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PAHs	Total PAHs	1795.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Arsenic	7.7	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Cadmium	0.6	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Chromium	54.2	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Copper	33.9	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Lead	55	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Mercury	0.23	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Nickel	17.6	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Silver	0.5	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Metals	Zinc	88.8	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	2-Methylnaphthalene	6.2	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Acenaphthene	3.6	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Acenaphthylene	8.3	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Anthracene	18	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Benz[a]anthracene	85.2	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Benzo[a]pyrene	77.6	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Chrysene	95.9	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Dibenz[a,h]anthracene	13.4	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Fluoranthene	123.3	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Fluorene	4.9	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Naphthalene	13.1	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Phenanthrene	33.7	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Pyrene	158.4	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PAHs	Total PAHs	818.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB406	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Arsenic	14.8	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Cadmium	1.2	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Chromium	76.1	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Copper	74.6	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Lead	85.5	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Mercury	0.56	Yes	ppm	150	710	No	No

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Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Nickel	26.1	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Silver	1.4	Yes	ppm	1	3.7	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Metals	Zinc	215.1	Yes	ppm	150	410	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	2-Methylnaphthalene	8.9	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Acenaphthene	3.6	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Acenaphthylene	6.5	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Anthracene	15	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Benz[a]anthracene	89.5	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Benzo[a]pyrene	120.9	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Chrysene	137.9	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Dibenz[a,h]anthracene	27.1	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Fluoranthene	225.4	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Fluorene	5.7	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Naphthalene	13.3	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Phenanthrene	40.6	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Pyrene	208.5	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PAHs	Total PAHs	1395	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB407	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Arsenic	7	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Cadmium	0.7	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Chromium	52.7	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Copper	34.8	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Lead	51.5	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Mercury	0.44	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Nickel	16.3	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Silver	0.7	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Metals	Zinc	103.4	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Acenaphthene	2	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Anthracene	6.2	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Benz[a]anthracene	27.1	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Benzo[a]pyrene	22.4	Yes	ppb	430	1,600	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Chrysene	23.7	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Dibenz[a,h]anthracene	10.6	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Fluoranthene	50.2	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Naphthalene	2	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Phenanthrene	4.8	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Pyrene	41.5	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PAHs	Total PAHs	279.5	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Arsenic	2.3	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Cadmium	0.3	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Chromium	43.5	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Copper	7.8	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Lead	16.9	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Mercury	0.11	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Nickel	13.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Silver	0.2	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Metals	Zinc	36.6	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	2-Methylnaphthalene	2.6	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Acenaphthene	1.4	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Acenaphthylene	1.3	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Anthracene	4.2	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Benz[a]anthracene	17.7	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Benzo[a]pyrene	17.5	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Chrysene	16.9	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Dibenz[a,h]anthracene	5.5	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Fluoranthene	34.9	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Fluorene	2.4	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Naphthalene	3.9	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Phenanthrene	16.4	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Pyrene	32.2	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PAHs	Total PAHs	226.8	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB410	PCBs (Aroclors)	Total PCBs	2.1	Yes	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Arsenic	3.2	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Cadmium	0.2	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Chromium	30.6	Yes	ppm	81	370	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Copper	4.7	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Lead	17.2	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Mercury	0.05	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Nickel	6.1	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Metals	Zinc	31.1	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Anthracene	1.1	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Benz[a]anthracene	2	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Benzo[a]pyrene	2	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Chrysene	2.3	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Dibenz[a,h]anthracene	1.4	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Fluoranthene	1	No	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Naphthalene	1	No	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Phenanthrene	1	No	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Pyrene	1	No	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PAHs	Total PAHs	19.6	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB415	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Arsenic	4.9	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Cadmium	0.4	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Chromium	47.6	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Copper	18.6	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Lead	26.3	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Mercury	0.28	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Nickel	13.6	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Silver	0.4	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Metals	Zinc	63.4	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Acenaphthene	1	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Anthracene	2.5	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Benz[a]anthracene	9.2	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Benzo[a]pyrene	10.7	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Chrysene	9.2	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Dibenz[a,h]anthracene	6.4	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Fluoranthene	11.1	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Naphthalene	1	No	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Phenanthrene	1	No	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Pyrene	11.8	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PAHs	Total PAHs	112.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB416	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Arsenic	2.3	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Chromium	22.8	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Copper	3.8	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Lead	12.7	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Mercury	0.05	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Nickel	5.2	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Metals	Zinc	21.8	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	2-Methylnaphthalene	1.4	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Acenaphthene	4.4	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Anthracene	8.8	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Benz[a]anthracene	26.8	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Benzo[a]pyrene	22.9	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Chrysene	21.7	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Dibenz[a,h]anthracene	6.3	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Fluoranthene	60.9	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Fluorene	4	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Naphthalene	2.2	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Phenanthrene	38	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Pyrene	50.3	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PAHs	Total PAHs	321.1	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB417	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Arsenic	2.5	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Chromium	19.3	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Copper	4.2	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Lead	15.1	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Mercury	0.05	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Nickel	5.6	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Metals	Zinc	21.1	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	2-Methylnaphthalene	2.3	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Acenaphthylene	2.9	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Anthracene	2.4	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Benz[a]anthracene	45.6	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Benzo[a]pyrene	46.7	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Chrysene	42.6	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Dibenz[a,h]anthracene	7.3	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Fluoranthene	26.2	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Fluorene	1.1	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Naphthalene	3.3	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Phenanthrene	6.1	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Pyrene	61.2	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PAHs	Total PAHs	340.4	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB419	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Arsenic	1.5	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Cadmium	0.025	No	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Chromium	19.1	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Copper	2.4	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Lead	8.4	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Mercury	0.02	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Nickel	6.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Silver	0.025	No	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Metals	Zinc	12.4	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Anthracene	1	No	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Benz[a]anthracene	1	No	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Benzo[a]pyrene	1.4	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Chrysene	1	No	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Dibenz[a,h]anthracene	1	No	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Fluoranthene	2	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Naphthalene	1	No	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Phenanthrene	2	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Pyrene	1.8	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PAHs	Total PAHs	7.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB422	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Arsenic	11.3	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Cadmium	1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Chromium	76.6	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Copper	41.7	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Lead	62.5	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Mercury	0.66	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Nickel	24.2	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Silver	0.9	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Metals	Zinc	140.9	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	2-Methylnaphthalene	4.3	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Acenaphthene	2.8	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Acenaphthylene	4	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Anthracene	45.3	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Benz[a]anthracene	45.8	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Benzo[a]pyrene	36.2	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Chrysene	51.8	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Dibenz[a,h]anthracene	7.6	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Fluoranthene	89	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Fluorene	4.4	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Naphthalene	9.5	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Phenanthrene	42.5	Yes	ppb	240	1,500	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Pyrene	85.9	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PAHs	Total PAHs	539.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB423	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Arsenic	3.8	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Cadmium	0.2	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Chromium	35.5	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Copper	10	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Lead	21.5	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Mercury	0.11	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Nickel	9.5	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Silver	0.2	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Metals	Zinc	36	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	2-Methylnaphthalene	1.6	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Acenaphthene	2	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Acenaphthylene	2	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Anthracene	6.7	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Benz[a]anthracene	18.1	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Benzo[a]pyrene	17.3	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Chrysene	21.1	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Dibenz[a,h]anthracene	5	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Fluoranthene	46.3	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Fluorene	3.4	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Naphthalene	2.3	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Phenanthrene	27.1	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Pyrene	42.9	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PAHs	Total PAHs	253.7	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB454	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Arsenic	2.9	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Chromium	25.8	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Copper	4.5	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Lead	17.1	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Mercury	0.05	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Nickel	5.9	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Metals	Zinc	24.1	Yes	ppm	150	410	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB458	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	2-Methylnaphthalene	1.5	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Acenaphthene	2	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Anthracene	4.1	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Benz[a]anthracene	9.3	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Benzo[a]pyrene	6	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Chrysene	10.5	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Dibenz[a,h]anthracene	3.1	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Fluoranthene	25.1	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Fluorene	2.1	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Naphthalene	4.4	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Phenanthrene	16.1	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Pyrene	22.4	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PAHs	Total PAHs	136.1	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB458	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Arsenic	1.9	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Chromium	15.6	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Copper	3.5	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Lead	11	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Mercury	0.05	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Nickel	3.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Silver	0.025	No	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Metals	Zinc	15.2	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Anthracene	1	No	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Benz[a]anthracene	1.2	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Benzo[a]pyrene	1.4	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Chrysene	1.7	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Dibenz[a,h]anthracene	1	No	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Fluoranthene	3.2	Yes	ppb	600	5,100	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Naphthalene	1.8	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Phenanthrene	2.8	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Pyrene	2.8	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PAHs	Total PAHs	22	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB459	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Arsenic	4.2	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Cadmium	0.4	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Chromium	31.3	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Copper	17.7	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Lead	30	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Mercury	0.23	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Nickel	11	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Silver	0.4	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Metals	Zinc	60	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	2-Methylnaphthalene	3.6	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Acenaphthene	1.6	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Acenaphthylene	1.7	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Anthracene	4.7	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Benz[a]anthracene	15.3	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Benzo[a]pyrene	15.1	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Chrysene	19.2	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Dibenz[a,h]anthracene	5.4	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Fluoranthene	33.5	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Fluorene	2.3	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Naphthalene	6.9	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Phenanthrene	12.3	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Pyrene	37	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PAHs	Total PAHs	229.7	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB464	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Arsenic	2.1	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Chromium	12.6	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Copper	2.8	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Lead	11.4	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Mercury	0.04	Yes	ppm	150	710	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Nickel	2.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Metals	Zinc	14.1	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	2-Methylnaphthalene	1.4	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Acenaphthylene	2.4	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Anthracene	2.2	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Benz[a]anthracene	25.5	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Benzo[a]pyrene	21.2	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Chrysene	21.7	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Dibenz[a,h]anthracene	4.3	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Fluoranthene	21.2	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Fluorene	1.1	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Naphthalene	1.4	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Phenanthrene	6	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Pyrene	38.4	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PAHs	Total PAHs	198.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB466	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Arsenic	5.5	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Cadmium	0.5	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Chromium	46.1	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Copper	21.6	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Lead	36.1	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Mercury	0.32	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Nickel	13.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Silver	0.5	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Metals	Zinc	73.8	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	2-Methylnaphthalene	3.2	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Acenaphthene	1.9	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Acenaphthylene	2	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Anthracene	7.9	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Benz[a]anthracene	26.2	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Benzo[a]pyrene	22.4	Yes	ppb	430	1,600	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Chrysene	29	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Dibenz[a,h]anthracene	7.6	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Fluoranthene	61.2	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Fluorene	3.2	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Naphthalene	6.1	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Phenanthrene	26.6	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Pyrene	54.3	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PAHs	Total PAHs	317.7	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB467	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Arsenic	1.6	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Chromium	12.1	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Copper	2.1	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Lead	9.2	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Mercury	0.03	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Nickel	2.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Silver	0.025	No	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Metals	Zinc	11.1	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Anthracene	1.9	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Benz[a]anthracene	20.7	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Benzo[a]pyrene	8.2	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Chrysene	23.6	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Dibenz[a,h]anthracene	3	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Fluoranthene	41.8	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Fluorene	1.1	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Naphthalene	1.9	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Phenanthrene	4.3	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Pyrene	19.4	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PAHs	Total PAHs	153.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB468	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Arsenic	10.4	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Cadmium	0.8	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Chromium	82.1	Yes	ppm	81	370	Yes	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Copper	55.4	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Lead	67	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Mercury	0.52	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Nickel	26.5	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Silver	0.9	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Metals	Zinc	116.3	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	2-Methylnaphthalene	4.8	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Acenaphthene	3.7	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Acenaphthylene	3.1	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Anthracene	11.7	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Benz[a]anthracene	33.9	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Benzo[a]pyrene	27.9	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Chrysene	31.1	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Dibenz[a,h]anthracene	6.9	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Fluoranthene	78.6	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Fluorene	4.6	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Naphthalene	13.1	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Phenanthrene	37.3	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Pyrene	69	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PAHs	Total PAHs	406.5	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Arsenic	14.2	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Cadmium	2.8	Yes	ppm	1.2	9.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Chromium	104	Yes	ppm	81	370	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Copper	263	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Lead	223.4	Yes	ppm	46.7	218	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Mercury	0.82	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Nickel	40	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Silver	1.6	Yes	ppm	1	3.7	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Metals	Zinc	629.8	Yes	ppm	150	410	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB472	Pesticides	Total DDx (2,4 & 4,4)	17.4	Yes	ppb	1.58	46.1	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Pesticides	Total DDx (4,4)	17.4	Yes	ppb	1.58	46.1	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	Pesticides	p,p'-DDE	8.8	Yes	ppb	2.2	27	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	2-Methylnaphthalene	29	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Acenaphthene	23.4	Yes	ppb	16	500	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Acenaphthylene	23.3	Yes	ppb	44	640	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Anthracene	99.7	Yes	ppb	85.3	1,100	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Benz[a]anthracene	781.9	Yes	ppb	261	1,600	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Benzo[a]pyrene	947.3	Yes	ppb	430	1,600	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Chrysene	959.5	Yes	ppb	384	2,800	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Dibenz[a,h]anthracene	248.7	Yes	ppb	63.4	260	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Fluoranthene	1632.1	Yes	ppb	600	5,100	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Fluorene	35	Yes	ppb	19	540	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Naphthalene	40.2	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Phenanthrene	309.5	Yes	ppb	240	1,500	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Pyrene	1485.5	Yes	ppb	665	2,600	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PAHs	Total PAHs	10314.8	Yes	ppb	4,000	45,000	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	PCBs (Aroclors)	Total PCBs	23.2	Yes	ppb	23	180	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Arsenic	11.2	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Cadmium	14.2	Yes	ppm	1.2	9.6	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Chromium	72	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Copper	54.6	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Lead	90.1	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Mercury	0.62	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Nickel	25.1	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Silver	0.9	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Metals	Zinc	160.5	Yes	ppm	150	410	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	2-Methylnaphthalene	4.5	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Acenaphthene	2.9	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Acenaphthylene	2.8	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Anthracene	6.9	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Benz[a]anthracene	30.5	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Benzo[a]pyrene	31.1	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Chrysene	31	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Dibenz[a,h]anthracene	10.8	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Fluoranthene	55.1	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Fluorene	3.9	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Naphthalene	8.1	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Phenanthrene	26.1	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Pyrene	56.3	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PAHs	Total PAHs	397.7	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No

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Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Arsenic	1.6	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Chromium	11.4	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Copper	4.1	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Lead	9.5	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Mercury	0.04	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Nickel	3.3	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Metals	Zinc	12.4	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	2-Methylnaphthalene	5.1	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Acenaphthene	3.3	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Acenaphthylene	5.6	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Anthracene	15.6	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Benz[a]anthracene	82.7	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Benzo[a]pyrene	74.4	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Chrysene	84.4	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Dibenz[a,h]anthracene	15.1	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Fluoranthene	135.3	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Fluorene	4.4	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Naphthalene	6.7	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Phenanthrene	35.9	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Pyrene	144.5	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PAHs	Total PAHs	825.7	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Arsenic	2.9	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Cadmium	0.1	Yes	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Chromium	21.5	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Copper	3.3	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Lead	13.8	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Mercury	0.03	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Nickel	4.2	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Silver	0.1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Metals	Zinc	17	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Anthracene	1.1	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Benz[a]anthracene	2.8	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Benzo[a]pyrene	2.3	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Chrysene	2.2	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Dibenz[a,h]anthracene	1	No	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Fluoranthene	5.4	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Fluorene	1.1	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Naphthalene	1.5	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Phenanthrene	5.3	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Pyrene	5.2	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PAHs	Total PAHs	37.2	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB481	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Arsenic	0.8	Yes	ppm	8.2	70	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Cadmium	0.025	No	ppm	1.2	9.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Chromium	4.4	Yes	ppm	81	370	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Copper	0.9	Yes	ppm	34	270	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Lead	4.5	Yes	ppm	46.7	218	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Mercury	0.01	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Nickel	1.7	Yes	ppm	20.9	51.6	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Silver	0.025	No	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Metals	Zinc	5.2	Yes	ppm	150	410	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	2-Methylnaphthalene	1	No	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Acenaphthene	1	No	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Acenaphthylene	1	No	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Anthracene	1	No	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Benz[a]anthracene	1	No	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Benzo[a]pyrene	1	No	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Chrysene	1	No	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Dibenz[a,h]anthracene	1	No	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Fluoranthene	1.6	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Fluorene	1	No	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Naphthalene	1	No	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Phenanthrene	1.8	Yes	ppb	240	1,500	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Parameter Group	Chemical	Result[b]	Detected	Units	Screening Values		Result Exceeds ERL?	Result Exceeds ERM?
							ERL[c]	ERM[c]		
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Pyrene	1.7	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PAHs	Total PAHs	5.1	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB486	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Arsenic	11.5	Yes	ppm	8.2	70	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Cadmium	1.3	Yes	ppm	1.2	9.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Chromium	85.3	Yes	ppm	81	370	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Copper	79.3	Yes	ppm	34	270	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Lead	85	Yes	ppm	46.7	218	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Mercury	0.6	Yes	ppm	150	710	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Nickel	33.9	Yes	ppm	20.9	51.6	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Silver	1	Yes	ppm	1	3.7	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Metals	Zinc	165.6	Yes	ppm	150	410	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Pesticides	Total DDx (2,4 & 4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Pesticides	Total DDx (4,4)	1	No	ppb	1.58	46.1	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	Pesticides	p,p'-DDE	1	No	ppb	2.2	27	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	2-Methylnaphthalene	5.3	Yes	ppb	70	670	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Acenaphthene	3.1	Yes	ppb	16	500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Acenaphthylene	2.7	Yes	ppb	44	640	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Anthracene	8.3	Yes	ppb	85.3	1,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Benz[a]anthracene	21.7	Yes	ppb	261	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Benzo[a]pyrene	19.7	Yes	ppb	430	1,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Chrysene	31.8	Yes	ppb	384	2,800	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Dibenz[a,h]anthracene	13	Yes	ppb	63.4	260	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Fluoranthene	61.1	Yes	ppb	600	5,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Fluorene	4.8	Yes	ppb	19	540	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Naphthalene	15.1	Yes	ppb	160	2,100	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Phenanthrene	25.5	Yes	ppb	240	1,500	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Pyrene	57.8	Yes	ppb	665	2,600	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PAHs	Total PAHs	368.6	Yes	ppb	4,000	45,000	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	PCBs (Aroclors)	Total PCBs	0	No	ppb	23	180	No	No

Table A-1-2
Sediment Chemistry Results and Screening of the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Notes:

[a]Sediment chemistry data for these studies were downloaded from the Water Quality Portal (National Water Quality Monitoring Council 2019) - a cooperative service sponsored by the United States Geological Survey (USGS), the United States Environmental Protection Agency (USEPA), and the National Water Quality Monitoring Council that integrates publicly available water-quality data from the USGS National Water Information System (NWIS) database and the USEPA STOrage and RETrieval (STORET) data warehouse.

[b]The value of the detection limit is reported for non-detects when it was avalable in the data source. Non-detect PCBs were reported as 0 in the data source.
[c]Sediment screening values are the ERL and ERM reported in Long et al. (1995).

Acronyms and Abbreviations:

ERL = effect range-low
ERM = effect range-medium
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
ID = identification
NY/NJ = New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
p,p'-DDE = 4,4'-dichlorodiphenyldichloroethylene
ppb = parts per billion
ppm = parts per million
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
Total DDx (4,4) = sum of three isomers of DDE, DDD, and DDT

References:

Long E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ Manage 19:81-97.
National Water Quality Monitoring Council. 2019. Water Quality Portal. Available online at https://www.waterqualitydata.us/. Accessed on April 10, 2019.

Table A-1-3
Sediment Chemistry Screening Results, *A. abdita* Survival Data and Benthic Metrics for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	*A. abdita* 10-Day Survival	*A. abdita* 10-Day Survival (% of Control Survival)	Number of Taxa	Abundance (per m^2)	Shannon-Wiener H'	Swartz's Dominance Index	Pielou's J'	Proportion of Abundance that are Sensitive Species	Proportion of Abundance that are Tolerant Species	Biomass (grams per m^2)	Saline Class	Sediment Type	Percent Silt and Clay
Region 2 2008 NY/NJ Harbor Sampling	JB401	92	103	13	7650	0.99	2	0.385	16%	75%	1.18	Polyhaline	Mud	43.1
Region 2 2008 NY/NJ Harbor Sampling	JB403	74	80	2	100	0.56	1	0.811	0%	0%	0.0025	Polyhaline	Mud	91
Region 2 2008 NY/NJ Harbor Sampling	JB404	93	96	15	49900	1.13	2	0.418	0%	10%	5.95	Polyhaline	Mud	86
Region 2 2008 NY/NJ Harbor Sampling	JB405	50	54	43	126775	1.57	3	0.417	1%	25%	33.67	Polyhaline	Sand	35
Region 2 2008 NY/NJ Harbor Sampling	JB406	97	97	13	7650	1.12	2	0.437	0%	1%	24.22	Polyhaline	Sand	2.2
Region 2 2008 NY/NJ Harbor Sampling	JB407	71	77	14	875	2.29	6	0.869	0%	3%	50.31	Polyhaline	Mud	74
Region 2 2008 NY/NJ Harbor Sampling	JB409	47	48	23	99700	1.15	2	0.365	0%	15%	135.36	Polyhaline	Mud	73
Region 2 2008 NY/NJ Harbor Sampling	JB410	0	0	15	5275	1.71	3	0.631	0%	51%	40.32	Polyhaline	Sand	8.8
Region 2 2008 NY/NJ Harbor Sampling	JB415	91	91	23	18000	1.61	3	0.512	1%	57%	34.28	Polyhaline	Sand	3.2
Region 2 2008 NY/NJ Harbor Sampling	JB416	0	0	36	85125	1.80	3	0.503	0%	32%	299.64	Polyhaline	Mud	40
Region 2 2008 NY/NJ Harbor Sampling	JB417	0	0	17	2950	2.14	5	0.757	0%	61%	4.97	Polyhaline	Sand	18.2
Region 2 2008 NY/NJ Harbor Sampling	JB419	0	0	44	387700	1.02	2	0.269	0%	5%	94.06	Polyhaline	Sand	3.6
Region 2 2008 NY/NJ Harbor Sampling	JB422	0	0	35	124975	1.53	3	0.429	0%	71%	17.74	Polyhaline	Sand	15.8
Region 2 2008 NY/NJ Harbor Sampling	JB423	0	0	35	83050	1.69	3	0.475	0%	32%	30.98	Polyhaline	Mud	59
Region 2 2008 NY/NJ Harbor Sampling	JB454	0	0	38	89625	1.97	3	0.543	0%	30%	20.95	Polyhaline	Mud	41
Region 2 2008 NY/NJ Harbor Sampling	JB458	1	1	43	53675	1.32	2	0.350	2%	72%	9.91	Polyhaline	Sand	13.3
Region 2 2008 NY/NJ Harbor Sampling	JB459	13	13	42	32200	2.06	4	0.552	0%	54%	148.82	Polyhaline	Sand	4.2
Region 2 2008 NY/NJ Harbor Sampling	JB464	34	37	28	53850	1.34	2	0.402	0%	18%	95.91	Polyhaline	Sand	33
Region 2 2008 NY/NJ Harbor Sampling	JB466	4	4	28	101300	1.85	3	0.554	0%	25%	65.86	Polyhaline	Sand	14.3
Region 2 2008 NY/NJ Harbor Sampling	JB467	0	0	27	200400	1.86	3	0.565	0%	41%	29.56	Polyhaline	Mud	60
Region 2 2008 NY/NJ Harbor Sampling	JB468	85	88	32	15750	1.52	3	0.440	4%	69%	14.85	Polyhaline	Sand	21
Region 2 2008 NY/NJ Harbor Sampling	JB471	26	28	17	23200	1.42	3	0.503	0%	30%	28.42	Polyhaline	Mud	66
Region 2 2008 NY/NJ Harbor Sampling	JB472	82	89	2	50	0.69	2	1.000	0%	0%	0.025	Polyhaline	Mud	85
Region 2 2008 NY/NJ Harbor Sampling	JB474	92	95	1	325	0.00	1		0%	0%	0.078	Polyhaline	Mud	88
Region 2 2008 NY/NJ Harbor Sampling	JB480	26	27	15	5050	1.60	3	0.592	0%	80%	64.97	Polyhaline	Mud	44
Region 2 2008 NY/NJ Harbor Sampling	JB481	91	91	27	15225	2.04	5	0.620	2%	47%	121.14	Polyhaline	Sand	4.4
Region 2 2008 NY/NJ Harbor Sampling	JB486	89	100	30	10050	2.35	6	0.691	37%	12%	2.17	Polyhaline	Sand	1.7
Region 2 2008 NY/NJ Harbor Sampling	JB487	98	98	--	--	--	--	--	--	--	--	--	--	--
Region 2 2013 NY/NJ Harbor Sampling	JB401	95	98	7	1200	1.56	3	0.802	0%	29%	0.14	Polyhaline	Sand	3.5
Region 2 2013 NY/NJ Harbor Sampling	JB403	92	95	1	25	0.00	1		0%	100%	0.0025	Polyhaline	Mud	96
Region 2 2013 NY/NJ Harbor Sampling	JB404	95	98	6	1100	0.76	1	0.423	0%	82%	0.41	Polyhaline	Mud	94
Region 2 2013 NY/NJ Harbor Sampling	JB405	89	92	10	2800	1.56	3	0.676	0%	49%	2.69	Polyhaline	Sand	13.9
Region 2 2013 NY/NJ Harbor Sampling	JB406	94	97	10	3050	0.77	1	0.332	0%	84%	1.41	Polyhaline	Mud	49
Region 2 2013 NY/NJ Harbor Sampling	JB407	97	100	5	1625	1.05	2	0.654	0%	83%	3.10	Polyhaline	Mud	47.5
Region 2 2013 NY/NJ Harbor Sampling	JB409	95	98	10	1900	1.45	3	0.631	0%	67%	2.46	Polyhaline	Mud	64
Region 2 2013 NY/NJ Harbor Sampling	JB410	84	90	4	875	0.69	1	0.499	0%	86%	0.65	Polyhaline	Sand	8.8
Region 2 2013 NY/NJ Harbor Sampling	JB415	93	100	8	1125	1.51	3	0.726	2%	47%	2.09	Polyhaline	Sand	4.3
Region 2 2013 NY/NJ Harbor Sampling	JB416	94	97	12	1975	1.55	3	0.622	0%	70%	1.17	Polyhaline	Sand	14.1
Region 2 2013 NY/NJ Harbor Sampling	JB417	92	95	10	1350	1.93	5	0.838	0%	43%	15.51	Polyhaline	Sand	11.9
Region 2 2013 NY/NJ Harbor Sampling	JB419	94	97	5	1900	0.71	1	0.443	3%	87%	0.52	Polyhaline	Sand	10.7
Region 2 2013 NY/NJ Harbor Sampling	JB422	91	94	5	1300	0.99	2	0.615	0%	85%	0.76	Polyhaline	Sand	2.1
Region 2 2013 NY/NJ Harbor Sampling	JB423	80	82	6	2175	0.69	1	0.385	0%	84%	2.62	Polyhaline	Mud	65

Table A-1-3
Sediment Chemistry Screening Results, *A. abdita* Survival Data and Benthic Metrics for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	*A. abdita* 10-Day Survival	*A. abdita* 10-Day Survival (% of Control Survival)	Number of Taxa	Abundance (per m^2)	Shannon-Wiener H'	Swartz's Dominance Index	Pielou's J'	Proportion of Abundance that are Sensitive Species	Proportion of Abundance that are Tolerant Species	Biomass (grams per m^2)	Saline Class	Sediment Type	Percent Silt and Clay
Region 2 2013 NY/NJ Harbor Sampling	JB454	93	96	12	1775	2.02	5	0.815	0%	45%	20.83	Polyhaline	Sand	14
Region 2 2013 NY/NJ Harbor Sampling	JB458	96	99	9	2075	1.27	3	0.577	0%	72%	58.04	Polyhaline	Sand	26.9
Region 2 2013 NY/NJ Harbor Sampling	JB459	89	96	10	2650	1.35	2	0.586	2%	58%	7.66	Polyhaline	Sand	15.6
Region 2 2013 NY/NJ Harbor Sampling	JB464	88	102	10	2450	1.45	3	0.631	0%	59%	65.84	Polyhaline	Sand	24.8
Region 2 2013 NY/NJ Harbor Sampling	JB466	96	99	7	1850	1.50	3	0.770	0%	51%	1.54	Polyhaline	Sand	1.3
Region 2 2013 NY/NJ Harbor Sampling	JB467	93	96	8	1525	1.33	2	0.638	0%	57%	2.09	Polyhaline	Sand	30
Region 2 2013 NY/NJ Harbor Sampling	JB468	67	69	7	1900	1.46	3	0.749	0%	49%	120.60	Polyhaline	Sand	2.1
Region 2 2013 NY/NJ Harbor Sampling	JB471	98	101	5	1525	0.93	2	0.581	0%	69%	168.42	Polyhaline	Mud	59
Region 2 2013 NY/NJ Harbor Sampling	JB472	80	86	--	--	--	--	--	--	--	--	--	--	--
Region 2 2013 NY/NJ Harbor Sampling	JB474	97	100	9	1100	1.57	3	0.715	5%	57%	3.92	Polyhaline	Mud	95
Region 2 2013 NY/NJ Harbor Sampling	JB480	92	95	4	1525	0.95	2	0.688	0%	0%	264.33	Polyhaline	Sand	5.8
Region 2 2013 NY/NJ Harbor Sampling	JB481	95	102	6	1575	1.45	3	0.808	0%	41%	54.16	Polyhaline	Sand	14
Region 2 2013 NY/NJ Harbor Sampling	JB486	72	74	12	1950	1.53	3	0.617	1%	60%	230.33	Polyhaline	Sand	5.2
Region 2 2013 NY/NJ Harbor Sampling	JB487	95	98	9	1650	1.55	3	0.707	2%	44%	84.95	Polyhaline	Mud	95

Table A-1-3
Sediment Chemistry Screening Results, *A. abdita* Survival Data and Benthic Metrics for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	NY/NJ B-IBI Indices						Number of ERL[b] Exceedances	Number of ERM[b] Exceedances	Pass Chemical Screen	Pass Toxicity Screen	Acceptable Reference Sample
		Taxa	Proportion Sensitive	Proportion Tolerant	Abundance	Biomass	NJ/NY B-IBI Final					
Region 2 2008 NY/NJ Harbor Sampling	JB401	1	5	1	5	3	3	0	0	Yes	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB403	1	1	5	1	1	1.8	13	1	No	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB404	3	1	5	1	5	3	11	1	No	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB405	5	1	3	1	3	2.6	3	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB406	1	1	5	5	3	3	0	0	Yes	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB407	1	1	5	1	3	2.2	11	1	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB409	5	1	3	1	3	2.6	9	1	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB410	3	1	1	5	3	2.6	1	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB415	5	1	1	3	3	2.6	0	0	Yes	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB416	5	1	3	1	3	2.6	6	0	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB417	3	1	1	5	5	3	2	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB419	5	1	5	1	3	3	8	1	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB422	5	1	1	1	3	2.2	2	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB423	5	1	3	1	3	2.6	8	1	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB454	5	1	3	1	3	2.6	4	0	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB458	5	1	1	1	3	2.2	1	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB459	5	1	1	1	3	2.2	2	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB464	5	1	3	1	3	2.6	4	0	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB466	5	1	3	1	3	2.6	2	0	Yes	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB467	5	1	1	1	3	2.2	8	0	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB468	5	3	1	3	3	3	3	0	Yes	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB471	3	1	3	1	3	2.2	8	0	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB472	1	1	5	1	1	1.8	12	4	No	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB474	1	1	5	1	1	1.8	17	1	No	Yes	No
Region 2 2008 NY/NJ Harbor Sampling	JB480	3	1	1	5	3	2.6	4	0	No	No	No
Region 2 2008 NY/NJ Harbor Sampling	JB481	5	1	1	3	3	2.6	0	0	Yes	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB486	5	5	3	3	5	4.2	0	0	Yes	Yes	Yes
Region 2 2008 NY/NJ Harbor Sampling	JB487	--	--	--	--	--	--	5	0	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	1	1	3	3	1	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB403	1	1	1	1	1	1	7	0	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB404	1	1	1	1	1	1	8	0	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB405	1	1	1	5	5	2.6	1	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB406	1	1	1	5	3	2.2	1	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB407	1	1	1	3	5	2.2	6	0	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB409	1	1	1	3	3	1.8	2	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB410	1	1	1	1	1	1	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB415	1	1	1	3	5	2.2	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB416	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB417	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB419	1	1	1	3	1	1.4	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB422	1	1	1	3	1	1.4	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB423	1	1	1	3	3	1.8	4	0	No	Yes	No

Table A-1-3
Sediment Chemistry Screening Results, *A. abdita* Survival Data and Benthic Metrics for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	NY/NJ B-IBI Indices						Number of ERL[b] Exceedances	Number of ERM[b] Exceedances	Pass Chemical Screen	Pass Toxicity Screen	Acceptable Reference Sample
		Taxa	Proportion Sensitive	Proportion Tolerant	Abundance	Biomass	NJ/NY B-IBI Final					
Region 2 2013 NY/NJ Harbor Sampling	JB454	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB458	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB459	1	1	1	5	5	2.6	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB464	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB466	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB467	1	1	1	3	5	2.2	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB468	1	1	1	3	3	1.8	0	0	Yes	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB471	1	1	1	3	3	1.8	5	0	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB472	--	--	--	--	--	--	22	2	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB474	1	3	1	1	5	2.2	6	1	No	Yes	No
Region 2 2013 NY/NJ Harbor Sampling	JB480	1	1	5	3	3	2.6	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB481	1	1	1	3	3	1.8	0	0	Yes	Yes	Yes
Region 2 2013 NY/NJ Harbor Sampling	JB486	1	1	1	3	3	1.8	0	0	Yes	No	No
Region 2 2013 NY/NJ Harbor Sampling	JB487	1	1	1	3	3	1.8	7	0	No	Yes	No

Table A-1-3
Sediment Chemistry Screening Results, *A. abdita* Survival Data and Benthic Metrics for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Notes:

[a]Sediment toxicity and benthic invertebrate community data for these studies were downloaded from the Water Quality Portal (National Water Quality Monitoring Council 2019) - a cooperative service sponsored by the United States Geological Survey (USGS), the United States Environmental Protection Agency (USEPA), and the National Water Quality Monitoring Council that integrates publicly available water-quality data from the USGS National Water Information System (NWIS) database and the USEPA STOrage and RETrieval (STORET) data warehouse. The BIC metrics were calcuated from the individual species counts for each station.

[b]Sediment screeing values are the ERL and ERM reported in Long et al. (1995).

Acronyms and Abbreviations:

B-IBI = Benthic Index of Biotic Integrity
ERL = effect range-low
ERM = effect range-medium
ID = Identification
per m^2 = per square meter
NY/NJ = New York/New Jersey
-- = Benthic invertebrate community data not available.
% = percent

References:

Long E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ Manage 19:81-97.
National Water Quality Monitoring Council. 2019. Water Quality Portal. Available online at https://www.waterqualitydata.us/. Accessed on April 10, 2019.

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling	JB401	Biomass, benthic	0.005	g/m^2	Amphipoda
	JB401	Biomass, benthic	0.0025	g/m^2	Gastropoda
	JB401	Biomass, benthic	0.74	g/m^2	Nephtys
	JB401	Biomass, benthic	0.025	g/m^2	Oligochaeta (Oligochaeta)
	JB401	Biomass, benthic	0.0025	g/m^2	Polydora
	JB401	Biomass, benthic	0.025	g/m^2	Polygordius
	JB401	Biomass, benthic	0.2375	g/m^2	Streblospio benedicti
	JB401	Biomass, benthic	0.1425	g/m^2	Tellinidae
	JB401	Count	175	$\#/m^2$	Cirratulidae
	JB401	Count	100	$\#/m^2$	Eobrolgus spinosus
	JB401	Count	25	$\#/m^2$	Gastropoda
	JB401	Count	25	$\#/m^2$	Nassarius trivittatus
	JB401	Count	75	$\#/m^2$	Nephtys picta
	JB401	Count	25	$\#/m^2$	Phyllodoce arenae
	JB401	Count	25	$\#/m^2$	Polydora cornuta
	JB401	Count	1125	$\#/m^2$	Polygordius
	JB401	Count	5675	$\#/m^2$	Streblospio benedicti
	JB401	Count	25	$\#/m^2$	Tellina agilis
	JB401	Count	150	$\#/m^2$	Tellinidae
	JB401	Count	100	$\#/m^2$	Tharyx acutus
	JB401	Count	125	$\#/m^2$	Tubificidae
	JB403	Biomass, benthic	0.0025	g/m^2	Ampelisca
	JB403	Count	75	$\#/m^2$	Ampelisca vadorum
	JB403	Count	25	$\#/m^2$	Podarke obscura
	JB404	Biomass, benthic	4.95	g/m^2	Ampelisca
	JB404	Biomass, benthic	0.09	g/m^2	Amphipoda
	JB404	Biomass, benthic	0.455	g/m^2	Decapoda
	JB404	Biomass, benthic	0.0125	g/m^2	Mediomastus ambiseta
	JB404	Biomass, benthic	0.2	g/m^2	Neanthes succinea

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB404	Biomass, benthic	0.0175	g/m^2	Nemertea
	JB404	Biomass, benthic	0.0075	g/m^2	Ostracoda
	JB404	Biomass, benthic	0.025	g/m^2	Polydora
	JB404	Biomass, benthic	0.1875	g/m^2	Streblospio benedicti
	JB404	Count	29125	$\#/m^2$	Ampelisca
	JB404	Count	13700	$\#/m^2$	Ampelisca abdita
	JB404	Count	950	$\#/m^2$	Ampelisca vadorum
	JB404	Count	75	$\#/m^2$	Crangon septemspinosa
	JB404	Count	25	$\#/m^2$	Dyspanopeus sayi
	JB404	Count	600	$\#/m^2$	Lysianopsis alba
	JB404	Count	200	$\#/m^2$	Mediomastus ambiseta
	JB404	Count	200	$\#/m^2$	Neanthes succinea
	JB404	Count	25	$\#/m^2$	Nemertea
	JB404	Count	50	$\#/m^2$	Parasterope pollex
	JB404	Count	75	$\#/m^2$	Phyllodocidae
	JB404	Count	25	$\#/m^2$	Podarke obscura
	JB404	Count	75	$\#/m^2$	Podarkeopsis levifuscina
	JB404	Count	200	$\#/m^2$	Polydora cornuta
	JB404	Count	4575	$\#/m^2$	Streblospio benedicti
	JB405	Biomass, benthic	17.1325	g/m^2	Ampelisca
	JB405	Biomass, benthic	1.0125	g/m^2	Amphipoda
	JB405	Biomass, benthic	0.035	g/m^2	Corophium
	JB405	Biomass, benthic	11.9775	g/m^2	Decapoda
	JB405	Biomass, benthic	0.9025	g/m^2	Gastropoda
	JB405	Biomass, benthic	0.195	g/m^2	Leitoscoloplos
	JB405	Biomass, benthic	0.0075	g/m^2	Mediomastus ambiseta
	JB405	Biomass, benthic	0.0025	g/m^2	Mercenaria mercenaria
	JB405	Biomass, benthic	0.1225	g/m^2	Neanthes succinea
	JB405	Biomass, benthic	0.075	g/m^2	Nemertea

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB405	Biomass, benthic	0.03	g/m^2	Nucula
	JB405	Biomass, benthic	0.01	g/m^2	Oligochaeta (Oligochaeta)
	JB405	Biomass, benthic	0.005	g/m^2	Ostracoda
	JB405	Biomass, benthic	0.655	g/m^2	Polydora
	JB405	Biomass, benthic	0.87	g/m^2	Streblospio benedicti
	JB405	Biomass, benthic	0.64	g/m^2	Tellinidae
	JB405	Count	3800	$\#/m^2$	Ampelisca
	JB405	Count	73825	$\#/m^2$	Ampelisca abdita
	JB405	Count	1250	$\#/m^2$	Ampelisca vadorum
	JB405	Count	25	$\#/m^2$	Arcidae
	JB405	Count	25	$\#/m^2$	Calyptraeidae
	JB405	Count	200	$\#/m^2$	Capitella capitata
	JB405	Count	150	$\#/m^2$	Cirratulidae
	JB405	Count	75	$\#/m^2$	Crepidula fornicata
	JB405	Count	125	$\#/m^2$	Dyspanopeus sayi
	JB405	Count	1100	$\#/m^2$	Elasmopus levis
	JB405	Count	50	$\#/m^2$	Eumida sanguinea
	JB405	Count	100	$\#/m^2$	Exogone dispar
	JB405	Count	5900	$\#/m^2$	Lysianopsis alba
	JB405	Count	1025	$\#/m^2$	Mediomastus ambiseta
	JB405	Count	400	$\#/m^2$	Melita nitida
	JB405	Count	25	$\#/m^2$	Melitidae
	JB405	Count	25	$\#/m^2$	Mercenaria mercenaria
	JB405	Count	275	$\#/m^2$	Microdeutopus
	JB405	Count	1225	$\#/m^2$	Microdeutopus gryllotalpa
	JB405	Count	250	$\#/m^2$	Monocorophium tuberculatum
	JB405	Count	100	$\#/m^2$	Mysella planulata
	JB405	Count	125	$\#/m^2$	Neanthes succinea
	JB405	Count	100	$\#/m^2$	Nemertea

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB405	Count	175	#/m^2	Nereididae
	JB405	Count	450	#/m^2	Nereis acuminata
	JB405	Count	25	#/m^2	Notocirrus spiniferus
	JB405	Count	275	#/m^2	Nucula proxima
	JB405	Count	100	#/m^2	Parasterope pollex
	JB405	Count	100	#/m^2	Petricolaria pholadiformis
	JB405	Count	75	#/m^2	Phyllodoce arenae
	JB405	Count	75	#/m^2	Phyllodocidae
	JB405	Count	200	#/m^2	Podarke obscura
	JB405	Count	11475	#/m^2	Polydora cornuta
	JB405	Count	600	#/m^2	Rhepoxynius hudsoni
	JB405	Count	25	#/m^2	Scoloplos robustus
	JB405	Count	25	#/m^2	Spio filicornis
	JB405	Count	20225	#/m^2	Streblospio benedicti
	JB405	Count	250	#/m^2	Tellina agilis
	JB405	Count	75	#/m^2	Tellinidae
	JB405	Count	1225	#/m^2	Tharyx acutus
	JB405	Count	725	#/m^2	Tubificidae
	JB405	Count	25	#/m^2	Unciola serrata
	JB405	Count	475	#/m^2	Xanthidae
	JB406	Biomass, benthic	0.0025	g/m^2	Ampelisca
	JB406	Biomass, benthic	21.1075	g/m^2	Gastropoda
	JB406	Biomass, benthic	0.74	g/m^2	Gemma gemma
	JB406	Biomass, benthic	2.3275	g/m^2	Leitoscoloplos
	JB406	Biomass, benthic	0.01	g/m^2	Mercenaria mercenaria
	JB406	Biomass, benthic	0.03	g/m^2	Neanthes succinea
	JB406	Count	25	#/m^2	Ampelisca
	JB406	Count	50	#/m^2	Capitella capitata
	JB406	Count	2875	#/m^2	Gemma gemma

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB406	Count	25	#/m^2	Mercenaria mercenaria
	JB406	Count	25	#/m^2	Mya arenaria
	JB406	Count	25	#/m^2	Mytilidae
	JB406	Count	425	#/m^2	Nassarius obsoletus
	JB406	Count	25	#/m^2	Neanthes succinea
	JB406	Count	100	#/m^2	Odostomia trifida
	JB406	Count	25	#/m^2	Palaemonetes intermedius
	JB406	Count	25	#/m^2	Phyllodocidae
	JB406	Count	3975	#/m^2	Scoloplos robustus
	JB406	Count	50	#/m^2	Veneridae
	JB407	Biomass, benthic	0.03	g/m^2	Ampelisca
	JB407	Biomass, benthic	1.18	g/m^2	Gastropoda
	JB407	Biomass, benthic	49.0925	g/m^2	Mercenaria mercenaria
	JB407	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB407	Count	25	#/m^2	Actiniaria
	JB407	Count	50	#/m^2	Ampelisca
	JB407	Count	200	#/m^2	Ampelisca abdita
	JB407	Count	25	#/m^2	Capitella capitata
	JB407	Count	25	#/m^2	Crepidula plana
	JB407	Count	25	#/m^2	Gastropoda
	JB407	Count	25	#/m^2	Glycera americana
	JB407	Count	25	#/m^2	Hesionidae
	JB407	Count	75	#/m^2	Mercenaria mercenaria
	JB407	Count	25	#/m^2	Nassariidae
	JB407	Count	25	#/m^2	Nassarius obsoletus
	JB407	Count	50	#/m^2	Podarke obscura
	JB407	Count	150	#/m^2	Podarkeopsis levifuscina
	JB407	Count	150	#/m^2	Tubificidae
	JB409	Biomass, benthic	8.0325	g/m^2	Ampelisca

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB409	Biomass, benthic	0.2525	g/m^2	Amphipoda
	JB409	Biomass, benthic	0.03	g/m^2	Corophium
	JB409	Biomass, benthic	0.0225	g/m^2	Cyathura
	JB409	Biomass, benthic	22.6375	g/m^2	Decapoda
	JB409	Biomass, benthic	2.83	g/m^2	Gastropoda
	JB409	Biomass, benthic	0.0675	g/m^2	Glycera
	JB409	Biomass, benthic	0.02	g/m^2	Mediomastus ambiseta
	JB409	Biomass, benthic	100.3775	g/m^2	Mercenaria mercenaria
	JB409	Biomass, benthic	0.16	g/m^2	Neanthes succinea
	JB409	Biomass, benthic	0.1725	g/m^2	Polydora
	JB409	Biomass, benthic	0.755	g/m^2	Streblospio benedicti
	JB409	Count	65600	$\#/m^2$	Ampelisca
	JB409	Count	14100	$\#/m^2$	Ampelisca abdita
	JB409	Count	1300	$\#/m^2$	Ampelisca vadorum
	JB409	Count	25	$\#/m^2$	Capitella capitata
	JB409	Count	25	$\#/m^2$	Cyathura burbancki
	JB409	Count	250	$\#/m^2$	Dyspanopeus sayi
	JB409	Count	25	$\#/m^2$	Elasmopus levis
	JB409	Count	25	$\#/m^2$	Glycera americana
	JB409	Count	50	$\#/m^2$	Hesionidae
	JB409	Count	1025	$\#/m^2$	Lysianopsis alba
	JB409	Count	150	$\#/m^2$	Mediomastus ambiseta
	JB409	Count	75	$\#/m^2$	Mercenaria mercenaria
	JB409	Count	650	$\#/m^2$	Microdeutopus gryllotalpa
	JB409	Count	50	$\#/m^2$	Monocorophium tuberculatum
	JB409	Count	100	$\#/m^2$	Nassarius obsoletus
	JB409	Count	50	$\#/m^2$	Neanthes succinea
	JB409	Count	25	$\#/m^2$	Nereis acuminata
	JB409	Count	50	$\#/m^2$	Phyllodoce arenae

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB409	Count	625	#/m^2	Podarke obscura
	JB409	Count	175	#/m^2	Podarkeopsis levifuscina
	JB409	Count	2100	#/m^2	Polydora cornuta
	JB409	Count	13200	#/m^2	Streblospio benedicti
	JB409	Count	25	#/m^2	Xanthidae
	JB410	Biomass, benthic	0.0025	g/m^2	Ampelisca
	JB410	Biomass, benthic	0.945	g/m^2	Decapoda
	JB410	Biomass, benthic	39.225	g/m^2	Gastropoda
	JB410	Biomass, benthic	0.0075	g/m^2	Gemma gemma
	JB410	Biomass, benthic	0.03	g/m^2	Leitoscoloplos
	JB410	Biomass, benthic	0.005	g/m^2	Oligochaeta (Oligochaeta)
	JB410	Biomass, benthic	0.015	g/m^2	Polydora
	JB410	Biomass, benthic	0.0875	g/m^2	Streblospio benedicti
	JB410	Biomass, benthic	0.0025	g/m^2	Tellinidae
	JB410	Count	50	#/m^2	Ampelisca
	JB410	Count	900	#/m^2	Capitella capitata
	JB410	Count	50	#/m^2	Crepidula fornicata
	JB410	Count	150	#/m^2	Gemma gemma
	JB410	Count	1925	#/m^2	Nassarius obsoletus
	JB410	Count	25	#/m^2	Nereididae
	JB410	Count	25	#/m^2	Nucula proxima
	JB410	Count	150	#/m^2	Odostomia trifida
	JB410	Count	25	#/m^2	Pagurus
	JB410	Count	250	#/m^2	Polydora cornuta
	JB410	Count	50	#/m^2	Scoloplos robustus
	JB410	Count	1525	#/m^2	Streblospio benedicti
	JB410	Count	25	#/m^2	Tellina
	JB410	Count	100	#/m^2	Tubificidae
	JB410	Count	25	#/m^2	Veneridae

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB415	Biomass, benthic	0.01	g/m^2	Ampelisca
	JB415	Biomass, benthic	6.775	g/m^2	Decapoda
	JB415	Biomass, benthic	26.2275	g/m^2	Gastropoda
	JB415	Biomass, benthic	0.5675	g/m^2	Leitoscoloplos
	JB415	Biomass, benthic	0.08	g/m^2	Mediomastus ambiseta
	JB415	Biomass, benthic	0.1475	g/m^2	Mercenaria mercenaria
	JB415	Biomass, benthic	0.0025	g/m^2	Mulinia lateralis
	JB415	Biomass, benthic	0.005	g/m^2	Oligochaeta (Oligochaeta)
	JB415	Biomass, benthic	0.0025	g/m^2	Polydora
	JB415	Biomass, benthic	0.445	g/m^2	Streblospio benedicti
	JB415	Biomass, benthic	0.0125	g/m^2	Tellinidae
	JB415	Count	25	$\#/m^2$	Acmira catherinae
	JB415	Count	75	$\#/m^2$	Ampelisca
	JB415	Count	100	$\#/m^2$	Anthozoa (Anthozoa)
	JB415	Count	150	$\#/m^2$	Capitella capitata
	JB415	Count	25	$\#/m^2$	Cirratulidae
	JB415	Count	500	$\#/m^2$	Crepidula fornicata
	JB415	Count	25	$\#/m^2$	Doridella obscura
	JB415	Count	75	$\#/m^2$	Glycinde solitaria
	JB415	Count	2650	$\#/m^2$	Mediomastus ambiseta
	JB415	Count	725	$\#/m^2$	Mercenaria mercenaria
	JB415	Count	25	$\#/m^2$	Mulinia lateralis
	JB415	Count	1025	$\#/m^2$	Nassarius obsoletus
	JB415	Count	575	$\#/m^2$	Odostomia trifida
	JB415	Count	25	$\#/m^2$	Pagurus
	JB415	Count	100	$\#/m^2$	Pagurus politus
	JB415	Count	25	$\#/m^2$	Phyllodoce arenae
	JB415	Count	25	$\#/m^2$	Polydora cornuta
	JB415	Count	25	$\#/m^2$	Scolelepis texana

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB415	Count	125	#/m^2	Scoloplos robustus
	JB415	Count	25	#/m^2	Spiochaetopterus oculatus
	JB415	Count	9975	#/m^2	Streblospio benedicti
	JB415	Count	50	#/m^2	Tellina agilis
	JB415	Count	1650	#/m^2	Tubificidae
	JB416	Biomass, benthic	29.19	g/m^2	Ampelisca
	JB416	Biomass, benthic	0.625	g/m^2	Amphipoda
	JB416	Biomass, benthic	0.005	g/m^2	Corophium
	JB416	Biomass, benthic	0.245	g/m^2	Cyathura
	JB416	Biomass, benthic	22.77	g/m^2	Decapoda
	JB416	Biomass, benthic	0.54	g/m^2	Gastropoda
	JB416	Biomass, benthic	0.015	g/m^2	Mediomastus ambiseta
	JB416	Biomass, benthic	244.2675	g/m^2	Mercenaria mercenaria
	JB416	Biomass, benthic	0.0025	g/m^2	Nemertea
	JB416	Biomass, benthic	0.075	g/m^2	Oligochaeta (Oligochaeta)
	JB416	Biomass, benthic	0.0125	g/m^2	Ostracoda
	JB416	Biomass, benthic	0.2775	g/m^2	Polydora
	JB416	Biomass, benthic	1.345	g/m^2	Streblospio benedicti
	JB416	Biomass, benthic	0.2725	g/m^2	Tellinidae
	JB416	Count	26200	#/m^2	Ampelisca
	JB416	Count	21100	#/m^2	Ampelisca vadorum
	JB416	Count	25	#/m^2	Ampharetidae
	JB416	Count	75	#/m^2	Aoridae
	JB416	Count	50	#/m^2	Catenulida (Platyhelminthes)
	JB416	Count	175	#/m^2	Cirratulidae
	JB416	Count	25	#/m^2	Crangon septemspinosa
	JB416	Count	200	#/m^2	Cyathura burbancki
	JB416	Count	575	#/m^2	Dyspanopeus sayi
	JB416	Count	1250	#/m^2	Elasmopus levis

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB416	Count	100	#/m^2	Eobrolgus spinosus
	JB416	Count	50	#/m^2	Ericthonius brasiliensis
	JB416	Count	50	#/m^2	Eumida sanguinea
	JB416	Count	125	#/m^2	Hesionidae
	JB416	Count	25	#/m^2	Hydrozoa
	JB416	Count	1175	#/m^2	Lysianopsis alba
	JB416	Count	275	#/m^2	Mediomastus ambiseta
	JB416	Count	575	#/m^2	Melita nitida
	JB416	Count	425	#/m^2	Melitidae
	JB416	Count	25	#/m^2	Mercenaria mercenaria
	JB416	Count	1225	#/m^2	Microdeutopus gryllotalpa
	JB416	Count	200	#/m^2	Monocorophium tuberculatum
	JB416	Count	25	#/m^2	Nassarius obsoletus
	JB416	Count	25	#/m^2	Nemertea
	JB416	Count	100	#/m^2	Nereis acuminata
	JB416	Count	25	#/m^2	Parasterope pollex
	JB416	Count	100	#/m^2	Phyllodocidae
	JB416	Count	1400	#/m^2	Podarke obscura
	JB416	Count	175	#/m^2	Podarkeopsis levifuscina
	JB416	Count	3950	#/m^2	Polydora cornuta
	JB416	Count	23275	#/m^2	Streblospio benedicti
	JB416	Count	25	#/m^2	Syllidae
	JB416	Count	50	#/m^2	Tellina agilis
	JB416	Count	425	#/m^2	Tharyx acutus
	JB416	Count	1600	#/m^2	Tubificidae
	JB416	Count	25	#/m^2	Xanthidae
	JB417	Biomass, benthic	0.02	g/m^2	Ampelisca
	JB417	Biomass, benthic	0.015	g/m^2	Amphipoda
	JB417	Biomass, benthic	0.005	g/m^2	Decapoda

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB417	Biomass, benthic	4.87	g/m^2	Neanthes succinea
	JB417	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB417	Biomass, benthic	0.01	g/m^2	Polydora
	JB417	Biomass, benthic	0.0425	g/m^2	Streblospio benedicti
	JB417	Count	50	$\#/m^2$	Ampelisca abdita
	JB417	Count	25	$\#/m^2$	Ampharetidae
	JB417	Count	725	$\#/m^2$	Capitella capitata
	JB417	Count	200	$\#/m^2$	Dyspanopeus sayi
	JB417	Count	25	$\#/m^2$	Heteromysis formosa
	JB417	Count	25	$\#/m^2$	Lysianopsis alba
	JB417	Count	25	$\#/m^2$	Melita
	JB417	Count	125	$\#/m^2$	Mytilus edulis
	JB417	Count	200	$\#/m^2$	Neanthes succinea
	JB417	Count	50	$\#/m^2$	Nereididae
	JB417	Count	25	$\#/m^2$	Nereis acuminata
	JB417	Count	100	$\#/m^2$	Palaemonetes intermedius
	JB417	Count	25	$\#/m^2$	Podarke obscura
	JB417	Count	175	$\#/m^2$	Polydora cornuta
	JB417	Count	900	$\#/m^2$	Streblospio benedicti
	JB417	Count	75	$\#/m^2$	Tubificidae
	JB417	Count	200	$\#/m^2$	Xanthidae
	JB419	Biomass, benthic	79.88	g/m^2	Ampelisca
	JB419	Biomass, benthic	1.4375	g/m^2	Amphipoda
	JB419	Biomass, benthic	0.095	g/m^2	Corophium
	JB419	Biomass, benthic	8.015	g/m^2	Decapoda
	JB419	Biomass, benthic	0.875	g/m^2	Gastropoda
	JB419	Biomass, benthic	1.9675	g/m^2	Glycera
	JB419	Biomass, benthic	0.0575	g/m^2	Mediomastus ambiseta
	JB419	Biomass, benthic	0.0025	g/m^2	Mercenaria mercenaria

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB419	Biomass, benthic	0.105	g/m^2	Neanthes succinea
	JB419	Biomass, benthic	0.0025	g/m^2	Nemertea
	JB419	Biomass, benthic	0.005	g/m^2	Nucula
	JB419	Biomass, benthic	0.0125	g/m^2	Oligochaeta (Oligochaeta)
	JB419	Biomass, benthic	0.0025	g/m^2	Ostracoda
	JB419	Biomass, benthic	0.025	g/m^2	Polydora
	JB419	Biomass, benthic	0.0025	g/m^2	Polygordius
	JB419	Biomass, benthic	0.95	g/m^2	Streblospio benedicti
	JB419	Biomass, benthic	0.22	g/m^2	Tellinidae
	JB419	Biomass, benthic	0.4	g/m^2	Unciola
	JB419	Count	268400	$\#/m^2$	Ampelisca
	JB419	Count	79600	$\#/m^2$	Ampelisca abdita
	JB419	Count	6000	$\#/m^2$	Ampelisca vadorum
	JB419	Count	50	$\#/m^2$	Ampharetidae
	JB419	Count	100	$\#/m^2$	Arcidae
	JB419	Count	25	$\#/m^2$	Bivalvia
	JB419	Count	175	$\#/m^2$	Capitella capitata
	JB419	Count	425	$\#/m^2$	Catenulida (Platyhelminthes)
	JB419	Count	75	$\#/m^2$	Cirratulidae
	JB419	Count	25	$\#/m^2$	Crepidula fornicata
	JB419	Count	50	$\#/m^2$	Dyspanopeus sayi
	JB419	Count	1100	$\#/m^2$	Elasmopus levis
	JB419	Count	25	$\#/m^2$	Ericthonius brasiliensis
	JB419	Count	100	$\#/m^2$	Eumida sanguinea
	JB419	Count	25	$\#/m^2$	Gastropoda
	JB419	Count	75	$\#/m^2$	Glycera americana
	JB419	Count	450	$\#/m^2$	Lysianopsis alba
	JB419	Count	1700	$\#/m^2$	Mediomastus ambiseta
	JB419	Count	3100	$\#/m^2$	Melita nitida

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB419	Count	75	#/m^2	Mercenaria mercenaria
	JB419	Count	25	#/m^2	Microdeutopus gryllotalpa
	JB419	Count	575	#/m^2	Monocorophium tuberculatum
	JB419	Count	100	#/m^2	Mysella planulata
	JB419	Count	25	#/m^2	Nassarius obsoletus
	JB419	Count	175	#/m^2	Neanthes succinea
	JB419	Count	125	#/m^2	Nemertea
	JB419	Count	125	#/m^2	Nereis
	JB419	Count	1275	#/m^2	Nereis acuminata
	JB419	Count	25	#/m^2	Nucula proxima
	JB419	Count	25	#/m^2	Parasterope pollex
	JB419	Count	350	#/m^2	Phyllodoce arenae
	JB419	Count	75	#/m^2	Podarke obscura
	JB419	Count	50	#/m^2	Podarkeopsis levifuscina
	JB419	Count	425	#/m^2	Polydora cornuta
	JB419	Count	50	#/m^2	Polygordius
	JB419	Count	19450	#/m^2	Streblospio benedicti
	JB419	Count	25	#/m^2	Streptosyllis pettiboneae
	JB419	Count	100	#/m^2	Tellina agilis
	JB419	Count	150	#/m^2	Tellinidae
	JB419	Count	1475	#/m^2	Tharyx acutus
	JB419	Count	325	#/m^2	Tubificidae
	JB419	Count	50	#/m^2	Unciola
	JB419	Count	625	#/m^2	Unciola serrata
	JB419	Count	500	#/m^2	Xanthidae
	JB422	Biomass, benthic	8.17	g/m^2	Ampelisca
	JB422	Biomass, benthic	0.1725	g/m^2	Amphipoda
	JB422	Biomass, benthic	0.0025	g/m^2	Corophium
	JB422	Biomass, benthic	0.555	g/m^2	Cyathura

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB422	Biomass, benthic	1.4275	g/m^2	Decapoda
	JB422	Biomass, benthic	0.125	g/m^2	Gastropoda
	JB422	Biomass, benthic	0.0025	g/m^2	Leitoscoloplos
	JB422	Biomass, benthic	0.025	g/m^2	Mediomastus ambiseta
	JB422	Biomass, benthic	0.08	g/m^2	Oligochaeta (Oligochaeta)
	JB422	Biomass, benthic	0.0475	g/m^2	Ostracoda
	JB422	Biomass, benthic	1.9975	g/m^2	Polydora
	JB422	Biomass, benthic	4.7325	g/m^2	Streblospio benedicti
	JB422	Biomass, benthic	0.4	g/m^2	Tellinidae
	JB422	Count	25	$\#/m^2$	Acmira catherinae
	JB422	Count	15000	$\#/m^2$	Ampelisca
	JB422	Count	3600	$\#/m^2$	Ampelisca abdita
	JB422	Count	7200	$\#/m^2$	Ampelisca vadorum
	JB422	Count	25	$\#/m^2$	Aoridae
	JB422	Count	25	$\#/m^2$	Asabellides oculata
	JB422	Count	25	$\#/m^2$	Bivalvia
	JB422	Count	25	$\#/m^2$	Capitella capitata
	JB422	Count	100	$\#/m^2$	Cirratulidae
	JB422	Count	275	$\#/m^2$	Crepidula fornicata
	JB422	Count	325	$\#/m^2$	Cyathura burbancki
	JB422	Count	1750	$\#/m^2$	Eobrolgus spinosus
	JB422	Count	400	$\#/m^2$	Exogone dispar
	JB422	Count	25	$\#/m^2$	Lysianassidae
	JB422	Count	250	$\#/m^2$	Lysianopsis alba
	JB422	Count	400	$\#/m^2$	Mediomastus ambiseta
	JB422	Count	25	$\#/m^2$	Melitidae
	JB422	Count	500	$\#/m^2$	Microdeutopus gryllotalpa
	JB422	Count	50	$\#/m^2$	Monocorophium tuberculatum
	JB422	Count	1275	$\#/m^2$	Nereis acuminata

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB422	Count	25	#/m^2	Pagurus politus
	JB422	Count	1375	#/m^2	Parasterope pollex
	JB422	Count	50	#/m^2	Phoxocephalidae
	JB422	Count	100	#/m^2	Phyllodoce arenae
	JB422	Count	25	#/m^2	Podarkeopsis levifuscina
	JB422	Count	18100	#/m^2	Polydora cornuta
	JB422	Count	25	#/m^2	Scoloplos robustus
	JB422	Count	25	#/m^2	Spio filicornis
	JB422	Count	70700	#/m^2	Streblospio benedicti
	JB422	Count	25	#/m^2	Streptosyllis pettiboneae
	JB422	Count	100	#/m^2	Tellina agilis
	JB422	Count	275	#/m^2	Tharyx acutus
	JB422	Count	2800	#/m^2	Tubificidae
	JB422	Count	25	#/m^2	Veneridae
	JB422	Count	25	#/m^2	Xanthidae
	JB423	Biomass, benthic	10.9	g/m^2	Ampelisca
	JB423	Biomass, benthic	0.4875	g/m^2	Amphipoda
	JB423	Biomass, benthic	0.0025	g/m^2	Corophium
	JB423	Biomass, benthic	12.945	g/m^2	Decapoda
	JB423	Biomass, benthic	0.04	g/m^2	Mediomastus ambiseta
	JB423	Biomass, benthic	0.1425	g/m^2	Neanthes succinea
	JB423	Biomass, benthic	0.1175	g/m^2	Nemertea
	JB423	Biomass, benthic	2.875	g/m^2	Nucula
	JB423	Biomass, benthic	0.0075	g/m^2	Oligochaeta (Oligochaeta)
	JB423	Biomass, benthic	0.005	g/m^2	Ostracoda
	JB423	Biomass, benthic	0.6775	g/m^2	Polydora
	JB423	Biomass, benthic	2.1725	g/m^2	Streblospio benedicti
	JB423	Biomass, benthic	0.605	g/m^2	Tellinidae
	JB423	Count	24800	#/m^2	Ampelisca

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB423	Count	23400	#/m^2	Ampelisca abdita
	JB423	Count	50	#/m^2	Ampelisca vadorum
	JB423	Count	25	#/m^2	Asabellides oculata
	JB423	Count	25	#/m^2	Batea catharinensis
	JB423	Count	25	#/m^2	Bivalvia
	JB423	Count	25	#/m^2	Capitella capitata
	JB423	Count	25	#/m^2	Cirratulidae
	JB423	Count	25	#/m^2	Clymenella torquata
	JB423	Count	25	#/m^2	Crangon septemspinosa
	JB423	Count	150	#/m^2	Dyspanopeus sayi
	JB423	Count	50	#/m^2	Elasmopus levis
	JB423	Count	925	#/m^2	Eobrolgus spinosus
	JB423	Count	25	#/m^2	Eumida sanguinea
	JB423	Count	50	#/m^2	Exogone dispar
	JB423	Count	1625	#/m^2	Lysianopsis alba
	JB423	Count	725	#/m^2	Mediomastus ambiseta
	JB423	Count	525	#/m^2	Melita nitida
	JB423	Count	300	#/m^2	Microdeutopus gryllotalpa
	JB423	Count	25	#/m^2	Monocorophium tuberculatum
	JB423	Count	100	#/m^2	Neanthes succinea
	JB423	Count	50	#/m^2	Nemertea
	JB423	Count	25	#/m^2	Nereididae
	JB423	Count	225	#/m^2	Nereis acuminata
	JB423	Count	1425	#/m^2	Nucula proxima
	JB423	Count	625	#/m^2	Parasterope pollex
	JB423	Count	75	#/m^2	Phyllodoce arenae
	JB423	Count	50	#/m^2	Polycirrus eximius
	JB423	Count	3075	#/m^2	Polydora cornuta
	JB423	Count	25	#/m^2	Schistomeringos rudolphi

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB423	Count	23475	#/m^2	Streblospio benedicti
	JB423	Count	175	#/m^2	Tellina agilis
	JB423	Count	175	#/m^2	Tharyx acutus
	JB423	Count	450	#/m^2	Tubificidae
	JB423	Count	275	#/m^2	Xanthidae
	JB454	Biomass, benthic	4.21	g/m^2	Ampelisca
	JB454	Biomass, benthic	0.74	g/m^2	Amphipoda
	JB454	Biomass, benthic	0.035	g/m^2	Corophium
	JB454	Biomass, benthic	8.4875	g/m^2	Decapoda
	JB454	Biomass, benthic	0.0125	g/m^2	Gastropoda
	JB454	Biomass, benthic	1.8725	g/m^2	Glycera
	JB454	Biomass, benthic	0.0125	g/m^2	Leitoscoloplos
	JB454	Biomass, benthic	0.0975	g/m^2	Lophogastrida
	JB454	Biomass, benthic	0.0675	g/m^2	Maldanidae
	JB454	Biomass, benthic	0.1	g/m^2	Mediomastus ambiseta
	JB454	Biomass, benthic	0.015	g/m^2	Neanthes succinea
	JB454	Biomass, benthic	0.125	g/m^2	Nemertea
	JB454	Biomass, benthic	0.7875	g/m^2	Nucula
	JB454	Biomass, benthic	0.025	g/m^2	Oligochaeta (Oligochaeta)
	JB454	Biomass, benthic	0.0525	g/m^2	Ostracoda
	JB454	Biomass, benthic	0.905	g/m^2	Polydora
	JB454	Biomass, benthic	1.57	g/m^2	Streblospio benedicti
	JB454	Biomass, benthic	1.83	g/m^2	Tellinidae
	JB454	Count	21000	#/m^2	Ampelisca
	JB454	Count	25600	#/m^2	Ampelisca abdita
	JB454	Count	25	#/m^2	Asabellides oculata
	JB454	Count	50	#/m^2	Clymenella torquata
	JB454	Count	50	#/m^2	Crangon septemspinosa
	JB454	Count	50	#/m^2	Crepidula

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB454	Count	200	#/m^2	Dyspanopeus sayi
	JB454	Count	400	#/m^2	Elasmopus levis
	JB454	Count	100	#/m^2	Eobrolgus spinosus
	JB454	Count	50	#/m^2	Eumida sanguinea
	JB454	Count	75	#/m^2	Exogone dispar
	JB454	Count	25	#/m^2	Glycera americana
	JB454	Count	1975	#/m^2	Lysianopsis alba
	JB454	Count	2250	#/m^2	Mediomastus ambiseta
	JB454	Count	725	#/m^2	Melita nitida
	JB454	Count	50	#/m^2	Melitidae
	JB454	Count	2700	#/m^2	Microdeutopus gryllotalpa
	JB454	Count	175	#/m^2	Monocorophium tuberculatum
	JB454	Count	75	#/m^2	Mysella planulata
	JB454	Count	50	#/m^2	Neanthes succinea
	JB454	Count	150	#/m^2	Nemertea
	JB454	Count	175	#/m^2	Neomysis americana
	JB454	Count	225	#/m^2	Nereis acuminata
	JB454	Count	1675	#/m^2	Nucula proxima
	JB454	Count	1900	#/m^2	Parasterope pollex
	JB454	Count	25	#/m^2	Petricolaria pholadiformis
	JB454	Count	100	#/m^2	Phoxocephalidae
	JB454	Count	25	#/m^2	Phyllodoce arenae
	JB454	Count	50	#/m^2	Podarke obscura
	JB454	Count	75	#/m^2	Podarkeopsis levifuscina
	JB454	Count	3850	#/m^2	Polydora cornuta
	JB454	Count	25	#/m^2	Scoloplos robustus
	JB454	Count	22650	#/m^2	Streblospio benedicti
	JB454	Count	350	#/m^2	Tellina agilis
	JB454	Count	775	#/m^2	Tharyx acutus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB454	Count	1725	#/m^2	Tubificidae
	JB454	Count	25	#/m^2	Veneridae
	JB454	Count	200	#/m^2	Xanthidae
	JB458	Biomass, benthic	0.015	g/m^2	Ampelisca
	JB458	Biomass, benthic	0.0025	g/m^2	Amphipoda
	JB458	Biomass, benthic	0.005	g/m^2	Corophium
	JB458	Biomass, benthic	5.8675	g/m^2	Decapoda
	JB458	Biomass, benthic	0.27	g/m^2	Gastropoda
	JB458	Biomass, benthic	0.0125	g/m^2	Gemma gemma
	JB458	Biomass, benthic	0.0375	g/m^2	Leitoscoloplos
	JB458	Biomass, benthic	0.085	g/m^2	Mediomastus ambiseta
	JB458	Biomass, benthic	0.0475	g/m^2	Mercenaria mercenaria
	JB458	Biomass, benthic	0.25	g/m^2	Nephtys
	JB458	Biomass, benthic	0.05	g/m^2	Nucula
	JB458	Biomass, benthic	0.0875	g/m^2	Oligochaeta (Oligochaeta)
	JB458	Biomass, benthic	0.0025	g/m^2	Polydora
	JB458	Biomass, benthic	0.01	g/m^2	Polygordius
	JB458	Biomass, benthic	2.445	g/m^2	Streblospio benedicti
	JB458	Biomass, benthic	0.715	g/m^2	Tellinidae
	JB458	Biomass, benthic	0.01	g/m^2	Unciola
	JB458	Count	250	#/m^2	Acmira catherinae
	JB458	Count	50	#/m^2	Ampelisca
	JB458	Count	25	#/m^2	Ampharetidae
	JB458	Count	25	#/m^2	Arcidae
	JB458	Count	75	#/m^2	Aricidea
	JB458	Count	50	#/m^2	Capitellidae
	JB458	Count	3125	#/m^2	Cirratulidae
	JB458	Count	275	#/m^2	Crepidula
	JB458	Count	375	#/m^2	Crepidula fornicata

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB458	Count	25	#/m^2	Dyspanopeus sayi
	JB458	Count	125	#/m^2	Elasmopus levis
	JB458	Count	75	#/m^2	Eumida sanguinea
	JB458	Count	75	#/m^2	Gemma gemma
	JB458	Count	50	#/m^2	Hydroides dianthus
	JB458	Count	25	#/m^2	Hydrozoa
	JB458	Count	25	#/m^2	Leitoscoloplos
	JB458	Count	1125	#/m^2	Mediomastus ambiseta
	JB458	Count	225	#/m^2	Mercenaria mercenaria
	JB458	Count	50	#/m^2	Monocorophium tuberculatum
	JB458	Count	25	#/m^2	Nephtys picta
	JB458	Count	100	#/m^2	Nereididae
	JB458	Count	250	#/m^2	Nereis acuminata
	JB458	Count	50	#/m^2	Nucula proxima
	JB458	Count	25	#/m^2	Pagurus politus
	JB458	Count	25	#/m^2	Phyllodoce arenae
	JB458	Count	225	#/m^2	Polydora cornuta
	JB458	Count	575	#/m^2	Polygordius
	JB458	Count	25	#/m^2	Rhepoxynius hudsoni
	JB458	Count	600	#/m^2	Sabellaria vulgaris
	JB458	Count	25	#/m^2	Spiophanes bombyx
	JB458	Count	75	#/m^2	Stenothoe minuta
	JB458	Count	25	#/m^2	Stenothoidae
	JB458	Count	38400	#/m^2	Streblospio benedicti
	JB458	Count	25	#/m^2	Streptosyllis pettiboneae
	JB458	Count	225	#/m^2	Tellina
	JB458	Count	500	#/m^2	Tellina agilis
	JB458	Count	25	#/m^2	Terebellidae
	JB458	Count	2475	#/m^2	Tharyx acutus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB458	Count	3575	#/m^2	Tubificidae
	JB458	Count	100	#/m^2	Unciola
	JB458	Count	200	#/m^2	Unciola serrata
	JB458	Count	25	#/m^2	Veneridae
	JB458	Count	50	#/m^2	Xanthidae
	JB459	Biomass, benthic	0.795	g/m^2	Amphipoda
	JB459	Biomass, benthic	0.005	g/m^2	Cumacea
	JB459	Biomass, benthic	127.03	g/m^2	Decapoda
	JB459	Biomass, benthic	10.97	g/m^2	Gastropoda
	JB459	Biomass, benthic	0.04	g/m^2	Gemma gemma
	JB459	Biomass, benthic	0.35	g/m^2	Leitoscoloplos
	JB459	Biomass, benthic	0.65	g/m^2	Maldanidae
	JB459	Biomass, benthic	0.01	g/m^2	Mediomastus ambiseta
	JB459	Biomass, benthic	0.035	g/m^2	Mercenaria mercenaria
	JB459	Biomass, benthic	0.035	g/m^2	Nemertea
	JB459	Biomass, benthic	0.14	g/m^2	Oligochaeta (Oligochaeta)
	JB459	Biomass, benthic	0.025	g/m^2	Ostracoda
	JB459	Biomass, benthic	0.07	g/m^2	Polydora
	JB459	Biomass, benthic	8.65	g/m^2	Streblospio benedicti
	JB459	Biomass, benthic	0.015	g/m^2	Tellinidae
	JB459	Count	50	#/m^2	Anachis lafresnayi
	JB459	Count	200	#/m^2	Aricidea
	JB459	Count	750	#/m^2	Capitella capitata
	JB459	Count	50	#/m^2	Clymenella torquata
	JB459	Count	700	#/m^2	Crepidula fornicata
	JB459	Count	50	#/m^2	Doridella obscura
	JB459	Count	150	#/m^2	Dyspanopeus sayi
	JB459	Count	150	#/m^2	Elasmopus levis
	JB459	Count	1950	#/m^2	Eobrolgus spinosus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB459	Count	50	#/m^2	Ericthonius brasiliensis
	JB459	Count	100	#/m^2	Eumida sanguinea
	JB459	Count	500	#/m^2	Gemma gemma
	JB459	Count	200	#/m^2	Hydroides dianthus
	JB459	Count	2550	#/m^2	Lysianopsis alba
	JB459	Count	50	#/m^2	Lysidice ninetta
	JB459	Count	550	#/m^2	Mediomastus ambiseta
	JB459	Count	200	#/m^2	Melita nitida
	JB459	Count	600	#/m^2	Mercenaria mercenaria
	JB459	Count	50	#/m^2	Microdeutopus gryllotalpa
	JB459	Count	250	#/m^2	Nassarius trivittatus
	JB459	Count	50	#/m^2	Nemertea
	JB459	Count	50	#/m^2	Nereis
	JB459	Count	50	#/m^2	Nereis acuminata
	JB459	Count	100	#/m^2	Odostomia trifida
	JB459	Count	50	#/m^2	Oxyurostylis smithi
	JB459	Count	300	#/m^2	Paracaprella tenuis
	JB459	Count	50	#/m^2	Parasterope pollex
	JB459	Count	50	#/m^2	Pectinaria gouldii
	JB459	Count	100	#/m^2	Podarkeopsis levifuscina
	JB459	Count	100	#/m^2	Polycirrus eximius
	JB459	Count	900	#/m^2	Polydora cornuta
	JB459	Count	250	#/m^2	Sabellaria vulgaris
	JB459	Count	50	#/m^2	Scolelepis texana
	JB459	Count	350	#/m^2	Scoloplos robustus
	JB459	Count	50	#/m^2	Stenothoidae
	JB459	Count	15800	#/m^2	Streblospio benedicti
	JB459	Count	50	#/m^2	Streptosyllis pettiboneae
	JB459	Count	50	#/m^2	Tellina

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB459	Count	50	#/m^2	Tellina agilis
	JB459	Count	50	#/m^2	Tharyx acutus
	JB459	Count	4400	#/m^2	Tubificidae
	JB459	Count	150	#/m^2	Xanthidae
	JB464	Biomass, benthic	6.14	g/m^2	Ampelisca
	JB464	Biomass, benthic	0.1125	g/m^2	Amphipoda
	JB464	Biomass, benthic	0.015	g/m^2	Cyathura
	JB464	Biomass, benthic	6.2875	g/m^2	Decapoda
	JB464	Biomass, benthic	35.4075	g/m^2	Gastropoda
	JB464	Biomass, benthic	0.175	g/m^2	Leitoscoloplos
	JB464	Biomass, benthic	0.0225	g/m^2	Mediomastus ambiseta
	JB464	Biomass, benthic	47.3875	g/m^2	Mercenaria mercenaria
	JB464	Biomass, benthic	0.0025	g/m^2	Neanthes succinea
	JB464	Biomass, benthic	0.01	g/m^2	Oligochaeta (Oligochaeta)
	JB464	Biomass, benthic	0.0025	g/m^2	Polydora
	JB464	Biomass, benthic	0.3475	g/m^2	Streblospio benedicti
	JB464	Count	32400	#/m^2	Ampelisca
	JB464	Count	6800	#/m^2	Ampelisca abdita
	JB464	Count	400	#/m^2	Ampelisca vadorum
	JB464	Count	100	#/m^2	Capitella capitata
	JB464	Count	550	#/m^2	Cirratulidae
	JB464	Count	75	#/m^2	Crepidula fornicata
	JB464	Count	25	#/m^2	Crepidula plana
	JB464	Count	25	#/m^2	Cyathura burbancki
	JB464	Count	125	#/m^2	Dyspanopeus sayi
	JB464	Count	25	#/m^2	Eumida sanguinea
	JB464	Count	25	#/m^2	Hesionidae
	JB464	Count	25	#/m^2	Leitoscoloplos
	JB464	Count	400	#/m^2	Lysianopsis alba

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB464	Count	50	#/m^2	Mediomastus ambiseta
	JB464	Count	25	#/m^2	Mercenaria mercenaria
	JB464	Count	650	#/m^2	Nassarius obsoletus
	JB464	Count	25	#/m^2	Neanthes succinea
	JB464	Count	25	#/m^2	Nereis
	JB464	Count	75	#/m^2	Nereis acuminata
	JB464	Count	75	#/m^2	Pagurus politus
	JB464	Count	100	#/m^2	Phyllodoce (Phyllodocidae)
	JB464	Count	1975	#/m^2	Podarke obscura
	JB464	Count	75	#/m^2	Podarkeopsis levifuscina
	JB464	Count	275	#/m^2	Polydora cornuta
	JB464	Count	275	#/m^2	Spio filicornis
	JB464	Count	9150	#/m^2	Streblospio benedicti
	JB464	Count	75	#/m^2	Tubificidae
	JB464	Count	25	#/m^2	Veneridae
	JB466	Biomass, benthic	52.72	g/m^2	Ampelisca
	JB466	Biomass, benthic	0.84	g/m^2	Amphipoda
	JB466	Biomass, benthic	0.01	g/m^2	Corophium
	JB466	Biomass, benthic	6.64	g/m^2	Decapoda
	JB466	Biomass, benthic	3.32	g/m^2	Gastropoda
	JB466	Biomass, benthic	0.01	g/m^2	Gemma gemma
	JB466	Biomass, benthic	0.01	g/m^2	Mediomastus ambiseta
	JB466	Biomass, benthic	0.45	g/m^2	Neanthes succinea
	JB466	Biomass, benthic	0.04	g/m^2	Oligochaeta (Oligochaeta)
	JB466	Biomass, benthic	0.01	g/m^2	Ostracoda
	JB466	Biomass, benthic	0.22	g/m^2	Polydora
	JB466	Biomass, benthic	1.59	g/m^2	Streblospio benedicti
	JB466	Count	43600	#/m^2	Ampelisca
	JB466	Count	1000	#/m^2	Ampelisca abdita

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB466	Count	11200	#/m^2	Ampelisca vadorum
	JB466	Count	200	#/m^2	Dyspanopeus sayi
	JB466	Count	800	#/m^2	Elasmopus levis
	JB466	Count	700	#/m^2	Eobrolgus spinosus
	JB466	Count	800	#/m^2	Exogone dispar
	JB466	Count	100	#/m^2	Gastropoda
	JB466	Count	100	#/m^2	Hydroides dianthus
	JB466	Count	2400	#/m^2	Lysianopsis alba
	JB466	Count	1300	#/m^2	Mediomastus ambiseta
	JB466	Count	300	#/m^2	Melitidae
	JB466	Count	7800	#/m^2	Microdeutopus gryllotalpa
	JB466	Count	1100	#/m^2	Monocorophium tuberculatum
	JB466	Count	100	#/m^2	Nassarius obsoletus
	JB466	Count	100	#/m^2	Neanthes succinea
	JB466	Count	1300	#/m^2	Nereis acuminata
	JB466	Count	200	#/m^2	Parasterope pollex
	JB466	Count	200	#/m^2	Pectinaria gouldii
	JB466	Count	100	#/m^2	Petricolaria pholadiformis
	JB466	Count	100	#/m^2	Phyllodoce arenae
	JB466	Count	800	#/m^2	Podarke obscura
	JB466	Count	2200	#/m^2	Polydora cornuta
	JB466	Count	100	#/m^2	Schistomeringos rudolphi
	JB466	Count	23100	#/m^2	Streblospio benedicti
	JB466	Count	200	#/m^2	Tharyx acutus
	JB466	Count	1300	#/m^2	Tubificidae
	JB466	Count	100	#/m^2	Xanthidae
	JB467	Biomass, benthic	17.1	g/m^2	Ampelisca
	JB467	Biomass, benthic	0.96	g/m^2	Amphipoda
	JB467	Biomass, benthic	0.02	g/m^2	Corophium

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB467	Biomass, benthic	0.12	g/m^2	Cyathura
	JB467	Biomass, benthic	5.56	g/m^2	Decapoda
	JB467	Biomass, benthic	0.36	g/m^2	Mediomastus ambiseta
	JB467	Biomass, benthic	0.24	g/m^2	Nemertea
	JB467	Biomass, benthic	0.04	g/m^2	Nucula
	JB467	Biomass, benthic	0.02	g/m^2	Oligochaeta (Oligochaeta)
	JB467	Biomass, benthic	0.2	g/m^2	Ostracoda
	JB467	Biomass, benthic	0.74	g/m^2	Polydora
	JB467	Biomass, benthic	4.2	g/m^2	Streblospio benedicti
	JB467	Count	600	$\#/m^2$	Actiniaria
	JB467	Count	56600	$\#/m^2$	Ampelisca
	JB467	Count	28600	$\#/m^2$	Ampelisca abdita
	JB467	Count	1400	$\#/m^2$	Ampelisca vadorum
	JB467	Count	400	$\#/m^2$	Bivalvia
	JB467	Count	200	$\#/m^2$	Capitella capitata
	JB467	Count	200	$\#/m^2$	Catenulida (Platyhelminthes)
	JB467	Count	200	$\#/m^2$	Corophiidae
	JB467	Count	200	$\#/m^2$	Cyathura burbancki
	JB467	Count	4200	$\#/m^2$	Eumida sanguinea
	JB467	Count	1800	$\#/m^2$	Exogone dispar
	JB467	Count	4800	$\#/m^2$	Lysianopsis alba
	JB467	Count	7200	$\#/m^2$	Mediomastus ambiseta
	JB467	Count	600	$\#/m^2$	Melita nitida
	JB467	Count	1800	$\#/m^2$	Microdeutopus gryllotalpa
	JB467	Count	200	$\#/m^2$	Nemertea
	JB467	Count	1000	$\#/m^2$	Nereis acuminata
	JB467	Count	200	$\#/m^2$	Nucula proxima
	JB467	Count	6400	$\#/m^2$	Parasterope pollex
	JB467	Count	200	$\#/m^2$	Phyllodocidae

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB467	Count	600	#/m^2	Podarke obscura
	JB467	Count	200	#/m^2	Polycirrus eximius
	JB467	Count	10200	#/m^2	Polydora cornuta
	JB467	Count	200	#/m^2	Rhepoxynius hudsoni
	JB467	Count	71200	#/m^2	Streblospio benedicti
	JB467	Count	800	#/m^2	Tubificidae
	JB467	Count	400	#/m^2	Xanthidae
	JB468	Biomass, benthic	0.0025	g/m^2	Amphipoda
	JB468	Biomass, benthic	12.795	g/m^2	Decapoda
	JB468	Biomass, benthic	0.32	g/m^2	Gastropoda
	JB468	Biomass, benthic	0.0025	g/m^2	Leitoscoloplos
	JB468	Biomass, benthic	0.0025	g/m^2	Mediomastus ambiseta
	JB468	Biomass, benthic	0.005	g/m^2	Mercenaria mercenaria
	JB468	Biomass, benthic	0.11	g/m^2	Neanthes succinea
	JB468	Biomass, benthic	0.01	g/m^2	Nemertea
	JB468	Biomass, benthic	0.14	g/m^2	Nephtys
	JB468	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB468	Biomass, benthic	0.0025	g/m^2	Polydora
	JB468	Biomass, benthic	0.7075	g/m^2	Streblospio benedicti
	JB468	Biomass, benthic	0.745	g/m^2	Tellinidae
	JB468	Count	25	#/m^2	Acmira catherinae
	JB468	Count	25	#/m^2	Arcidae
	JB468	Count	50	#/m^2	Cirratulidae
	JB468	Count	50	#/m^2	Crepidula
	JB468	Count	225	#/m^2	Crepidula fornicata
	JB468	Count	75	#/m^2	Crepidula plana
	JB468	Count	50	#/m^2	Doridella obscura
	JB468	Count	150	#/m^2	Eobrolgus spinosus
	JB468	Count	25	#/m^2	Eumida sanguinea

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB468	Count	225	#/m^2	Hydroides dianthus
	JB468	Count	50	#/m^2	Mediomastus ambiseta
	JB468	Count	100	#/m^2	Mercenaria mercenaria
	JB468	Count	25	#/m^2	Neanthes succinea
	JB468	Count	25	#/m^2	Nemertea
	JB468	Count	25	#/m^2	Nephtys
	JB468	Count	50	#/m^2	Nephtys picta
	JB468	Count	675	#/m^2	Nereis acuminata
	JB468	Count	25	#/m^2	Pectinaria gouldii
	JB468	Count	25	#/m^2	Phyllodoce arenae
	JB468	Count	25	#/m^2	Phyllodocidae
	JB468	Count	25	#/m^2	Podarke obscura
	JB468	Count	25	#/m^2	Polycirrus eximius
	JB468	Count	100	#/m^2	Polydora cornuta
	JB468	Count	325	#/m^2	Sabellaria vulgaris
	JB468	Count	200	#/m^2	Scoloplos robustus
	JB468	Count	175	#/m^2	Serpulidae
	JB468	Count	10725	#/m^2	Streblospio benedicti
	JB468	Count	625	#/m^2	Tellina
	JB468	Count	525	#/m^2	Tellina agilis
	JB468	Count	700	#/m^2	Tharyx acutus
	JB468	Count	350	#/m^2	Tubificidae
	JB468	Count	50	#/m^2	Xanthidae
	JB471	Biomass, benthic	2.425	g/m^2	Ampelisca
	JB471	Biomass, benthic	0.12	g/m^2	Amphipoda
	JB471	Biomass, benthic	25.025	g/m^2	Decapoda
	JB471	Biomass, benthic	0.005	g/m^2	Mediomastus ambiseta
	JB471	Biomass, benthic	0.5025	g/m^2	Mercenaria mercenaria
	JB471	Biomass, benthic	0.0275	g/m^2	Neanthes succinea

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB471	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB471	Biomass, benthic	0.035	g/m^2	Polydora
	JB471	Biomass, benthic	0.2725	g/m^2	Streblospio benedicti
	JB471	Count	10325	$\#/m^2$	Ampelisca
	JB471	Count	4025	$\#/m^2$	Ampelisca abdita
	JB471	Count	25	$\#/m^2$	Capitella capitata
	JB471	Count	25	$\#/m^2$	Dyspanopeus sayi
	JB471	Count	25	$\#/m^2$	Elasmopus levis
	JB471	Count	25	$\#/m^2$	Hydrozoa
	JB471	Count	825	$\#/m^2$	Lysianopsis alba
	JB471	Count	150	$\#/m^2$	Mediomastus ambiseta
	JB471	Count	75	$\#/m^2$	Mercenaria mercenaria
	JB471	Count	25	$\#/m^2$	Microdeutopus gryllotalpa
	JB471	Count	75	$\#/m^2$	Neanthes succinea
	JB471	Count	50	$\#/m^2$	Pectinaria gouldii
	JB471	Count	250	$\#/m^2$	Podarke obscura
	JB471	Count	300	$\#/m^2$	Polydora cornuta
	JB471	Count	6725	$\#/m^2$	Streblospio benedicti
	JB471	Count	225	$\#/m^2$	Tharyx acutus
	JB471	Count	50	$\#/m^2$	Tubificidae
	JB472	Biomass, benthic	0.0175	g/m^2	Glycera
	JB472	Biomass, benthic	0.0075	g/m^2	Mediomastus ambiseta
	JB472	Count	25	$\#/m^2$	Glycera
	JB472	Count	25	$\#/m^2$	Mediomastus ambiseta
	JB474	Biomass, benthic	0.0775	g/m^2	Ampelisca
	JB474	Count	325	$\#/m^2$	Ampelisca abdita
	JB480	Biomass, benthic	0.005	g/m^2	Ampelisca
	JB480	Biomass, benthic	0.0025	g/m^2	Amphipoda
	JB480	Biomass, benthic	43.185	g/m^2	Decapoda

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB480	Biomass, benthic	21.625	g/m^2	Mercenaria mercenaria
	JB480	Biomass, benthic	0.02	g/m^2	Oligochaeta (Oligochaeta)
	JB480	Biomass, benthic	0.0375	g/m^2	Polydora
	JB480	Biomass, benthic	0.0925	g/m^2	Streblospio benedicti
	JB480	Count	350	$\#/m^2$	Ampelisca
	JB480	Count	550	$\#/m^2$	Capitella capitata
	JB480	Count	100	$\#/m^2$	Dyspanopeus sayi
	JB480	Count	25	$\#/m^2$	Melita nitida
	JB480	Count	25	$\#/m^2$	Mercenaria mercenaria
	JB480	Count	175	$\#/m^2$	Nereididae
	JB480	Count	50	$\#/m^2$	Nereis acuminata
	JB480	Count	25	$\#/m^2$	Palaemonetes intermedius
	JB480	Count	25	$\#/m^2$	Phyllodocidae
	JB480	Count	25	$\#/m^2$	Podarke obscura
	JB480	Count	25	$\#/m^2$	Podarkeopsis levifuscina
	JB480	Count	850	$\#/m^2$	Polydora cornuta
	JB480	Count	2650	$\#/m^2$	Streblospio benedicti
	JB480	Count	100	$\#/m^2$	Tubificidae
	JB480	Count	75	$\#/m^2$	Xanthidae
	JB481	Biomass, benthic	0.0025	g/m^2	Amphipoda
	JB481	Biomass, benthic	6.4075	g/m^2	Decapoda
	JB481	Biomass, benthic	64.26	g/m^2	Gastropoda
	JB481	Biomass, benthic	0.0175	g/m^2	Gemma gemma
	JB481	Biomass, benthic	25.195	g/m^2	Leitoscoloplos
	JB481	Biomass, benthic	0.045	g/m^2	Mediomastus ambiseta
	JB481	Biomass, benthic	0.0225	g/m^2	Mercenaria mercenaria
	JB481	Biomass, benthic	0.005	g/m^2	Neanthes succinea
	JB481	Biomass, benthic	0.0175	g/m^2	Oligochaeta (Oligochaeta)
	JB481	Biomass, benthic	0.0075	g/m^2	Polydora

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB481	Biomass, benthic	24.885	g/m^2	Streblospio benedicti
	JB481	Biomass, benthic	0.2775	g/m^2	Tellinidae
	JB481	Count	25	$\#/m^2$	Ampelisca
	JB481	Count	150	$\#/m^2$	Capitella capitata
	JB481	Count	25	$\#/m^2$	Crangon septemspinosa
	JB481	Count	700	$\#/m^2$	Crepidula fornicata
	JB481	Count	25	$\#/m^2$	Dyspanopeus sayi
	JB481	Count	25	$\#/m^2$	Eumida sanguinea
	JB481	Count	200	$\#/m^2$	Gemma gemma
	JB481	Count	225	$\#/m^2$	Glycinde solitaria
	JB481	Count	25	$\#/m^2$	Mactridae
	JB481	Count	1625	$\#/m^2$	Mediomastus ambiseta
	JB481	Count	25	$\#/m^2$	Melitidae
	JB481	Count	175	$\#/m^2$	Mercenaria mercenaria
	JB481	Count	1550	$\#/m^2$	Nassarius trivittatus
	JB481	Count	25	$\#/m^2$	Neanthes succinea
	JB481	Count	425	$\#/m^2$	Odostomia trifida
	JB481	Count	75	$\#/m^2$	Polydora cornuta
	JB481	Count	225	$\#/m^2$	Scolelepis texana
	JB481	Count	925	$\#/m^2$	Scoloplos robustus
	JB481	Count	200	$\#/m^2$	Spio filicornis
	JB481	Count	25	$\#/m^2$	Spiochaetopterus oculatus
	JB481	Count	7000	$\#/m^2$	Streblospio benedicti
	JB481	Count	375	$\#/m^2$	Tellina
	JB481	Count	25	$\#/m^2$	Tellina agilis
	JB481	Count	25	$\#/m^2$	Tellinidae
	JB481	Count	325	$\#/m^2$	Tharyx acutus
	JB481	Count	775	$\#/m^2$	Tubificidae
	JB481	Count	25	$\#/m^2$	Xanthidae

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB486	Biomass, benthic	0.085	g/m^2	Ampelisca
	JB486	Biomass, benthic	0.1825	g/m^2	Amphipoda
	JB486	Biomass, benthic	0.0175	g/m^2	Corophium
	JB486	Biomass, benthic	0.0275	g/m^2	Decapoda
	JB486	Biomass, benthic	0.0475	g/m^2	Gastropoda
	JB486	Biomass, benthic	0.795	g/m^2	Leitoscoloplos
	JB486	Biomass, benthic	0.0125	g/m^2	Lophogastrida
	JB486	Biomass, benthic	0.165	g/m^2	Nephtys
	JB486	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB486	Biomass, benthic	0.0025	g/m^2	Polydora
	JB486	Biomass, benthic	0.5625	g/m^2	Polygordius
	JB486	Biomass, benthic	0.0025	g/m^2	Streblospio benedicti
	JB486	Biomass, benthic	0.24	g/m^2	Tellinidae
	JB486	Biomass, benthic	0.0225	g/m^2	Unciola
	JB486	Count	100	$\#/m^2$	Ampelisca
	JB486	Count	350	$\#/m^2$	Ampelisca abdita
	JB486	Count	50	$\#/m^2$	Bivalvia
	JB486	Count	225	$\#/m^2$	Crepidula
	JB486	Count	250	$\#/m^2$	Crepidula fornicata
	JB486	Count	75	$\#/m^2$	Elasmopus levis
	JB486	Count	1500	$\#/m^2$	Eobrolgus spinosus
	JB486	Count	50	$\#/m^2$	Ericthonius brasiliensis
	JB486	Count	125	$\#/m^2$	Lysianopsis alba
	JB486	Count	25	$\#/m^2$	Magelona
	JB486	Count	75	$\#/m^2$	Melita nitida
	JB486	Count	75	$\#/m^2$	Microphthalmus
	JB486	Count	250	$\#/m^2$	Monocorophium tuberculatum
	JB486	Count	50	$\#/m^2$	Mysidae
	JB486	Count	25	$\#/m^2$	Nephtys picta

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB486	Count	275	#/m^2	Nereis acuminata
	JB486	Count	25	#/m^2	Phyllodoce arenae
	JB486	Count	175	#/m^2	Polydora cornuta
	JB486	Count	3650	#/m^2	Polygordius
	JB486	Count	50	#/m^2	Scoloplos robustus
	JB486	Count	25	#/m^2	Solenidae
	JB486	Count	25	#/m^2	Stenothoidae
	JB486	Count	1025	#/m^2	Streblospio benedicti
	JB486	Count	400	#/m^2	Tellina
	JB486	Count	25	#/m^2	Tellina agilis
	JB486	Count	675	#/m^2	Tharyx acutus
	JB486	Count	275	#/m^2	Tubificidae
	JB486	Count	100	#/m^2	Unciola
	JB486	Count	75	#/m^2	Unciola serrata
	JB486	Count	25	#/m^2	Xanthidae
Region 2 2013 NY/NJ Harbor Sampling	JB401	Biomass, benthic	0.0125	g/m^2	Ampelisca macrocephala
	JB401	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB401	Biomass, benthic	0.0525	g/m^2	Rhithropanopeus harrisii
	JB401	Biomass, benthic	0.005	g/m^2	Scoloplos robustus
	JB401	Biomass, benthic	0.015	g/m^2	Streblospio benedicti
	JB401	Biomass, benthic	0.0225	g/m^2	Tellina
	JB401	Biomass, benthic	0.03	g/m^2	Tharyx
	JB401	Count	75	#/m^2	Ampelisca macrocephala
	JB401	Count	50	#/m^2	Oligochaeta (Oligochaeta)
	JB401	Count	50	#/m^2	Rhithropanopeus harrisii
	JB401	Count	25	#/m^2	Scoloplos robustus
	JB401	Count	300	#/m^2	Streblospio benedicti
	JB401	Count	250	#/m^2	Tellina
	JB401	Count	450	#/m^2	Tharyx

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB403	Biomass, benthic	0.0025	g/m^2	Streblospio benedicti
	JB403	Count	25	$\#/m^2$	Streblospio benedicti
	JB404	Biomass, benthic	0.0475	g/m^2	Alitta succinea
	JB404	Biomass, benthic	0.025	g/m^2	Ampelisca
	JB404	Biomass, benthic	0.135	g/m^2	Nassarius obsoletus
	JB404	Biomass, benthic	0.0275	g/m^2	Neomysis americana
	JB404	Biomass, benthic	0.105	g/m^2	Streblospio benedicti
	JB404	Biomass, benthic	0.07	g/m^2	Tellina
	JB404	Count	25	$\#/m^2$	Alitta succinea
	JB404	Count	25	$\#/m^2$	Ampelisca
	JB404	Count	50	$\#/m^2$	Nassarius obsoletus
	JB404	Count	50	$\#/m^2$	Neomysis americana
	JB404	Count	900	$\#/m^2$	Streblospio benedicti
	JB404	Count	50	$\#/m^2$	Tellina
	JB405	Biomass, benthic	0.0075	g/m^2	Eteone
	JB405	Biomass, benthic	1.355	g/m^2	Mercenaria mercenaria
	JB405	Biomass, benthic	0.135	g/m^2	Nassarius obsoletus
	JB405	Biomass, benthic	0.0325	g/m^2	Nucula
	JB405	Biomass, benthic	0.5275	g/m^2	Pagurus
	JB405	Biomass, benthic	0.165	g/m^2	Prionospio
	JB405	Biomass, benthic	0.025	g/m^2	Scoloplos robustus
	JB405	Biomass, benthic	0.11	g/m^2	Streblospio benedicti
	JB405	Biomass, benthic	0.155	g/m^2	Tellina
	JB405	Biomass, benthic	0.1775	g/m^2	Yoldia
	JB405	Count	25	$\#/m^2$	Eteone
	JB405	Count	25	$\#/m^2$	Mercenaria mercenaria
	JB405	Count	550	$\#/m^2$	Nassarius obsoletus
	JB405	Count	175	$\#/m^2$	Nucula
	JB405	Count	25	$\#/m^2$	Pagurus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB405	Count	100	#/m^2	Prionospio
	JB405	Count	300	#/m^2	Scoloplos robustus
	JB405	Count	1375	#/m^2	Streblospio benedicti
	JB405	Count	200	#/m^2	Tellina
	JB405	Count	25	#/m^2	Yoldia
	JB406	Biomass, benthic	0.005	g/m^2	Alitta succinea
	JB406	Biomass, benthic	0.015	g/m^2	Ampelisca
	JB406	Biomass, benthic	0.0825	g/m^2	Crepidula fornicata
	JB406	Biomass, benthic	0.5325	g/m^2	Nassarius obsoletus
	JB406	Biomass, benthic	0.125	g/m^2	Nucula
	JB406	Biomass, benthic	0.2925	g/m^2	Pagurus
	JB406	Biomass, benthic	0.0225	g/m^2	Scoloplos robustus
	JB406	Biomass, benthic	0.205	g/m^2	Streblospio benedicti
	JB406	Biomass, benthic	0.1225	g/m^2	Tellina
	JB406	Biomass, benthic	0.0025	g/m^2	Tharyx
	JB406	Count	25	#/m^2	Alitta succinea
	JB406	Count	25	#/m^2	Ampelisca
	JB406	Count	25	#/m^2	Crepidula fornicata
	JB406	Count	150	#/m^2	Nassarius obsoletus
	JB406	Count	75	#/m^2	Nucula
	JB406	Count	25	#/m^2	Pagurus
	JB406	Count	50	#/m^2	Scoloplos robustus
	JB406	Count	2550	#/m^2	Streblospio benedicti
	JB406	Count	100	#/m^2	Tellina
	JB406	Count	25	#/m^2	Tharyx
	JB407	Biomass, benthic	0.0175	g/m^2	Alitta succinea
	JB407	Biomass, benthic	1.9475	g/m^2	Mercenaria mercenaria
	JB407	Biomass, benthic	0.93	g/m^2	Nassarius obsoletus
	JB407	Biomass, benthic	0.005	g/m^2	Oligochaeta (Oligochaeta)

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB407	Biomass, benthic	0.1975	g/m^2	Streblospio benedicti
	JB407	Count	125	$\#/m^2$	Alitta succinea
	JB407	Count	25	$\#/m^2$	Mercenaria mercenaria
	JB407	Count	125	$\#/m^2$	Nassarius obsoletus
	JB407	Count	300	$\#/m^2$	Oligochaeta (Oligochaeta)
	JB407	Count	1050	$\#/m^2$	Streblospio benedicti
	JB409	Biomass, benthic	0.05	g/m^2	Corophium
	JB409	Biomass, benthic	0.27	g/m^2	Crepidula fornicata
	JB409	Biomass, benthic	0.035	g/m^2	Eteone
	JB409	Biomass, benthic	1.1325	g/m^2	Mercenaria mercenaria
	JB409	Biomass, benthic	0.5075	g/m^2	Nassarius obsoletus
	JB409	Biomass, benthic	0.0775	g/m^2	Nephtys incisa
	JB409	Biomass, benthic	0.0125	g/m^2	Oligochaeta (Oligochaeta)
	JB409	Biomass, benthic	0.2375	g/m^2	Streblospio benedicti
	JB409	Biomass, benthic	0.14	g/m^2	Tellina
	JB409	Count	50	$\#/m^2$	Corophium
	JB409	Count	50	$\#/m^2$	Crepidula fornicata
	JB409	Count	75	$\#/m^2$	Eteone
	JB409	Count	25	$\#/m^2$	Mercenaria mercenaria
	JB409	Count	300	$\#/m^2$	Nassarius obsoletus
	JB409	Count	25	$\#/m^2$	Nephtys incisa
	JB409	Count	175	$\#/m^2$	Oligochaeta (Oligochaeta)
	JB409	Count	50	$\#/m^2$	Scoloplos robustus
	JB409	Count	1100	$\#/m^2$	Streblospio benedicti
	JB409	Count	50	$\#/m^2$	Tellina
	JB410	Biomass, benthic	0.005	g/m^2	Capitella
	JB410	Biomass, benthic	0.4125	g/m^2	Pagurus
	JB410	Biomass, benthic	0.22	g/m^2	Streblospio benedicti
	JB410	Biomass, benthic	0.0075	g/m^2	Tharyx

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB410	Count	50	#/m^2	Capitella
	JB410	Count	25	#/m^2	Pagurus
	JB410	Count	700	#/m^2	Streblospio benedicti
	JB410	Count	100	#/m^2	Tharyx
	JB415	Biomass, benthic	0.045	g/m^2	Alitta succinea
	JB415	Biomass, benthic	0.02	g/m^2	Clymenella torquata
	JB415	Biomass, benthic	0.13	g/m^2	Crepidula fornicata
	JB415	Biomass, benthic	1.145	g/m^2	Nassarius obsoletus
	JB415	Biomass, benthic	0.3575	g/m^2	Rhithropanopeus harrisii
	JB415	Biomass, benthic	0.055	g/m^2	Scoloplos robustus
	JB415	Biomass, benthic	0.085	g/m^2	Streblospio benedicti
	JB415	Biomass, benthic	0.25	g/m^2	Tellina
	JB415	Count	25	#/m^2	Alitta succinea
	JB415	Count	25	#/m^2	Clymenella torquata
	JB415	Count	25	#/m^2	Crepidula fornicata
	JB415	Count	250	#/m^2	Nassarius obsoletus
	JB415	Count	50	#/m^2	Rhithropanopeus harrisii
	JB415	Count	175	#/m^2	Scoloplos robustus
	JB415	Count	525	#/m^2	Streblospio benedicti
	JB415	Count	50	#/m^2	Tellina
	JB416	Biomass, benthic	0.0075	g/m^2	Alitta succinea
	JB416	Biomass, benthic	0.085	g/m^2	Crepidula fornicata
	JB416	Biomass, benthic	0.0125	g/m^2	Gammarus
	JB416	Biomass, benthic	0.19	g/m^2	Mytilus edulis
	JB416	Biomass, benthic	0.1025	g/m^2	Nassarius obsoletus
	JB416	Biomass, benthic	0.0075	g/m^2	Oligochaeta (Oligochaeta)
	JB416	Biomass, benthic	0.2175	g/m^2	Pagurus
	JB416	Biomass, benthic	0.1725	g/m^2	Rhithropanopeus harrisii
	JB416	Biomass, benthic	0.03	g/m^2	Scoloplos robustus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB416	Biomass, benthic	0.255	g/m^2	Streblospio benedicti
	JB416	Biomass, benthic	0.0725	g/m^2	Tellina
	JB416	Biomass, benthic	0.02	g/m^2	Tharyx
	JB416	Count	25	$\#/m^2$	Alitta succinea
	JB416	Count	50	$\#/m^2$	Crepidula fornicata
	JB416	Count	25	$\#/m^2$	Gammarus
	JB416	Count	25	$\#/m^2$	Mytilus edulis
	JB416	Count	75	$\#/m^2$	Nassarius obsoletus
	JB416	Count	200	$\#/m^2$	Oligochaeta (Oligochaeta)
	JB416	Count	25	$\#/m^2$	Pagurus
	JB416	Count	75	$\#/m^2$	Rhithropanopeus harrisii
	JB416	Count	125	$\#/m^2$	Scoloplos robustus
	JB416	Count	1175	$\#/m^2$	Streblospio benedicti
	JB416	Count	50	$\#/m^2$	Tellina
	JB416	Count	125	$\#/m^2$	Tharyx
	JB417	Biomass, benthic	0.94	g/m^2	Crepidula fornicata
	JB417	Biomass, benthic	0.2375	g/m^2	Crepidula plana
	JB417	Biomass, benthic	0.005	g/m^2	Eteone
	JB417	Biomass, benthic	0.0425	g/m^2	Glycera
	JB417	Biomass, benthic	13.31	g/m^2	Mercenaria mercenaria
	JB417	Biomass, benthic	0.01	g/m^2	Oligochaeta (Oligochaeta)
	JB417	Biomass, benthic	0.31	g/m^2	Pagurus
	JB417	Biomass, benthic	0.15	g/m^2	Streblospio benedicti
	JB417	Biomass, benthic	0.4375	g/m^2	Tellina
	JB417	Biomass, benthic	0.07	g/m^2	Tharyx
	JB417	Count	125	$\#/m^2$	Crepidula fornicata
	JB417	Count	25	$\#/m^2$	Crepidula plana
	JB417	Count	25	$\#/m^2$	Eteone
	JB417	Count	25	$\#/m^2$	Glycera

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB417	Count	125	#/m^2	Mercenaria mercenaria
	JB417	Count	200	#/m^2	Oligochaeta (Oligochaeta)
	JB417	Count	25	#/m^2	Pagurus
	JB417	Count	375	#/m^2	Streblospio benedicti
	JB417	Count	125	#/m^2	Tellina
	JB417	Count	300	#/m^2	Tharyx
	JB419	Biomass, benthic	0.035	g/m^2	Alitta succinea
	JB419	Biomass, benthic	0.0225	g/m^2	Clymenella torquata
	JB419	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB419	Biomass, benthic	0.2775	g/m^2	Streblospio benedicti
	JB419	Biomass, benthic	0.185	g/m^2	Tellina
	JB419	Count	150	#/m^2	Alitta succinea
	JB419	Count	50	#/m^2	Clymenella torquata
	JB419	Count	100	#/m^2	Oligochaeta (Oligochaeta)
	JB419	Count	1550	#/m^2	Streblospio benedicti
	JB419	Count	50	#/m^2	Tellina
	JB422	Biomass, benthic	0.105	g/m^2	Glycera
	JB422	Biomass, benthic	0.005	g/m^2	Oligochaeta (Oligochaeta)
	JB422	Biomass, benthic	0.2575	g/m^2	Rhepoxynius epistomus
	JB422	Biomass, benthic	0.1475	g/m^2	Streblospio benedicti
	JB422	Biomass, benthic	0.245	g/m^2	Tellina
	JB422	Count	50	#/m^2	Glycera
	JB422	Count	200	#/m^2	Oligochaeta (Oligochaeta)
	JB422	Count	100	#/m^2	Rhepoxynius epistomus
	JB422	Count	900	#/m^2	Streblospio benedicti
	JB422	Count	50	#/m^2	Tellina
	JB423	Biomass, benthic	0.09	g/m^2	Eteone
	JB423	Biomass, benthic	0.04	g/m^2	Glycera
	JB423	Biomass, benthic	2.0325	g/m^2	Nassarius obsoletus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB423	Biomass, benthic	0.08	g/m^2	Pectinaria
	JB423	Biomass, benthic	0.38	g/m^2	Streblospio benedicti
	JB423	Count	50	$\#/m^2$	Eteone
	JB423	Count	25	$\#/m^2$	Glycera
	JB423	Count	250	$\#/m^2$	Nassarius obsoletus
	JB423	Count	50	$\#/m^2$	Oligochaeta (Oligochaeta)
	JB423	Count	25	$\#/m^2$	Pectinaria
	JB423	Count	1775	$\#/m^2$	Streblospio benedicti
	JB454	Biomass, benthic	0.1725	g/m^2	Ampelisca
	JB454	Biomass, benthic	3.025	g/m^2	Corophium
	JB454	Biomass, benthic	7.175	g/m^2	Gammarus
	JB454	Biomass, benthic	0.24	g/m^2	Glycera
	JB454	Biomass, benthic	9.5425	g/m^2	Mercenaria mercenaria
	JB454	Biomass, benthic	0.105	g/m^2	Mulinia lateralis
	JB454	Biomass, benthic	0.02	g/m^2	Nephtys incisa
	JB454	Biomass, benthic	0.045	g/m^2	Nucula
	JB454	Biomass, benthic	0.01	g/m^2	Oligochaeta (Oligochaeta)
	JB454	Biomass, benthic	0.135	g/m^2	Scoloplos robustus
	JB454	Biomass, benthic	0.195	g/m^2	Streblospio benedicti
	JB454	Biomass, benthic	0.1675	g/m^2	Tellina
	JB454	Count	125	$\#/m^2$	Ampelisca
	JB454	Count	225	$\#/m^2$	Corophium
	JB454	Count	250	$\#/m^2$	Gammarus
	JB454	Count	75	$\#/m^2$	Glycera
	JB454	Count	25	$\#/m^2$	Mercenaria mercenaria
	JB454	Count	25	$\#/m^2$	Mulinia lateralis
	JB454	Count	25	$\#/m^2$	Nephtys incisa
	JB454	Count	50	$\#/m^2$	Nucula
	JB454	Count	150	$\#/m^2$	Oligochaeta (Oligochaeta)

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB454	Count	50	#/m^2	Scoloplos robustus
	JB454	Count	625	#/m^2	Streblospio benedicti
	JB454	Count	150	#/m^2	Tellina
	JB458	Biomass, benthic	0.1075	g/m^2	Alitta succinea
	JB458	Biomass, benthic	0.0675	g/m^2	Corophium
	JB458	Biomass, benthic	15.6	g/m^2	Crepidula fornicata
	JB458	Biomass, benthic	27.83	g/m^2	Mercenaria mercenaria
	JB458	Biomass, benthic	0.005	g/m^2	Oligochaeta (Oligochaeta)
	JB458	Biomass, benthic	3.575	g/m^2	Rhithropanopeus harrisii
	JB458	Biomass, benthic	2.6	g/m^2	Scoloplos robustus
	JB458	Biomass, benthic	5.35	g/m^2	Streblospio benedicti
	JB458	Biomass, benthic	2.9	g/m^2	Tellina
	JB458	Count	25	#/m^2	Alitta succinea
	JB458	Count	25	#/m^2	Corophium
	JB458	Count	125	#/m^2	Crepidula fornicata
	JB458	Count	125	#/m^2	Mercenaria mercenaria
	JB458	Count	100	#/m^2	Oligochaeta (Oligochaeta)
	JB458	Count	75	#/m^2	Rhithropanopeus harrisii
	JB458	Count	100	#/m^2	Scoloplos robustus
	JB458	Count	1400	#/m^2	Streblospio benedicti
	JB458	Count	100	#/m^2	Tellina
	JB459	Biomass, benthic	0.1275	g/m^2	Alitta succinea
	JB459	Biomass, benthic	0.02	g/m^2	Clymenella torquata
	JB459	Biomass, benthic	0.105	g/m^2	Crepidula fornicata
	JB459	Biomass, benthic	0.555	g/m^2	Marphysa sanguinea
	JB459	Biomass, benthic	0.1675	g/m^2	Nassarius obsoletus
	JB459	Biomass, benthic	0.5725	g/m^2	Pagurus
	JB459	Biomass, benthic	0.0475	g/m^2	Scoloplos robustus
	JB459	Biomass, benthic	4.3	g/m^2	Streblospio benedicti

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB459	Biomass, benthic	1.3575	g/m^2	Tellina
	JB459	Biomass, benthic	0.4075	g/m^2	Tharyx
	JB459	Count	50	$\#/m^2$	Alitta succinea
	JB459	Count	50	$\#/m^2$	Clymenella torquata
	JB459	Count	25	$\#/m^2$	Crepidula fornicata
	JB459	Count	25	$\#/m^2$	Marphysa sanguinea
	JB459	Count	225	$\#/m^2$	Nassarius obsoletus
	JB459	Count	25	$\#/m^2$	Pagurus
	JB459	Count	75	$\#/m^2$	Scoloplos robustus
	JB459	Count	1550	$\#/m^2$	Streblospio benedicti
	JB459	Count	100	$\#/m^2$	Tellina
	JB459	Count	525	$\#/m^2$	Tharyx
	JB464	Biomass, benthic	0.81	g/m^2	Ampelisca abdita
	JB464	Biomass, benthic	0.2975	g/m^2	Corophium
	JB464	Biomass, benthic	0.02	g/m^2	Eteone
	JB464	Biomass, benthic	0.1025	g/m^2	Glycera
	JB464	Biomass, benthic	53.1425	g/m^2	Mercenaria mercenaria
	JB464	Biomass, benthic	0.245	g/m^2	Nassarius obsoletus
	JB464	Biomass, benthic	0.1425	g/m^2	Scoloplos robustus
	JB464	Biomass, benthic	0.34	g/m^2	Streblospio benedicti
	JB464	Biomass, benthic	10.625	g/m^2	Tellina
	JB464	Biomass, benthic	0.115	g/m^2	Tharyx
	JB464	Count	175	$\#/m^2$	Ampelisca abdita
	JB464	Count	100	$\#/m^2$	Corophium
	JB464	Count	25	$\#/m^2$	Eteone
	JB464	Count	25	$\#/m^2$	Glycera
	JB464	Count	75	$\#/m^2$	Mercenaria mercenaria
	JB464	Count	25	$\#/m^2$	Nassarius obsoletus
	JB464	Count	175	$\#/m^2$	Scoloplos robustus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB464	Count	1450	#/m^2	Streblospio benedicti
	JB464	Count	100	#/m^2	Tellina
	JB464	Count	300	#/m^2	Tharyx
	JB466	Biomass, benthic	0.4475	g/m^2	Mytilus edulis
	JB466	Biomass, benthic	0.2525	g/m^2	Nassarius obsoletus
	JB466	Biomass, benthic	0.005	g/m^2	Oligochaeta (Oligochaeta)
	JB466	Biomass, benthic	0.1875	g/m^2	Scoloplos robustus
	JB466	Biomass, benthic	0.115	g/m^2	Streblospio benedicti
	JB466	Biomass, benthic	0.245	g/m^2	Tellina
	JB466	Biomass, benthic	0.285	g/m^2	Tharyx
	JB466	Count	25	#/m^2	Mytilus edulis
	JB466	Count	50	#/m^2	Nassarius obsoletus
	JB466	Count	175	#/m^2	Oligochaeta (Oligochaeta)
	JB466	Count	200	#/m^2	Scoloplos robustus
	JB466	Count	775	#/m^2	Streblospio benedicti
	JB466	Count	100	#/m^2	Tellina
	JB466	Count	525	#/m^2	Tharyx
	JB467	Biomass, benthic	0.115	g/m^2	Alitta succinea
	JB467	Biomass, benthic	0.405	g/m^2	Glycera
	JB467	Biomass, benthic	0.41	g/m^2	Nassarius obsoletus
	JB467	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB467	Biomass, benthic	0.5425	g/m^2	Scoloplos robustus
	JB467	Biomass, benthic	0.3	g/m^2	Streblospio benedicti
	JB467	Biomass, benthic	0.1975	g/m^2	Tellina
	JB467	Biomass, benthic	0.1125	g/m^2	Tharyx
	JB467	Count	50	#/m^2	Alitta succinea
	JB467	Count	75	#/m^2	Glycera
	JB467	Count	25	#/m^2	Nassarius obsoletus
	JB467	Count	25	#/m^2	Oligochaeta (Oligochaeta)

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB467	Count	375	#/m^2	Scoloplos robustus
	JB467	Count	850	#/m^2	Streblospio benedicti
	JB467	Count	50	#/m^2	Tellina
	JB467	Count	75	#/m^2	Tharyx
	JB468	Biomass, benthic	0.56	g/m^2	Corophium
	JB468	Biomass, benthic	48.7775	g/m^2	Crepidula fornicata
	JB468	Biomass, benthic	16.82	g/m^2	Pagurus
	JB468	Biomass, benthic	1.29	g/m^2	Rhepoxynius epistomus
	JB468	Biomass, benthic	0.5025	g/m^2	Streblospio benedicti
	JB468	Biomass, benthic	52.51	g/m^2	Tellina
	JB468	Biomass, benthic	0.14	g/m^2	Tharyx
	JB468	Count	75	#/m^2	Corophium
	JB468	Count	50	#/m^2	Crepidula fornicata
	JB468	Count	75	#/m^2	Pagurus
	JB468	Count	425	#/m^2	Rhepoxynius epistomus
	JB468	Count	925	#/m^2	Streblospio benedicti
	JB468	Count	100	#/m^2	Tellina
	JB468	Count	250	#/m^2	Tharyx
	JB471	Biomass, benthic	80.3625	g/m^2	Mercenaria mercenaria
	JB471	Biomass, benthic	86.2825	g/m^2	Nassarius obsoletus
	JB471	Biomass, benthic	0.6375	g/m^2	Scoloplos robustus
	JB471	Biomass, benthic	0.6	g/m^2	Streblospio benedicti
	JB471	Biomass, benthic	0.5325	g/m^2	Tellina
	JB471	Count	25	#/m^2	Mercenaria mercenaria
	JB471	Count	300	#/m^2	Nassarius obsoletus
	JB471	Count	100	#/m^2	Scoloplos robustus
	JB471	Count	1050	#/m^2	Streblospio benedicti
	JB471	Count	50	#/m^2	Tellina
	JB474	Biomass, benthic	0.03	g/m^2	Alitta succinea

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB474	Biomass, benthic	0.1125	g/m^2	Clymenella torquata
	JB474	Biomass, benthic	0.0225	g/m^2	Eteone
	JB474	Biomass, benthic	2.695	g/m^2	Nassarius obsoletus
	JB474	Biomass, benthic	0.01	g/m^2	Oligochaeta (Oligochaeta)
	JB474	Biomass, benthic	0.545	g/m^2	Scoloplos robustus
	JB474	Biomass, benthic	0.2475	g/m^2	Streblospio benedicti
	JB474	Biomass, benthic	0.2525	g/m^2	Tellina
	JB474	Biomass, benthic	0.0075	g/m^2	Tharyx
	JB474	Count	25	$\#/m^2$	Alitta succinea
	JB474	Count	50	$\#/m^2$	Clymenella torquata
	JB474	Count	25	$\#/m^2$	Eteone
	JB474	Count	125	$\#/m^2$	Nassarius obsoletus
	JB474	Count	75	$\#/m^2$	Oligochaeta (Oligochaeta)
	JB474	Count	200	$\#/m^2$	Scoloplos robustus
	JB474	Count	550	$\#/m^2$	Streblospio benedicti
	JB474	Count	25	$\#/m^2$	Tellina
	JB474	Count	25	$\#/m^2$	Tharyx
	JB480	Biomass, benthic	60.375	g/m^2	Crepidula fornicata
	JB480	Biomass, benthic	203.135	g/m^2	Mytilus edulis
	JB480	Biomass, benthic	0.76	g/m^2	Rhithropanopeus harrisii
	JB480	Biomass, benthic	0.0575	g/m^2	Tharyx
	JB480	Count	925	$\#/m^2$	Crepidula fornicata
	JB480	Count	450	$\#/m^2$	Mytilus edulis
	JB480	Count	50	$\#/m^2$	Rhithropanopeus harrisii
	JB480	Count	100	$\#/m^2$	Tharyx
	JB481	Biomass, benthic	25.28	g/m^2	Corophium
	JB481	Biomass, benthic	21.0525	g/m^2	Crepidula fornicata
	JB481	Biomass, benthic	2.495	g/m^2	Scoloplos robustus
	JB481	Biomass, benthic	1.1425	g/m^2	Streblospio benedicti

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB481	Biomass, benthic	3.9675	g/m^2	Tellina
	JB481	Biomass, benthic	0.2175	g/m^2	Tharyx
	JB481	Count	200	$\#/m^2$	Corophium
	JB481	Count	50	$\#/m^2$	Crepidula fornicata
	JB481	Count	175	$\#/m^2$	Scoloplos robustus
	JB481	Count	650	$\#/m^2$	Streblospio benedicti
	JB481	Count	50	$\#/m^2$	Tellina
	JB481	Count	450	$\#/m^2$	Tharyx
	JB486	Biomass, benthic	0.0525	g/m^2	Alitta succinea
	JB486	Biomass, benthic	0.0275	g/m^2	Clymenella torquata
	JB486	Biomass, benthic	1.2375	g/m^2	Corophium
	JB486	Biomass, benthic	114.5525	g/m^2	Crangon septemspinosa
	JB486	Biomass, benthic	0.0225	g/m^2	Eteone
	JB486	Biomass, benthic	0.0975	g/m^2	Glycera
	JB486	Biomass, benthic	113.04	g/m^2	Nassarius obsoletus
	JB486	Biomass, benthic	0.0025	g/m^2	Oligochaeta (Oligochaeta)
	JB486	Biomass, benthic	0.505	g/m^2	Scoloplos robustus
	JB486	Biomass, benthic	0.2225	g/m^2	Streblospio benedicti
	JB486	Biomass, benthic	0.5225	g/m^2	Tellina
	JB486	Biomass, benthic	0.05	g/m^2	Tharyx
	JB486	Count	25	$\#/m^2$	Alitta succinea
	JB486	Count	25	$\#/m^2$	Clymenella torquata
	JB486	Count	100	$\#/m^2$	Corophium
	JB486	Count	50	$\#/m^2$	Crangon septemspinosa
	JB486	Count	25	$\#/m^2$	Eteone
	JB486	Count	25	$\#/m^2$	Glycera
	JB486	Count	125	$\#/m^2$	Nassarius obsoletus
	JB486	Count	50	$\#/m^2$	Oligochaeta (Oligochaeta)
	JB486	Count	300	$\#/m^2$	Scoloplos robustus

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Study[a]	Location ID	Metric	Result	Units	Taxonomic Name
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB486	Count	1125	#/m^2	Streblospio benedicti
	JB486	Count	50	#/m^2	Tellina
	JB486	Count	50	#/m^2	Tharyx
	JB487	Biomass, benthic	0.1875	g/m^2	Ampelisca
	JB487	Biomass, benthic	0.0225	g/m^2	Clymenella torquata
	JB487	Biomass, benthic	0.06	g/m^2	Corophium
	JB487	Biomass, benthic	52.645	g/m^2	Mytilus edulis
	JB487	Biomass, benthic	30.345	g/m^2	Nassarius obsoletus
	JB487	Biomass, benthic	0.22	g/m^2	Scoloplos robustus
	JB487	Biomass, benthic	0.1125	g/m^2	Streblospio benedicti
	JB487	Biomass, benthic	1.0375	g/m^2	Tellina
	JB487	Biomass, benthic	0.3175	g/m^2	Yoldia
	JB487	Count	25	#/m^2	Ampelisca
	JB487	Count	25	#/m^2	Clymenella torquata
	JB487	Count	25	#/m^2	Corophium
	JB487	Count	25	#/m^2	Mytilus edulis
	JB487	Count	200	#/m^2	Nassarius obsoletus
	JB487	Count	300	#/m^2	Scoloplos robustus
	JB487	Count	725	#/m^2	Streblospio benedicti
	JB487	Count	300	#/m^2	Tellina
	JB487	Count	25	#/m^2	Yoldia

Table A-1-4
Benthic Invertebrate Taxonomic Data for the 2008 and 2013 NY/NJ Harbor Data from the Jamaica Bay Estuary

Note:

[a]Benthic invertebrate community data for these studies were downloaded from the Water Quality Portal (National Water Quality Monitoring Council 2019) - a cooperative service sponsored by the United States Geological Survey (USGS), the United States Environmental Protection Agency (USEPA), and the National Water Quality Monitoring Council that integrates publicly available water-quality data from the USGS National Water Information System (NWIS) database and the USEPA STOrage and RETrieval (STORET) data warehouse. The BIC metrics were calcuated from the individual species counts for each station.

Acronyms and Abbreviations:

g/m^2 = grams per square meter
ID = Identification
NY/NJ = New York/New Jersey
$\#/m^2$ = count per square meter

References:

National Water Quality Monitoring Council. 2019. Water Quality Portal. Available online at https://www.waterqualitydata.us/. Accessed on April 10, 2019.

Table A-1-5
Jamaica Bay REMAP Chemistry Statistics 2008/2013

Study	Parameter Group	Chemical	Unit	Number of Samples	Number of Detects	Frequency of Detection	Mean	Standard Deviation	Median	Minimum Detected Value	Maximum Detected Value	Minimum Non-Detect	Maximum Non-Detect
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	13	13	100%	13	14.6	6.6	6	55		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	13	13	100%	241	394	75	12	1300		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	13	13	100%	8.27	10.6	3.3	3	36		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	13	13	100%	24.2	39.2	6.9	3	130		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	13	13	100%	3.21	0.185	3.2	3	3.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	13	13	100%	3.37	0.581	3.2	3	5.2		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	13	13	100%	3.21	0.185	3.2	3	3.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	13	13	100%	3.25	0.23	3.2	3	3.7		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	13	13	100%	3.68	1.31	3.2	3	7.7		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	13	13	100%	3.21	0.185	3.2	3	3.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	13	13	100%	3.68	1.35	3.2	3	7.8		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	13	13	100%	3.32	0.428	3.2	3	4.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	13	13	100%	3.21	0.185	3.2	3	3.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	13	13	100%	3.21	0.185	3.2	3	3.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	13	13	100%	3.24	0.214	3.2	3	3.6		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	13	13	100%	2.33	3.4	0.68	0.6	12		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	13	13	100%	1.03	0.872	0.66	0.6	3.5		
Region 2 2013 NY/NJ Harbor Sampling	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	13	13	100%	8.34	2.23	7.54	6.86	14.6		
Region 2 2008 NY/NJ Harbor Sampling	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	28	28	100%	17	15.9	13	0.1	47		
Region 2 2013 NY/NJ Harbor Sampling	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	28	28	100%	14.3	14.3	7.15	0.1	42		
Region 2 2008 NY/NJ Harbor Sampling	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	28	28	100%	62	30.2	66.5	9.2	98		
Region 2 2013 NY/NJ Harbor Sampling	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	28	28	100%	66.2	33.1	85	3.6	99		
Region 2 2008 NY/NJ Harbor Sampling	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	28	28	100%	21	15.7	17	0.3	50		
Region 2 2013 NY/NJ Harbor Sampling	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	28	28	100%	19.4	21.9	9.65	0.8	71		
Region 2 2008 NY/NJ Harbor Sampling	Grain Size	Substrate - silt/clay mix	%	28	28	100%	38	30.2	34	1.7	91		
Region 2 2013 NY/NJ Harbor Sampling	Grain Size	Substrate - silt/clay mix	%	28	28	100%	33.7	33	14.9	1.3	96		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Aluminum	ppm	28	28	100%	5330	3740	4850	560	11000		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Aluminum	ppm	28	28	100%	32300	13400	30800	9920	56500		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Antimony	ppm	28	7	25%	1	1.18	<1.9	2.1	6.5	1.9	2
Region 2 2013 NY/NJ Harbor Sampling	Metals	Antimony	ppm	28	27	96%	0.475	0.872	0.2	0.1	4.7	0.025	0.025
Region 2 2008 NY/NJ Harbor Sampling	Metals	Arsenic	ppm	28	28	100%	6	4.5	5.15	0.93	16		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Arsenic	ppm	28	28	100%	5.94	4.79	4	0.8	16.9		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Cadmium	ppm	28	17	61%	1	0.651	0.46	0.4	2.9	0.28	0.29
Region 2 2013 NY/NJ Harbor Sampling	Metals	Cadmium	ppm	28	25	89%	1.02	2.66	0.25	0.1	14.2	0.025	0.025
Region 2 2008 NY/NJ Harbor Sampling	Metals	Chromium	ppm	28	28	100%	27	20.2	25	2.3	77		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Chromium	ppm	28	28	100%	43.8	30.5	33.4	4.4	104		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Copper	ppm	28	26	93%	48	75.1	32	1.3	390	0.95	0.96
Region 2 2013 NY/NJ Harbor Sampling	Metals	Copper	ppm	28	28	100%	32.4	52	13.9	0.9	263		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Iron	ppm	28	28	100%	13900	10500	12500	1400	35000		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Iron	ppm	28	28	100%	19800	12900	18100	2660	43000		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Lead	ppm	28	28	100%	49	58.1	37.5	2.9	290		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Lead	ppm	28	28	100%	41.5	45.8	19.4	4.5	223		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Manganese	ppm	28	28	100%	163	106	135	26	350		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Manganese	ppm	28	28	100%	389	121	389	125	645		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Mercury	ppm	28	28	100%	0	0.597	0.24	0.01	3.2		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Mercury	ppm	28	28	100%	0.273	0.284	0.11	0.01	0.88		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Nickel	ppm	28	24	86%	11	8.65	10.3	2.2	34	1.9	1.9
Region 2 2013 NY/NJ Harbor Sampling	Metals	Nickel	ppm	28	28	100%	14	11.2	10.3	1.7	40		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Selenium	ppm	28	0	0%	<1.928	0.023	<1.9			1.9	2
Region 2 2013 NY/NJ Harbor Sampling	Metals	Selenium	ppm	28	25	89%	0.416	0.437	0.15	0.1	1.5	0.025	0.025
Region 2 2008 NY/NJ Harbor Sampling	Metals	Silicon	ppm	28	28	100%	959	295	975	360	1500		
Region 2 2008 NY/NJ Harbor Sampling	Metals	Silver	ppm	28	26	93%	3	1.83	2.75	0.72	5.9	0.48	0.48
Region 2 2013 NY/NJ Harbor Sampling	Metals	Silver	ppm	28	24	86%	0.495	0.5	0.3	0.1	1.6	0.025	0.025
Region 2 2008 NY/NJ Harbor Sampling	Metals	Tin	ppm	28	20	71%	4	4.58	3.6	1.1	19	0.95	0.97
Region 2 2013 NY/NJ Harbor Sampling	Metals	Tin	ppm	28	28	100%	5.63	5.84	2.65	0.3	21.5		

Table A-1-5
Jamaica Bay REMAP Chemistry Statistics 2008/2013

Study	Parameter Group	Chemical	Unit	Number of Samples	Number of Detects	Frequency of Detection	Mean	Standard Deviation	Median	Minimum Detected Value	Maximum Detected Value	Minimum Non-Detect	Maximum Non-Detect
Region 2 2008 NY/NJ Harbor Sampling	Metals	Zinc	ppm	28	28	100%	107	130	81.5	6	670		
Region 2 2013 NY/NJ Harbor Sampling	Metals	Zinc	ppm	28	28	100%	89.8	125	39.9	5.2	630		
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Aldrin	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Aldrin	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Chlordane	ppb	28	2	7%	3	14.1	<0	0.86	74.6	0	0
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Chlordane	ppb	28	1	4%	3.2	16.9	<0	89.6	89.6	0	0
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	cis-Chlordane	ppb	28	2	7%	2	5.04	<0.9	0.86	27	0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	cis-Chlordane	ppb	28	1	4%	1.53	5.42	<1	29.2	29.2	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	cis-Nonachlor	ppb	28	1	4%	1	1.24	<0.9	5.6	5.6	0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	cis-Nonachlor	ppb	28	1	4%	0.711	1.11	<1	6.4	6.4	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Dieldrin	ppb	28	0	0%	<2.68	1.59	<1.8			1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Dieldrin	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Endrin	ppb	28	0	0%	<2.68	1.59	<1.8			1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Endrin	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Heptachlor	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Heptachlor	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Heptachlor epoxide	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Heptachlor epoxide	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Hexachlorobenzene	ppb	28	1	4%	1	0.808	<0.9	0.63	0.63	0.54	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Hexachlorobenzene	ppb	28	1	4%	0.564	0.34	<1	2.3	2.3	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Methoxychlor	ppb	28	0	0%	<13.48	8.12	<9			5.3	92
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Methoxychlor	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Mirex	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Mirex	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	o,p'-DDD	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	o,p'-DDD	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	o,p'-DDE	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	o,p'-DDE	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	o,p'-DDT	ppb	28	2	7%	1	0.889	<1.01	1.5	2.5	0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	o,p'-DDT	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Oxychlordane	ppb	28	0	0%	<1.348	0.812	<0.9			0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Oxychlordane	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	p,p'-DDD	ppb	28	1	4%	2	2	<1.8	7.8	7.8	1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	p,p'-DDD	ppb	28	1	4%	0.789	1.53	<1	8.6	8.6	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	p,p'-DDE	ppb	28	2	7%	2	1.94	<1.95	3	7.2	1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	p,p'-DDE	ppb	28	1	4%	0.796	1.57	<1	8.8	8.8	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	p,p'-DDT	ppb	28	3	11%	2	2.6	<1.95	3	12	1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	p,p'-DDT	ppb	28	0	0%	<1	0	<1			1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Total alpha + gamma chlordane	ppb	28	2	7%	2	9.17	<0.9	0.86	49	0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Total alpha + gamma chlordane	ppb	28	1	4%	2.76	11.9	<1	63.7	63.7	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Total DDx (2,4 & 4,4)	ppb	28	3	11%	3	5.28	<1.95	4.5	27	1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Total DDx (2,4 & 4,4)	ppb	28	1	4%	1.1	3.19	<1	17.4	17.4	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	Total DDx (4,4)	ppb	28	3	11%	3	5.17	<1.95	3	27	1.1	18
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	Total DDx (4,4)	ppb	28	1	4%	1.1	3.19	<1	17.4	17.4	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	trans-Chlordane	ppb	28	1	4%	1	4.11	<0.9	22	22	0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	trans-Chlordane	ppb	28	1	4%	1.71	6.43	<1	34.5	34.5	1	1
Region 2 2008 NY/NJ Harbor Sampling	OC Pesticides	trans-Nonachlor	ppb	28	1	4%	1	3.74	<0.9	20	20	0.53	9.2
Region 2 2013 NY/NJ Harbor Sampling	OC Pesticides	trans-Nonachlor	ppb	28	1	4%	1.18	3.59	<1	19.5	19.5	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	1-Methylnaphthalene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	1-Methylnaphthalene	ppb	28	18	64%	2.13	2.79	1.3	1	14.9	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	1-Methylphenanthrene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	1-Methylphenanthrene	ppb	28	21	75%	6.3	10	3.2	1.1	48.5	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	2,3,5-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphthalene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	2,3,5-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphthalene	ppb	28	12	43%	1.2	1.11	<1	1.1	5.5	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	2,6-Dimethylnaphthalene	ppb	28	1	4%	17	23.5	<20.5	56	56	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	2,6-Dimethylnaphthalene	ppb	28	18	64%	2.78	4.87	1.8	1	26.5	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	2-Methylnaphthalene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	2-Methylnaphthalene	ppb	28	19	68%	3.74	5.46	2.45	1.4	29	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Acenaphthene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250

Table A-1-5
Jamaica Bay REMAP Chemistry Statistics 2008/2013

Study	Parameter Group	Chemical	Unit	Number of Samples	Number of Detects	Frequency of Detection	Mean	Standard Deviation	Median	Minimum Detected Value	Maximum Detected Value	Minimum Non-Detect	Maximum Non-Detect
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Acenaphthene	ppb	28	20	71%	3.09	4.8	1.95	1	23.4	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Acenaphthylene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Acenaphthylene	ppb	28	18	64%	3.19	4.53	1.95	1.3	23.3	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Anthracene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Anthracene	ppb	28	25	89%	11.9	20.2	5.45	1.1	99.7	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benz[a]anthracene	ppb	28	5	18%	26	44.7	<22	17	220	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benz[a]anthracene	ppb	28	26	93%	58.7	146	23.6	1.2	782	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benzo(b)fluoranthene	ppb	28	6	21%	35	83.3	<22	14	440	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benzo(b)fluoranthene	ppb	28	26	93%	81.1	266	20.4	1.3	1420	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benzo[a]pyrene	ppb	28	4	14%	27	53.1	<22	17	270	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benzo[a]pyrene	ppb	28	27	96%	64.7	177	21.8	1.4	947	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benzo[b,k]fluoranthene	ppb	28	6	21%	28	114	<0	14	600	0	0
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benzo[b,k]fluoranthene	ppb	28	26	93%	121	378	35.8	2.7	2020	0	0
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benzo[e]pyrene	ppb	28	1	4%	18	25.3	<20.5	80	80	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benzo[e]pyrene	ppb	28	26	93%	54.6	165	15.6	1.6	886	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benzo[ghi]perylene	ppb	28	2	7%	24	44.7	<20.5	47	220	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benzo[ghi]perylene	ppb	28	26	93%	43.7	126	15.5	1.8	676	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Benzo[k]fluoranthene	ppb	28	1	4%	21	35.1	<20.5	160	160	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Benzo[k]fluoranthene	ppb	28	26	93%	39.6	112	13	1.4	601	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Biphenyl	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Biphenyl	ppb	28	16	57%	1.5	1.99	1.05	1	10.9	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Chrysene	ppb	28	4	14%	29.3	58.4	<22	16	300	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Chrysene	ppb	28	26	93%	67.2	179	22.7	1.7	960	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Dibenz[a,h]anthracene	ppb	28	1	4%	17.8	24.3	<20.5	68	68	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Dibenz[a,h]anthracene	ppb	28	24	86%	18	47	6.65	1.4	249	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Fluoranthene	ppb	28	11	39%	57.8	128	<25	16	600	12	65
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Fluoranthene	ppb	28	27	96%	114	304	44.1	1.6	1630	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Fluorene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Fluorene	ppb	28	21	75%	4.18	6.84	2.35	1.1	35	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Indeno[1,2,3-cd]pyrene	ppb	28	2	7%	23.5	41.5	<20.5	48	200	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Indeno[1,2,3-cd]pyrene	ppb	28	26	93%	70.8	190	21.4	2.3	1000	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Naphthalene	ppb	28	0	0%	<32.2	22.2	<20.5			12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Naphthalene	ppb	28	24	86%	6.8	8.01	4.15	1.4	40.2	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Perylene	ppb	28	3	11%	25.7	48	<22	27	240	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Perylene	ppb	28	26	93%	19.9	41.5	9.1	1.3	218	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Phenanthrene	ppb	28	2	7%	24.9	39.7	<22	120	160	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Phenanthrene	ppb	28	26	93%	31.8	59.5	16.3	1.8	310	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Pyrene	ppb	28	11	39%	53.2	114	<25	15	510	12	65
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Pyrene	ppb	28	27	96%	109	276	42.2	1.7	1490	1	1
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Total HMW PAHs	ppb	28	11	39%	193	576	<33	51	2990	12	65
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Total HMW PAHs	ppb	28	28	100%	666	1820	235	3.3	9750		
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Total LMW PAHs	ppb	28	2	7%	24.9	39.7	<22	120	160	12	250
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Total LMW PAHs	ppb	28	28	100%	63.9	108	32.7	1.1	560		
Region 2 2008 NY/NJ Harbor Sampling	PAHs	Total PAHs	ppb	28	11	39%	203	608	<33	51	3150	12	65
Region 2 2013 NY/NJ Harbor Sampling	PAHs	Total PAHs	ppb	28	28	100%	730	1920	267	5.1	10300		
Region 2 2008 NY/NJ Harbor Sampling	PCBs (Aroclors)	Total PCBs	ppb	28	1	4%	0.464	2.46	<0	13	13	0	0
Region 2 2013 NY/NJ Harbor Sampling	PCBs (Aroclors)	Total PCBs	ppb	28	3	11%	1.16	4.54	<0	2.1	23.2	0	0
Region 2 2008 NY/NJ Harbor Sampling	TOC	Organic carbon	ppm	28	28	100%	29800	28400	21500	1600	120000		
Region 2 2013 NY/NJ Harbor Sampling	TOC	Organic carbon	ppm	25	25	100%	20700	23800	11000	1400	95000		

Table A-1-5
Jamaica Bay REMAP Chemistry Statistics 2008/2013

Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
If all sample results are non-detect,the mean is reported as < average reporting limit.

Acronyms and Abbreviations:
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mm = millimeters
ND = nondetect
NY/NJ = New York/New Jersey
OC = organochlorine
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picograms per gram
p,p'-DDE = 4,4'-dichlorodiphenyldichloroethylene
ppb = parts per billion
ppm = parts per million
TEQ = toxic equivalency
TOC = total organic carbon
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
Total DDx (4,4) = sum of three isomers of DDE, DDD, and DDT
WHO = World Health Organization
% = percent
< = less than

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
NCA Prog New York/New Jersey Harbor 2000	2300_M0_NY-0029-A	Metals	Arsenic	ppm	1	No
	2300_M0_NY-0029-A	Metals	Cadmium	ppm	1	No
	2300_M0_NY-0029-A	Metals	Chromium	ppm	1	Yes
	2300_M0_NY-0029-A	Metals	Copper	ppm	1	No
	2300_M0_NY-0029-A	Metals	Lead	ppm	2	Yes
	2300_M0_NY-0029-A	Metals	Mercury	ppb	100	No
	2300_M0_NY-0029-A	Metals	Nickel	ppm	1	No
	2300_M0_NY-0029-A	Metals	Silver	ppm	1	No
	2300_M0_NY-0029-A	Metals	Zinc	ppm	7	Yes
	2300_M0_NY-0029-A	PAHs	2-Methylnaphthalene	ppb	1.18	Yes
	2300_M0_NY-0029-A	PAHs	Acenaphthene	ppb	0.68	Yes
	2300_M0_NY-0029-A	PAHs	Acenaphthylene	ppb	0.23	Yes
	2300_M0_NY-0029-A	PAHs	Anthracene	ppb	0.57	Yes
	2300_M0_NY-0029-A	PAHs	Benzo(a)anthracene	ppb	1.11	Yes
	2300_M0_NY-0029-A	PAHs	Benzo(a)pyrene	ppb	1.38	Yes
	2300_M0_NY-0029-A	PAHs	Chrysene	ppb	0.8	Yes
	2300_M0_NY-0029-A	PAHs	Dibenzo(a,h)anthracene	ppb	0.25	Yes
	2300_M0_NY-0029-A	PAHs	Fluoranthene	ppb	3.63	Yes
	2300_M0_NY-0029-A	PAHs	Fluorene	ppb	1.57	Yes
	2300_M0_NY-0029-A	PAHs	Naphthalene	ppb	0.99	Yes
	2300_M0_NY-0029-A	PAHs	Pyrene	ppb	2.28	Yes
	2300_M0_NY-0029-A	PAHs	Total PAHs	ppb	18	Yes
	2300_M0_NY-0029-A	Pesticides	4,4'-DDE	ppb	1	No
	2300_M0_NY-0029-A	Pesticides	Total DDx	ppb	1	No
NCA Prog New York/New Jersey Harbor 2001	2300_M1_NY-0032-A	Metals	Arsenic	ppm	1	Yes
	2300_M1_NY-0032-A	Metals	Cadmium	ppm	1	No
	2300_M1_NY-0032-A	Metals	Chromium	ppm	5	Yes
	2300_M1_NY-0032-A	Metals	Copper	ppm	4	Yes
	2300_M1_NY-0032-A	Metals	Lead	ppm	5	Yes
	2300_M1_NY-0032-A	Metals	Mercury	ppb	50	No
	2300_M1_NY-0032-A	Metals	Nickel	ppm	3	Yes
	2300_M1_NY-0032-A	Metals	Silver	ppm	1	No
	2300_M1_NY-0032-A	Metals	Zinc	ppm	14	Yes
	2300_M1_NY-0032-A	PAHs	2-Methylnaphthalene	ppb	0.15	Yes
	2300_M1_NY-0032-A	PAHs	Acenaphthene	ppb	0.07	Yes
	2300_M1_NY-0032-A	PAHs	Acenaphthylene	ppb	0.05	Yes
	2300_M1_NY-0032-A	PAHs	Anthracene	ppb	0.24	Yes
	2300_M1_NY-0032-A	PAHs	Benzo(a)anthracene	ppb	0.58	Yes
	2300_M1_NY-0032-A	PAHs	Benzo(a)pyrene	ppb	0.8	Yes
	2300_M1_NY-0032-A	PAHs	Chrysene	ppb	0.52	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
NCA Prog New York/New Jersey Harbor 2001 (cont.)	2300_M1_NY-0032-A	PAHs	Dibenzo(a,h)anthracene	ppb	1	No
	2300_M1_NY-0032-A	PAHs	Fluoranthene	ppb	1.13	Yes
	2300_M1_NY-0032-A	PAHs	Fluorene	ppb	0.1	Yes
	2300_M1_NY-0032-A	PAHs	Naphthalene	ppb	0.16	Yes
	2300_M1_NY-0032-A	PAHs	Pyrene	ppb	1.27	Yes
	2300_M1_NY-0032-A	PAHs	Total PAHs	ppb	7.1	Yes
	2300_M1_NY-0032-A	Pesticides	4,4'-DDE	ppb	1	No
NCA Prog New York/New Jersey Harbor 2002	2300_M2_NY-0029-A	Metals	Arsenic	ppm	1	No
	2300_M2_NY-0029-A	Metals	Cadmium	ppm	0.4	No
	2300_M2_NY-0029-A	Metals	Chromium	ppm	1.39	Yes
	2300_M2_NY-0029-A	Metals	Copper	ppm	1.04	Yes
	2300_M2_NY-0029-A	Metals	Lead	ppm	2.62	Yes
	2300_M2_NY-0029-A	Metals	Mercury	ppb	50	No
	2300_M2_NY-0029-A	Metals	Nickel	ppm	0.43	Yes
	2300_M2_NY-0029-A	Metals	Silver	ppm	0.67	Yes
	2300_M2_NY-0029-A	Metals	Zinc	ppm	4.81	Yes
	2300_M2_NY-0029-A	PAHs	2-Methylnaphthalene	ppb	0.29	Yes
	2300_M2_NY-0029-A	PAHs	Acenaphthene	ppb	0.07	Yes
	2300_M2_NY-0029-A	PAHs	Acenaphthylene	ppb	1	No
	2300_M2_NY-0029-A	PAHs	Anthracene	ppb	0.06	Yes
	2300_M2_NY-0029-A	PAHs	Benzo(a)anthracene	ppb	0.15	Yes
	2300_M2_NY-0029-A	PAHs	Benzo(a)pyrene	ppb	0.12	Yes
	2300_M2_NY-0029-A	PAHs	Chrysene	ppb	0.11	Yes
	2300_M2_NY-0029-A	PAHs	Dibenzo(a,h)anthracene	ppb	1	No
	2300_M2_NY-0029-A	PAHs	Fluoranthene	ppb	1	Yes
	2300_M2_NY-0029-A	PAHs	Fluorene	ppb	0.11	Yes
	2300_M2_NY-0029-A	PAHs	Naphthalene	ppb	0.41	Yes
	2300_M2_NY-0029-A	PAHs	Pyrene	ppb	0.55	Yes
	2300_M2_NY-0029-A	PAHs	Total PAHs	ppb	3.1	Yes
	2300_M2_NY-0029-A	Pesticides	4,4'-DDE	ppb	1	No
	2300_M2_NY-0029-A	Pesticides	Total DDx	ppb	1	Yes
NCA Prog New York/New Jersey Harbor 2003	2300_M3_NY03-0236	Metals	Arsenic	ppm	1	No
	2300_M3_NY03-0236	Metals	Cadmium	ppm	0.4	No
	2300_M3_NY03-0236	Metals	Chromium	ppm	2.88	Yes
	2300_M3_NY03-0236	Metals	Copper	ppm	7.28	Yes
	2300_M3_NY03-0236	Metals	Lead	ppm	5.23	Yes
	2300_M3_NY03-0236	Metals	Mercury	ppb	10	No
	2300_M3_NY03-0236	Metals	Nickel	ppm	2.56	Yes
	2300_M3_NY03-0236	Metals	Silver	ppm	0.4	No
	2300_M3_NY03-0236	Metals	Zinc	ppm	21.4	Yes
	2300_M3_NY03-0236	PAHs	2-Methylnaphthalene	ppb	0.11	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
NCA Prog New York/New Jersey Harbor 2003 (cont.)	2300_M3_NY03-0236	PAHs	Acenaphthene	ppb	0.07	No
	2300_M3_NY03-0236	PAHs	Acenaphthylene	ppb	0.07	No
	2300_M3_NY03-0236	PAHs	Anthracene	ppb	0.04	Yes
	2300_M3_NY03-0236	PAHs	Benzo(a)anthracene	ppb	0.71	Yes
	2300_M3_NY03-0236	PAHs	Benzo(a)pyrene	ppb	0.84	Yes
	2300_M3_NY03-0236	PAHs	Chrysene	ppb	0.72	Yes
	2300_M3_NY03-0236	PAHs	Dibenzo(a,h)anthracene	ppb	0.14	Yes
	2300_M3_NY03-0236	PAHs	Fluoranthene	ppb	1.44	Yes
	2300_M3_NY03-0236	PAHs	Fluorene	ppb	0.07	Yes
	2300_M3_NY03-0236	PAHs	Naphthalene	ppb	0.26	Yes
	2300_M3_NY03-0236	PAHs	Pyrene	ppb	1.02	Yes
	2300_M3_NY03-0236	PAHs	Total PAHs	ppb	8.6	Yes
	2300_M3_NY03-0236	Pesticides	4,4'-DDE	ppb	1.6	No
	2300_M3_NY03-0236	Pesticides	Total DDx	ppb	1.6	No
REMAP 1998	2200_56_JB031	Metals	Arsenic	ppm	2	Yes
	2200_56_JB031	Metals	Cadmium	ppm	0	No
	2200_56_JB031	Metals	Chromium	ppm	9	Yes
	2200_56_JB031	Metals	Copper	ppm	4	Yes
	2200_56_JB031	Metals	Lead	ppm	11	Yes
	2200_56_JB031	Metals	Mercury	ppb	0	No
	2200_56_JB031	Metals	Nickel	ppm	3	Yes
	2200_56_JB031	Metals	Silver	ppm	0	No
	2200_56_JB031	Metals	Zinc	ppm	23	Yes
	2200_56_JB031	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB031	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB031	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB031	PAHs	Anthracene	ppb	0	No
	2200_56_JB031	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB031	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB031	PAHs	Chrysene	ppb	0	No
	2200_56_JB031	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB031	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB031	PAHs	Fluorene	ppb	0	No
	2200_56_JB031	PAHs	Naphthalene	ppb	0	No
	2200_56_JB031	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB031	PAHs	Pyrene	ppb	0	No
	2200_56_JB031	PAHs	Total PAHs	ppb	0	No
	2200_56_JB031	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB031	Pesticides	Total DDx	ppb	0	No
	2200_56_JB041	Metals	Arsenic	ppm	8	Yes
	2200_56_JB041	Metals	Cadmium	ppm	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB041	Metals	Chromium	ppm	36	Yes
	2200_56_JB041	Metals	Copper	ppm	28	Yes
	2200_56_JB041	Metals	Lead	ppm	37	Yes
	2200_56_JB041	Metals	Mercury	ppb	380	Yes
	2200_56_JB041	Metals	Nickel	ppm	13	Yes
	2200_56_JB041	Metals	Silver	ppm	0.7	Yes
	2200_56_JB041	Metals	Zinc	ppm	77	Yes
	2200_56_JB041	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB041	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB041	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB041	PAHs	Anthracene	ppb	52	Yes
	2200_56_JB041	PAHs	Benzo(a)anthracene	ppb	110	Yes
	2200_56_JB041	PAHs	Benzo(a)pyrene	ppb	130	Yes
	2200_56_JB041	PAHs	Chrysene	ppb	120	Yes
	2200_56_JB041	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB041	PAHs	Fluoranthene	ppb	250	Yes
	2200_56_JB041	PAHs	Fluorene	ppb	0	No
	2200_56_JB041	PAHs	Naphthalene	ppb	43	Yes
	2200_56_JB041	PAHs	Phenanthrene	ppb	120	Yes
	2200_56_JB041	PAHs	Pyrene	ppb	200	Yes
	2200_56_JB041	PAHs	Total PAHs	ppb	1200	Yes
	2200_56_JB041	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB041	Pesticides	Total DDx	ppb	0	No
	2200_56_JB042	Metals	Arsenic	ppm	0	No
	2200_56_JB042	Metals	Cadmium	ppm	0	No
	2200_56_JB042	Metals	Chromium	ppm	4	Yes
	2200_56_JB042	Metals	Copper	ppm	3	Yes
	2200_56_JB042	Metals	Lead	ppm	4	Yes
	2200_56_JB042	Metals	Mercury	ppb	0	No
	2200_56_JB042	Metals	Nickel	ppm	0	No
	2200_56_JB042	Metals	Silver	ppm	0	No
	2200_56_JB042	Metals	Zinc	ppm	0	No
	2200_56_JB042	PAHs	2-Methylnaphthalene	ppb	8	Yes
	2200_56_JB042	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB042	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB042	PAHs	Anthracene	ppb	0	No
	2200_56_JB042	PAHs	Benzo(a)anthracene	ppb	77	Yes
	2200_56_JB042	PAHs	Benzo(a)pyrene	ppb	69	Yes
	2200_56_JB042	PAHs	Chrysene	ppb	72	Yes
	2200_56_JB042	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB042	PAHs	Fluoranthene	ppb	68	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB042	PAHs	Fluorene	ppb	0	No
	2200_56_JB042	PAHs	Naphthalene	ppb	0	No
	2200_56_JB042	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB042	PAHs	Pyrene	ppb	130	Yes
	2200_56_JB042	PAHs	Total PAHs	ppb	520	Yes
	2200_56_JB042	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB042	Pesticides	Total DDx	ppb	0	No
	2200_56_JB043	Metals	Arsenic	ppm	1	Yes
	2200_56_JB043	Metals	Cadmium	ppm	0	No
	2200_56_JB043	Metals	Chromium	ppm	4	Yes
	2200_56_JB043	Metals	Copper	ppm	0	No
	2200_56_JB043	Metals	Lead	ppm	4	Yes
	2200_56_JB043	Metals	Mercury	ppb	0	No
	2200_56_JB043	Metals	Nickel	ppm	3	Yes
	2200_56_JB043	Metals	Silver	ppm	0	No
	2200_56_JB043	Metals	Zinc	ppm	0	No
	2200_56_JB043	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB043	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB043	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB043	PAHs	Anthracene	ppb	0	No
	2200_56_JB043	PAHs	Benzo(a)anthracene	ppb	29	Yes
	2200_56_JB043	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB043	PAHs	Chrysene	ppb	16	Yes
	2200_56_JB043	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB043	PAHs	Fluoranthene	ppb	29	Yes
	2200_56_JB043	PAHs	Fluorene	ppb	0	No
	2200_56_JB043	PAHs	Naphthalene	ppb	0	No
	2200_56_JB043	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB043	PAHs	Pyrene	ppb	36	Yes
	2200_56_JB043	PAHs	Total PAHs	ppb	110	Yes
	2200_56_JB043	Pesticides	4,4'-DDE	ppb	1.3	Yes
	2200_56_JB043	Pesticides	Total DDx	ppb	1.3	Yes
	2200_56_JB201	Metals	Arsenic	ppm	0	No
	2200_56_JB201	Metals	Cadmium	ppm	0	No
	2200_56_JB201	Metals	Chromium	ppm	3	Yes
	2200_56_JB201	Metals	Copper	ppm	0	No
	2200_56_JB201	Metals	Lead	ppm	2	Yes
	2200_56_JB201	Metals	Mercury	ppb	0	No
	2200_56_JB201	Metals	Nickel	ppm	2	Yes
	2200_56_JB201	Metals	Silver	ppm	0	No
	2200_56_JB201	Metals	Zinc	ppm	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB201	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB201	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB201	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB201	PAHs	Anthracene	ppb	0	No
	2200_56_JB201	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB201	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB201	PAHs	Chrysene	ppb	0	No
	2200_56_JB201	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB201	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB201	PAHs	Fluorene	ppb	0	No
	2200_56_JB201	PAHs	Naphthalene	ppb	0	No
	2200_56_JB201	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB201	PAHs	Pyrene	ppb	0	No
	2200_56_JB201	PAHs	Total PAHs	ppb	0	No
	2200_56_JB201	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB201	Pesticides	Total DDx	ppb	0	No
	2200_56_JB205	Metals	Arsenic	ppm	1	Yes
	2200_56_JB205	Metals	Cadmium	ppm	0	No
	2200_56_JB205	Metals	Chromium	ppm	4	Yes
	2200_56_JB205	Metals	Copper	ppm	0	No
	2200_56_JB205	Metals	Lead	ppm	4	Yes
	2200_56_JB205	Metals	Mercury	ppb	0	No
	2200_56_JB205	Metals	Nickel	ppm	0	No
	2200_56_JB205	Metals	Silver	ppm	0	No
	2200_56_JB205	Metals	Zinc	ppm	0	No
	2200_56_JB205	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB205	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB205	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB205	PAHs	Anthracene	ppb	0	No
	2200_56_JB205	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB205	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB205	PAHs	Chrysene	ppb	0	No
	2200_56_JB205	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB205	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB205	PAHs	Fluorene	ppb	0	No
	2200_56_JB205	PAHs	Naphthalene	ppb	0	No
	2200_56_JB205	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB205	PAHs	Pyrene	ppb	0	No
	2200_56_JB205	PAHs	Total PAHs	ppb	0	No
	2200_56_JB205	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB205	Pesticides	Total DDx	ppb	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB210	Metals	Arsenic	ppm	2	Yes
	2200_56_JB210	Metals	Cadmium	ppm	0	No
	2200_56_JB210	Metals	Chromium	ppm	12	Yes
	2200_56_JB210	Metals	Copper	ppm	8	Yes
	2200_56_JB210	Metals	Lead	ppm	13	Yes
	2200_56_JB210	Metals	Mercury	ppb	100	Yes
	2200_56_JB210	Metals	Nickel	ppm	5	Yes
	2200_56_JB210	Metals	Silver	ppm	0	No
	2200_56_JB210	Metals	Zinc	ppm	32	Yes
	2200_56_JB210	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB210	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB210	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB210	PAHs	Anthracene	ppb	0	No
	2200_56_JB210	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB210	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB210	PAHs	Chrysene	ppb	40	Yes
	2200_56_JB210	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB210	PAHs	Fluoranthene	ppb	83	Yes
	2200_56_JB210	PAHs	Fluorene	ppb	0	No
	2200_56_JB210	PAHs	Naphthalene	ppb	0	No
	2200_56_JB210	PAHs	Phenanthrene	ppb	40	Yes
	2200_56_JB210	PAHs	Pyrene	ppb	80	Yes
	2200_56_JB210	PAHs	Total PAHs	ppb	280	Yes
	2200_56_JB210	Pesticides	4,4'-DDE	ppb	1.7	Yes
	2200_56_JB210	Pesticides	Total DDx	ppb	1.7	Yes
	2200_56_JB212	Metals	Arsenic	ppm	1	Yes
	2200_56_JB212	Metals	Cadmium	ppm	0	No
	2200_56_JB212	Metals	Chromium	ppm	5	Yes
	2200_56_JB212	Metals	Copper	ppm	0	No
	2200_56_JB212	Metals	Lead	ppm	5	Yes
	2200_56_JB212	Metals	Mercury	ppb	0	No
	2200_56_JB212	Metals	Nickel	ppm	0	No
	2200_56_JB212	Metals	Silver	ppm	0	No
	2200_56_JB212	Metals	Zinc	ppm	0	No
	2200_56_JB212	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB212	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB212	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB212	PAHs	Anthracene	ppb	0	No
	2200_56_JB212	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB212	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB212	PAHs	Chrysene	ppb	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB212	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB212	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB212	PAHs	Fluorene	ppb	0	No
	2200_56_JB212	PAHs	Naphthalene	ppb	0	No
	2200_56_JB212	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB212	PAHs	Pyrene	ppb	0	No
	2200_56_JB212	PAHs	Total PAHs	ppb	0	No
	2200_56_JB212	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB212	Pesticides	Total DDx	ppb	0	No
	2200_56_JB214	Metals	Arsenic	ppm	7	Yes
	2200_56_JB214	Metals	Cadmium	ppm	0	No
	2200_56_JB214	Metals	Chromium	ppm	38	Yes
	2200_56_JB214	Metals	Copper	ppm	41	Yes
	2200_56_JB214	Metals	Lead	ppm	38	Yes
	2200_56_JB214	Metals	Mercury	ppb	340	Yes
	2200_56_JB214	Metals	Nickel	ppm	14	Yes
	2200_56_JB214	Metals	Silver	ppm	0.7	Yes
	2200_56_JB214	Metals	Zinc	ppm	81	Yes
	2200_56_JB214	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB214	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB214	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB214	PAHs	Anthracene	ppb	0	No
	2200_56_JB214	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB214	PAHs	Benzo(a)pyrene	ppb	130	Yes
	2200_56_JB214	PAHs	Chrysene	ppb	110	Yes
	2200_56_JB214	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB214	PAHs	Fluoranthene	ppb	200	Yes
	2200_56_JB214	PAHs	Fluorene	ppb	0	No
	2200_56_JB214	PAHs	Naphthalene	ppb	0	No
	2200_56_JB214	PAHs	Phenanthrene	ppb	110	Yes
	2200_56_JB214	PAHs	Pyrene	ppb	190	Yes
	2200_56_JB214	PAHs	Total PAHs	ppb	1000	Yes
	2200_56_JB214	Pesticides	4,4'-DDE	ppb	0	No
	2200_56_JB214	Pesticides	Total DDx	ppb	0	No
	2200_56_JB217	Metals	Arsenic	ppm	1	Yes
	2200_56_JB217	Metals	Cadmium	ppm	0	No
	2200_56_JB217	Metals	Chromium	ppm	5	Yes
	2200_56_JB217	Metals	Copper	ppm	3	Yes
	2200_56_JB217	Metals	Lead	ppm	5	Yes
	2200_56_JB217	Metals	Mercury	ppb	0	No
	2200_56_JB217	Metals	Nickel	ppm	2	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB217	Metals	Silver	ppm	0	No
	2200_56_JB217	Metals	Zinc	ppm	0	No
	2200_56_JB217	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB217	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB217	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB217	PAHs	Anthracene	ppb	0	No
	2200_56_JB217	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB217	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB217	PAHs	Chrysene	ppb	0	No
	2200_56_JB217	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB217	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB217	PAHs	Fluorene	ppb	0	No
	2200_56_JB217	PAHs	Naphthalene	ppb	0	No
	2200_56_JB217	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB217	PAHs	Pyrene	ppb	0	No
	2200_56_JB217	PAHs	Total PAHs	ppb	0	No
	2200_56_JB217	Pesticides	4,4'-DDE	ppb	1.5	Yes
	2200_56_JB217	Pesticides	Total DDx	ppb	1.5	Yes
	2200_56_JB219	Metals	Arsenic	ppm	0	No
	2200_56_JB219	Metals	Cadmium	ppm	0	No
	2200_56_JB219	Metals	Chromium	ppm	3	Yes
	2200_56_JB219	Metals	Copper	ppm	0	No
	2200_56_JB219	Metals	Lead	ppm	4	Yes
	2200_56_JB219	Metals	Mercury	ppb	0	No
	2200_56_JB219	Metals	Nickel	ppm	0	No
	2200_56_JB219	Metals	Silver	ppm	0	No
	2200_56_JB219	Metals	Zinc	ppm	0	No
	2200_56_JB219	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB219	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB219	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB219	PAHs	Anthracene	ppb	0	No
	2200_56_JB219	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB219	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB219	PAHs	Chrysene	ppb	0	No
	2200_56_JB219	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB219	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB219	PAHs	Fluorene	ppb	0	No
	2200_56_JB219	PAHs	Naphthalene	ppb	0	No
	2200_56_JB219	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB219	PAHs	Pyrene	ppb	0	No
	2200_56_JB219	PAHs	Total PAHs	ppb	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1998 (cont.)	2200_56_JB219	Pesticides	4,4'-DDE	ppb	1.4	Yes
	2200_56_JB219	Pesticides	Total DDx	ppb	1.4	Yes
	2200_56_JB222	Metals	Arsenic	ppm	2	Yes
	2200_56_JB222	Metals	Cadmium	ppm	0	No
	2200_56_JB222	Metals	Chromium	ppm	12	Yes
	2200_56_JB222	Metals	Copper	ppm	4	Yes
	2200_56_JB222	Metals	Lead	ppm	5	Yes
	2200_56_JB222	Metals	Mercury	ppb	0	No
	2200_56_JB222	Metals	Nickel	ppm	5	Yes
	2200_56_JB222	Metals	Silver	ppm	0	No
	2200_56_JB222	Metals	Zinc	ppm	0	No
	2200_56_JB222	PAHs	2-Methylnaphthalene	ppb	0	No
	2200_56_JB222	PAHs	Acenaphthene	ppb	0	No
	2200_56_JB222	PAHs	Acenaphthylene	ppb	0	No
	2200_56_JB222	PAHs	Anthracene	ppb	0	No
	2200_56_JB222	PAHs	Benzo(a)anthracene	ppb	0	No
	2200_56_JB222	PAHs	Benzo(a)pyrene	ppb	0	No
	2200_56_JB222	PAHs	Chrysene	ppb	0	No
	2200_56_JB222	PAHs	Dibenzo(a,h)anthracene	ppb	0	No
	2200_56_JB222	PAHs	Fluoranthene	ppb	0	No
	2200_56_JB222	PAHs	Fluorene	ppb	0	No
	2200_56_JB222	PAHs	Naphthalene	ppb	0	No
	2200_56_JB222	PAHs	Phenanthrene	ppb	0	No
	2200_56_JB222	PAHs	Pyrene	ppb	0	No
	2200_56_JB222	PAHs	Total PAHs	ppb	0	No
	2200_56_JB222	Pesticides	4,4'-DDE	ppb	3	Yes
	2200_56_JB222	Pesticides	Total DDx	ppb	6.1	Yes
REMAP 1993/94	2200_26_JB002	Metals	Arsenic	ppm	2.7	Yes
	2200_26_JB002	Metals	Cadmium	ppm	0.277	Yes
	2200_26_JB002	Metals	Chromium	ppm	30.2	Yes
	2200_26_JB002	Metals	Copper	ppm	9.8	Yes
	2200_26_JB002	Metals	Lead	ppm	17.1	Yes
	2200_26_JB002	Metals	Mercury	ppb	54	Yes
	2200_26_JB002	Metals	Nickel	ppm	8.17	Yes
	2200_26_JB002	Metals	Silver	ppm	0.195	Yes
	2200_26_JB002	Metals	Zinc	ppm	30	Yes
	2200_26_JB002	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_26_JB002	PAHs	Acenaphthene	ppb	12	No
	2200_26_JB002	PAHs	Acenaphthylene	ppb	12	No
	2200_26_JB002	PAHs	Anthracene	ppb	12	No
	2200_26_JB002	PAHs	Benzo(a)anthracene	ppb	36	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_26_JB002	PAHs	Benzo(a)pyrene	ppb	31	Yes
	2200_26_JB002	PAHs	Chrysene	ppb	78	Yes
	2200_26_JB002	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_26_JB002	PAHs	Fluoranthene	ppb	46	Yes
	2200_26_JB002	PAHs	Fluorene	ppb	12	No
	2200_26_JB002	PAHs	Naphthalene	ppb	28	Yes
	2200_26_JB002	PAHs	Phenanthrene	ppb	18	Yes
	2200_26_JB002	PAHs	Pyrene	ppb	63	Yes
	2200_26_JB002	PAHs	Total PAHs	ppb	420	Yes
	2200_26_JB002	Pesticides	4,4'-DDE	ppb	0.22	Yes
	2200_26_JB002	Pesticides	Total DDx	ppb	0.4	Yes
	2200_26_JB006	Metals	Arsenic	ppm	1.24	Yes
	2200_26_JB006	Metals	Cadmium	ppm	0.234	Yes
	2200_26_JB006	Metals	Chromium	ppm	26.2	Yes
	2200_26_JB006	Metals	Copper	ppm	4.52	Yes
	2200_26_JB006	Metals	Lead	ppm	16.5	Yes
	2200_26_JB006	Metals	Mercury	ppb	48	Yes
	2200_26_JB006	Metals	Nickel	ppm	5.05	Yes
	2200_26_JB006	Metals	Silver	ppm	0.033	Yes
	2200_26_JB006	Metals	Zinc	ppm	36	Yes
	2200_26_JB006	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_26_JB006	PAHs	Acenaphthene	ppb	12	No
	2200_26_JB006	PAHs	Acenaphthylene	ppb	12	No
	2200_26_JB006	PAHs	Anthracene	ppb	14	Yes
	2200_26_JB006	PAHs	Benzo(a)anthracene	ppb	38	Yes
	2200_26_JB006	PAHs	Benzo(a)pyrene	ppb	33	Yes
	2200_26_JB006	PAHs	Chrysene	ppb	38	Yes
	2200_26_JB006	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_26_JB006	PAHs	Fluoranthene	ppb	64	Yes
	2200_26_JB006	PAHs	Fluorene	ppb	12	No
	2200_26_JB006	PAHs	Naphthalene	ppb	16	Yes
	2200_26_JB006	PAHs	Phenanthrene	ppb	36	Yes
	2200_26_JB006	PAHs	Pyrene	ppb	59	Yes
	2200_26_JB006	PAHs	Total PAHs	ppb	370	Yes
	2200_26_JB006	Pesticides	4,4'-DDE	ppb	0.17	Yes
	2200_26_JB006	Pesticides	Total DDx	ppb	0.43	Yes
	2200_26_JB022	Metals	Arsenic	ppm	2.47	Yes
	2200_26_JB022	Metals	Cadmium	ppm	0.317	Yes
	2200_26_JB022	Metals	Chromium	ppm	40	Yes
	2200_26_JB022	Metals	Copper	ppm	8.14	Yes
	2200_26_JB022	Metals	Lead	ppm	22.4	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_26_JB022	Metals	Mercury	ppb	117	Yes
	2200_26_JB022	Metals	Nickel	ppm	6.55	Yes
	2200_26_JB022	Metals	Silver	ppm	0.239	Yes
	2200_26_JB022	Metals	Zinc	ppm	46	Yes
	2200_26_JB022	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_26_JB022	PAHs	Acenaphthene	ppb	12	No
	2200_26_JB022	PAHs	Acenaphthylene	ppb	12	No
	2200_26_JB022	PAHs	Anthracene	ppb	19	Yes
	2200_26_JB022	PAHs	Benzo(a)anthracene	ppb	47	Yes
	2200_26_JB022	PAHs	Benzo(a)pyrene	ppb	52	Yes
	2200_26_JB022	PAHs	Chrysene	ppb	52	Yes
	2200_26_JB022	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_26_JB022	PAHs	Fluoranthene	ppb	71	Yes
	2200_26_JB022	PAHs	Fluorene	ppb	12	No
	2200_26_JB022	PAHs	Naphthalene	ppb	14	Yes
	2200_26_JB022	PAHs	Phenanthrene	ppb	35	Yes
	2200_26_JB022	PAHs	Pyrene	ppb	76	Yes
	2200_26_JB022	PAHs	Total PAHs	ppb	520	Yes
	2200_26_JB022	Pesticides	4,4'-DDE	ppb	0.17	Yes
	2200_26_JB022	Pesticides	Total DDx	ppb	0.44	Yes
	2200_26_JB026	Metals	Arsenic	ppm	1.61	Yes
	2200_26_JB026	Metals	Cadmium	ppm	0.422	Yes
	2200_26_JB026	Metals	Chromium	ppm	21.7	Yes
	2200_26_JB026	Metals	Copper	ppm	5.97	Yes
	2200_26_JB026	Metals	Lead	ppm	19.9	Yes
	2200_26_JB026	Metals	Mercury	ppb	111	Yes
	2200_26_JB026	Metals	Nickel	ppm	4.23	Yes
	2200_26_JB026	Metals	Silver	ppm	0.182	Yes
	2200_26_JB026	Metals	Zinc	ppm	39	Yes
	2200_26_JB026	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_26_JB026	PAHs	Acenaphthene	ppb	12	No
	2200_26_JB026	PAHs	Acenaphthylene	ppb	12	No
	2200_26_JB026	PAHs	Anthracene	ppb	12	No
	2200_26_JB026	PAHs	Benzo(a)anthracene	ppb	18	Yes
	2200_26_JB026	PAHs	Benzo(a)pyrene	ppb	16	Yes
	2200_26_JB026	PAHs	Chrysene	ppb	19	Yes
	2200_26_JB026	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_26_JB026	PAHs	Fluoranthene	ppb	36	Yes
	2200_26_JB026	PAHs	Fluorene	ppb	12	No
	2200_26_JB026	PAHs	Naphthalene	ppb	17	Yes
	2200_26_JB026	PAHs	Phenanthrene	ppb	32	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_26_JB026	PAHs	Pyrene	ppb	38	Yes
	2200_26_JB026	PAHs	Total PAHs	ppb	220	Yes
	2200_26_JB026	Pesticides	4,4'-DDE	ppb	0.14	Yes
	2200_26_JB026	Pesticides	Total DDx	ppb	0.32	Yes
	2200_26_JB031	Metals	Arsenic	ppm	1.34	Yes
	2200_26_JB031	Metals	Cadmium	ppm	0.257	Yes
	2200_26_JB031	Metals	Chromium	ppm	35.5	Yes
	2200_26_JB031	Metals	Copper	ppm	4.98	Yes
	2200_26_JB031	Metals	Lead	ppm	18.2	Yes
	2200_26_JB031	Metals	Mercury	ppb	63	Yes
	2200_26_JB031	Metals	Nickel	ppm	8.75	Yes
	2200_26_JB031	Metals	Silver	ppm	0.115	Yes
	2200_26_JB031	Metals	Zinc	ppm	38	Yes
	2200_26_JB031	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_26_JB031	PAHs	Acenaphthene	ppb	12	No
	2200_26_JB031	PAHs	Acenaphthylene	ppb	12	No
	2200_26_JB031	PAHs	Anthracene	ppb	12	No
	2200_26_JB031	PAHs	Benzo(a)anthracene	ppb	12	No
	2200_26_JB031	PAHs	Benzo(a)pyrene	ppb	12	No
	2200_26_JB031	PAHs	Chrysene	ppb	12	No
	2200_26_JB031	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_26_JB031	PAHs	Fluoranthene	ppb	14	Yes
	2200_26_JB031	PAHs	Fluorene	ppb	12	No
	2200_26_JB031	PAHs	Naphthalene	ppb	14	Yes
	2200_26_JB031	PAHs	Phenanthrene	ppb	12	No
	2200_26_JB031	PAHs	Pyrene	ppb	12	Yes
	2200_26_JB031	PAHs	Total PAHs	ppb	64	Yes
	2200_26_JB031	Pesticides	4,4'-DDE	ppb	0.11	Yes
	2200_26_JB031	Pesticides	Total DDx	ppb	0.29	Yes
	2200_26_JB042	Metals	Arsenic	ppm	0.73	Yes
	2200_26_JB042	Metals	Cadmium	ppm	0.043	Yes
	2200_26_JB042	Metals	Chromium	ppm	11.7	Yes
	2200_26_JB042	Metals	Copper	ppm	3.33	Yes
	2200_26_JB042	Metals	Lead	ppm	10.2	Yes
	2200_26_JB042	Metals	Mercury	ppb	35	Yes
	2200_26_JB042	Metals	Nickel	ppm	2.15	Yes
	2200_26_JB042	Metals	Silver	ppm	0.116	Yes
	2200_26_JB042	Metals	Zinc	ppm	11	Yes
	2200_26_JB042	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_26_JB042	PAHs	Acenaphthene	ppb	12	No
	2200_26_JB042	PAHs	Acenaphthylene	ppb	58	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_26_JB042	PAHs	Anthracene	ppb	44	Yes
	2200_26_JB042	PAHs	Benzo(a)anthracene	ppb	130	Yes
	2200_26_JB042	PAHs	Benzo(a)pyrene	ppb	110	Yes
	2200_26_JB042	PAHs	Chrysene	ppb	130	Yes
	2200_26_JB042	PAHs	Dibenzo(a,h)anthracene	ppb	14	Yes
	2200_26_JB042	PAHs	Fluoranthene	ppb	140	Yes
	2200_26_JB042	PAHs	Fluorene	ppb	12	No
	2200_26_JB042	PAHs	Naphthalene	ppb	24	Yes
	2200_26_JB042	PAHs	Phenanthrene	ppb	66	Yes
	2200_26_JB042	PAHs	Pyrene	ppb	250	Yes
	2200_26_JB042	PAHs	Total PAHs	ppb	1200	Yes
	2200_26_JB042	Pesticides	4,4'-DDE	ppb	0.17	Yes
	2200_26_JB042	Pesticides	Total DDx	ppb	0.58	Yes
	2200_27_JB104	Metals	Arsenic	ppm	3.6	Yes
	2200_27_JB104	Metals	Cadmium	ppm	0.569	Yes
	2200_27_JB104	Metals	Chromium	ppm	41.5	Yes
	2200_27_JB104	Metals	Copper	ppm	24.7	Yes
	2200_27_JB104	Metals	Lead	ppm	29.6	Yes
	2200_27_JB104	Metals	Mercury	ppb	141	Yes
	2200_27_JB104	Metals	Nickel	ppm	9.8	Yes
	2200_27_JB104	Metals	Silver	ppm	0.755	Yes
	2200_27_JB104	Metals	Zinc	ppm	83	Yes
	2200_27_JB104	PAHs	2-Methylnaphthalene	ppb	8.1	Yes
	2200_27_JB104	PAHs	Acenaphthene	ppb	24	No
	2200_27_JB104	PAHs	Acenaphthylene	ppb	9.7	Yes
	2200_27_JB104	PAHs	Anthracene	ppb	14	Yes
	2200_27_JB104	PAHs	Benzo(a)anthracene	ppb	29	Yes
	2200_27_JB104	PAHs	Benzo(a)pyrene	ppb	30	Yes
	2200_27_JB104	PAHs	Chrysene	ppb	33	Yes
	2200_27_JB104	PAHs	Dibenzo(a,h)anthracene	ppb	24	No
	2200_27_JB104	PAHs	Fluoranthene	ppb	59	Yes
	2200_27_JB104	PAHs	Fluorene	ppb	6.5	Yes
	2200_27_JB104	PAHs	Naphthalene	ppb	32	Yes
	2200_27_JB104	PAHs	Phenanthrene	ppb	33	Yes
	2200_27_JB104	PAHs	Pyrene	ppb	56	Yes
	2200_27_JB104	PAHs	Total PAHs	ppb	470	Yes
	2200_27_JB104	Pesticides	4,4'-DDE	ppb	0.92	Yes
	2200_27_JB104	Pesticides	Total DDx	ppb	2	Yes
	2200_27_JB108	Metals	Arsenic	ppm	2.19	Yes
	2200_27_JB108	Metals	Cadmium	ppm	0.111	Yes
	2200_27_JB108	Metals	Chromium	ppm	21	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_27_JB108	Metals	Copper	ppm	4	Yes
	2200_27_JB108	Metals	Lead	ppm	14.4	Yes
	2200_27_JB108	Metals	Mercury	ppb	38	Yes
	2200_27_JB108	Metals	Nickel	ppm	3.6	Yes
	2200_27_JB108	Metals	Silver	ppm	0.119	Yes
	2200_27_JB108	Metals	Zinc	ppm	30	Yes
	2200_27_JB108	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_27_JB108	PAHs	Acenaphthene	ppb	12	No
	2200_27_JB108	PAHs	Acenaphthylene	ppb	12	No
	2200_27_JB108	PAHs	Anthracene	ppb	12	No
	2200_27_JB108	PAHs	Benzo(a)anthracene	ppb	12	No
	2200_27_JB108	PAHs	Benzo(a)pyrene	ppb	12	No
	2200_27_JB108	PAHs	Chrysene	ppb	12	No
	2200_27_JB108	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_27_JB108	PAHs	Fluoranthene	ppb	4.4	Yes
	2200_27_JB108	PAHs	Fluorene	ppb	12	No
	2200_27_JB108	PAHs	Naphthalene	ppb	12	No
	2200_27_JB108	PAHs	Phenanthrene	ppb	12	No
	2200_27_JB108	PAHs	Pyrene	ppb	12	No
	2200_27_JB108	PAHs	Total PAHs	ppb	28	Yes
	2200_27_JB108	Pesticides	4,4'-DDE	ppb	0.07	Yes
	2200_27_JB108	Pesticides	Total DDx	ppb	0.16	Yes
	2200_27_JB110	Metals	Arsenic	ppm	1.35	Yes
	2200_27_JB110	Metals	Cadmium	ppm	0.041	Yes
	2200_27_JB110	Metals	Chromium	ppm	31.9	Yes
	2200_27_JB110	Metals	Copper	ppm	5	Yes
	2200_27_JB110	Metals	Lead	ppm	6.85	Yes
	2200_27_JB110	Metals	Mercury	ppb	67	Yes
	2200_27_JB110	Metals	Nickel	ppm	3.4	Yes
	2200_27_JB110	Metals	Silver	ppm	0.056	Yes
	2200_27_JB110	Metals	Zinc	ppm	15	Yes
	2200_27_JB110	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_27_JB110	PAHs	Acenaphthene	ppb	5.5	Yes
	2200_27_JB110	PAHs	Acenaphthylene	ppb	37	Yes
	2200_27_JB110	PAHs	Anthracene	ppb	56	Yes
	2200_27_JB110	PAHs	Benzo(a)anthracene	ppb	100	Yes
	2200_27_JB110	PAHs	Benzo(a)pyrene	ppb	57	Yes
	2200_27_JB110	PAHs	Chrysene	ppb	110	Yes
	2200_27_JB110	PAHs	Dibenzo(a,h)anthracene	ppb	34	Yes
	2200_27_JB110	PAHs	Fluoranthene	ppb	260	Yes
	2200_27_JB110	PAHs	Fluorene	ppb	8.7	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_27_JB110	PAHs	Naphthalene	ppb	12	No
	2200_27_JB110	PAHs	Phenanthrene	ppb	91	Yes
	2200_27_JB110	PAHs	Pyrene	ppb	220	Yes
	2200_27_JB110	PAHs	Total PAHs	ppb	1300	Yes
	2200_27_JB110	Pesticides	4,4'-DDE	ppb	0.09	Yes
	2200_27_JB110	Pesticides	Total DDx	ppb	0.17	Yes
	2200_27_JB112	Metals	Arsenic	ppm	2.41	Yes
	2200_27_JB112	Metals	Cadmium	ppm	0.232	Yes
	2200_27_JB112	Metals	Chromium	ppm	27	Yes
	2200_27_JB112	Metals	Copper	ppm	7	Yes
	2200_27_JB112	Metals	Lead	ppm	15.6	Yes
	2200_27_JB112	Metals	Mercury	ppb	69	Yes
	2200_27_JB112	Metals	Nickel	ppm	4.4	Yes
	2200_27_JB112	Metals	Silver	ppm	0.328	Yes
	2200_27_JB112	Metals	Zinc	ppm	45	Yes
	2200_27_JB112	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_27_JB112	PAHs	Acenaphthene	ppb	12	No
	2200_27_JB112	PAHs	Acenaphthylene	ppb	12	No
	2200_27_JB112	PAHs	Anthracene	ppb	12	No
	2200_27_JB112	PAHs	Benzo(a)anthracene	ppb	5.2	Yes
	2200_27_JB112	PAHs	Benzo(a)pyrene	ppb	4	Yes
	2200_27_JB112	PAHs	Chrysene	ppb	4.4	Yes
	2200_27_JB112	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_27_JB112	PAHs	Fluoranthene	ppb	10	Yes
	2200_27_JB112	PAHs	Fluorene	ppb	12	No
	2200_27_JB112	PAHs	Naphthalene	ppb	12	No
	2200_27_JB112	PAHs	Phenanthrene	ppb	12	No
	2200_27_JB112	PAHs	Pyrene	ppb	8.4	Yes
	2200_27_JB112	PAHs	Total PAHs	ppb	42	Yes
	2200_27_JB112	Pesticides	4,4'-DDE	ppb	0.11	Yes
	2200_27_JB112	Pesticides	Total DDx	ppb	0.24	Yes
	2200_27_JB113	Metals	Arsenic	ppm	1.89	Yes
	2200_27_JB113	Metals	Cadmium	ppm	0.218	Yes
	2200_27_JB113	Metals	Chromium	ppm	31.1	Yes
	2200_27_JB113	Metals	Copper	ppm	4.4	Yes
	2200_27_JB113	Metals	Lead	ppm	10.3	Yes
	2200_27_JB113	Metals	Mercury	ppb	80	Yes
	2200_27_JB113	Metals	Nickel	ppm	3.2	Yes
	2200_27_JB113	Metals	Silver	ppm	0.16	Yes
	2200_27_JB113	Metals	Zinc	ppm	33	Yes
	2200_27_JB113	PAHs	2-Methylnaphthalene	ppb	12	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_27_JB113	PAHs	Acenaphthene	ppb	12	No
	2200_27_JB113	PAHs	Acenaphthylene	ppb	12	No
	2200_27_JB113	PAHs	Anthracene	ppb	12	No
	2200_27_JB113	PAHs	Benzo(a)anthracene	ppb	10	Yes
	2200_27_JB113	PAHs	Benzo(a)pyrene	ppb	7.2	Yes
	2200_27_JB113	PAHs	Chrysene	ppb	8.8	Yes
	2200_27_JB113	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_27_JB113	PAHs	Fluoranthene	ppb	17	Yes
	2200_27_JB113	PAHs	Fluorene	ppb	12	No
	2200_27_JB113	PAHs	Naphthalene	ppb	12	No
	2200_27_JB113	PAHs	Phenanthrene	ppb	13	Yes
	2200_27_JB113	PAHs	Pyrene	ppb	16	Yes
	2200_27_JB113	PAHs	Total PAHs	ppb	90	Yes
	2200_27_JB113	Pesticides	4,4'-DDE	ppb	0.21	Yes
	2200_27_JB113	Pesticides	Total DDx	ppb	0.45	Yes
	2200_27_JB114	Metals	Arsenic	ppm	2.63	Yes
	2200_27_JB114	Metals	Cadmium	ppm	0.131	Yes
	2200_27_JB114	Metals	Chromium	ppm	34.3	Yes
	2200_27_JB114	Metals	Copper	ppm	6.6	Yes
	2200_27_JB114	Metals	Lead	ppm	16	Yes
	2200_27_JB114	Metals	Mercury	ppb	82	Yes
	2200_27_JB114	Metals	Nickel	ppm	4.3	Yes
	2200_27_JB114	Metals	Silver	ppm	0.241	Yes
	2200_27_JB114	Metals	Zinc	ppm	30	Yes
	2200_27_JB114	PAHs	2-Methylnaphthalene	ppb	4	Yes
	2200_27_JB114	PAHs	Acenaphthene	ppb	4	Yes
	2200_27_JB114	PAHs	Acenaphthylene	ppb	5.2	Yes
	2200_27_JB114	PAHs	Anthracene	ppb	12	Yes
	2200_27_JB114	PAHs	Benzo(a)anthracene	ppb	27	Yes
	2200_27_JB114	PAHs	Benzo(a)pyrene	ppb	24	Yes
	2200_27_JB114	PAHs	Chrysene	ppb	31	Yes
	2200_27_JB114	PAHs	Dibenzo(a,h)anthracene	ppb	16	Yes
	2200_27_JB114	PAHs	Fluoranthene	ppb	51	Yes
	2200_27_JB114	PAHs	Fluorene	ppb	5.2	Yes
	2200_27_JB114	PAHs	Naphthalene	ppb	12	No
	2200_27_JB114	PAHs	Phenanthrene	ppb	37	Yes
	2200_27_JB114	PAHs	Pyrene	ppb	47	Yes
	2200_27_JB114	PAHs	Total PAHs	ppb	380	Yes
	2200_27_JB114	Pesticides	4,4'-DDE	ppb	0.54	Yes
	2200_27_JB114	Pesticides	Total DDx	ppb	1.3	Yes
	2200_27_JB115	Metals	Arsenic	ppm	2.88	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_27_JB115	Metals	Cadmium	ppm	0.018	No
	2200_27_JB115	Metals	Chromium	ppm	48	Yes
	2200_27_JB115	Metals	Copper	ppm	3.7	Yes
	2200_27_JB115	Metals	Lead	ppm	7.49	Yes
	2200_27_JB115	Metals	Mercury	ppb	40	Yes
	2200_27_JB115	Metals	Nickel	ppm	5.2	Yes
	2200_27_JB115	Metals	Silver	ppm	0.031	Yes
	2200_27_JB115	Metals	Zinc	ppm	15	Yes
	2200_27_JB115	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_27_JB115	PAHs	Acenaphthene	ppb	12	No
	2200_27_JB115	PAHs	Acenaphthylene	ppb	12	No
	2200_27_JB115	PAHs	Anthracene	ppb	12	No
	2200_27_JB115	PAHs	Benzo(a)anthracene	ppb	6.8	Yes
	2200_27_JB115	PAHs	Benzo(a)pyrene	ppb	5.6	Yes
	2200_27_JB115	PAHs	Chrysene	ppb	7.2	Yes
	2200_27_JB115	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_27_JB115	PAHs	Fluoranthene	ppb	11	Yes
	2200_27_JB115	PAHs	Fluorene	ppb	12	No
	2200_27_JB115	PAHs	Naphthalene	ppb	12	No
	2200_27_JB115	PAHs	Phenanthrene	ppb	12	No
	2200_27_JB115	PAHs	Pyrene	ppb	9.9	Yes
	2200_27_JB115	PAHs	Total PAHs	ppb	53	Yes
	2200_27_JB115	Pesticides	4,4'-DDE	ppb	0.19	Yes
	2200_27_JB115	Pesticides	Total DDx	ppb	0.34	Yes
	2200_27_JB119	Metals	Arsenic	ppm	2.08	Yes
	2200_27_JB119	Metals	Cadmium	ppm	0.069	Yes
	2200_27_JB119	Metals	Chromium	ppm	28.8	Yes
	2200_27_JB119	Metals	Copper	ppm	2.8	Yes
	2200_27_JB119	Metals	Lead	ppm	9.73	Yes
	2200_27_JB119	Metals	Mercury	ppb	35	Yes
	2200_27_JB119	Metals	Nickel	ppm	4.1	Yes
	2200_27_JB119	Metals	Silver	ppm	0.075	Yes
	2200_27_JB119	Metals	Zinc	ppm	20	Yes
	2200_27_JB119	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_27_JB119	PAHs	Acenaphthene	ppb	12	No
	2200_27_JB119	PAHs	Acenaphthylene	ppb	12	No
	2200_27_JB119	PAHs	Anthracene	ppb	12	No
	2200_27_JB119	PAHs	Benzo(a)anthracene	ppb	12	No
	2200_27_JB119	PAHs	Benzo(a)pyrene	ppb	12	No
	2200_27_JB119	PAHs	Chrysene	ppb	12	No
	2200_27_JB119	PAHs	Dibenzo(a,h)anthracene	ppb	12	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
REMAP 1993/94 (cont.)	2200_27_JB119	PAHs	Fluoranthene	ppb	2.8	Yes
	2200_27_JB119	PAHs	Fluorene	ppb	12	No
	2200_27_JB119	PAHs	Naphthalene	ppb	12	No
	2200_27_JB119	PAHs	Phenanthrene	ppb	3.5	Yes
	2200_27_JB119	PAHs	Pyrene	ppb	3.2	Yes
	2200_27_JB119	PAHs	Total PAHs	ppb	34	Yes
	2200_27_JB119	Pesticides	4,4'-DDE	ppb	0.1	Yes
	2200_27_JB119	Pesticides	Total DDx	ppb	0.21	Yes
	2200_27_JB120	Metals	Arsenic	ppm	1.38	Yes
	2200_27_JB120	Metals	Cadmium	ppm	0.045	Yes
	2200_27_JB120	Metals	Chromium	ppm	16	Yes
	2200_27_JB120	Metals	Copper	ppm	2.4	Yes
	2200_27_JB120	Metals	Lead	ppm	6.71	Yes
	2200_27_JB120	Metals	Mercury	ppb	30	Yes
	2200_27_JB120	Metals	Nickel	ppm	3.5	Yes
	2200_27_JB120	Metals	Silver	ppm	0.069	Yes
	2200_27_JB120	Metals	Zinc	ppm	13	Yes
	2200_27_JB120	PAHs	2-Methylnaphthalene	ppb	12	No
	2200_27_JB120	PAHs	Acenaphthene	ppb	12	No
	2200_27_JB120	PAHs	Acenaphthylene	ppb	12	No
	2200_27_JB120	PAHs	Anthracene	ppb	15	Yes
	2200_27_JB120	PAHs	Benzo(a)anthracene	ppb	69	Yes
	2200_27_JB120	PAHs	Benzo(a)pyrene	ppb	31	Yes
	2200_27_JB120	PAHs	Chrysene	ppb	70	Yes
	2200_27_JB120	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	2200_27_JB120	PAHs	Fluoranthene	ppb	120	Yes
	2200_27_JB120	PAHs	Fluorene	ppb	12	No
	2200_27_JB120	PAHs	Naphthalene	ppb	12	No
	2200_27_JB120	PAHs	Phenanthrene	ppb	17	Yes
	2200_27_JB120	PAHs	Pyrene	ppb	110	Yes
	2200_27_JB120	PAHs	Total PAHs	ppb	580	Yes
	2200_27_JB120	Pesticides	4,4'-DDE	ppb	0.07	Yes
	2200_27_JB120	Pesticides	Total DDx	ppb	0.17	Yes
Region 2 2003 NY/NJ Harbor Data Sets	JB317	Metals	Arsenic	ppm	1.8	Yes
	JB317	Metals	Cadmium	ppm	0.16	Yes
	JB317	Metals	Chromium	ppm	13.7	Yes
	JB317	Metals	Copper	ppm	5	Yes
	JB317	Metals	Lead	ppm	14.5	Yes
	JB317	Metals	Nickel	ppm	4	Yes
	JB317	Metals	Silver	ppm	0.15	Yes
	JB317	Metals	Zinc	ppm	25.6	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2003 NY/NJ Harbor Data Sets (cont.)	JB317	PAHs	2-Methylnaphthalene	ppb	10	No
	JB317	PAHs	Acenaphthene	ppb	10	No
	JB317	PAHs	Acenaphthylene	ppb	10	No
	JB317	PAHs	Anthracene	ppb	10	No
	JB317	PAHs	Benzo(a)anthracene	ppb	10	No
	JB317	PAHs	Benzo(a)pyrene	ppb	10	No
	JB317	PAHs	Chrysene	ppb	10	No
	JB317	PAHs	Dibenzo(a,h)anthracene	ppb	10	No
	JB317	PAHs	Fluoranthene	ppb	16	Yes
	JB317	PAHs	Fluorene	ppb	10	No
	JB317	PAHs	Naphthalene	ppb	10	No
	JB317	PAHs	Phenanthrene	ppb	10	No
	JB317	PAHs	Pyrene	ppb	12	Yes
	JB317	PAHs	Total PAHs	ppb	40	Yes
	JB317	Pesticides	4,4'-DDE	ppb	0.5	No
	JB317	Pesticides	Total DDx	ppb	0.5	No
	JB319	Metals	Arsenic	ppm	1.3	Yes
	JB319	Metals	Cadmium	ppm	0.2	Yes
	JB319	Metals	Chromium	ppm	13.3	Yes
	JB319	Metals	Copper	ppm	2.5	Yes
	JB319	Metals	Lead	ppm	8.7	Yes
	JB319	Metals	Nickel	ppm	3.2	Yes
	JB319	Metals	Silver	ppm	0.065	Yes
	JB319	Metals	Zinc	ppm	14.2	Yes
	JB319	PAHs	2-Methylnaphthalene	ppb	10	No
	JB319	PAHs	Acenaphthene	ppb	10	No
	JB319	PAHs	Acenaphthylene	ppb	10	No
	JB319	PAHs	Anthracene	ppb	10	No
	JB319	PAHs	Benzo(a)anthracene	ppb	10	No
	JB319	PAHs	Benzo(a)pyrene	ppb	10	No
	JB319	PAHs	Chrysene	ppb	10	No
	JB319	PAHs	Dibenzo(a,h)anthracene	ppb	10	No
	JB319	PAHs	Fluoranthene	ppb	10	No
	JB319	PAHs	Fluorene	ppb	10	No
	JB319	PAHs	Naphthalene	ppb	10	No
	JB319	PAHs	Phenanthrene	ppb	10	No
	JB319	PAHs	Pyrene	ppb	10	No
	JB319	PAHs	Total PAHs	ppb	10	No
	JB319	Pesticides	4,4'-DDE	ppb	0.77	Yes
	JB319	Pesticides	Total DDx	ppb	0.77	Yes
	JB322	Metals	Arsenic	ppm	2.4	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2003 NY/NJ Harbor Data Sets (cont.)	JB322	Metals	Cadmium	ppm	0.21	Yes
	JB322	Metals	Chromium	ppm	18.8	Yes
	JB322	Metals	Copper	ppm	5.2	Yes
	JB322	Metals	Lead	ppm	16	Yes
	JB322	Metals	Nickel	ppm	5.2	Yes
	JB322	Metals	Silver	ppm	0.14	Yes
	JB322	Metals	Zinc	ppm	24.3	Yes
	JB322	PAHs	2-Methylnaphthalene	ppb	10	No
	JB322	PAHs	Acenaphthene	ppb	10	No
	JB322	PAHs	Acenaphthylene	ppb	10	No
	JB322	PAHs	Anthracene	ppb	10	No
	JB322	PAHs	Benzo(a)anthracene	ppb	10	No
	JB322	PAHs	Benzo(a)pyrene	ppb	10	No
	JB322	PAHs	Chrysene	ppb	10	No
	JB322	PAHs	Dibenzo(a,h)anthracene	ppb	10	No
	JB322	PAHs	Fluoranthene	ppb	10	No
	JB322	PAHs	Fluorene	ppb	10	No
	JB322	PAHs	Naphthalene	ppb	10	No
	JB322	PAHs	Phenanthrene	ppb	10	No
	JB322	PAHs	Pyrene	ppb	10	No
	JB322	PAHs	Total PAHs	ppb	10	No
	JB322	Pesticides	4,4'-DDE	ppb	0.76	Yes
	JB322	Pesticides	Total DDx	ppb	3.1	Yes
	JB386	Metals	Arsenic	ppm	1.3	Yes
	JB386	Metals	Cadmium	ppm	0.12	No
	JB386	Metals	Chromium	ppm	7.9	Yes
	JB386	Metals	Copper	ppm	2.1	Yes
	JB386	Metals	Lead	ppm	8.7	Yes
	JB386	Metals	Nickel	ppm	2.3	Yes
	JB386	Metals	Silver	ppm	0.038	Yes
	JB386	Metals	Zinc	ppm	8.9	Yes
	JB386	PAHs	2-Methylnaphthalene	ppb	10	No
	JB386	PAHs	Acenaphthene	ppb	10	No
	JB386	PAHs	Acenaphthylene	ppb	10	No
	JB386	PAHs	Anthracene	ppb	10	No
	JB386	PAHs	Benzo(a)anthracene	ppb	10	No
	JB386	PAHs	Benzo(a)pyrene	ppb	10	No
	JB386	PAHs	Chrysene	ppb	10	No
	JB386	PAHs	Dibenzo(a,h)anthracene	ppb	10	No
	JB386	PAHs	Fluoranthene	ppb	10	No
	JB386	PAHs	Fluorene	ppb	10	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2008 NY/NJ Harbor Sampling	JB386	PAHs	Naphthalene	ppb	10	No
	JB386	PAHs	Phenanthrene	ppb	10	No
	JB386	PAHs	Pyrene	ppb	10	No
	JB386	PAHs	Total PAHs	ppb	10	No
	JB386	Pesticides	4,4'-DDE	ppb	0.5	No
	JB386	Pesticides	Total DDx	ppb	0.5	No
	JB401	Metals	Arsenic	ppm	1.1	Yes
	JB401	Metals	Cadmium	ppm	0.29	No
	JB401	Metals	Chromium	ppm	2.4	Yes
	JB401	Metals	Copper	ppm	0.95	No
	JB401	Metals	Lead	ppm	3	Yes
	JB401	Metals	Mercury	ppm	0.01	Yes
	JB401	Metals	Nickel	ppm	1.9	No
	JB401	Metals	Silver	ppm	0.48	No
	JB401	Metals	Zinc	ppm	6.9	Yes
	JB401	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.1	No
	JB401	Pesticides	Total DDx (4,4)	ppb	1.1	No
	JB401	Pesticides	4,4'-DDE	ppb	1.1	No
	JB401	PAHs	2-Methylnaphthalene	ppb	12	No
	JB401	PAHs	Acenaphthene	ppb	12	No
	JB401	PAHs	Acenaphthylene	ppb	12	No
	JB401	PAHs	Anthracene	ppb	12	No
	JB401	PAHs	Benzo(a)anthracene	ppb	12	No
	JB401	PAHs	Benzo(a)pyrene	ppb	12	No
	JB401	PAHs	Chrysene	ppb	12	No
	JB401	PAHs	Dibenzo(a,h)anthracene	ppb	12	No
	JB401	PAHs	Fluoranthene	ppb	12	No
	JB401	PAHs	Fluorene	ppb	12	No
	JB401	PAHs	Naphthalene	ppb	12	No
	JB401	PAHs	Phenanthrene	ppb	12	No
	JB401	PAHs	Pyrene	ppb	12	No
	JB401	PAHs	Total PAHs	ppb	12	No
	JB401	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB406	Metals	Arsenic	ppm	0.93	Yes
	JB406	Metals	Cadmium	ppm	0.29	No
	JB406	Metals	Chromium	ppm	5.8	Yes
	JB406	Metals	Copper	ppm	6.6	Yes
	JB406	Metals	Lead	ppm	18	Yes
	JB406	Metals	Mercury	ppm	0.01	Yes
	JB406	Metals	Nickel	ppm	2.5	Yes
	JB406	Metals	Silver	ppm	0.92	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB406	Metals	Zinc	ppm	26	Yes
	JB406	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.1	No
	JB406	Pesticides	Total DDx (4,4)	ppb	1.1	No
	JB406	Pesticides	4,4'-DDE	ppb	1.1	No
	JB406	PAHs	2-Methylnaphthalene	ppb	13	No
	JB406	PAHs	Acenaphthene	ppb	13	No
	JB406	PAHs	Acenaphthylene	ppb	13	No
	JB406	PAHs	Anthracene	ppb	13	No
	JB406	PAHs	Benzo(a)anthracene	ppb	13	No
	JB406	PAHs	Benzo(a)pyrene	ppb	13	No
	JB406	PAHs	Chrysene	ppb	16	Yes
	JB406	PAHs	Dibenzo(a,h)anthracene	ppb	13	No
	JB406	PAHs	Fluoranthene	ppb	16	Yes
	JB406	PAHs	Fluorene	ppb	13	No
	JB406	PAHs	Naphthalene	ppb	13	No
	JB406	PAHs	Phenanthrene	ppb	13	No
	JB406	PAHs	Pyrene	ppb	15	Yes
	JB406	PAHs	Total PAHs	ppb	62	Yes
	JB406	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB415	Metals	Arsenic	ppm	1.3	Yes
	JB415	Metals	Cadmium	ppm	0.29	No
	JB415	Metals	Chromium	ppm	6	Yes
	JB415	Metals	Copper	ppm	1.5	Yes
	JB415	Metals	Lead	ppm	7.2	Yes
	JB415	Metals	Mercury	ppm	0.04	Yes
	JB415	Metals	Nickel	ppm	1.9	No
	JB415	Metals	Silver	ppm	0.77	Yes
	JB415	Metals	Zinc	ppm	17	Yes
	JB415	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.1	No
	JB415	Pesticides	Total DDx (4,4)	ppb	1.1	No
	JB415	Pesticides	4,4'-DDE	ppb	1.1	No
	JB415	PAHs	2-Methylnaphthalene	ppb	13	No
	JB415	PAHs	Acenaphthene	ppb	13	No
	JB415	PAHs	Acenaphthylene	ppb	13	No
	JB415	PAHs	Anthracene	ppb	13	No
	JB415	PAHs	Benzo(a)anthracene	ppb	13	No
	JB415	PAHs	Benzo(a)pyrene	ppb	13	No
	JB415	PAHs	Chrysene	ppb	13	No
	JB415	PAHs	Dibenzo(a,h)anthracene	ppb	13	No
	JB415	PAHs	Fluoranthene	ppb	13	No
	JB415	PAHs	Fluorene	ppb	13	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB415	PAHs	Naphthalene	ppb	13	No
	JB415	PAHs	Phenanthrene	ppb	13	No
	JB415	PAHs	Pyrene	ppb	13	No
	JB415	PAHs	Total PAHs	ppb	13	No
	JB415	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB468	Metals	Arsenic	ppm	3.3	Yes
	JB468	Metals	Cadmium	ppm	0.4	Yes
	JB468	Metals	Chromium	ppm	17	Yes
	JB468	Metals	Copper	ppm	17	Yes
	JB468	Metals	Lead	ppm	22	Yes
	JB468	Metals	Mercury	ppm	0.17	Yes
	JB468	Metals	Nickel	ppm	6.3	Yes
	JB468	Metals	Silver	ppm	1.7	Yes
	JB468	Metals	Zinc	ppm	52	Yes
	JB468	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.6	No
	JB468	Pesticides	Total DDx (4,4)	ppb	1.6	No
	JB468	Pesticides	4,4'-DDE	ppb	1.6	No
	JB468	PAHs	2-Methylnaphthalene	ppb	17	No
	JB468	PAHs	Acenaphthene	ppb	17	No
	JB468	PAHs	Acenaphthylene	ppb	17	No
	JB468	PAHs	Anthracene	ppb	17	No
	JB468	PAHs	Benzo(a)anthracene	ppb	17	No
	JB468	PAHs	Benzo(a)pyrene	ppb	17	No
	JB468	PAHs	Chrysene	ppb	17	No
	JB468	PAHs	Dibenzo(a,h)anthracene	ppb	17	No
	JB468	PAHs	Fluoranthene	ppb	27	Yes
	JB468	PAHs	Fluorene	ppb	17	No
	JB468	PAHs	Naphthalene	ppb	17	No
	JB468	PAHs	Phenanthrene	ppb	17	No
	JB468	PAHs	Pyrene	ppb	24	Yes
	JB468	PAHs	Total PAHs	ppb	51	Yes
	JB468	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB481	Metals	Arsenic	ppm	1.5	Yes
	JB481	Metals	Cadmium	ppm	0.29	No
	JB481	Metals	Chromium	ppm	5.1	Yes
	JB481	Metals	Copper	ppm	1.3	Yes
	JB481	Metals	Lead	ppm	7.1	Yes
	JB481	Metals	Mercury	ppm	0.03	Yes
	JB481	Metals	Nickel	ppm	1.9	No
	JB481	Metals	Silver	ppm	0.82	Yes
	JB481	Metals	Zinc	ppm	13	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB481	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.1	No
	JB481	Pesticides	Total DDx (4,4)	ppb	1.1	No
	JB481	Pesticides	4,4'-DDE	ppb	1.1	No
	JB481	PAHs	2-Methylnaphthalene	ppb	13	No
	JB481	PAHs	Acenaphthene	ppb	13	No
	JB481	PAHs	Acenaphthylene	ppb	13	No
	JB481	PAHs	Anthracene	ppb	13	No
	JB481	PAHs	Benzo(a)anthracene	ppb	13	No
	JB481	PAHs	Benzo(a)pyrene	ppb	13	No
	JB481	PAHs	Chrysene	ppb	13	No
	JB481	PAHs	Dibenzo(a,h)anthracene	ppb	13	No
	JB481	PAHs	Fluoranthene	ppb	13	No
	JB481	PAHs	Fluorene	ppb	13	No
	JB481	PAHs	Naphthalene	ppb	13	No
	JB481	PAHs	Phenanthrene	ppb	13	No
	JB481	PAHs	Pyrene	ppb	13	No
	JB481	PAHs	Total PAHs	ppb	13	No
	JB481	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB486	Metals	Arsenic	ppm	1	Yes
	JB486	Metals	Cadmium	ppm	0.29	No
	JB486	Metals	Chromium	ppm	2.3	Yes
	JB486	Metals	Copper	ppm	0.96	No
	JB486	Metals	Lead	ppm	2.9	Yes
	JB486	Metals	Mercury	ppm	0.01	Yes
	JB486	Metals	Nickel	ppm	1.9	No
	JB486	Metals	Silver	ppm	0.48	No
	JB486	Metals	Zinc	ppm	6	Yes
	JB486	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.1	No
	JB486	Pesticides	Total DDx (4,4)	ppb	1.1	No
	JB486	Pesticides	4,4'-DDE	ppb	1.1	No
	JB486	PAHs	2-Methylnaphthalene	ppb	13	No
	JB486	PAHs	Acenaphthene	ppb	13	No
	JB486	PAHs	Acenaphthylene	ppb	13	No
	JB486	PAHs	Anthracene	ppb	13	No
	JB486	PAHs	Benzo(a)anthracene	ppb	13	No
	JB486	PAHs	Benzo(a)pyrene	ppb	13	No
	JB486	PAHs	Chrysene	ppb	13	No
	JB486	PAHs	Dibenzo(a,h)anthracene	ppb	13	No
	JB486	PAHs	Fluoranthene	ppb	13	No
	JB486	PAHs	Fluorene	ppb	13	No
	JB486	PAHs	Naphthalene	ppb	13	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2008 NY/NJ Harbor Sampling (cont.)	JB486	PAHs	Phenanthrene	ppb	13	No
	JB486	PAHs	Pyrene	ppb	13	No
	JB486	PAHs	Total PAHs	ppb	13	No
	JB486	PCBs (Aroclors)	Total PCBs	ppb	0	No
Region 2 2013 NY/NJ Harbor Sampling	JB401	Metals	Arsenic	ppm	1.3	Yes
	JB401	Metals	Cadmium	ppm	0.025	No
	JB401	Metals	Chromium	ppm	8.1	Yes
	JB401	Metals	Copper	ppm	2.4	Yes
	JB401	Metals	Lead	ppm	6.8	Yes
	JB401	Metals	Mercury	ppm	0.01	Yes
	JB401	Metals	Nickel	ppm	5	Yes
	JB401	Metals	Silver	ppm	0.1	Yes
	JB401	Metals	Zinc	ppm	7.5	Yes
	JB401	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB401	Pesticides	Total DDx (4,4)	ppb	1	No
	JB401	Pesticides	4,4'-DDE	ppb	1	No
	JB401	PAHs	2-Methylnaphthalene	ppb	1	No
	JB401	PAHs	Acenaphthene	ppb	1.2	Yes
	JB401	PAHs	Acenaphthylene	ppb	1.4	Yes
	JB401	PAHs	Anthracene	ppb	1.2	Yes
	JB401	PAHs	Benzo(a)anthracene	ppb	6.1	Yes
	JB401	PAHs	Benzo(a)pyrene	ppb	5.8	Yes
	JB401	PAHs	Chrysene	ppb	8.7	Yes
	JB401	PAHs	Dibenzo(a,h)anthracene	ppb	1.4	Yes
	JB401	PAHs	Fluoranthene	ppb	6.5	Yes
	JB401	PAHs	Fluorene	ppb	1	No
	JB401	PAHs	Naphthalene	ppb	2.3	Yes
	JB401	PAHs	Phenanthrene	ppb	3	Yes
	JB401	PAHs	Pyrene	ppb	12	Yes
	JB401	PAHs	Total PAHs	ppb	68	Yes
	JB401	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB405	Metals	Arsenic	ppm	4.7	Yes
	JB405	Metals	Cadmium	ppm	0.2	Yes
	JB405	Metals	Chromium	ppm	25.9	Yes
	JB405	Metals	Copper	ppm	18.2	Yes
	JB405	Metals	Lead	ppm	17.1	Yes
	JB405	Metals	Mercury	ppm	0.11	Yes
	JB405	Metals	Nickel	ppm	7.3	Yes
	JB405	Metals	Silver	ppm	0.7	Yes
	JB405	Metals	Zinc	ppm	43.1	Yes
	JB405	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB405	Pesticides	Total DDx (4,4)	ppb	1	No
	JB405	Pesticides	4,4'-DDE	ppb	1	No
	JB405	PAHs	2-Methylnaphthalene	ppb	6.3	Yes
	JB405	PAHs	Acenaphthene	ppb	14.5	Yes
	JB405	PAHs	Acenaphthylene	ppb	6.5	Yes
	JB405	PAHs	Anthracene	ppb	38.7	Yes
	JB405	PAHs	Benzo(a)anthracene	ppb	161.4	Yes
	JB405	PAHs	Benzo(a)pyrene	ppb	170.3	Yes
	JB405	PAHs	Chrysene	ppb	131.3	Yes
	JB405	PAHs	Dibenzo(a,h)anthracene	ppb	68	Yes
	JB405	PAHs	Fluoranthene	ppb	257	Yes
	JB405	PAHs	Fluorene	ppb	16.7	Yes
	JB405	PAHs	Naphthalene	ppb	12.3	Yes
	JB405	PAHs	Phenanthrene	ppb	119.7	Yes
	JB405	PAHs	Pyrene	ppb	228.3	Yes
	JB405	PAHs	Total PAHs	ppb	1795.2	Yes
	JB405	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB406	Metals	Arsenic	ppm	7.7	Yes
	JB406	Metals	Cadmium	ppm	0.6	Yes
	JB406	Metals	Chromium	ppm	54.2	Yes
	JB406	Metals	Copper	ppm	33.9	Yes
	JB406	Metals	Lead	ppm	55	Yes
	JB406	Metals	Mercury	ppm	0.23	Yes
	JB406	Metals	Nickel	ppm	17.6	Yes
	JB406	Metals	Silver	ppm	0.5	Yes
	JB406	Metals	Zinc	ppm	88.8	Yes
	JB406	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB406	Pesticides	Total DDx (4,4)	ppb	1	No
	JB406	Pesticides	4,4'-DDE	ppb	1	No
	JB406	PAHs	2-Methylnaphthalene	ppb	6.2	Yes
	JB406	PAHs	Acenaphthene	ppb	3.6	Yes
	JB406	PAHs	Acenaphthylene	ppb	8.3	Yes
	JB406	PAHs	Anthracene	ppb	18	Yes
	JB406	PAHs	Benzo(a)anthracene	ppb	85.2	Yes
	JB406	PAHs	Benzo(a)pyrene	ppb	77.6	Yes
	JB406	PAHs	Chrysene	ppb	95.9	Yes
	JB406	PAHs	Dibenzo(a,h)anthracene	ppb	13.4	Yes
	JB406	PAHs	Fluoranthene	ppb	123.3	Yes
	JB406	PAHs	Fluorene	ppb	4.9	Yes
	JB406	PAHs	Naphthalene	ppb	13.1	Yes
	JB406	PAHs	Phenanthrene	ppb	33.7	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB406	PAHs	Pyrene	ppb	158.4	Yes
	JB406	PAHs	Total PAHs	ppb	818.2	Yes
	JB406	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB409	Metals	Arsenic	ppm	7	Yes
	JB409	Metals	Cadmium	ppm	0.7	Yes
	JB409	Metals	Chromium	ppm	52.7	Yes
	JB409	Metals	Copper	ppm	34.8	Yes
	JB409	Metals	Lead	ppm	51.5	Yes
	JB409	Metals	Mercury	ppm	0.44	Yes
	JB409	Metals	Nickel	ppm	16.3	Yes
	JB409	Metals	Silver	ppm	0.7	Yes
	JB409	Metals	Zinc	ppm	103.4	Yes
	JB409	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB409	Pesticides	Total DDx (4,4)	ppb	1	No
	JB409	Pesticides	4,4'-DDE	ppb	1	No
	JB409	PAHs	2-Methylnaphthalene	ppb	1	No
	JB409	PAHs	Acenaphthene	ppb	2	Yes
	JB409	PAHs	Acenaphthylene	ppb	1	No
	JB409	PAHs	Anthracene	ppb	6.2	Yes
	JB409	PAHs	Benzo(a)anthracene	ppb	27.1	Yes
	JB409	PAHs	Benzo(a)pyrene	ppb	22.4	Yes
	JB409	PAHs	Chrysene	ppb	23.7	Yes
	JB409	PAHs	Dibenzo(a,h)anthracene	ppb	10.6	Yes
	JB409	PAHs	Fluoranthene	ppb	50.2	Yes
	JB409	PAHs	Fluorene	ppb	1	No
	JB409	PAHs	Naphthalene	ppb	2	Yes
	JB409	PAHs	Phenanthrene	ppb	4.8	Yes
	JB409	PAHs	Pyrene	ppb	41.5	Yes
	JB409	PAHs	Total PAHs	ppb	279.5	Yes
	JB409	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB410	Metals	Arsenic	ppm	2.3	Yes
	JB410	Metals	Cadmium	ppm	0.3	Yes
	JB410	Metals	Chromium	ppm	43.5	Yes
	JB410	Metals	Copper	ppm	7.8	Yes
	JB410	Metals	Lead	ppm	16.9	Yes
	JB410	Metals	Mercury	ppm	0.11	Yes
	JB410	Metals	Nickel	ppm	13.7	Yes
	JB410	Metals	Silver	ppm	0.2	Yes
	JB410	Metals	Zinc	ppm	36.6	Yes
	JB410	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB410	Pesticides	Total DDx (4,4)	ppb	1	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB410	Pesticides	4,4'-DDE	ppb	1	No
	JB410	PAHs	2-Methylnaphthalene	ppb	2.6	Yes
	JB410	PAHs	Acenaphthene	ppb	1.4	Yes
	JB410	PAHs	Acenaphthylene	ppb	1.3	Yes
	JB410	PAHs	Anthracene	ppb	4.2	Yes
	JB410	PAHs	Benzo(a)anthracene	ppb	17.7	Yes
	JB410	PAHs	Benzo(a)pyrene	ppb	17.5	Yes
	JB410	PAHs	Chrysene	ppb	16.9	Yes
	JB410	PAHs	Dibenzo(a,h)anthracene	ppb	5.5	Yes
	JB410	PAHs	Fluoranthene	ppb	34.9	Yes
	JB410	PAHs	Fluorene	ppb	2.4	Yes
	JB410	PAHs	Naphthalene	ppb	3.9	Yes
	JB410	PAHs	Phenanthrene	ppb	16.4	Yes
	JB410	PAHs	Pyrene	ppb	32.2	Yes
	JB410	PAHs	Total PAHs	ppb	226.8	Yes
	JB410	PCBs (Aroclors)	Total PCBs	ppb	2.1	Yes
	JB415	Metals	Arsenic	ppm	3.2	Yes
	JB415	Metals	Cadmium	ppm	0.2	Yes
	JB415	Metals	Chromium	ppm	30.6	Yes
	JB415	Metals	Copper	ppm	4.7	Yes
	JB415	Metals	Lead	ppm	17.2	Yes
	JB415	Metals	Mercury	ppm	0.05	Yes
	JB415	Metals	Nickel	ppm	6.1	Yes
	JB415	Metals	Silver	ppm	0.1	Yes
	JB415	Metals	Zinc	ppm	31.1	Yes
	JB415	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB415	Pesticides	Total DDx (4,4)	ppb	1	No
	JB415	Pesticides	4,4'-DDE	ppb	1	No
	JB415	PAHs	2-Methylnaphthalene	ppb	1	No
	JB415	PAHs	Acenaphthene	ppb	1	No
	JB415	PAHs	Acenaphthylene	ppb	1	No
	JB415	PAHs	Anthracene	ppb	1.1	Yes
	JB415	PAHs	Benzo(a)anthracene	ppb	2	Yes
	JB415	PAHs	Benzo(a)pyrene	ppb	2	Yes
	JB415	PAHs	Chrysene	ppb	2.3	Yes
	JB415	PAHs	Dibenzo(a,h)anthracene	ppb	1.4	Yes
	JB415	PAHs	Fluoranthene	ppb	1	No
	JB415	PAHs	Fluorene	ppb	1	No
	JB415	PAHs	Naphthalene	ppb	1	No
	JB415	PAHs	Phenanthrene	ppb	1	No
	JB415	PAHs	Pyrene	ppb	1	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB415	PAHs	Total PAHs	ppb	19.6	Yes
	JB415	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB416	Metals	Arsenic	ppm	4.9	Yes
	JB416	Metals	Cadmium	ppm	0.4	Yes
	JB416	Metals	Chromium	ppm	47.6	Yes
	JB416	Metals	Copper	ppm	18.6	Yes
	JB416	Metals	Lead	ppm	26.3	Yes
	JB416	Metals	Mercury	ppm	0.28	Yes
	JB416	Metals	Nickel	ppm	13.6	Yes
	JB416	Metals	Silver	ppm	0.4	Yes
	JB416	Metals	Zinc	ppm	63.4	Yes
	JB416	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB416	Pesticides	Total DDx (4,4)	ppb	1	No
	JB416	Pesticides	4,4'-DDE	ppb	1	No
	JB416	PAHs	2-Methylnaphthalene	ppb	1	No
	JB416	PAHs	Acenaphthene	ppb	1	Yes
	JB416	PAHs	Acenaphthylene	ppb	1	No
	JB416	PAHs	Anthracene	ppb	2.5	Yes
	JB416	PAHs	Benzo(a)anthracene	ppb	9.2	Yes
	JB416	PAHs	Benzo(a)pyrene	ppb	10.7	Yes
	JB416	PAHs	Chrysene	ppb	9.2	Yes
	JB416	PAHs	Dibenzo(a,h)anthracene	ppb	6.4	Yes
	JB416	PAHs	Fluoranthene	ppb	11.1	Yes
	JB416	PAHs	Fluorene	ppb	1	No
	JB416	PAHs	Naphthalene	ppb	1	No
	JB416	PAHs	Phenanthrene	ppb	1	No
	JB416	PAHs	Pyrene	ppb	11.8	Yes
	JB416	PAHs	Total PAHs	ppb	112.2	Yes
	JB416	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB417	Metals	Arsenic	ppm	2.3	Yes
	JB417	Metals	Cadmium	ppm	0.1	Yes
	JB417	Metals	Chromium	ppm	22.8	Yes
	JB417	Metals	Copper	ppm	3.8	Yes
	JB417	Metals	Lead	ppm	12.7	Yes
	JB417	Metals	Mercury	ppm	0.05	Yes
	JB417	Metals	Nickel	ppm	5.2	Yes
	JB417	Metals	Silver	ppm	0.1	Yes
	JB417	Metals	Zinc	ppm	21.8	Yes
	JB417	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB417	Pesticides	Total DDx (4,4)	ppb	1	No
	JB417	Pesticides	4,4'-DDE	ppb	1	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB417	PAHs	2-Methylnaphthalene	ppb	1.4	Yes
	JB417	PAHs	Acenaphthene	ppb	4.4	Yes
	JB417	PAHs	Acenaphthylene	ppb	1	No
	JB417	PAHs	Anthracene	ppb	8.8	Yes
	JB417	PAHs	Benzo(a)anthracene	ppb	26.8	Yes
	JB417	PAHs	Benzo(a)pyrene	ppb	22.9	Yes
	JB417	PAHs	Chrysene	ppb	21.7	Yes
	JB417	PAHs	Dibenzo(a,h)anthracene	ppb	6.3	Yes
	JB417	PAHs	Fluoranthene	ppb	60.9	Yes
	JB417	PAHs	Fluorene	ppb	4	Yes
	JB417	PAHs	Naphthalene	ppb	2.2	Yes
	JB417	PAHs	Phenanthrene	ppb	38	Yes
	JB417	PAHs	Pyrene	ppb	50.3	Yes
	JB417	PAHs	Total PAHs	ppb	321.1	Yes
	JB417	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB419	Metals	Arsenic	ppm	2.5	Yes
	JB419	Metals	Cadmium	ppm	0.1	Yes
	JB419	Metals	Chromium	ppm	19.3	Yes
	JB419	Metals	Copper	ppm	4.2	Yes
	JB419	Metals	Lead	ppm	15.1	Yes
	JB419	Metals	Mercury	ppm	0.05	Yes
	JB419	Metals	Nickel	ppm	5.6	Yes
	JB419	Metals	Silver	ppm	0.1	Yes
	JB419	Metals	Zinc	ppm	21.1	Yes
	JB419	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB419	Pesticides	Total DDx (4,4)	ppb	1	No
	JB419	Pesticides	4,4'-DDE	ppb	1	No
	JB419	PAHs	2-Methylnaphthalene	ppb	2.3	Yes
	JB419	PAHs	Acenaphthene	ppb	1	No
	JB419	PAHs	Acenaphthylene	ppb	2.9	Yes
	JB419	PAHs	Anthracene	ppb	2.4	Yes
	JB419	PAHs	Benzo(a)anthracene	ppb	45.6	Yes
	JB419	PAHs	Benzo(a)pyrene	ppb	46.7	Yes
	JB419	PAHs	Chrysene	ppb	42.6	Yes
	JB419	PAHs	Dibenzo(a,h)anthracene	ppb	7.3	Yes
	JB419	PAHs	Fluoranthene	ppb	26.2	Yes
	JB419	PAHs	Fluorene	ppb	1.1	Yes
	JB419	PAHs	Naphthalene	ppb	3.3	Yes
	JB419	PAHs	Phenanthrene	ppb	6.1	Yes
	JB419	PAHs	Pyrene	ppb	61.2	Yes
	JB419	PAHs	Total PAHs	ppb	340.4	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB419	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB422	Metals	Arsenic	ppm	1.5	Yes
	JB422	Metals	Cadmium	ppm	0.025	No
	JB422	Metals	Chromium	ppm	19.1	Yes
	JB422	Metals	Copper	ppm	2.4	Yes
	JB422	Metals	Lead	ppm	8.4	Yes
	JB422	Metals	Mercury	ppm	0.02	Yes
	JB422	Metals	Nickel	ppm	6.7	Yes
	JB422	Metals	Silver	ppm	0.025	No
	JB422	Metals	Zinc	ppm	12.4	Yes
	JB422	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB422	Pesticides	Total DDx (4,4)	ppb	1	No
	JB422	Pesticides	4,4'-DDE	ppb	1	No
	JB422	PAHs	2-Methylnaphthalene	ppb	1	No
	JB422	PAHs	Acenaphthene	ppb	1	No
	JB422	PAHs	Acenaphthylene	ppb	1	No
	JB422	PAHs	Anthracene	ppb	1	No
	JB422	PAHs	Benzo(a)anthracene	ppb	1	No
	JB422	PAHs	Benzo(a)pyrene	ppb	1.4	Yes
	JB422	PAHs	Chrysene	ppb	1	No
	JB422	PAHs	Dibenzo(a,h)anthracene	ppb	1	No
	JB422	PAHs	Fluoranthene	ppb	2	Yes
	JB422	PAHs	Fluorene	ppb	1	No
	JB422	PAHs	Naphthalene	ppb	1	No
	JB422	PAHs	Phenanthrene	ppb	2	Yes
	JB422	PAHs	Pyrene	ppb	1.8	Yes
	JB422	PAHs	Total PAHs	ppb	7.2	Yes
	JB422	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB454	Metals	Arsenic	ppm	3.8	Yes
	JB454	Metals	Cadmium	ppm	0.2	Yes
	JB454	Metals	Chromium	ppm	35.5	Yes
	JB454	Metals	Copper	ppm	10	Yes
	JB454	Metals	Lead	ppm	21.5	Yes
	JB454	Metals	Mercury	ppm	0.11	Yes
	JB454	Metals	Nickel	ppm	9.5	Yes
	JB454	Metals	Silver	ppm	0.2	Yes
	JB454	Metals	Zinc	ppm	36	Yes
	JB454	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB454	Pesticides	Total DDx (4,4)	ppb	1	No
	JB454	Pesticides	4,4'-DDE	ppb	1	No
	JB454	PAHs	2-Methylnaphthalene	ppb	1.6	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB454	PAHs	Acenaphthene	ppb	2	Yes
	JB454	PAHs	Acenaphthylene	ppb	2	Yes
	JB454	PAHs	Anthracene	ppb	6.7	Yes
	JB454	PAHs	Benzo(a)anthracene	ppb	18.1	Yes
	JB454	PAHs	Benzo(a)pyrene	ppb	17.3	Yes
	JB454	PAHs	Chrysene	ppb	21.1	Yes
	JB454	PAHs	Dibenzo(a,h)anthracene	ppb	5	Yes
	JB454	PAHs	Fluoranthene	ppb	46.3	Yes
	JB454	PAHs	Fluorene	ppb	3.4	Yes
	JB454	PAHs	Naphthalene	ppb	2.3	Yes
	JB454	PAHs	Phenanthrene	ppb	27.1	Yes
	JB454	PAHs	Pyrene	ppb	42.9	Yes
	JB454	PAHs	Total PAHs	ppb	253.7	Yes
	JB454	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB458	Metals	Arsenic	ppm	2.9	Yes
	JB458	Metals	Cadmium	ppm	0.1	Yes
	JB458	Metals	Chromium	ppm	25.8	Yes
	JB458	Metals	Copper	ppm	4.5	Yes
	JB458	Metals	Lead	ppm	17.1	Yes
	JB458	Metals	Mercury	ppm	0.05	Yes
	JB458	Metals	Nickel	ppm	5.9	Yes
	JB458	Metals	Silver	ppm	0.1	Yes
	JB458	Metals	Zinc	ppm	24.1	Yes
	JB458	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB458	Pesticides	Total DDx (4,4)	ppb	1	No
	JB458	Pesticides	4,4'-DDE	ppb	1	No
	JB458	PAHs	2-Methylnaphthalene	ppb	1.5	Yes
	JB458	PAHs	Acenaphthene	ppb	2	Yes
	JB458	PAHs	Acenaphthylene	ppb	1	No
	JB458	PAHs	Anthracene	ppb	4.1	Yes
	JB458	PAHs	Benzo(a)anthracene	ppb	9.3	Yes
	JB458	PAHs	Benzo(a)pyrene	ppb	6	Yes
	JB458	PAHs	Chrysene	ppb	10.5	Yes
	JB458	PAHs	Dibenzo(a,h)anthracene	ppb	3.1	Yes
	JB458	PAHs	Fluoranthene	ppb	25.1	Yes
	JB458	PAHs	Fluorene	ppb	2.1	Yes
	JB458	PAHs	Naphthalene	ppb	4.4	Yes
	JB458	PAHs	Phenanthrene	ppb	16.1	Yes
	JB458	PAHs	Pyrene	ppb	22.4	Yes
	JB458	PAHs	Total PAHs	ppb	136.1	Yes
	JB458	PCBs (Aroclors)	Total PCBs	ppb	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB459	Metals	Arsenic	ppm	1.9	Yes
	JB459	Metals	Cadmium	ppm	0.1	Yes
	JB459	Metals	Chromium	ppm	15.6	Yes
	JB459	Metals	Copper	ppm	3.5	Yes
	JB459	Metals	Lead	ppm	11	Yes
	JB459	Metals	Mercury	ppm	0.05	Yes
	JB459	Metals	Nickel	ppm	3.7	Yes
	JB459	Metals	Silver	ppm	0.025	No
	JB459	Metals	Zinc	ppm	15.2	Yes
	JB459	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB459	Pesticides	Total DDx (4,4)	ppb	1	No
	JB459	Pesticides	4,4'-DDE	ppb	1	No
	JB459	PAHs	2-Methylnaphthalene	ppb	1	No
	JB459	PAHs	Acenaphthene	ppb	1	No
	JB459	PAHs	Acenaphthylene	ppb	1	No
	JB459	PAHs	Anthracene	ppb	1	No
	JB459	PAHs	Benzo(a)anthracene	ppb	1.2	Yes
	JB459	PAHs	Benzo(a)pyrene	ppb	1.4	Yes
	JB459	PAHs	Chrysene	ppb	1.7	Yes
	JB459	PAHs	Dibenzo(a,h)anthracene	ppb	1	No
	JB459	PAHs	Fluoranthene	ppb	3.2	Yes
	JB459	PAHs	Fluorene	ppb	1	No
	JB459	PAHs	Naphthalene	ppb	1.8	Yes
	JB459	PAHs	Phenanthrene	ppb	2.8	Yes
	JB459	PAHs	Pyrene	ppb	2.8	Yes
	JB459	PAHs	Total PAHs	ppb	22	Yes
	JB459	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB464	Metals	Arsenic	ppm	4.2	Yes
	JB464	Metals	Cadmium	ppm	0.4	Yes
	JB464	Metals	Chromium	ppm	31.3	Yes
	JB464	Metals	Copper	ppm	17.7	Yes
	JB464	Metals	Lead	ppm	30	Yes
	JB464	Metals	Mercury	ppm	0.23	Yes
	JB464	Metals	Nickel	ppm	11	Yes
	JB464	Metals	Silver	ppm	0.4	Yes
	JB464	Metals	Zinc	ppm	60	Yes
	JB464	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB464	Pesticides	Total DDx (4,4)	ppb	1	No
	JB464	Pesticides	4,4'-DDE	ppb	1	No
	JB464	PAHs	2-Methylnaphthalene	ppb	3.6	Yes
	JB464	PAHs	Acenaphthene	ppb	1.6	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB464	PAHs	Acenaphthylene	ppb	1.7	Yes
	JB464	PAHs	Anthracene	ppb	4.7	Yes
	JB464	PAHs	Benzo(a)anthracene	ppb	15.3	Yes
	JB464	PAHs	Benzo(a)pyrene	ppb	15.1	Yes
	JB464	PAHs	Chrysene	ppb	19.2	Yes
	JB464	PAHs	Dibenzo(a,h)anthracene	ppb	5.4	Yes
	JB464	PAHs	Fluoranthene	ppb	33.5	Yes
	JB464	PAHs	Fluorene	ppb	2.3	Yes
	JB464	PAHs	Naphthalene	ppb	6.9	Yes
	JB464	PAHs	Phenanthrene	ppb	12.3	Yes
	JB464	PAHs	Pyrene	ppb	37	Yes
	JB464	PAHs	Total PAHs	ppb	229.7	Yes
	JB464	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB466	Metals	Arsenic	ppm	2.1	Yes
	JB466	Metals	Cadmium	ppm	0.1	Yes
	JB466	Metals	Chromium	ppm	12.6	Yes
	JB466	Metals	Copper	ppm	2.8	Yes
	JB466	Metals	Lead	ppm	11.4	Yes
	JB466	Metals	Mercury	ppm	0.04	Yes
	JB466	Metals	Nickel	ppm	2.7	Yes
	JB466	Metals	Silver	ppm	0.1	Yes
	JB466	Metals	Zinc	ppm	14.1	Yes
	JB466	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB466	Pesticides	Total DDx (4,4)	ppb	1	No
	JB466	Pesticides	4,4'-DDE	ppb	1	No
	JB466	PAHs	2-Methylnaphthalene	ppb	1.4	Yes
	JB466	PAHs	Acenaphthene	ppb	1	No
	JB466	PAHs	Acenaphthylene	ppb	2.4	Yes
	JB466	PAHs	Anthracene	ppb	2.2	Yes
	JB466	PAHs	Benzo(a)anthracene	ppb	25.5	Yes
	JB466	PAHs	Benzo(a)pyrene	ppb	21.2	Yes
	JB466	PAHs	Chrysene	ppb	21.7	Yes
	JB466	PAHs	Dibenzo(a,h)anthracene	ppb	4.3	Yes
	JB466	PAHs	Fluoranthene	ppb	21.2	Yes
	JB466	PAHs	Fluorene	ppb	1.1	Yes
	JB466	PAHs	Naphthalene	ppb	1.4	Yes
	JB466	PAHs	Phenanthrene	ppb	6	Yes
	JB466	PAHs	Pyrene	ppb	38.4	Yes
	JB466	PAHs	Total PAHs	ppb	198.2	Yes
	JB466	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB467	Metals	Arsenic	ppm	5.5	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB467	Metals	Cadmium	ppm	0.5	Yes
	JB467	Metals	Chromium	ppm	46.1	Yes
	JB467	Metals	Copper	ppm	21.6	Yes
	JB467	Metals	Lead	ppm	36.1	Yes
	JB467	Metals	Mercury	ppm	0.32	Yes
	JB467	Metals	Nickel	ppm	13.7	Yes
	JB467	Metals	Silver	ppm	0.5	Yes
	JB467	Metals	Zinc	ppm	73.8	Yes
	JB467	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB467	Pesticides	Total DDx (4,4)	ppb	1	No
	JB467	Pesticides	4,4'-DDE	ppb	1	No
	JB467	PAHs	2-Methylnaphthalene	ppb	3.2	Yes
	JB467	PAHs	Acenaphthene	ppb	1.9	Yes
	JB467	PAHs	Acenaphthylene	ppb	2	Yes
	JB467	PAHs	Anthracene	ppb	7.9	Yes
	JB467	PAHs	Benzo(a)anthracene	ppb	26.2	Yes
	JB467	PAHs	Benzo(a)pyrene	ppb	22.4	Yes
	JB467	PAHs	Chrysene	ppb	29	Yes
	JB467	PAHs	Dibenzo(a,h)anthracene	ppb	7.6	Yes
	JB467	PAHs	Fluoranthene	ppb	61.2	Yes
	JB467	PAHs	Fluorene	ppb	3.2	Yes
	JB467	PAHs	Naphthalene	ppb	6.1	Yes
	JB467	PAHs	Phenanthrene	ppb	26.6	Yes
	JB467	PAHs	Pyrene	ppb	54.3	Yes
	JB467	PAHs	Total PAHs	ppb	317.7	Yes
	JB467	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB480	Metals	Arsenic	ppm	1.6	Yes
	JB480	Metals	Cadmium	ppm	0.1	Yes
	JB480	Metals	Chromium	ppm	11.4	Yes
	JB480	Metals	Copper	ppm	4.1	Yes
	JB480	Metals	Lead	ppm	9.5	Yes
	JB480	Metals	Mercury	ppm	0.04	Yes
	JB480	Metals	Nickel	ppm	3.3	Yes
	JB480	Metals	Silver	ppm	0.1	Yes
	JB480	Metals	Zinc	ppm	12.4	Yes
	JB480	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB480	Pesticides	Total DDx (4,4)	ppb	1	No
	JB480	Pesticides	4,4'-DDE	ppb	1	No
	JB480	PAHs	2-Methylnaphthalene	ppb	5.1	Yes
	JB480	PAHs	Acenaphthene	ppb	3.3	Yes
	JB480	PAHs	Acenaphthylene	ppb	5.6	Yes

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

Study	Station	Parameter Group	Chemical	Units	Result	Detected
Region 2 2013 NY/NJ Harbor Sampling (cont.)	JB480	PAHs	Anthracene	ppb	15.6	Yes
	JB480	PAHs	Benzo(a)anthracene	ppb	82.7	Yes
	JB480	PAHs	Benzo(a)pyrene	ppb	74.4	Yes
	JB480	PAHs	Chrysene	ppb	84.4	Yes
	JB480	PAHs	Dibenzo(a,h)anthracene	ppb	15.1	Yes
	JB480	PAHs	Fluoranthene	ppb	135.3	Yes
	JB480	PAHs	Fluorene	ppb	4.4	Yes
	JB480	PAHs	Naphthalene	ppb	6.7	Yes
	JB480	PAHs	Phenanthrene	ppb	35.9	Yes
	JB480	PAHs	Pyrene	ppb	144.5	Yes
	JB480	PAHs	Total PAHs	ppb	825.7	Yes
	JB480	PCBs (Aroclors)	Total PCBs	ppb	0	No
	JB481	Metals	Arsenic	ppm	2.9	Yes
	JB481	Metals	Cadmium	ppm	0.1	Yes
	JB481	Metals	Chromium	ppm	21.5	Yes
	JB481	Metals	Copper	ppm	3.3	Yes
	JB481	Metals	Lead	ppm	13.8	Yes
	JB481	Metals	Mercury	ppm	0.03	Yes
	JB481	Metals	Nickel	ppm	4.2	Yes
	JB481	Metals	Silver	ppm	0.1	Yes
	JB481	Metals	Zinc	ppm	17	Yes
	JB481	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	No
	JB481	Pesticides	Total DDx (4,4)	ppb	1	No
	JB481	Pesticides	4,4'-DDE	ppb	1	No
	JB481	PAHs	2-Methylnaphthalene	ppb	1	No
	JB481	PAHs	Acenaphthene	ppb	1	No
	JB481	PAHs	Acenaphthylene	ppb	1	No
	JB481	PAHs	Anthracene	ppb	1.1	Yes
	JB481	PAHs	Benzo(a)anthracene	ppb	2.8	Yes
	JB481	PAHs	Benzo(a)pyrene	ppb	2.3	Yes
	JB481	PAHs	Chrysene	ppb	2.2	Yes
	JB481	PAHs	Dibenzo(a,h)anthracene	ppb	1	No
	JB481	PAHs	Fluoranthene	ppb	5.4	Yes
	JB481	PAHs	Fluorene	ppb	1.1	Yes
	JB481	PAHs	Naphthalene	ppb	1.5	Yes
	JB481	PAHs	Phenanthrene	ppb	5.3	Yes
	JB481	PAHs	Pyrene	ppb	5.2	Yes
	JB481	PAHs	Total PAHs	ppb	37.2	Yes
	JB481	PCBs (Aroclors)	Total PCBs	ppb	0	No

Table A-1-6
Sediment Chemistry Data for the Final Jamaica Bay Reference Dataset

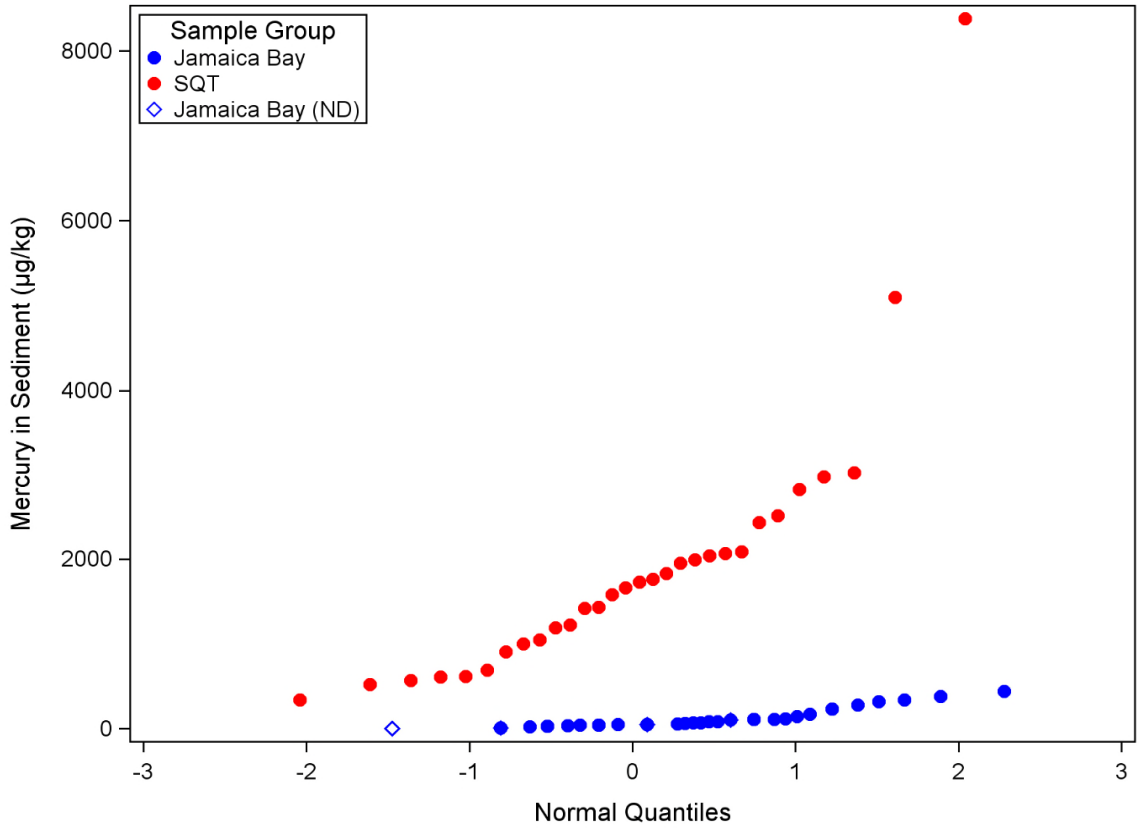
Acronyms and Abbreviations:
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
NCA = National Coastal Assessment
NY/NJ = New York/New Jersey
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
p,p'-DDE = 4,4'-dichlorodiphenyldichloroethylene
ppb = parts per billion
ppm = parts per million
REMAP = Regional Environmental Monitoring and Assessment Program
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
Total DDx (4,4) = sum of three isomers of DDE, DDD, and DDT

Table A-1-7
Comparision of Physical Characteristics between the NBSA and Jamaica Bay

Parameter	Units	Jamaica Bay REMAP (2008)				Jamaica Bay REMAP (2013)				NBSA				
		Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Data
Silt and Clay Fraction	%	37.8	30.2	1.7	91	33.7	33	1.3	96	56	27	2.6	96.8	RI Phase III Sediment
Total Organic Carbon	ppm	29,800	28,400	1,600	120,000	20,700	23,800	1,400	95,000	23,600	16,100	1,030	151,000	
Dissolved Oxygen[a]	mg/l	5.25	1.26	2.24	8.06	5.00	1.48	2	8.9	5.18	0.785	4.10	6.4	REMAP 2008-2013
Salinity[a]	ppt	29.3	1.80	26	34	29.6	1.58	24.9	32.5	21.0	2.42	12.8	25	

Notes:
[a]Measured near the bottom of the water column.

Acronyms and Abbreviations:
% = percent
NBSA = Newark Bay Study Area
mg/l = milligrams per liter
ppm = parts per million
ppt = parts per thousand
REMAP = Regional Environmental Monitoring and Assessment Program
RI = Remedial Investigation



Notes:

Jamaica Bay data includes only the 59 samples that passed the chemistry and toxicity screen (Table A-1-6).

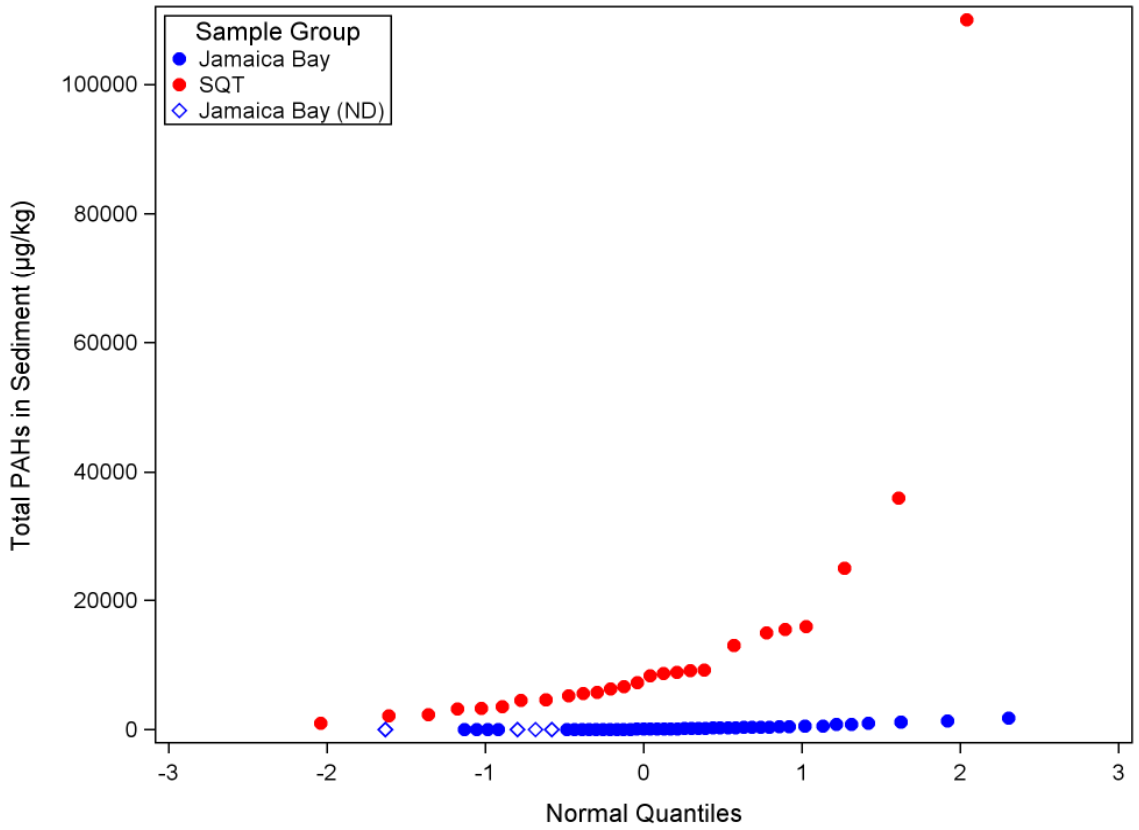
ND = non-detect data shown at the value of the detection limit.

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

Probability Plots of Jamaica Bay Reference and NBSA SQT Data: Mercury

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
A-1-1



Notes:

Jamaica Bay data includes only the 59 samples that passed the chemistry and toxicity screen (Table A-1-6).

ND = non-detect data shown at the value of the detection limit.

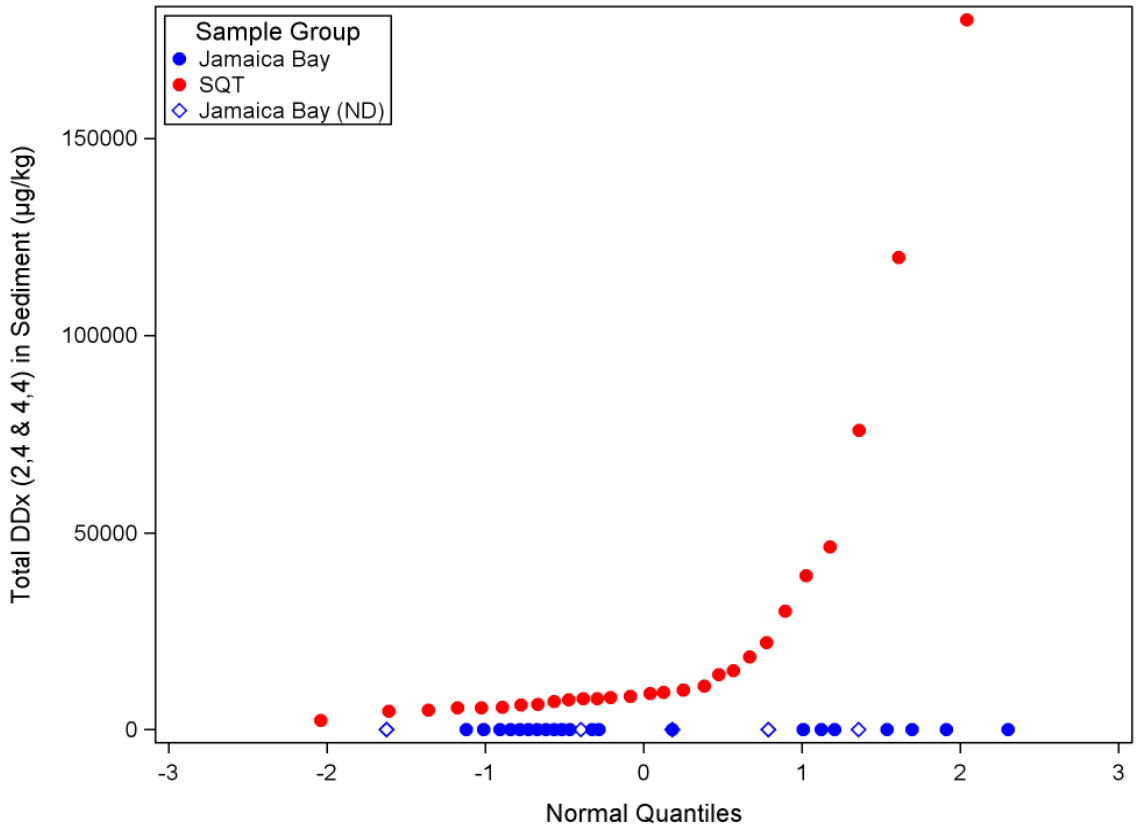
PAH = polycyclic aromatic hydrocarbon

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

Probability Plots of Jamaica Bay Reference and NBSA SQT Data: PAHs

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
A-1-2



Notes:

Jamaica Bay data includes only the 59 samples that passed the chemistry and toxicity screen (Table A-1-6).

ND = non-detect data shown at the value of the detection limit.

Total DDx (2,4 and 4,4) = sum of six isomers of dichlorodiphenyltrichloroethane

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

Probability Plots of Jamaica Bay Reference and NBSA SQT Data: Total DDx

OXY Glenn Springs Holdings, Inc.
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FIGURE
A-1-3

ATTACHMENT A-2

Leptocheirus plumulosus Bioassay Data

Table A-2-1
Summary Statistics and Minimum Detectable Differences
Leptocheirus plumulosus Bioassay Toxicity Endpoints

Geographic Area	Sample Identification Number	10 Day Percent Survival			28 Day Percent Survival			28 Day Growth (mg/organism/day)			28 Day Reproduction (Young per Surviving Adult)		
		Mean	Standard Deviation	CV	Mean	Standard Deviation	CV	Mean	Standard Deviation	CV	Mean	Standard Deviation	CV
		90%	10%	11%	81%	4%	5%	0.044	0.002	5%	1.97	1.46	74%
North	NB03SED-TOX136	92%	8%	8%	63%	34%	53%	0.028	0.017	60%	**0.69**	0.25	36%
	NB03SED-TOX137	96%	5%	6%	75%	18%	24%	0.029	0.010	34%	**0.28**	0.26	94%
	NB03SED-TOX138	89%	8%	9%	**46%**	38%	83%	**0.017**	0.012	70%	**0.33**	0.39	120%
	NB03SED-TOX139	92%	8%	8%	92%	9%	10%	0.033	0.013	39%	**0.56**	0.43	78%
	NB03SED-TOX140	81%	15%	18%	79%	33%	42%	0.032	0.015	47%	**0.77**	0.84	108%
	NB03SED-TOX158	93%	6%	6%	**39%**	37%	94%	**0.010**	0.013	125%	**0**	--	--
	NB03SED-TOX159	90%	9%	10%	62%	37%	60%	0.029	0.022	76%	**0.67**	0.44	66%
	NB03SED-TOX160	90%	6%	7%	**0%**	--	--	--	--	--	--	--	--
	NB03SED-TOX161	95%	5%	5%	96%	4%	4%	0.034	0.007	20%	**0.71**	0.24	34%
	NB03SED-TOX162	92%	10%	11%	86%	14%	16%	0.037	0.004	11%	**0.95**	0.08	8%
	NB03SED-TOX163	94%	7%	7%	69%	33%	48%	0.031	0.016	53%	**1.02**	0.59	57%
	NB03SED-TOX164	96%	4%	4%	84%	10%	11%	**0.021**	0.009	44%	**0.83**	0.83	100%
	NB03SED-TOX165	95%	4%	4%	88%	20%	22%	0.028	0.007	24%	**0.68**	0.31	46%
Central	NB03SED-TOX141	92%	10%	11%	67%	14%	20%	0.036	0.015	41%	**0.80**	0.86	107%
	NB03SED-TOX142	98%	4%	5%	53%	49%	92%	0.050	0.006	13%	1.93	1.49	77%
	NB03SED-TOX143	90%	9%	10%	**30%**	31%	103%	**0.012**	0.007	62%	**0.21**	0.44	208%
	NB03SED-TOX144	93%	8%	8%	65%	31%	47%	**0.021**	0.014	65%	**1.13**	1.08	95%
	NB03SED-TOX145	97%	4%	5%	59%	34%	57%	0.040	0.016	39%	**0.58**	0.84	144%
	NB03SED-TOX156	96%	4%	4%	86%	14%	16%	0.035	0.008	23%	**0.79**	0.63	80%
	NB03SED-TOX157	92%	10%	11%	80%	34%	43%	**0.024**	0.016	69%	**0.94**	0.56	59%
South	NB03SED-TOX146	83%	6%	7%	84%	14%	17%	0.029	0.014	48%	**0.60**	0.43	72%
	NB03SED-TOX147	90%	12%	13%	79%	20%	25%	0.035	0.013	36%	**0.28**	0.20	70%
	NB03SED-TOX148	97%	3%	3%	92%	6%	6%	0.032	0.007	22%	**0.84**	0.52	61%
	NB03SED-TOX149	98%	3%	3%	63%	37%	58%	**0.020**	0.009	45%	**0.64**	0.80	125%
	NB03SED-TOX150	89%	7%	7%	73%	26%	36%	0.030	0.019	63%	**0.67**	0.38	57%
	NB03SED-TOX151	**39%**	19%	47%	**0%**	--	--	--	--	--	--	--	--
	NB03SEDDUP-02 (151)	**36%**	24%	68%	**0%**	--	--	--	--	--	--	--	--
	NB03SED-TOX152	97%	4%	5%	86%	19%	22%	**0.025**	0.014	55%	**0.37**	0.23	62%
	NB03SED-TOX153	98%	3%	3%	83%	8%	9%	0.037	0.019	51%	**0.73**	0.61	83%
	NB03SED-TOX154	**32%**	16%	49%	**7%**	10%	139%	**0.001**	0.002	133%	**0.96**	1.00	105%
	NB03SEDDUP-03 (154)	**46%**	19%	42%	**11%**	15%	138%	**0.004**	0.000	8%	**0.00**	--	--
	NB03SED-TOX155	95%	5%	5%	70%	29%	42%	0.035	0.017	49%	**0.60**	0.19	31%
Pooled standard Deviation			0.10			0.27			0.013			0.66	
Minimum Detectable Difference[a]			0.12			0.33			0.016			0.82	

Table A-2-1
Summary Statistics and Minimum Detectable Differences
Leptocheirus plumulosus Bioassay Toxicity Endpoints

Notes:
[a]This is the minimum detectable difference at 95% confidence and 80% power based on the pooled standard deviation of the site samples for the endpoint.
Shaded cells indicate value if statistically significantly different from control.
Bolded cells indicate value is less than control minus the minimum detectable difference (MDD) for the endpoint.

Acronyms and Abbreviations
CV = coefficient of variation
mg = milligrams
% = percent

Table A-2-2
Replicate Results of Leptocheirus plumulosus Bioassay Tests

Sample Identification Number	Laboratory Identification Number	10 Day Replicate Percent Survival					28 Day Replicate Percent Survival					28 Day Replicate Growth (mg/organism/day)					28 Day Replicate Reproduction (Young per Surviving Adult)				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Control	Control	100%	90%	80%	80%	100%	85%	80%	85%	75%	80%	0.0405	0.0449	0.0453	0.0453	0.0464	1.2353	4	1.4118	0.3333	2.875
NB03SED-TOX136	AT5-396	80%	95%	90%	95%	100%	25%	75%	100%	30%	85%	0.0143	0.0269	0.0436	0.0092	0.047	0.8	0.6	1	0.3333	0.7059
NB03SED-TOX137	AT5-395	100%	90%	100%	100%	90%	85%	90%	75%	80%	45%	0.0165	0.0358	0.0291	0.0409	0.0222	0	0.5	0.5333	0.375	0
NB03SED-TOX138	AT5-394	85%	95%	100%	85%	80%	70%	0%	95%	20%	45%	0.0328	0.019	0.0052	0.0112		0.7857	0.5263	0	0	
NB03SED-TOX139	AT5-397	90%	95%	95%	100%	80%	100%	85%	100%	95%	80%	0.0327	0.0399	0.0395	0.0429	0.0109	0.45	1.2353	0.7	0.1053	0.3125
NB03SED-TOX140	AT5-438	85%	100%	85%	75%	60%	20%	95%	90%	95%	95%	0.0443	0.0141	0.0366	0.0181	0.0477	2	0	0.2778	0.3158	1.2632
NB03SED-TOX158	AT5-435	95%	90%	100%	95%	85%	75%	0%	70%	50%	0%	0.0292	0	0.0073	0.0049		0	0	0		
NB03SED-TOX159	AT5-434	100%	95%	95%	80%	80%	70%	85%	95%	60%	0%	0.0245	0.0503	0.0528	0.0188	0	0.6429	0.8235	1.0526	0.1667	
NB03SED-TOX160	AT5-436	100%	90%	85%	85%	90%	0%	0%	0%	0%	0%	--	--	--	--	--	--	--	--	--	--
NB03SED-TOX161	AT5-398	100%	90%	95%	100%	90%	90%	95%	100%	100%	95%	0.038	0.0333	0.0399	0.0362	0.0228	0.6111	0.8421	0.45	1.05	0.5789
NB03SED-TOX162	AT5-409	100%	95%	95%	95%	75%	75%	100%	100%	70%	85%	0.035	0.0384	0.0436	0.0344	0.0339	0.9333	1.05	0.8636	1	0.8824
NB03SED-TOX163	AT5-431	90%	100%	95%	100%	85%	15%	95%	90%	60%	85%	0.0154	0.0548	0.0339	0.0159	0.0352	1	0.6316	1.1111	0.4167	1.9412
NB03SED-TOX164	AT5-392	95%	100%	95%	100%	90%	90%	80%	70%	95%	85%	0.0221	0.0086	0.0237	0.0165	0.0336	1	0	0.5714	0.4211	2.1765
NB03SED-TOX165	AT5-393	95%	100%	95%	90%	95%	100%	85%	100%	100%	55%	0.0367	0.0272	0.0315	0.0215	0.0216	0.65	1.1176	0.8095	0.55	0.2727
NB03SED-TOX141	AT5-399	100%	95%	75%	90%	100%	55%	75%	80%	50%	75%	0.0155	0.0493	0.035	0.0294	0.0509	1.3636	0	2	0.5	0.1333
NB03SED-TOX142	AT5-437	90%	100%	100%	100%	100%	0%	0%	95%	80%	90%	0.0447	0.0569	0.0479			0.8421	3.625	1.3333		
NB03SED-TOX143	AT5-440	85%	80%	100%	85%	100%	10%	5%	80%	15%	40%	0.0131	0.0078	0.0222	0.0025	0.0148	1	0	0.0625	0	0
NB03SED-TOX144	AT5-401	85%	85%	100%	95%	100%	90%	50%	95%	20%	70%	0.0109	0.0099	0.0396	0.0134	0.0332	0	0.3	1.3158	2.75	1.2857
NB03SED-TOX145	AT5-439	95%	100%	90%	100%	100%	70%	65%	0%	75%	85%	0.0217	0.033	0.0568	0.0481		0	0.2308	0.2667	1.8235	
NB03SED-TOX156	AT5-402	100%	100%	90%	95%	95%	95%	65%	80%	100%	90%	0.0289	0.0412	0.0404	0.0236	0.0398	0.0526	1.2308	1.1875	0.15	1.3333
NB03SED-TOX157	AT5-400	75%	95%	100%	100%	90%	20%	100%	95%	100%	85%	0.0013	0.0218	0.0342	0.0436	0.0166	1.25	0.4	1.5263	1.25	0.2941
NB03SED-TOX146	AT5-411	85%	90%	75%	80%	85%	65%	100%	95%	80%	80%	0.0088	0.044	0.0221	0.0374	0.0302	0.2308	0.7	0.6316	1.25	0.1875
NB03SED-TOX147	AT5-408	80%	95%	100%	100%	75%	100%	60%	90%	90%	55%	0.0462	0.0152	0.037	0.0317	0.0447	0.35	0.5	0.3889	0.1667	0
NB03SED-TOX148	AT5-410	95%	100%	95%	95%	100%	90%	95%	85%	90%	100%	0.035	0.0385	0.028	0.0219	0.0371	1.6667	0.7895	0.2353	0.7778	0.75
NB03SED-TOX149	AT5-427	100%	95%	100%	100%	95%	85%	50%	80%	95%	5%	0.0339	0.0097	0.0215	0.0226	0.0142	0.5882	0	0.5	0.1053	2
NB03SED-TOX150	AT5-432	85%	90%	95%	95%	80%	90%	45%	85%	45%	100%	0.0181	0.0131	0.0584	0.0204	0.0391	0.2222	0.8889	1.1765	0.6667	0.4
NB03SED-TOX151	AT5-403	50%	20%	35%	25%	65%	0%	0%	0%	0%	0%	--	--	--	--	--	--	--	--	--	--
NB03SEDDUP-02	AT5-404	15%	40%	45%	70%	10%	0%	0%	0%	0%	0%	--	--	--	--	--	--	--	--	--	--
NB03SED-TOX152	AT5-441	90%	100%	100%	100%	95%	80%	55%	95%	100%	100%	0.0213	0.0107	0.0467	0.0296	0.0175	0.4375	0.0909	0.6842	0.2	0.45
NB03SED-TOX153	AT5-433	100%	100%	95%	100%	95%	75%	90%	90%	75%	85%	0.0163	0.0548	0.0345	0.0209	0.0576	0.2667	0.6667	0.0556	1.1333	1.5294
NB03SED-TOX154	AT5-406	35%	45%	40%	35%	5%	15%	0%	0%	0%	20%	0.0007	0	0.0036	--	--	1.6667	0.25	--	--	--
NB03SEDDUP-03	AT5-407	65%	35%	45%	20%	65%	30%	25%	0%	0%	0%	0.0038	0.0034	--	--	--	0	0	--	--	--
NB03SED-TOX155	AT5-405	100%	95%	90%	100%	90%	80%	90%	100%	50%	30%	0.0502	0.0498	0.0404	0.0236	0.011	0.625	0.8333	0.5238	0.7	0.3333

Notes:
Twenty organisms were in each replicate.

Acronyms and Abbreviations
mg = milligrams
% = percent

ATTACHMENT A-3

Sediment and Porewater Data Screens

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	110	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	77.4	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	413	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	103	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	100	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	96.8	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	14.3	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	77.6	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	78.3	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	53.6	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	11.4	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	76.25	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	94.6	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	58.3	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	42.3	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	347	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	27.4	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	20.4	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	256	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	5.62	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	33.6	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	71.6	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	22.5	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	61.5	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	83.9	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	137	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	59.2	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	58.6	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	48.2	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	101	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	295,000	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	115,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	909,000	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	234,000	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	211,000	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	462,000	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	94,400	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	424,000	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	757,000	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	407,000	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	167,000	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	540,500	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	632,000	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	636,000	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	701,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	4,370,000	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED136	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED137	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED138	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED139	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED140	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED141	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED142	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	No
NB03SED143	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED144	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED145	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED146	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	No
NB03SED147	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED148	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED149	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED150	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED151	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED152	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED153	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	No
NB03SED154	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED155	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	No
NB03SED156	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED157	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED158	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED159	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED160	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED161	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED162	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED163	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED164	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED165	--	--	--	--	--	0.85	21.5	--	--	--	--	--	Yes	Yes
NB03SED136	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED137	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	No	Yes	No
NB03SED138	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED139	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED140	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED141	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED142	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	No	Yes	No
NB03SED143	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED144	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED145	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED146	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	No	Yes	No
NB03SED147	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED148	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED150	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED151	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	637,500	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	140,000	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	1,120,000	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	50,600	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	404,000	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	490,000	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	92,700	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	290,000	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	1,200,000	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	713,000	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	507,000	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	301,000	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	221,000	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/kg	524,000	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	210	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	170	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	340	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	160	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	190	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	160	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	80	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	400	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	180	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	280	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	590	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	285	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	190	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	250	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	190	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	2,500	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	435	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	41	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	1,100	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	43	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	28	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	200	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	99	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	180	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	510	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	150	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	150	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	160	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	160	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PCB Aroclors	Total Aroclor PCBs (9)	µg/kg	120	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	4,4'-DDD	ng/kg	12,700	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	4,4'-DDD	ng/kg	12,800	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED152	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED153	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	No	Yes	No
NB03SED154	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED155	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	No	Yes	No
NB03SED156	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED157	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED158	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	No	Yes	No
NB03SED159	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED160	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED161	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED162	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED163	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED164	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED165	35,000	370,000	3,930,000	22,700	180,000	35,000	370,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED136	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED137	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED138	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED139	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED140	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED141	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED142	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED143	35	370	3,930	22.7	180	35	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED144	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED145	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED146	35	370	3,930	22.7	180	35	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED147	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED148	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED149	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED150	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED151	35	370	3,930	22.7	180	35	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED152	35	370	3,930	22.7	180	35	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED153	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED154	35	370	3,930	22.7	180	35	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED155	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED156	35	370	3,930	22.7	180	35	370	No	No	No	Yes	No	No	No
NB03SED157	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	Yes	Yes	No
NB03SED158	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED159	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED160	35	370	3,930	22.7	180	35	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED161	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED162	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED163	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED164	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED165	35	370	3,930	22.7	180	35	370	Yes	No	No	Yes	No	Yes	No
NB03SED136	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED137	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	4,4'-DDD	ng/kg	17,300	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	4,4'-DDD	ng/kg	53,700	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	4,4'-DDD	ng/kg	8,700	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDD	ng/kg	8,320	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	4,4'-DDD	ng/kg	4,360	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDD	ng/kg	43,500	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	4,4'-DDD	ng/kg	4,760	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDD	ng/kg	8,810	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	4,4'-DDD	ng/kg	7,300	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDD	ng/kg	21,700	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	4,4'-DDD	ng/kg	15,900	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDD	ng/kg	63,900	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	4,4'-DDD	ng/kg	25,900	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDD	ng/kg	125,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	4,4'-DDD	ng/kg	90,000	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDD	ng/kg	6,130	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDD	ng/kg	35,900	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDD	ng/kg	11,900	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	4,4'-DDD	ng/kg	6,460	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	4,4'-DDD	ng/kg	9,560	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	4,4'-DDD	ng/kg	13,100	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDD	ng/kg	8,930	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	4,4'-DDD	ng/kg	11,200	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	4,4'-DDD	ng/kg	16,100	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDD	ng/kg	11,400	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDD	ng/kg	11,200	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	4,4'-DDD	ng/kg	8,060	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	4,4'-DDD	ng/kg	13,100	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	4,4'-DDE	ng/kg	23,300	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	4,4'-DDE	ng/kg	17,200	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	4,4'-DDE	ng/kg	39,700	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	4,4'-DDE	ng/kg	24,200	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	4,4'-DDE	ng/kg	13,900	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDE	ng/kg	16,000	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	4,4'-DDE	ng/kg	4,590	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDE	ng/kg	143,000	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	4,4'-DDE	ng/kg	36,600	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDE	ng/kg	17,300	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	4,4'-DDE	ng/kg	11,600	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDE	ng/kg	42,200	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	4,4'-DDE	ng/kg	33,500	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDE	ng/kg	51,200	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	4,4'-DDE	ng/kg	39,600	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDE	ng/kg	252,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	4,4'-DDE	ng/kg	55,350	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDE	ng/kg	9,880	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED138	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED139	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED141	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED142	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED143	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED144	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED145	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED146	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED147	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED148	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED149	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED150	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED151	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED154	2,200	19,000	160,000	--	--	2,200	19,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED155	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED156	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED157	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED158	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED159	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED160	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED161	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED162	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED163	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED164	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED165	2,200	19,000	160,000	--	--	2,200	19,000	Yes	No	No	--	--	Yes	No
NB03SED136	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED137	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED138	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED139	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED140	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED141	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED142	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED143	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED144	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED145	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED146	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED147	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED148	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED149	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED150	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED151	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED152	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED153	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDE	ng/kg	336,000	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDE	ng/kg	6,920	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	4,4'-DDE	ng/kg	12,400	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	4,4'-DDE	ng/kg	17,000	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	4,4'-DDE	ng/kg	6,940	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDE	ng/kg	11,800	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	4,4'-DDE	ng/kg	35,200	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	4,4'-DDE	ng/kg	30,600	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDE	ng/kg	16,700	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDE	ng/kg	14,200	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	4,4'-DDE	ng/kg	10,200	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	4,4'-DDE	ng/kg	25,400	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	4,4'-DDT	ng/kg	1,360	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	4,4'-DDT	ng/kg	1,190	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	4,4'-DDT	ng/kg	744	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	4,4'-DDT	ng/kg	482	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	4,4'-DDT	ng/kg	970	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDT	ng/kg	1,220	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	4,4'-DDT	ng/kg	570	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDT	ng/kg	5,040	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	4,4'-DDT	ng/kg	343	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	4,4'-DDT	ng/kg	238	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	4,4'-DDT	ng/kg	232	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDT	ng/kg	21,334	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	4,4'-DDT	ng/kg	650	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDT	ng/kg	7,400	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	4,4'-DDT	ng/kg	643	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDT	ng/kg	108,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	4,4'-DDT	ng/kg	30,250	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDT	ng/kg	229	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	4,4'-DDT	ng/kg	1,810	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	4,4'-DDT	ng/kg	759	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	4,4'-DDT	ng/kg	1,020	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	4,4'-DDT	ng/kg	903	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	4,4'-DDT	ng/kg	249	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDT	ng/kg	873	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	4,4'-DDT	ng/kg	764	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	4,4'-DDT	ng/kg	2,130	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDT	ng/kg	691	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	4,4'-DDT	ng/kg	7,370	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	4,4'-DDT	ng/kg	9,920	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	4,4'-DDT	ng/kg	2,070	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Dieldrin	ng/kg	1,760	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Dieldrin	ng/kg	1,260	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Dieldrin	ng/kg	3,600	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Dieldrin	ng/kg	1,050	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED154	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED155	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED156	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED157	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED158	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED159	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED160	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED161	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	Yes	Yes	No
NB03SED162	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED163	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED164	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED165	3,100	100,000	3,410,000	2,200	27,000	3,100	100,000	Yes	No	No	Yes	No	Yes	No
NB03SED136	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED137	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED138	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED139	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED140	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED141	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED142	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED143	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED144	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED145	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED146	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED147	1,700	11,000	76,000	--	--	1,700	11,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED148	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED149	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED150	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED151	1,700	11,000	76,000	--	--	1,700	11,000	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED152	1,700	11,000	76,000	--	--	1,700	11,000	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED154	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED155	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED156	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED157	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED158	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED159	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED160	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED161	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED162	1,700	11,000	76,000	--	--	1,700	11,000	No	No	No	--	--	No	No
NB03SED163	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED164	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED165	1,700	11,000	76,000	--	--	1,700	11,000	Yes	No	No	--	--	Yes	No
NB03SED136	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED137	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED138	830	2,900	10,000	--	--	830	2,900	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Dieldrin	ng/kg	753	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Dieldrin	ng/kg	1,250	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Dieldrin	ng/kg	677	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Dieldrin	ng/kg	1,870	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Dieldrin	ng/kg	396	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Dieldrin	ng/kg	1,910	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Dieldrin	ng/kg	600	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Dieldrin	ng/kg	2,190	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Dieldrin	ng/kg	1,540	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Dieldrin	ng/kg	3,460	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Dieldrin	ng/kg	1,300	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Dieldrin	ng/kg	7,830	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Dieldrin	ng/kg	876.5	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Dieldrin	ng/kg	312	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Dieldrin	ng/kg	2,020	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Dieldrin	ng/kg	106	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Dieldrin	ng/kg	754	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Dieldrin	ng/kg	1,080	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Dieldrin	ng/kg	381	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Dieldrin	ng/kg	1,030	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Dieldrin	ng/kg	1,500	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Dieldrin	ng/kg	1,850	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Dieldrin	ng/kg	1,010	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Dieldrin	ng/kg	1,340	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Dieldrin	ng/kg	718	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Dieldrin	ng/kg	1,740	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	gamma-BHC (lindane)	ng/kg	22.7	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	ng/kg	15.5	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	ng/kg	18.2	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	gamma-BHC (lindane)	ng/kg	9.75	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	75.1	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	9.9	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	35.1	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	218	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	19.4	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED140	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED141	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED142	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED143	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED144	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED145	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED146	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED147	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED148	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED149	830	2,900	10,000	--	--	830	2,900	Yes	Yes	No	--	--	Yes	Yes
NB03SED150	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED151	830	2,900	10,000	--	--	830	2,900	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED153	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED154	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED155	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED156	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED157	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED158	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED159	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED160	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED161	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED162	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED163	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED164	830	2,900	10,000	--	--	830	2,900	No	No	No	--	--	No	No
NB03SED165	830	2,900	10,000	--	--	830	2,900	Yes	No	No	--	--	Yes	No
NB03SED136	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED137	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED138	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED139	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED140	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED141	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED142	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED143	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED144	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED145	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED146	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED147	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED148	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED149	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED150	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED151	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED152	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED153	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED154	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED155	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	gamma-BHC (lindane)	ng/kg	9.49	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	gamma-BHC (lindane)	ng/kg	13.8	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	gamma-BHC (lindane)	ng/kg	9.69	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	gamma-BHC (lindane)	ng/kg	16.7	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	gamma-BHC (lindane)	ng/kg	23.4	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	gamma-BHC (lindane)	ng/kg	7.3	0
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	ng/kg	15.8	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Total alpha + gamma chlordane	ng/kg	13,000	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	ng/kg	9,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	ng/kg	8,400	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total alpha + gamma chlordane	ng/kg	4,200	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total alpha + gamma chlordane	ng/kg	7,100	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	7,100	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	3,700	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	9,500	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	1,400	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	5,700	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	1,400	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	5,450	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	5,200	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	8,400	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	5,900	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	16,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	4,450	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	2,200	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	5,200	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total alpha + gamma chlordane	ng/kg	460	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total alpha + gamma chlordane	ng/kg	4,200	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Total alpha + gamma chlordane	ng/kg	8,300	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total alpha + gamma chlordane	ng/kg	1,900	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total alpha + gamma chlordane	ng/kg	7,700	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Total alpha + gamma chlordane	ng/kg	7,700	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	ng/kg	14,000	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total alpha + gamma chlordane	ng/kg	6,000	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total alpha + gamma chlordane	ng/kg	5,000	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total alpha + gamma chlordane	ng/kg	5,100	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	ng/kg	11,000	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	46,000	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	39,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	73,000	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	110,000	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	30,000	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	33,000	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED156	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED157	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED158	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED159	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED160	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED161	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED162	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED163	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED164	--	--	--	--	--	320	990	--	--	--	--	--	ND	ND
NB03SED165	--	--	--	--	--	320	990	--	--	--	--	--	No	No
NB03SED136	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED137	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED138	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED139	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	No
NB03SED140	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED141	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED142	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	No
NB03SED143	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED144	--	--	--	--	--	2,260	4,790	--	--	--	--	--	No	No
NB03SED145	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED146	--	--	--	--	--	2,260	4,790	--	--	--	--	--	No	No
NB03SED147	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED148	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED149	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED150	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED151	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED152	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	No
NB03SED153	--	--	--	--	--	2,260	4,790	--	--	--	--	--	No	No
NB03SED154	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED155	--	--	--	--	--	2,260	4,790	--	--	--	--	--	No	No
NB03SED156	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	No
NB03SED157	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED158	--	--	--	--	--	2,260	4,790	--	--	--	--	--	No	No
NB03SED159	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED160	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED161	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED162	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED163	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED164	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED165	--	--	--	--	--	2,260	4,790	--	--	--	--	--	Yes	Yes
NB03SED136	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED137	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED138	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED139	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED140	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED141	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	12,000	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	270,000	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	47,000	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	35,000	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	28,000	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	104,500	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	64,000	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	160,000	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	88,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	600,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	220,000	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	21,000	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	560,000	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	30,000	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	25,000	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	35,000	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	27,000	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	27,000	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	58,000	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	59,000	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	36,000	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	41,000	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	33,000	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total DDx (2,4 & 4,4) Total Fraction	ng/kg	50,000	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	1-Methylnaphthalene	µg/kg	28	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	1-Methylnaphthalene	µg/kg	51	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	1-Methylnaphthalene	µg/kg	27	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	1-Methylnaphthalene	µg/kg	34	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	1-Methylnaphthalene	µg/kg	16	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	10	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	23	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	27	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	28	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	18	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	14	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	29	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	100	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	18	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	780	0
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	52	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	88.5	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	24	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	33	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	1-Methylnaphthalene	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	1-Methylnaphthalene	µg/kg	26	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	1-Methylnaphthalene	µg/kg	26	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED142	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED143	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED144	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED145	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED146	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED147	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED148	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED149	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED150	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED151	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED152	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED153	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED154	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED155	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED156	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED157	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED158	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED159	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED160	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED161	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED162	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED163	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED164	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	No	Yes	No
NB03SED165	--	--	--	1,580	46,100	1,580	46,100	--	--	--	Yes	Yes	Yes	Yes
NB03SED136	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED137	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED138	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED139	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED140	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED141	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED142	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED143	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED144	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED145	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED146	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED147	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED148	21	94	430	--	--	21	94	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED150	21	94	430	--	--	21	94	ND	ND	ND	--	--	ND	ND
NB03SED151	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED152	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED153	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED154	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED155	21	94	430	--	--	21	94	ND	ND	ND	--	--	ND	ND
NB03SED156	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED157	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	1-Methylnaphthalene	µg/kg	28	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	1-Methylnaphthalene	µg/kg	51	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	1-Methylnaphthalene	µg/kg	47	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	1-Methylnaphthalene	µg/kg	27	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	1-Methylnaphthalene	µg/kg	26	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	1-Methylnaphthalene	µg/kg	20	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	1-Methylnaphthalene	µg/kg	15	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	1-Methylnaphthalene	µg/kg	22	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	2-Methylnaphthalene	µg/kg	36	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	µg/kg	78	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	µg/kg	39	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	2-Methylnaphthalene	µg/kg	44	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	2-Methylnaphthalene	µg/kg	18	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	51	0
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	46	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	33	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	43	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	18	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	22	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	41.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	100	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	23	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	780	0
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	53	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	96	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	51	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	42	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	2-Methylnaphthalene	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	2-Methylnaphthalene	µg/kg	32	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	2-Methylnaphthalene	µg/kg	29	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	2-Methylnaphthalene	µg/kg	38	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	2-Methylnaphthalene	µg/kg	45	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	2-Methylnaphthalene	µg/kg	41	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	µg/kg	37	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	2-Methylnaphthalene	µg/kg	37	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	2-Methylnaphthalene	µg/kg	29	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	2-Methylnaphthalene	µg/kg	16	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	µg/kg	28	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Acenaphthene	µg/kg	33	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthene	µg/kg	86	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthene	µg/kg	48	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthene	µg/kg	65	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthene	µg/kg	31	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthene	µg/kg	16	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Acenaphthene	µg/kg	34	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthene	µg/kg	51	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED158	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED159	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED160	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED161	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED162	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED163	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED164	21	94	430	--	--	21	94	No	No	No	--	--	No	No
NB03SED165	21	94	430	--	--	21	94	Yes	No	No	--	--	Yes	No
NB03SED136	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED137	21	130	770	70	670	70	670	Yes	No	No	Yes	No	Yes	No
NB03SED138	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED139	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED140	21	130	770	70	670	70	670	No	No	No	No	No	No	No
NB03SED141	21	130	770	70	670	70	670	ND	ND	ND	ND	ND	ND	ND
NB03SED142	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED143	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED144	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED145	21	130	770	70	670	70	670	No	No	No	No	No	No	No
NB03SED146	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED147	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED148	21	130	770	70	670	70	670	Yes	No	No	Yes	No	Yes	No
NB03SED149	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED150	21	130	770	70	670	70	670	ND	ND	ND	ND	ND	ND	ND
NB03SED151	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED152	21	130	770	70	670	70	670	Yes	No	No	Yes	No	Yes	No
NB03SED153	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED154	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED155	21	130	770	70	670	70	670	ND	ND	ND	ND	ND	ND	ND
NB03SED156	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED157	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED158	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED159	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED160	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED161	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED162	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED163	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED164	21	130	770	70	670	70	670	No	No	No	No	No	No	No
NB03SED165	21	130	770	70	670	70	670	Yes	No	No	No	No	No	No
NB03SED136	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED137	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED138	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED139	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED140	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED141	19	120	710	16	500	19	500	No	No	No	No	No	No	No
NB03SED142	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED143	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Acenaphthene	µg/kg	40	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthene	µg/kg	26	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthene	µg/kg	39	0
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthene	µg/kg	64	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Acenaphthene	µg/kg	350	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthene	µg/kg	83	0
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Acenaphthene	µg/kg	910	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthene	µg/kg	100	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Acenaphthene	µg/kg	145	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthene	µg/kg	40	0
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthene	µg/kg	65	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthene	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthene	µg/kg	62	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Acenaphthene	µg/kg	53	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthene	µg/kg	38	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthene	µg/kg	360	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Acenaphthene	µg/kg	120	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthene	µg/kg	48	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthene	µg/kg	100	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthene	µg/kg	62	0
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthene	µg/kg	18	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthene	µg/kg	34	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Acenaphthylene	µg/kg	110	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthylene	µg/kg	240	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthylene	µg/kg	230	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthylene	µg/kg	600	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthylene	µg/kg	56	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	µg/kg	39	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Acenaphthylene	µg/kg	93	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	µg/kg	160	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	µg/kg	95	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	µg/kg	66	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthylene	µg/kg	32	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthylene	µg/kg	120	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	µg/kg	200	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthylene	µg/kg	86	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Acenaphthylene	µg/kg	1,400	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	µg/kg	190	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Acenaphthylene	µg/kg	190	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	µg/kg	55	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	µg/kg	130	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthylene	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthylene	µg/kg	68	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Acenaphthylene	µg/kg	140	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthylene	µg/kg	300	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthylene	µg/kg	240	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED144	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED145	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED146	19	120	710	16	500	19	500	ND	ND	ND	ND	ND	ND	ND
NB03SED147	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED148	19	120	710	16	500	19	500	Yes	Yes	No	Yes	No	Yes	No
NB03SED149	19	120	710	16	500	19	500	ND	ND	ND	ND	ND	ND	ND
NB03SED150	19	120	710	16	500	19	500	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED152	19	120	710	16	500	19	500	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	19	120	710	16	500	19	500	ND	ND	ND	ND	ND	ND	ND
NB03SED154	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED155	19	120	710	16	500	19	500	ND	ND	ND	ND	ND	ND	ND
NB03SED156	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED157	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED158	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED159	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED160	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED161	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED162	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED163	19	120	710	16	500	19	500	ND	ND	ND	ND	ND	ND	ND
NB03SED164	19	120	710	16	500	19	500	No	No	No	Yes	No	No	No
NB03SED165	19	120	710	16	500	19	500	Yes	No	No	Yes	No	Yes	No
NB03SED136	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED137	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED140	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED141	14	140	1,420	44	640	44	640	Yes	No	No	No	No	No	No
NB03SED142	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED143	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED145	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED146	14	140	1,420	44	640	44	640	Yes	No	No	No	No	No	No
NB03SED147	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED148	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED149	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED150	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED151	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED154	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED155	14	140	1,420	44	640	44	640	ND	ND	ND	ND	ND	ND	ND
NB03SED156	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED157	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED158	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED159	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Acenaphthylene	µg/kg	60	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthylene	µg/kg	120	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthylene	µg/kg	270	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthylene	µg/kg	83	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthylene	µg/kg	68	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthylene	µg/kg	170	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Anthracene	µg/kg	120	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Anthracene	µg/kg	270	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Anthracene	µg/kg	210	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Anthracene	µg/kg	300	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Anthracene	µg/kg	85	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Anthracene	µg/kg	35	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Anthracene	µg/kg	83	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Anthracene	µg/kg	150	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Anthracene	µg/kg	160	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Anthracene	µg/kg	110	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Anthracene	µg/kg	47	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Anthracene	µg/kg	158	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Anthracene	µg/kg	1,200	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Anthracene	µg/kg	95	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Anthracene	µg/kg	4,400	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Anthracene	µg/kg	430	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Anthracene	µg/kg	460	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Anthracene	µg/kg	45	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Anthracene	µg/kg	210	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Anthracene	µg/kg	14	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Anthracene	µg/kg	140	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Anthracene	µg/kg	170	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Anthracene	µg/kg	250	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Anthracene	µg/kg	540	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Anthracene	µg/kg	280	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Anthracene	µg/kg	140	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Anthracene	µg/kg	380	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Anthracene	µg/kg	93	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Anthracene	µg/kg	51	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Anthracene	µg/kg	140	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(a)anthracene	µg/kg	510	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	µg/kg	1,300	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	µg/kg	1,200	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)anthracene	µg/kg	2,500	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)anthracene	µg/kg	390	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	150	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	440	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	770	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	440	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	230	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED160	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED161	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED162	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED164	14	140	1,420	44	640	44	640	Yes	No	No	Yes	No	Yes	No
NB03SED165	14	140	1,420	44	640	44	640	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED137	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED138	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED139	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED140	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	No	No	No	No
NB03SED141	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	No	No	No	No
NB03SED142	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	No	No	No	No
NB03SED143	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED144	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED145	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED146	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	No	No	No	No
NB03SED147	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED148	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED150	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	No	No	No	No
NB03SED154	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED155	34	290	2,490	85.3	1,100	85.3	1,100	No	No	No	No	No	No	No
NB03SED156	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED157	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED158	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED159	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED160	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED161	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED162	34	290	2,490	85.3	1,100	85.3	1,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED164	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	No	No	No	No
NB03SED165	34	290	2,490	85.3	1,100	85.3	1,100	Yes	No	No	Yes	No	Yes	No
NB03SED136	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED140	61	470	3,530	261	1,600	261	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED141	61	470	3,530	261	1,600	261	1,600	Yes	No	No	No	No	No	No
NB03SED142	61	470	3,530	261	1,600	261	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED143	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	61	470	3,530	261	1,600	261	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED145	61	470	3,530	261	1,600	261	1,600	Yes	No	No	No	No	No	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	180	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	520	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	3,200	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	380	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	12,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	1,100	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	1,300	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	210	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	470	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)anthracene	µg/kg	120	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)anthracene	µg/kg	470	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(a)anthracene	µg/kg	780	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)anthracene	µg/kg	980	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)anthracene	µg/kg	2,400	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(a)anthracene	µg/kg	810	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	µg/kg	690	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)anthracene	µg/kg	1,700	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)anthracene	µg/kg	300	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)anthracene	µg/kg	310	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	µg/kg	670	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(a)pyrene	µg/kg	830	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	µg/kg	1,600	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	µg/kg	1,600	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)pyrene	µg/kg	3,900	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)pyrene	µg/kg	490	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	260	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	570	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	1,100	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	620	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	300	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	290	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	630	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	2,700	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	550	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	10,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	1000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	1,750	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	380	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	530	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)pyrene	µg/kg	120	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)pyrene	µg/kg	570	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(a)pyrene	µg/kg	1,100	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)pyrene	µg/kg	2,000	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)pyrene	µg/kg	2,500	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(a)pyrene	µg/kg	670	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	µg/kg	960	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED146	61	470	3,530	261	1,600	261	1,600	Yes	No	No	No	No	No	No
NB03SED147	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	61	470	3,530	261	1,600	261	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED150	61	470	3,530	261	1,600	261	1,600	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	61	470	3,530	261	1,600	261	1,600	Yes	No	No	No	No	No	No
NB03SED154	61	470	3,530	261	1,600	261	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED155	61	470	3,530	261	1,600	261	1,600	Yes	No	No	No	No	No	No
NB03SED156	61	470	3,530	261	1,600	261	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED157	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED159	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED160	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED165	61	470	3,530	261	1,600	261	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED140	69	520	3,910	430	1,600	430	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED141	69	520	3,910	430	1,600	430	1,600	Yes	No	No	No	No	No	No
NB03SED142	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED143	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED145	69	520	3,910	430	1,600	430	1,600	Yes	No	No	No	No	No	No
NB03SED146	69	520	3,910	430	1,600	430	1,600	Yes	No	No	No	No	No	No
NB03SED147	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED150	69	520	3,910	430	1,600	430	1,600	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED153	69	520	3,910	430	1,600	430	1,600	Yes	No	No	No	No	No	No
NB03SED154	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED155	69	520	3,910	430	1,600	430	1,600	Yes	No	No	No	No	No	No
NB03SED156	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED157	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED159	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED160	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)pyrene	µg/kg	1,700	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)pyrene	µg/kg	490	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)pyrene	µg/kg	430	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	µg/kg	1,100	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(b)fluoranthene	µg/kg	910	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	µg/kg	1,700	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	µg/kg	1,500	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(b)fluoranthene	µg/kg	2,900	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(b)fluoranthene	µg/kg	430	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	270	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	600	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	930	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	660	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	290	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	260	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	630	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	2,200	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	480	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	8,900	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	960	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	1,300	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	380	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	590	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(b)fluoranthene	µg/kg	95	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(b)fluoranthene	µg/kg	530	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(b)fluoranthene	µg/kg	1000	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(b)fluoranthene	µg/kg	1,200	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(b)fluoranthene	µg/kg	2,100	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(b)fluoranthene	µg/kg	560	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	µg/kg	1000	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(b)fluoranthene	µg/kg	1,400	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(b)fluoranthene	µg/kg	510	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(b)fluoranthene	µg/kg	370	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	µg/kg	980	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(g,h,i)perylene	µg/kg	450	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	µg/kg	750	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	µg/kg	720	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(g,h,i)perylene	µg/kg	1,300	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(g,h,i)perylene	µg/kg	300	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	120	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	390	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	590	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	230	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	170	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	170	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	365	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED162	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED163	69	520	3,910	430	1,600	430	1,600	Yes	No	No	Yes	No	Yes	No
NB03SED164	69	520	3,910	430	1,600	430	1,600	Yes	No	No	No	No	No	No
NB03SED165	69	520	3,910	430	1,600	430	1,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED137	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED138	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED141	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED142	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED143	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED144	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED145	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED146	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED147	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED148	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED150	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED151	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED152	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED154	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED155	130	1,110	9,410	--	--	130	1,110	No	No	No	--	--	No	No
NB03SED156	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED157	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED158	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED159	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED160	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED161	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED162	130	1,110	9,410	--	--	130	1,110	Yes	Yes	No	--	--	Yes	Yes
NB03SED163	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED164	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED165	130	1,110	9,410	--	--	130	1,110	Yes	No	No	--	--	Yes	No
NB03SED136	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED137	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED138	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED141	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED142	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED143	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED144	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED145	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED146	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED147	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	1,200	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	330	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	3,700	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	520	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	990	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	210	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	350	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(g,h,i)perylene	µg/kg	65	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(g,h,i)perylene	µg/kg	350	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(g,h,i)perylene	µg/kg	450	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(g,h,i)perylene	µg/kg	880	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(g,h,i)perylene	µg/kg	1,300	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(g,h,i)perylene	µg/kg	400	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	µg/kg	490	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(g,h,i)perylene	µg/kg	800	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(g,h,i)perylene	µg/kg	310	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(g,h,i)perylene	µg/kg	200	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	µg/kg	510	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(k)fluoranthene	µg/kg	910	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(k)fluoranthene	µg/kg	1,400	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(k)fluoranthene	µg/kg	1,500	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(k)fluoranthene	µg/kg	2,600	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(k)fluoranthene	µg/kg	440	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	260	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	450	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	860	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	510	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	280	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	230	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	515	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	2,100	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	400	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	8,800	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	810	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	1,250	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	330	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	430	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(k)fluoranthene	µg/kg	100	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(k)fluoranthene	µg/kg	540	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(k)fluoranthene	µg/kg	940	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(k)fluoranthene	µg/kg	1,100	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(k)fluoranthene	µg/kg	2,000	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(k)fluoranthene	µg/kg	600	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(k)fluoranthene	µg/kg	1000	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(k)fluoranthene	µg/kg	1,200	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(k)fluoranthene	µg/kg	430	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED148	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED150	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED151	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED154	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED155	67	500	3,710	--	--	67	500	No	No	No	--	--	No	No
NB03SED156	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED157	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED158	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED159	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED160	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED161	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED162	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED163	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED164	67	500	3,710	--	--	67	500	Yes	No	No	--	--	Yes	No
NB03SED165	67	500	3,710	--	--	67	500	Yes	Yes	No	--	--	Yes	Yes
NB03SED136	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED137	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED138	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED141	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED142	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED143	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED144	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED145	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED146	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED147	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED148	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED150	70	540	4,120	--	--	70	540	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED151	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED154	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED155	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED156	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED157	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED158	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED159	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED160	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED161	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED162	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED163	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(k)fluoranthene	µg/kg	380	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(k)fluoranthene	µg/kg	1000	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	240	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	470	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	320	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	790	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	270	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	70	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	170	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	290	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	350	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	260	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	90	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	330	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	2,600	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	170	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	4,700	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	1,100	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	770	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	96	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	940	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	240	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	350	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	430	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	810	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	960	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	300	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	940	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	170	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	170	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	290	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	C2-Naphthalenes	µg/kg	130	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	C2-Naphthalenes	µg/kg	220	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	C2-Naphthalenes	µg/kg	180	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	C2-Naphthalenes	µg/kg	320	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	C2-Naphthalenes	µg/kg	96	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	59	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	120	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	140	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	190	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	150	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	75	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	190	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	630	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	110	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED164	70	540	4,120	--	--	70	540	Yes	No	No	--	--	Yes	No
NB03SED165	70	540	4,120	--	--	70	540	Yes	Yes	No	--	--	Yes	Yes
NB03SED136	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED137	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED138	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED140	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED141	18	110	700	--	--	18	110	Yes	No	No	--	--	Yes	No
NB03SED142	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED143	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED144	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED145	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED146	18	110	700	--	--	18	110	Yes	No	No	--	--	Yes	No
NB03SED147	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED148	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED149	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED150	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED151	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED152	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED153	18	110	700	--	--	18	110	Yes	No	No	--	--	Yes	No
NB03SED154	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED155	18	110	700	--	--	18	110	ND	ND	ND	--	--	ND	ND
NB03SED156	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED157	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED158	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED159	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED160	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED161	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED162	18	110	700	--	--	18	110	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED163	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED164	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED165	18	110	700	--	--	18	110	Yes	Yes	No	--	--	Yes	Yes
NB03SED136	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED137	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED138	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED141	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED142	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED143	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED144	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED145	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED146	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED147	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED148	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	820	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	370	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	380	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	91	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	280	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	C2-Naphthalenes	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	C2-Naphthalenes	µg/kg	140	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	C2-Naphthalenes	µg/kg	150	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	C2-Naphthalenes	µg/kg	220	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	C2-Naphthalenes	µg/kg	270	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	C2-Naphthalenes	µg/kg	300	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	C2-Naphthalenes	µg/kg	170	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	C2-Naphthalenes	µg/kg	200	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	C2-Naphthalenes	µg/kg	110	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	C2-Naphthalenes	µg/kg	82	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	C2-Naphthalenes	µg/kg	120	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Chrysene	µg/kg	640	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Chrysene	µg/kg	1,300	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Chrysene	µg/kg	1,300	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Chrysene	µg/kg	2,400	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Chrysene	µg/kg	440	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Chrysene	µg/kg	190	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Chrysene	µg/kg	450	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Chrysene	µg/kg	890	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Chrysene	µg/kg	450	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Chrysene	µg/kg	200	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Chrysene	µg/kg	170	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Chrysene	µg/kg	575	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Chrysene	µg/kg	2,800	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Chrysene	µg/kg	440	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Chrysene	µg/kg	12,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Chrysene	µg/kg	1,200	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Chrysene	µg/kg	1,300	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Chrysene	µg/kg	250	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Chrysene	µg/kg	540	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Chrysene	µg/kg	110	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Chrysene	µg/kg	540	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Chrysene	µg/kg	810	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Chrysene	µg/kg	1,100	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Chrysene	µg/kg	1,900	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Chrysene	µg/kg	770	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Chrysene	µg/kg	770	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Chrysene	µg/kg	1,600	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Chrysene	µg/kg	370	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Chrysene	µg/kg	360	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Chrysene	µg/kg	810	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED150	25	130	710	--	--	25	130	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED151	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED154	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED155	25	130	710	--	--	25	130	ND	ND	ND	--	--	ND	ND
NB03SED156	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED157	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED158	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED159	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED160	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED161	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED162	25	130	710	--	--	25	130	Yes	Yes	No	--	--	Yes	Yes
NB03SED163	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED164	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED165	25	130	710	--	--	25	130	Yes	No	No	--	--	Yes	No
NB03SED136	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED137	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED140	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED141	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED142	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED143	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED145	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED146	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED147	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED148	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED149	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED150	82	650	5,190	384	2,800	384	2,800	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED154	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED155	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED156	82	650	5,190	384	2,800	384	2,800	Yes	No	No	Yes	No	Yes	No
NB03SED157	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED159	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED160	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED164	82	650	5,190	384	2,800	384	2,800	Yes	No	No	No	No	No	No
NB03SED165	82	650	5,190	384	2,800	384	2,800	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Dibenz(a,h)anthracene	µg/kg	160	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	µg/kg	300	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	µg/kg	280	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Dibenz(a,h)anthracene	µg/kg	610	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Dibenz(a,h)anthracene	µg/kg	110	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	49	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	120	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	230	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	97	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	64	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	59	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	128.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	530	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	100	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	1,600	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	190	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	300	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	78	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	110	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Dibenz(a,h)anthracene	µg/kg	21	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Dibenz(a,h)anthracene	µg/kg	120	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Dibenz(a,h)anthracene	µg/kg	170	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Dibenz(a,h)anthracene	µg/kg	380	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Dibenz(a,h)anthracene	µg/kg	480	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Dibenz(a,h)anthracene	µg/kg	150	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	µg/kg	180	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Dibenz(a,h)anthracene	µg/kg	330	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Dibenz(a,h)anthracene	µg/kg	110	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Dibenz(a,h)anthracene	µg/kg	77	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	µg/kg	200	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Fluoranthene	µg/kg	790	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluoranthene	µg/kg	2,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluoranthene	µg/kg	1,200	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluoranthene	µg/kg	2,300	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluoranthene	µg/kg	560	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluoranthene	µg/kg	220	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Fluoranthene	µg/kg	590	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluoranthene	µg/kg	970	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Fluoranthene	µg/kg	720	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluoranthene	µg/kg	470	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluoranthene	µg/kg	200	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluoranthene	µg/kg	1,080	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Fluoranthene	µg/kg	6,600	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluoranthene	µg/kg	520	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Fluoranthene	µg/kg	20,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluoranthene	µg/kg	2,200	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED136	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED138	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED139	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED140	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED141	19	110	690	63.4	260	63.4	260	Yes	No	No	No	No	No	No
NB03SED142	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED143	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED145	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED146	19	110	690	63.4	260	63.4	260	Yes	No	No	No	No	No	No
NB03SED147	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED150	19	110	690	63.4	260	63.4	260	Yes	Yes	Yes	Yes	No	Yes	No
NB03SED151	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED152	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED153	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED154	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED155	19	110	690	63.4	260	63.4	260	Yes	No	No	No	No	No	No
NB03SED156	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED157	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED159	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED160	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED163	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED164	19	110	690	63.4	260	63.4	260	Yes	No	No	Yes	No	Yes	No
NB03SED165	19	110	690	63.4	260	63.4	260	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED137	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED140	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED141	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED142	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED143	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED144	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED145	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED146	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED147	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED150	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Fluoranthene	µg/kg	1,900	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluoranthene	µg/kg	260	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluoranthene	µg/kg	860	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluoranthene	µg/kg	150	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluoranthene	µg/kg	800	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Fluoranthene	µg/kg	1,100	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluoranthene	µg/kg	1,100	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluoranthene	µg/kg	4,000	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Fluoranthene	µg/kg	1,400	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluoranthene	µg/kg	1000	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluoranthene	µg/kg	2,400	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluoranthene	µg/kg	550	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluoranthene	µg/kg	380	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluoranthene	µg/kg	780	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Fluorene	µg/kg	31	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluorene	µg/kg	61	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluorene	µg/kg	39	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluorene	µg/kg	54	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluorene	µg/kg	26	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluorene	µg/kg	51	0
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Fluorene	µg/kg	23	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluorene	µg/kg	45	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Fluorene	µg/kg	42	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluorene	µg/kg	36	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluorene	µg/kg	39	0
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluorene	µg/kg	46.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Fluorene	µg/kg	570	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluorene	µg/kg	83	0
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Fluorene	µg/kg	470	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluorene	µg/kg	110	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Fluorene	µg/kg	79.5	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluorene	µg/kg	16	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluorene	µg/kg	63	0
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluorene	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluorene	µg/kg	42	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Fluorene	µg/kg	46	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluorene	µg/kg	33	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluorene	µg/kg	210	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Fluorene	µg/kg	120	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluorene	µg/kg	40	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluorene	µg/kg	65	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluorene	µg/kg	32	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluorene	µg/kg	60	0
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluorene	µg/kg	31	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	460	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	780	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED152	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED154	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED155	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED156	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED157	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED159	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED160	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED162	120	1,030	8,950	600	5,100	600	5,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED164	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	No	No	No	No
NB03SED165	120	1,030	8,950	600	5,100	600	5,100	Yes	No	No	Yes	No	Yes	No
NB03SED136	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED137	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED138	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED139	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED140	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED141	19	110	660	19	540	19	540	ND	ND	ND	ND	ND	ND	ND
NB03SED142	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED143	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED144	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED145	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED146	19	110	660	19	540	19	540	ND	ND	ND	ND	ND	ND	ND
NB03SED147	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED148	19	110	660	19	540	19	540	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	19	110	660	19	540	19	540	ND	ND	ND	ND	ND	ND	ND
NB03SED150	19	110	660	19	540	19	540	Yes	Yes	No	Yes	No	Yes	No
NB03SED151	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED152	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED153	19	110	660	19	540	19	540	No	No	No	No	No	No	No
NB03SED154	19	110	660	19	540	19	540	ND	ND	ND	ND	ND	ND	ND
NB03SED155	19	110	660	19	540	19	540	ND	ND	ND	ND	ND	ND	ND
NB03SED156	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED157	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED158	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED159	19	110	660	19	540	19	540	Yes	Yes	No	Yes	No	Yes	No
NB03SED160	19	110	660	19	540	19	540	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED162	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED163	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED164	19	110	660	19	540	19	540	ND	ND	ND	ND	ND	ND	ND
NB03SED165	19	110	660	19	540	19	540	Yes	No	No	Yes	No	Yes	No
NB03SED136	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED137	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	770	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	1,500	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	280	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	130	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	350	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	580	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	250	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	170	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	160	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	360	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	1,400	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	300	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	4,200	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	510	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	855	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	220	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	290	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	65	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	330	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	470	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	810	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	1,300	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	370	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	510	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	800	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	300	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	200	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	530	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Naphthalene	µg/kg	82	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Naphthalene	µg/kg	180	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Naphthalene	µg/kg	140	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Naphthalene	µg/kg	93	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Naphthalene	µg/kg	40	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Naphthalene	µg/kg	20	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Naphthalene	µg/kg	76	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Naphthalene	µg/kg	75	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Naphthalene	µg/kg	66	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Naphthalene	µg/kg	28	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Naphthalene	µg/kg	29	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Naphthalene	µg/kg	71	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Naphthalene	µg/kg	180	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Naphthalene	µg/kg	34	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Naphthalene	µg/kg	430	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Naphthalene	µg/kg	65	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Naphthalene	µg/kg	135	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Naphthalene	µg/kg	77	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED138	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED141	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED142	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED143	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED144	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED145	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED146	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED147	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED148	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED150	68	490	3,480	--	--	68	490	Yes	Yes	Yes	--	--	Yes	Yes
NB03SED151	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED153	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED154	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED155	68	490	3,480	--	--	68	490	No	No	No	--	--	No	No
NB03SED156	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED157	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED158	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED159	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED160	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED161	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED162	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED163	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED164	68	490	3,480	--	--	68	490	Yes	No	No	--	--	Yes	No
NB03SED165	68	490	3,480	--	--	68	490	Yes	Yes	No	--	--	Yes	Yes
NB03SED136	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED137	30	220	1,570	160	2,100	160	2,100	Yes	No	No	Yes	No	Yes	No
NB03SED138	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED139	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED140	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED141	30	220	1,570	160	2,100	160	2,100	No	No	No	No	No	No	No
NB03SED142	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED143	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED144	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED145	30	220	1,570	160	2,100	160	2,100	No	No	No	No	No	No	No
NB03SED146	30	220	1,570	160	2,100	160	2,100	No	No	No	No	No	No	No
NB03SED147	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED148	30	220	1,570	160	2,100	160	2,100	Yes	No	No	Yes	No	Yes	No
NB03SED149	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED150	30	220	1,570	160	2,100	160	2,100	Yes	Yes	No	Yes	No	Yes	No
NB03SED151	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED152	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED153	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Naphthalene	µg/kg	65	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Naphthalene	µg/kg	49	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Naphthalene	µg/kg	56	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Naphthalene	µg/kg	54	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Naphthalene	µg/kg	120	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Naphthalene	µg/kg	94	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Naphthalene	µg/kg	99	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Naphthalene	µg/kg	79	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Naphthalene	µg/kg	80	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Naphthalene	µg/kg	40	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Naphthalene	µg/kg	41	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Naphthalene	µg/kg	74	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Perylene	µg/kg	320	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Perylene	µg/kg	540	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Perylene	µg/kg	470	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Perylene	µg/kg	840	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Perylene	µg/kg	140	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Perylene	µg/kg	100	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Perylene	µg/kg	180	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Perylene	µg/kg	360	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Perylene	µg/kg	280	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Perylene	µg/kg	97	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Perylene	µg/kg	100	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Perylene	µg/kg	235	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Perylene	µg/kg	810	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Perylene	µg/kg	240	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Perylene	µg/kg	2,400	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Perylene	µg/kg	310	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Perylene	µg/kg	380	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Perylene	µg/kg	150	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Perylene	µg/kg	340	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Perylene	µg/kg	36	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Perylene	µg/kg	280	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Perylene	µg/kg	380	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Perylene	µg/kg	410	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Perylene	µg/kg	660	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Perylene	µg/kg	170	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Perylene	µg/kg	360	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Perylene	µg/kg	440	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Perylene	µg/kg	230	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Perylene	µg/kg	120	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Perylene	µg/kg	310	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Phenanthrene	µg/kg	250	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Phenanthrene	µg/kg	470	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Phenanthrene	µg/kg	280	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Phenanthrene	µg/kg	400	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED154	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED155	30	220	1,570	160	2,100	160	2,100	ND	ND	ND	ND	ND	ND	ND
NB03SED156	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED157	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED158	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED159	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED160	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED161	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED162	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED163	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED164	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED165	30	220	1,570	160	2,100	160	2,100	Yes	No	No	No	No	No	No
NB03SED136	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED137	74	450	2,770	--	--	74	450	Yes	Yes	No	--	--	Yes	Yes
NB03SED138	74	450	2,770	--	--	74	450	Yes	Yes	No	--	--	Yes	Yes
NB03SED139	74	450	2,770	--	--	74	450	Yes	Yes	No	--	--	Yes	Yes
NB03SED140	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED141	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED142	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED143	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED144	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED145	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED146	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED147	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED148	74	450	2,770	--	--	74	450	Yes	Yes	No	--	--	Yes	Yes
NB03SED149	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED150	74	450	2,770	--	--	74	450	Yes	Yes	No	--	--	Yes	Yes
NB03SED151	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED152	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED153	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED154	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED155	74	450	2,770	--	--	74	450	No	No	No	--	--	No	No
NB03SED156	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED157	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED158	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED159	74	450	2,770	--	--	74	450	Yes	Yes	No	--	--	Yes	Yes
NB03SED160	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED161	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED162	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED163	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED164	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED165	74	450	2,770	--	--	74	450	Yes	No	No	--	--	Yes	No
NB03SED136	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED137	68	460	3,060	240	1,500	240	1,500	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED139	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Phenanthrene	µg/kg	280	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Phenanthrene	µg/kg	70	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Phenanthrene	µg/kg	210	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Phenanthrene	µg/kg	310	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Phenanthrene	µg/kg	280	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Phenanthrene	µg/kg	230	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Phenanthrene	µg/kg	82	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Phenanthrene	µg/kg	337.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Phenanthrene	µg/kg	4,300	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Phenanthrene	µg/kg	140	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Phenanthrene	µg/kg	4,200	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Phenanthrene	µg/kg	620	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Phenanthrene	µg/kg	820	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Phenanthrene	µg/kg	92	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Phenanthrene	µg/kg	170	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Phenanthrene	µg/kg	27	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Phenanthrene	µg/kg	330	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Phenanthrene	µg/kg	420	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Phenanthrene	µg/kg	170	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Phenanthrene	µg/kg	1,700	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Phenanthrene	µg/kg	1,200	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Phenanthrene	µg/kg	350	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Phenanthrene	µg/kg	390	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Phenanthrene	µg/kg	180	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Phenanthrene	µg/kg	140	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Phenanthrene	µg/kg	240	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Pyrene	µg/kg	980	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Pyrene	µg/kg	2,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Pyrene	µg/kg	1,500	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Pyrene	µg/kg	3,000	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Pyrene	µg/kg	660	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Pyrene	µg/kg	320	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Pyrene	µg/kg	680	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Pyrene	µg/kg	1,200	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Pyrene	µg/kg	890	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Pyrene	µg/kg	610	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Pyrene	µg/kg	380	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Pyrene	µg/kg	1,045	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Pyrene	µg/kg	6,400	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Pyrene	µg/kg	700	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Pyrene	µg/kg	20,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Pyrene	µg/kg	2,600	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Pyrene	µg/kg	2,600	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Pyrene	µg/kg	510	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Pyrene	µg/kg	1,400	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Pyrene	µg/kg	160	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED140	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED141	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED142	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED143	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED144	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED145	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED146	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED147	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED148	68	460	3,060	240	1,500	240	1,500	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED149	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED150	68	460	3,060	240	1,500	240	1,500	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	68	460	3,060	240	1,500	240	1,500	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	68	460	3,060	240	1,500	240	1,500	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED154	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED155	68	460	3,060	240	1,500	240	1,500	No	No	No	No	No	No	No
NB03SED156	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED157	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED158	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED159	68	460	3,060	240	1,500	240	1,500	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED160	68	460	3,060	240	1,500	240	1,500	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED162	68	460	3,060	240	1,500	240	1,500	Yes	No	No	Yes	No	Yes	No
NB03SED163	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED164	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED165	68	460	3,060	240	1,500	240	1,500	Yes	No	No	No	No	No	No
NB03SED136	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED140	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED141	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED142	120	930	6,980	665	2,600	665	2,600	Yes	No	No	Yes	No	Yes	No
NB03SED143	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	120	930	6,980	665	2,600	665	2,600	Yes	No	No	Yes	No	Yes	No
NB03SED145	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED146	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED147	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	120	930	6,980	665	2,600	665	2,600	Yes	No	No	Yes	No	Yes	No
NB03SED150	120	930	6,980	665	2,600	665	2,600	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED154	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED155	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Pyrene	µg/kg	840	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Pyrene	µg/kg	1,500	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Pyrene	µg/kg	2,400	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Pyrene	µg/kg	3,800	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Pyrene	µg/kg	1,400	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Pyrene	µg/kg	1,300	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Pyrene	µg/kg	2,400	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Pyrene	µg/kg	660	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Pyrene	µg/kg	570	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Pyrene	µg/kg	1000	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total HMW PAHs	µg/kg	6,600	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total HMW PAHs	µg/kg	13,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total HMW PAHs	µg/kg	12,000	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total HMW PAHs	µg/kg	23,000	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total HMW PAHs	µg/kg	4,100	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	µg/kg	2,000	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total HMW PAHs	µg/kg	4,600	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	µg/kg	8,100	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	µg/kg	4,900	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	µg/kg	2,800	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total HMW PAHs	µg/kg	2,100	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total HMW PAHs	µg/kg	5,850	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	µg/kg	29,000	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total HMW PAHs	µg/kg	4,200	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total HMW PAHs	µg/kg	100,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	µg/kg	11,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total HMW PAHs	µg/kg	13,500	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	µg/kg	2,800	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	µg/kg	5,600	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total HMW PAHs	µg/kg	1000	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total HMW PAHs	µg/kg	5,100	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total HMW PAHs	µg/kg	8,300	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total HMW PAHs	µg/kg	12,000	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total HMW PAHs	µg/kg	22,000	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total HMW PAHs	µg/kg	7,100	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total HMW PAHs	µg/kg	7,900	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total HMW PAHs	µg/kg	14,000	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total HMW PAHs	µg/kg	4,000	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total HMW PAHs	µg/kg	3,300	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total HMW PAHs	µg/kg	7,600	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total LMW PAHs	µg/kg	660	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total LMW PAHs	µg/kg	1,400	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total LMW PAHs	µg/kg	990	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total LMW PAHs	µg/kg	1,600	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total LMW PAHs	µg/kg	540	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	µg/kg	180	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED156	120	930	6,980	665	2,600	665	2,600	Yes	No	No	Yes	No	Yes	No
NB03SED157	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED159	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED160	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED164	120	930	6,980	665	2,600	665	2,600	Yes	No	No	No	No	No	No
NB03SED165	120	930	6,980	665	2,600	665	2,600	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED137	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED138	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED139	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED140	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED141	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED142	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED143	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED144	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED145	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED146	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED147	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED148	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED149	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED150	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED151	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED152	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED153	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED154	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED155	--	--	--	1,700	9,600	1,700	9,600	--	--	--	No	No	No	No
NB03SED156	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED157	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED158	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED159	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED160	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED161	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED162	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	Yes	Yes	Yes
NB03SED163	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED164	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED165	--	--	--	1,700	9,600	1,700	9,600	--	--	--	Yes	No	Yes	No
NB03SED136	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED137	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED138	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED139	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED140	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED141	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total LMW PAHs	µg/kg	570	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	µg/kg	820	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	µg/kg	730	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	µg/kg	510	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total LMW PAHs	µg/kg	210	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total LMW PAHs	µg/kg	815	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	µg/kg	6,900	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total LMW PAHs	µg/kg	380	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total LMW PAHs	µg/kg	12,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	µg/kg	1,600	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total LMW PAHs	µg/kg	1,900	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	µg/kg	340	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	µg/kg	680	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total LMW PAHs	µg/kg	41	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total LMW PAHs	µg/kg	730	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total LMW PAHs	µg/kg	910	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total LMW PAHs	µg/kg	950	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total LMW PAHs	µg/kg	3,200	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total LMW PAHs	µg/kg	1,900	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total LMW PAHs	µg/kg	810	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total LMW PAHs	µg/kg	1,300	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total LMW PAHs	µg/kg	460	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total LMW PAHs	µg/kg	330	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total LMW PAHs	µg/kg	720	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total PAH	µg/kg	7,300	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total PAH	µg/kg	15,000	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total PAH	µg/kg	13,000	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total PAH	µg/kg	25,000	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total PAH	µg/kg	4,600	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total PAH	µg/kg	2,100	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total PAH	µg/kg	5,200	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total PAH	µg/kg	8,900	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total PAH	µg/kg	5,600	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total PAH	µg/kg	3,300	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total PAH	µg/kg	2,300	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total PAH	µg/kg	6,700	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total PAH	µg/kg	36,000	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total PAH	µg/kg	4,600	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total PAH	µg/kg	110,000	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total PAH	µg/kg	13,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total PAH	µg/kg	15,500	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total PAH	µg/kg	3,200	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total PAH	µg/kg	6,300	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total PAH	µg/kg	1000	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total PAH	µg/kg	5,800	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total PAH	µg/kg	9,200	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED142	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED143	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED144	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED145	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED146	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED147	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED148	--	--	--	552	3,160	552	3,160	--	--	--	Yes	Yes	Yes	Yes
NB03SED149	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED150	--	--	--	552	3,160	552	3,160	--	--	--	Yes	Yes	Yes	Yes
NB03SED151	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED152	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED153	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED154	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED155	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED156	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED157	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED158	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED159	--	--	--	552	3,160	552	3,160	--	--	--	Yes	Yes	Yes	Yes
NB03SED160	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED161	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED162	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED163	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED164	--	--	--	552	3,160	552	3,160	--	--	--	No	No	No	No
NB03SED165	--	--	--	552	3,160	552	3,160	--	--	--	Yes	No	Yes	No
NB03SED136	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED137	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED138	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED139	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED140	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED141	--	--	--	4,022	44,792	4,022	44,792	--	--	--	No	No	No	No
NB03SED142	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED143	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED144	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED145	--	--	--	4,022	44,792	4,022	44,792	--	--	--	No	No	No	No
NB03SED146	--	--	--	4,022	44,792	4,022	44,792	--	--	--	No	No	No	No
NB03SED147	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED148	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED149	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED150	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	Yes	Yes	Yes
NB03SED151	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED152	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED153	--	--	--	4,022	44,792	4,022	44,792	--	--	--	No	No	No	No
NB03SED154	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED155	--	--	--	4,022	44,792	4,022	44,792	--	--	--	No	No	No	No
NB03SED156	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED157	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total PAH	µg/kg	13,000	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total PAH	µg/kg	25,000	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total PAH	µg/kg	9,100	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total PAH	µg/kg	8,700	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total PAH	µg/kg	16,000	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total PAH	µg/kg	4,500	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total PAH	µg/kg	3,600	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total PAH	µg/kg	8,300	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	41	0
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	34	0
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	30	0
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	25	0
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	26	0
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	36	0
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	38	0
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	29	0
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	24	0
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	35	0
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	43	0
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	40	0
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	44	0
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	41	0
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	55	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	29	0
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	33	0
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	23	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	44	0
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	35	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	32	0
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	30	0
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	39	0
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	65	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	27	0
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	39	0
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	260	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	290	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	1,100	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	650	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	510	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	310	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	370	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	740	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	2,200	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	1,300	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	330	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	2,900	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED158	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED159	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED160	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED161	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED162	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED163	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED164	--	--	--	4,022	44,792	4,022	44,792	--	--	--	No	No	No	No
NB03SED165	--	--	--	4,022	44,792	4,022	44,792	--	--	--	Yes	No	Yes	No
NB03SED136	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED138	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED139	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED140	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED142	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED143	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED144	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED145	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED146	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED147	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED148	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED149	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED150	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED151	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED152	17	73	310	--	--	17	73	Yes	No	No	--	--	Yes	No
NB03SED153	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED154	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED155	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED156	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED158	17	73	310	--	--	17	73	Yes	No	No	--	--	Yes	No
NB03SED159	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED160	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED162	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED163	17	73	310	--	--	17	73	Yes	No	No	--	--	Yes	No
NB03SED164	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED165	17	73	310	--	--	17	73	ND	ND	ND	--	--	ND	ND
NB03SED136	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED137	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED138	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED139	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED140	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED141	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED142	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED143	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED144	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED145	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED146	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED147	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	Yes

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	1,100	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	680	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	780	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	4,000	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	410	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	140	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	130	0
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	90	0
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	220	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	170	0
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	350	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	3,100	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	350	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	740	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	760	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	690	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Semivolatiles	bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	730	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Antimony	mg/kg	0.596	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Antimony	mg/kg	0.377	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Antimony	mg/kg	0.624	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Antimony	mg/kg	0.387	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Antimony	mg/kg	0.311	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Antimony	mg/kg	0.611	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Antimony	mg/kg	1.74	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Antimony	mg/kg	0.899	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Antimony	mg/kg	0.792	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Antimony	mg/kg	0.372	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Antimony	mg/kg	0.304	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Antimony	mg/kg	2.84	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Antimony	mg/kg	1.11	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Antimony	mg/kg	2.72	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Antimony	mg/kg	0.939	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Antimony	mg/kg	3.47	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Antimony	mg/kg	2.37	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Antimony	mg/kg	1.37	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Antimony	mg/kg	2.77	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Antimony	mg/kg	0.36	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Antimony	mg/kg	0.264	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Antimony	mg/kg	0.514	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Antimony	mg/kg	0.449	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Antimony	mg/kg	0.517	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Antimony	mg/kg	0.673	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Antimony	mg/kg	4.43	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Antimony	mg/kg	0.727	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Antimony	mg/kg	0.77	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Antimony	mg/kg	0.385	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED148	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED149	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED150	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED151	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	Yes
NB03SED152	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED153	--	--	--	--	--	182	2,647	--	--	--	--	--	No	No
NB03SED154	--	--	--	--	--	182	2,647	--	--	--	--	--	ND	ND
NB03SED155	--	--	--	--	--	182	2,647	--	--	--	--	--	ND	ND
NB03SED156	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED158	--	--	--	--	--	182	2,647	--	--	--	--	--	ND	ND
NB03SED159	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED160	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	Yes
NB03SED161	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED162	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED163	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED164	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED165	--	--	--	--	--	182	2,647	--	--	--	--	--	Yes	No
NB03SED136	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED137	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED138	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED139	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED140	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED141	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED142	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED143	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED144	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED145	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED146	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED147	0.63	2.4	8.9	--	--	0.63	2.4	Yes	Yes	No	--	--	Yes	Yes
NB03SED148	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED149	0.63	2.4	8.9	--	--	0.63	2.4	Yes	Yes	No	--	--	Yes	Yes
NB03SED150	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED151	0.63	2.4	8.9	--	--	0.63	2.4	Yes	Yes	No	--	--	Yes	Yes
NB03SED152	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED153	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED154	0.63	2.4	8.9	--	--	0.63	2.4	Yes	Yes	No	--	--	Yes	Yes
NB03SED155	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED156	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED157	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED158	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED159	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED160	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED161	0.63	2.4	8.9	--	--	0.63	2.4	Yes	Yes	No	--	--	Yes	Yes
NB03SED162	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED163	0.63	2.4	8.9	--	--	0.63	2.4	Yes	No	No	--	--	Yes	No
NB03SED164	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Antimony	mg/kg	0.496	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Arsenic	mg/kg	11.6	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Arsenic	mg/kg	8.24	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Arsenic	mg/kg	12.9	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Arsenic	mg/kg	9.77	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Arsenic	mg/kg	7.1	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Arsenic	mg/kg	11.7	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Arsenic	mg/kg	5.59	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Arsenic	mg/kg	29.7	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Arsenic	mg/kg	13.5	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Arsenic	mg/kg	9.45	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Arsenic	mg/kg	9.32	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Arsenic	mg/kg	20.6	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Arsenic	mg/kg	18.7	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Arsenic	mg/kg	26.8	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Arsenic	mg/kg	17.3	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Arsenic	mg/kg	61.5	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Arsenic	mg/kg	15.45	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Arsenic	mg/kg	9.48	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Arsenic	mg/kg	30.9	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Arsenic	mg/kg	5.92	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Arsenic	mg/kg	11.2	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Arsenic	mg/kg	10.6	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Arsenic	mg/kg	8.48	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Arsenic	mg/kg	8.11	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Arsenic	mg/kg	7.87	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Arsenic	mg/kg	12.2	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Arsenic	mg/kg	14.1	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Arsenic	mg/kg	9.64	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Arsenic	mg/kg	6.76	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Arsenic	mg/kg	12.9	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Cadmium	mg/kg	1.04	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Cadmium	mg/kg	0.582	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Cadmium	mg/kg	1.83	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Cadmium	mg/kg	0.944	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Cadmium	mg/kg	0.74	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Cadmium	mg/kg	0.801	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Cadmium	mg/kg	0.292	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Cadmium	mg/kg	2.28	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Cadmium	mg/kg	1.58	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Cadmium	mg/kg	1.11	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Cadmium	mg/kg	0.699	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Cadmium	mg/kg	2.26	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Cadmium	mg/kg	2.05	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Cadmium	mg/kg	3.25	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Cadmium	mg/kg	1.82	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED165	0.63	2.4	8.9	--	--	0.63	2.4	No	No	No	--	--	No	No
NB03SED136	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED137	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED138	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED139	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED140	7.4	20	56	8.2	70	8.2	70	No	No	No	No	No	No	No
NB03SED141	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED142	7.4	20	56	8.2	70	8.2	70	No	No	No	No	No	No	No
NB03SED143	7.4	20	56	8.2	70	8.2	70	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED145	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED146	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED147	7.4	20	56	8.2	70	8.2	70	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED149	7.4	20	56	8.2	70	8.2	70	Yes	Yes	No	Yes	No	Yes	No
NB03SED150	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED151	7.4	20	56	8.2	70	8.2	70	Yes	Yes	Yes	Yes	No	Yes	No
NB03SED152	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED153	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED154	7.4	20	56	8.2	70	8.2	70	Yes	Yes	No	Yes	No	Yes	No
NB03SED155	7.4	20	56	8.2	70	8.2	70	No	No	No	No	No	No	No
NB03SED156	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED157	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED158	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED159	7.4	20	56	8.2	70	8.2	70	Yes	No	No	No	No	No	No
NB03SED160	7.4	20	56	8.2	70	8.2	70	Yes	No	No	No	No	No	No
NB03SED161	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED162	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED163	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED164	7.4	20	56	8.2	70	8.2	70	No	No	No	No	No	No	No
NB03SED165	7.4	20	56	8.2	70	8.2	70	Yes	No	No	Yes	No	Yes	No
NB03SED136	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED137	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED138	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED140	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED141	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED142	0.38	1.4	4.9	1.2	9.6	1.2	9.6	No	No	No	No	No	No	No
NB03SED143	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED145	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED146	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED147	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED149	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED150	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Cadmium	mg/kg	17.8	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Cadmium	mg/kg	0.829	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Cadmium	mg/kg	0.483	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Cadmium	mg/kg	11.8	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Cadmium	mg/kg	0.512	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Cadmium	mg/kg	0.486	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Cadmium	mg/kg	0.966	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Cadmium	mg/kg	0.458	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Cadmium	mg/kg	0.766	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Cadmium	mg/kg	2.52	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Cadmium	mg/kg	1.5	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Cadmium	mg/kg	0.856	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Cadmium	mg/kg	1.31	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Cadmium	mg/kg	0.834	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Cadmium	mg/kg	1.29	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Chromium	mg/kg	121	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Chromium	mg/kg	83	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Chromium	mg/kg	159	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Chromium	mg/kg	93.6	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Chromium	mg/kg	60.3	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Chromium	mg/kg	104	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Chromium	mg/kg	67.4	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Chromium	mg/kg	194	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Chromium	mg/kg	120	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Chromium	mg/kg	67.3	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Chromium	mg/kg	49	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Chromium	mg/kg	153.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Chromium	mg/kg	124	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Chromium	mg/kg	127	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Chromium	mg/kg	118	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Chromium	mg/kg	317	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Chromium	mg/kg	69.55	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Chromium	mg/kg	52.7	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Chromium	mg/kg	397	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Chromium	mg/kg	34.2	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Chromium	mg/kg	69.2	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Chromium	mg/kg	86.2	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Chromium	mg/kg	46.5	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Chromium	mg/kg	65.8	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Chromium	mg/kg	121	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Chromium	mg/kg	109	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Chromium	mg/kg	117	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Chromium	mg/kg	127	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Chromium	mg/kg	50.9	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Chromium	mg/kg	116	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Copper	mg/kg	131	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED151	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED152	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED153	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED154	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED155	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED156	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED157	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED158	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED159	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED160	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED163	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	Yes	No	Yes	No
NB03SED164	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	No	No	No	No
NB03SED165	0.38	1.4	4.9	1.2	9.6	1.2	9.6	Yes	No	No	Yes	No	Yes	No
NB03SED136	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED137	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED138	49	140	410	81	370	81	370	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED140	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED141	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED142	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED143	49	140	410	81	370	81	370	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED145	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED146	49	140	410	81	370	81	370	No	No	No	No	No	No	No
NB03SED147	49	140	410	81	370	81	370	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED149	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED150	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED151	49	140	410	81	370	81	370	Yes	Yes	No	Yes	No	Yes	No
NB03SED152	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED153	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED154	49	140	410	81	370	81	370	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED155	49	140	410	81	370	81	370	No	No	No	No	No	No	No
NB03SED156	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED157	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED158	49	140	410	81	370	81	370	No	No	No	No	No	No	No
NB03SED159	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED160	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED161	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED162	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED163	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED164	49	140	410	81	370	81	370	Yes	No	No	No	No	No	No
NB03SED165	49	140	410	81	370	81	370	Yes	No	No	Yes	No	Yes	No
NB03SED136	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Copper	mg/kg	78.1	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Copper	mg/kg	130	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Copper	mg/kg	90.5	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Copper	mg/kg	56.4	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Copper	mg/kg	117	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Copper	mg/kg	42.6	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Copper	mg/kg	176	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Copper	mg/kg	143	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Copper	mg/kg	89.3	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Copper	mg/kg	57.4	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Copper	mg/kg	245.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Copper	mg/kg	180	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Copper	mg/kg	348	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Copper	mg/kg	185	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Copper	mg/kg	567	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Copper	mg/kg	205	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Copper	mg/kg	65.2	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Copper	mg/kg	545	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Copper	mg/kg	33.1	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Copper	mg/kg	75.7	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Copper	mg/kg	95.8	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Copper	mg/kg	46.1	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Copper	mg/kg	65	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Copper	mg/kg	155	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Copper	mg/kg	139	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Copper	mg/kg	109	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Copper	mg/kg	114	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Copper	mg/kg	55.8	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Copper	mg/kg	103	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Lead	mg/kg	137	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Lead	mg/kg	83.8	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Lead	mg/kg	102	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Lead	mg/kg	79.4	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Lead	mg/kg	49.4	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Lead	mg/kg	118	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Lead	mg/kg	66.8	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Lead	mg/kg	213	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Lead	mg/kg	133	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Lead	mg/kg	97	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Lead	mg/kg	59.7	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Lead	mg/kg	285.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Lead	mg/kg	875	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Lead	mg/kg	353	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Lead	mg/kg	175	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Lead	mg/kg	291	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Lead	mg/kg	190.5	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED137	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED138	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED140	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED141	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED142	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED143	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED145	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED146	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED147	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED149	32	94	280	34	270	34	270	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED150	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED151	32	94	280	34	270	34	270	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED152	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED156	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED157	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED159	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED160	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED164	32	94	280	34	270	34	270	Yes	No	No	Yes	No	Yes	No
NB03SED165	32	94	280	34	270	34	270	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED138	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED140	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED141	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED142	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED143	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED145	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED146	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED147	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED148	30	94	300	46.7	218	46.7	218	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED149	30	94	300	46.7	218	46.7	218	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED150	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED151	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED152	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Lead	mg/kg	59.9	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Lead	mg/kg	433	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Lead	mg/kg	38.8	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Lead	mg/kg	78.6	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Lead	mg/kg	104	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Lead	mg/kg	52.1	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Lead	mg/kg	77.9	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Lead	mg/kg	204	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Lead	mg/kg	156	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Lead	mg/kg	122	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Lead	mg/kg	125	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Lead	mg/kg	56	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Lead	mg/kg	109	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Mercury	µg/kg	1,830	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Mercury	µg/kg	1,660	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Mercury	µg/kg	3,020	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Mercury	µg/kg	1,220	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Mercury	µg/kg	689	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Mercury	µg/kg	1,430	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Mercury	µg/kg	336	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Mercury	µg/kg	2,820	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Mercury	µg/kg	1,950	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Mercury	µg/kg	1,190	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Mercury	µg/kg	608	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Mercury	µg/kg	1,760	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Mercury	µg/kg	2,090	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Mercury	µg/kg	2,510	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Mercury	µg/kg	2,430	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Mercury	µg/kg	8,380	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Mercury	µg/kg	2,040	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Mercury	µg/kg	567	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Mercury	µg/kg	5,100	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Mercury	µg/kg	521	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Mercury	µg/kg	1,050	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Mercury	µg/kg	1,580	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Mercury	µg/kg	613	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Mercury	µg/kg	903	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Mercury	µg/kg	2,970	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Mercury	µg/kg	1,990	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Mercury	µg/kg	1,420	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Mercury	µg/kg	1000	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Mercury	µg/kg	1,730	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Mercury	µg/kg	2,070	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Nickel	mg/kg	44.5	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Nickel	mg/kg	28.9	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Nickel	mg/kg	31.7	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED153	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED154	30	94	300	46.7	218	46.7	218	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED155	30	94	300	46.7	218	46.7	218	Yes	No	No	No	No	No	No
NB03SED156	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED157	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED159	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED160	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED164	30	94	300	46.7	218	46.7	218	Yes	No	No	Yes	No	Yes	No
NB03SED165	30	94	300	46.7	218	46.7	218	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED137	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED138	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED139	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED140	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	No	Yes	No
NB03SED141	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED142	140	480	1,700	150	710	150	710	Yes	No	No	Yes	No	Yes	No
NB03SED143	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED144	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED145	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED146	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	No	Yes	No
NB03SED147	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED148	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED149	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED150	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED151	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED152	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED153	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	No	Yes	No
NB03SED154	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED155	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	No	Yes	No
NB03SED156	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED157	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED158	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	No	Yes	No
NB03SED159	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED160	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED161	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED162	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED163	140	480	1,700	150	710	150	710	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED164	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED165	140	480	1,700	150	710	150	710	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED136	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED137	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED138	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Nickel	mg/kg	28.4	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Nickel	mg/kg	17.4	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Nickel	mg/kg	46.1	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Nickel	mg/kg	17.7	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Nickel	mg/kg	37.7	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Nickel	mg/kg	45.9	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Nickel	mg/kg	24	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Nickel	mg/kg	37.9	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Nickel	mg/kg	88.25	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Nickel	mg/kg	61.4	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Nickel	mg/kg	52.3	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Nickel	mg/kg	63.7	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Nickel	mg/kg	83.3	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Nickel	mg/kg	30.85	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Nickel	mg/kg	96	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Nickel	mg/kg	42.2	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Nickel	mg/kg	19.7	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Nickel	mg/kg	39.7	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Nickel	mg/kg	45.9	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Nickel	mg/kg	19	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Nickel	mg/kg	32.2	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Nickel	mg/kg	52.7	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Nickel	mg/kg	43.3	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Nickel	mg/kg	48.2	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Nickel	mg/kg	50.4	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Nickel	mg/kg	17.2	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Nickel	mg/kg	31.1	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Silver	mg/kg	2.11	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Silver	mg/kg	1.15	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Silver	mg/kg	1.81	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Silver	mg/kg	1.42	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Silver	mg/kg	1.02	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Silver	mg/kg	2.04	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Silver	mg/kg	0.36	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Silver	mg/kg	2.65	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Silver	mg/kg	3.38	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Silver	mg/kg	1.37	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Silver	mg/kg	0.968	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Silver	mg/kg	2.17	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Silver	mg/kg	2.99	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Silver	mg/kg	2.26	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Silver	mg/kg	2.75	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Silver	mg/kg	5.61	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Silver	mg/kg	1.195	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Silver	mg/kg	0.979	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Silver	mg/kg	5.47	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED139	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED140	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	No	No	No	No
NB03SED141	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED142	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	No	No	No	No
NB03SED143	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED144	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED145	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED146	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED147	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED148	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED150	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED151	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED152	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED153	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED154	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED155	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	No	No	No	No
NB03SED156	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED157	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED158	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	No	No	No	No
NB03SED159	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED160	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED161	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED162	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	15	47	150	20.9	51.6	20.9	51.6	Yes	Yes	No	Yes	No	Yes	No
NB03SED164	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	No	No	No	No
NB03SED165	15	47	150	20.9	51.6	20.9	51.6	Yes	No	No	Yes	No	Yes	No
NB03SED136	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED138	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED139	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED140	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	Yes	No	Yes	No
NB03SED141	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED142	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	No	No	No	No
NB03SED143	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED145	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED146	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	No	No	No	No
NB03SED147	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED148	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED149	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED150	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED151	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED152	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	No	No	No	No
NB03SED154	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	Yes	Yes	Yes

Table A-3-1
SQT Sediment Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Silver	mg/kg	0.31	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Silver	mg/kg	1.18	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Silver	mg/kg	1.48	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Silver	mg/kg	0.55	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Silver	mg/kg	1.14	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Silver	mg/kg	2.12	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Silver	mg/kg	2.12	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Silver	mg/kg	1.74	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Silver	mg/kg	1.51	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Silver	mg/kg	0.743	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Silver	mg/kg	2.15	1
NB03SED136	NB03SED-CHM136	NORTH	INTERTIDAL AREA	4	North	Metals	Zinc	mg/kg	259	1
NB03SED137	NB03SED-CHM137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Zinc	mg/kg	171	1
NB03SED138	NB03SED-CHM138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Zinc	mg/kg	224	1
NB03SED139	NB03SED-CHM139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Zinc	mg/kg	169	1
NB03SED140	NB03SED-CHM140	NORTH	INTERTIDAL AREA	6	North	Metals	Zinc	mg/kg	125	1
NB03SED141	NB03SED-CHM141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Zinc	mg/kg	231	1
NB03SED142	NB03SED-CHM142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Zinc	mg/kg	139	1
NB03SED143	NB03SED-CHM143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Zinc	mg/kg	340	1
NB03SED144	NB03SED-CHM144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Zinc	mg/kg	242	1
NB03SED145	NB03SED-CHM145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Zinc	mg/kg	165	1
NB03SED146	NB03SED-CHM146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Zinc	mg/kg	123	1
NB03SED147	NB03SED-CHM147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Zinc	mg/kg	541.5	1
NB03SED148	NB03SED-CHM148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Zinc	mg/kg	427	1
NB03SED149	NB03SED-CHM149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Zinc	mg/kg	588	1
NB03SED150	NB03SED-CHM150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Zinc	mg/kg	366	1
NB03SED151	NB03SED-CHM151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Zinc	mg/kg	681	1
NB03SED152	NB03SED-CHM152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Zinc	mg/kg	279	1
NB03SED153	NB03SED-CHM153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Zinc	mg/kg	139	1
NB03SED154	NB03SED-CHM154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Zinc	mg/kg	570	1
NB03SED155	NB03SED-CHM155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Zinc	mg/kg	88.1	1
NB03SED156	NB03SED-CHM156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Zinc	mg/kg	185	1
NB03SED157	NB03SED-CHM157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Zinc	mg/kg	210	1
NB03SED158	NB03SED-CHM158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Zinc	mg/kg	98.1	1
NB03SED159	NB03SED-CHM159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Zinc	mg/kg	158	1
NB03SED160	NB03SED-CHM160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Zinc	mg/kg	346	1
NB03SED161	NB03SED-CHM161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Zinc	mg/kg	304	1
NB03SED162	NB03SED-CHM162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Zinc	mg/kg	250	1
NB03SED163	NB03SED-CHM163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Zinc	mg/kg	274	1
NB03SED164	NB03SED-CHM164	NORTH	INTERTIDAL AREA	6	North	Metals	Zinc	mg/kg	125	1
NB03SED165	NB03SED-CHM165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Zinc	mg/kg	228	1

Table A-3-1
SQT Sediment Screening Results

Location ID	T20	T50	T80	ERL	ERM	Threshold	Median	Result Exceeds T20?	Result Exceeds T50?	Result Exceeds T80?	Result Exceeds ERL?	Result Exceeds ERM?	Result Exceeds Threshold?	Result Exceeds Median?
NB03SED155	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	No	No	No	No
NB03SED156	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED157	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED158	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	No	No	No	No
NB03SED159	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED160	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED164	0.23	1.1	5.8	1	3.7	1	3.7	Yes	No	No	No	No	No	No
NB03SED165	0.23	1.1	5.8	1	3.7	1	3.7	Yes	Yes	No	Yes	No	Yes	No
NB03SED136	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED137	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED138	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED139	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED140	94	240	640	150	410	150	410	Yes	No	No	No	No	No	No
NB03SED141	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED142	94	240	640	150	410	150	410	Yes	No	No	No	No	No	No
NB03SED143	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED144	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED145	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED146	94	240	640	150	410	150	410	Yes	No	No	No	No	No	No
NB03SED147	94	240	640	150	410	150	410	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED148	94	240	640	150	410	150	410	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED149	94	240	640	150	410	150	410	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED150	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED151	94	240	640	150	410	150	410	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NB03SED152	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED153	94	240	640	150	410	150	410	Yes	No	No	No	No	No	No
NB03SED154	94	240	640	150	410	150	410	Yes	Yes	No	Yes	Yes	Yes	Yes
NB03SED155	94	240	640	150	410	150	410	No	No	No	No	No	No	No
NB03SED156	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED157	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED158	94	240	640	150	410	150	410	Yes	No	No	No	No	No	No
NB03SED159	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No
NB03SED160	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED161	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED162	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED163	94	240	640	150	410	150	410	Yes	Yes	No	Yes	No	Yes	No
NB03SED164	94	240	640	150	410	150	410	Yes	No	No	No	No	No	No
NB03SED165	94	240	640	150	410	150	410	Yes	No	No	Yes	No	Yes	No

Table A-3-1
SQT Sediment Screening Results

Notes:
1. Tp values reported in USEPA 2005. The notation Tp (e.g., T50) is used to denote the concentration at which "p" percent of samples are expected to be toxic (e.g., the probability that 50% of the samples would be toxic).
2. ERL and ERM are values reported in Long et al. (1995).
3. The threshold value is the maximum of the T20 and ERL, if available. The median value is the maximum of the T50 and ERM, if available. When neither T20/T50 and ERL/ERM were available, screening values were selected from the National Oceanic and Atmospheric Administration's (NOAA's) Screening Quick Reference Table (SQuirT) (Buchman 2008). The threshold value is the threshold effect level (TEL), and the median value is the probable effect level (PEL) for marine sediment, as reported in the SQuirT.

Acronyms and Abbreviations:
BERA = Baseline Ecological Risk Assessment
BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
DEHP = bis(2-Ethylhexyl)phthalate
ERL = effect range-low
ERM = effect range-median
HMW = high molecular weight
ID = Identification
LMW = low molecular weight
mg/kg = milligrams per kilogram
ND = Not Detected
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SQT = Sediment Quality Triad
SQuiRT = Screening Quick Reference Tables
TCDD = tetrachlorodibenzo-p-dioxin
USEPA = United States Environmental Protection Agency
Total DDx = sum of DDE, DDD, and DDT
-- = not available
µg/kg = micrograms per kilogram

References:
Buchman, M.F. 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. Seattle WA. National Oceanic and Atmospheric Administration, Office of Response and Restoration
Long E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ Manage 19:81-97.
USEPA. 2005. Predicting Toxicity to Amphipods from Sediment Chemistry. United States Environmental Protection Agency, National Center for Environmental Assessment. Washington, D.C. EPA/600/R-04/030.

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.422	1	10,000	10	NOAA-FW	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.262	1	10,000	10	NOAA-FW	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	1.521	1	10,000	10	NOAA-FW	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.461	1	10,000	10	NOAA-FW	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.89	1	10,000	10	NOAA-FW	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.438	1	10,000	10	NOAA-FW	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.212	1	10,000	10	NOAA-FW	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.416	1	10,000	10	NOAA-FW	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.476	1	10,000	10	NOAA-FW	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.443	1	10,000	10	NOAA-FW	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.254	1	10,000	10	NOAA-FW	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.695	1	10,000	10	NOAA-FW	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.436	1	10,000	10	NOAA-FW	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.28	1	10,000	10	NOAA-FW	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.265	1	10,000	10	NOAA-FW	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	1.322	1	10,000	10	NOAA-FW	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.1585	1	10,000	10	NOAA-FW	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.119	1	10,000	10	NOAA-FW	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	9.35	1	10,000	10	NOAA-FW	No	No
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.232	1	10,000	10	NOAA-FW	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.133	1	10,000	10	NOAA-FW	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.237	1	10,000	10	NOAA-FW	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.397	1	10,000	10	NOAA-FW	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.424	1	10,000	10	NOAA-FW	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.791	1	10,000	10	NOAA-FW	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.443	1	10,000	10	NOAA-FW	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.373	1	10,000	10	NOAA-FW	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.353	1	10,000	10	NOAA-FW	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.554	1	10,000	10	NOAA-FW	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L	0.476	1	10,000	10	NOAA-FW	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	5.14	1	--	30	NJ WQC	--	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	4.79	1	--	30	NJ WQC	--	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	34.9	1	--	30	NJ WQC	--	Yes
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	6.84	1	--	30	NJ WQC	--	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	12.3	1	--	30	NJ WQC	--	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	5.13	1	--	30	NJ WQC	--	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	4.09	1	--	30	NJ WQC	--	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	6.51	1	--	30	NJ WQC	--	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	17.8	1	--	30	NJ WQC	--	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	15.3	1	--	30	NJ WQC	--	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	7.41	1	--	30	NJ WQC	--	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	20.4	1	--	30	NJ WQC	--	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	18.9	1	--	30	NJ WQC	--	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	7.9	1	--	30	NJ WQC	--	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	11.2	1	--	30	NJ WQC	--	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	152	1	--	30	NJ WQC	--	Yes
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	10.9	1	--	30	NJ WQC	--	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	4.82	1	--	30	NJ WQC	--	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	32.2	1	--	30	NJ WQC	--	Yes
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PCB Congeners	Total PCBs congener (209 specified)	ng/L	8.05	1	--	30	NJ WQC	--	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PCB Congeners	Total PCBs congener (209 specified)	ng/L	3.99	1	--	30	NJ WQC	--	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	5.89	1	--	30	NJ WQC	--	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	4.6	1	--	30	NJ WQC	--	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	6.62	1	--	30	NJ WQC	--	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	23.2	1	--	30	NJ WQC	--	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	5.27	1	--	30	NJ WQC	--	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	4.95	1	--	30	NJ WQC	--	No

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	5.76	1	--	30	NJ WQC	--	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	5.46	1	--	30	NJ WQC	--	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PCB Congeners	Total PCBs congener (209 specified)	ng/L	6.04	1	--	30	NJ WQC	--	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Aldrin	µg/L	1.11E-06	1	1.3	--	NJ WQC	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Aldrin	µg/L	7.61E-07	1	1.3	--	NJ WQC	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Aldrin	µg/L	3.42E-07	1	1.3	--	NJ WQC	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Aldrin	µg/L	9.06E-07	1	1.3	--	NJ WQC	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Aldrin	µg/L	8.61E-07	1	1.3	--	NJ WQC	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Aldrin	µg/L	8.26E-07	1	1.3	--	NJ WQC	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Aldrin	µg/L	5.53E-07	1	1.3	--	NJ WQC	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Aldrin	µg/L	1.18E-06	1	1.3	--	NJ WQC	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Aldrin	µg/L	8.84E-07	1	1.3	--	NJ WQC	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Aldrin	µg/L	9.18E-07	1	1.3	--	NJ WQC	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Aldrin	µg/L	6.48E-07	1	1.3	--	NJ WQC	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Aldrin	µg/L	2.60E-07	1	1.3	--	NJ WQC	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Aldrin	µg/L	8.60E-09	0	1.3	--	NJ WQC	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Aldrin	µg/L	1.41E-08	0	1.3	--	NJ WQC	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Aldrin	µg/L	5.39E-07	1	1.3	--	NJ WQC	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Aldrin	µg/L	4.22E-07	1	1.3	--	NJ WQC	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Aldrin	µg/L	1.31E-06	1	1.3	--	NJ WQC	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Aldrin	µg/L	1.41E-08	0	1.3	--	NJ WQC	ND	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Aldrin	µg/L	8.01E-07	1	1.3	--	NJ WQC	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Aldrin	µg/L	4.40E-07	1	1.3	--	NJ WQC	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Aldrin	µg/L	5.61E-07	1	1.3	--	NJ WQC	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Aldrin	µg/L	9.53E-07	1	1.3	--	NJ WQC	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Aldrin	µg/L	9.87E-07	1	1.3	--	NJ WQC	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Dieldrin	µg/L	0.000195	1	0.71	0.0019	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Dieldrin	µg/L	0.000181	1	0.71	0.0019	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Dieldrin	µg/L	0.000615	1	0.71	0.0019	NJ WQC	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Dieldrin	µg/L	0.000202	1	0.71	0.0019	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Dieldrin	µg/L	0.000292	1	0.71	0.0019	NJ WQC	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Dieldrin	µg/L	0.00018	1	0.71	0.0019	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Dieldrin	µg/L	0.000242	1	0.71	0.0019	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Dieldrin	µg/L	0.000224	1	0.71	0.0019	NJ WQC	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Dieldrin	µg/L	0.000138	1	0.71	0.0019	NJ WQC	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Dieldrin	µg/L	0.000499	1	0.71	0.0019	NJ WQC	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Dieldrin	µg/L	0.000143	1	0.71	0.0019	NJ WQC	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Dieldrin	µg/L	0.000315	1	0.71	0.0019	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Dieldrin	µg/L	0.000254	1	0.71	0.0019	NJ WQC	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Dieldrin	µg/L	0.000298	1	0.71	0.0019	NJ WQC	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Dieldrin	µg/L	0.000163	1	0.71	0.0019	NJ WQC	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Dieldrin	µg/L	0.000868	1	0.71	0.0019	NJ WQC	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Dieldrin	µg/L	0.000206	1	0.71	0.0019	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Dieldrin	µg/L	0.000132	1	0.71	0.0019	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Dieldrin	µg/L	0.000288	1	0.71	0.0019	NJ WQC	No	No
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Dieldrin	µg/L	0.000146	1	0.71	0.0019	NJ WQC	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Dieldrin	µg/L	0.000127	1	0.71	0.0019	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Dieldrin	µg/L	0.000177	1	0.71	0.0019	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Dieldrin	µg/L	0.000133	1	0.71	0.0019	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Dieldrin	µg/L	0.000189	1	0.71	0.0019	NJ WQC	No	No

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Dieldrin	µg/L	0.000292	1	0.71	0.0019	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Dieldrin	µg/L	0.000212	1	0.71	0.0019	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Dieldrin	µg/L	0.000135	1	0.71	0.0019	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Dieldrin	µg/L	0.00018	1	0.71	0.0019	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Dieldrin	µg/L	0.000221	1	0.71	0.0019	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Dieldrin	µg/L	0.00018	1	0.71	0.0019	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Endosulfan I	µg/L	1.95E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan I	µg/L	5.12E-06	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endosulfan I	µg/L	1.95E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Endosulfan I	µg/L	0.000834	1	0.034	0.0087	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endosulfan I	µg/L	0.000402	1	0.034	0.0087	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan I	µg/L	0.000405	1	0.034	0.0087	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Endosulfan I	µg/L	1.95E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endosulfan I	µg/L	0.000722	1	0.034	0.0087	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan I	µg/L	0.000812	1	0.034	0.0087	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan I	µg/L	1.95E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endosulfan I	µg/L	1.95E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endosulfan I	µg/L	0.000335	1	0.034	0.0087	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan II	µg/L	1.53E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endosulfan II	µg/L	2.54E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endosulfan sulfate	µg/L	1.81E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endosulfan sulfate	µg/L	2.87E-05	0	0.034	0.0087	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Endrin	µg/L	1.57E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Endrin	µg/L	2.95E-08	0	0.037	0.0023	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	gamma-BHC (lindane)	µg/L	2.20E-06	0	0.16	--	NJ WQC	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	gamma-BHC (lindane)	µg/L	1.50E-06	0	0.16	--	NJ WQC	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Heptachlor	µg/L	2.96E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Heptachlor	µg/L	2.72E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Heptachlor	µg/L	3.29E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Heptachlor	µg/L	2.57E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Heptachlor	µg/L	3.38E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Heptachlor	µg/L	2.35E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Heptachlor	µg/L	2.88E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Heptachlor	µg/L	7.80E-08	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Heptachlor	µg/L	3.65E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Heptachlor	µg/L	3.67E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Heptachlor	µg/L	5.74E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Heptachlor	µg/L	4.58E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Heptachlor	µg/L	7.80E-08	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Heptachlor	µg/L	3.69E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Heptachlor	µg/L	3.64E-06	1	0.053	0.0036	NJ WQC	No	No

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Heptachlor	µg/L	7.80E-08	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Heptachlor	µg/L	3.25E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Heptachlor	µg/L	3.34E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Heptachlor	µg/L	7.80E-08	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Heptachlor	µg/L	3.30E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Heptachlor	µg/L	3.60E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Heptachlor	µg/L	3.82E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Heptachlor	µg/L	2.69E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Heptachlor	µg/L	3.06E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Heptachlor	µg/L	2.81E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Heptachlor	µg/L	3.94E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Heptachlor	µg/L	3.22E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Heptachlor	µg/L	4.00E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Heptachlor	µg/L	2.94E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Heptachlor	µg/L	2.99E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Heptachlor epoxide	µg/L	1.51E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Heptachlor epoxide	µg/L	1.67E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Heptachlor epoxide	µg/L	9.62E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Heptachlor epoxide	µg/L	2.62E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	9.18E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	3.64E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	9.06E-06	1	0.053	0.0036	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Heptachlor epoxide	µg/L	1.42E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Heptachlor epoxide	µg/L	1.41E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Heptachlor epoxide	µg/L	1.46E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Heptachlor epoxide	µg/L	1.46E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Heptachlor epoxide	µg/L	1.46E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Heptachlor epoxide	µg/L	1.46E-07	0	0.053	0.0036	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Heptachlor epoxide	µg/L	2.31E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Heptachlor epoxide	µg/L	1.49E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Heptachlor epoxide	µg/L	1.49E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Heptachlor epoxide	µg/L	2.62E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Heptachlor epoxide	µg/L	1.29E-05	1	0.053	0.0036	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Hexachlorobenzene	µg/L	0.000158	1	160	129	NOAA-SW	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Hexachlorobenzene	µg/L	0.000223	1	160	129	NOAA-SW	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Hexachlorobenzene	µg/L	0.000466	1	160	129	NOAA-SW	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Hexachlorobenzene	µg/L	0.000184	1	160	129	NOAA-SW	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Hexachlorobenzene	µg/L	0.000729	1	160	129	NOAA-SW	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	0.000134	1	160	129	NOAA-SW	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	0.000449	1	160	129	NOAA-SW	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	0.000658	1	160	129	NOAA-SW	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	3.83E-05	1	160	129	NOAA-SW	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	0.000328	1	160	129	NOAA-SW	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	0.000204	1	160	129	NOAA-SW	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.000395	1	160	129	NOAA-SW	No	No

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.000234	1	160	129	NOAA-SW	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.000147	1	160	129	NOAA-SW	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.000119	1	160	129	NOAA-SW	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.00778	1	160	129	NOAA-SW	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.00018	1	160	129	NOAA-SW	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	9.59E-05	1	160	129	NOAA-SW	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.00531	1	160	129	NOAA-SW	No	No
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Hexachlorobenzene	µg/L	0.000293	1	160	129	NOAA-SW	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Hexachlorobenzene	µg/L	9.31E-05	1	160	129	NOAA-SW	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Hexachlorobenzene	µg/L	0.000125	1	160	129	NOAA-SW	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Hexachlorobenzene	µg/L	0.000239	1	160	129	NOAA-SW	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Hexachlorobenzene	µg/L	0.000123	1	160	129	NOAA-SW	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Hexachlorobenzene	µg/L	0.000726	1	160	129	NOAA-SW	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Hexachlorobenzene	µg/L	0.000243	1	160	129	NOAA-SW	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Hexachlorobenzene	µg/L	0.000527	1	160	129	NOAA-SW	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Hexachlorobenzene	µg/L	0.00026	1	160	129	NOAA-SW	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Hexachlorobenzene	µg/L	0.000466	1	160	129	NOAA-SW	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Hexachlorobenzene	µg/L	0.000189	1	160	129	NOAA-SW	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Methoxychlor	µg/L	7.23E-06	0	--	0.03	NJ WQC	--	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Methoxychlor	µg/L	4.16E-05	0	--	0.03	NJ WQC	--	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Mirex	µg/L	1.39E-06	1	--	0.001	NJ WQC	--	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Mirex	µg/L	9.21E-07	1	--	0.001	NJ WQC	--	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Mirex	µg/L	1.28E-06	1	--	0.001	NJ WQC	--	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Mirex	µg/L	9.16E-07	1	--	0.001	NJ WQC	--	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Mirex	µg/L	7.56E-07	1	--	0.001	NJ WQC	--	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Mirex	µg/L	2.36E-06	1	--	0.001	NJ WQC	--	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Mirex	µg/L	5.87E-07	1	--	0.001	NJ WQC	--	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Mirex	µg/L	5.00E-09	0	--	0.001	NJ WQC	--	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Mirex	µg/L	8.25E-07	1	--	0.001	NJ WQC	--	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Mirex	µg/L	7.96E-07	1	--	0.001	NJ WQC	--	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Mirex	µg/L	6.80E-09	0	--	0.001	NJ WQC	--	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Mirex	µg/L	9.08E-07	1	--	0.001	NJ WQC	--	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Mirex	µg/L	1.37E-06	1	--	0.001	NJ WQC	--	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Mirex	µg/L	1.15E-06	1	--	0.001	NJ WQC	--	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Mirex	µg/L	1.03E-06	1	--	0.001	NJ WQC	--	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Mirex	µg/L	1.02E-06	1	--	0.001	NJ WQC	--	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Mirex	µg/L	1.18E-06	1	--	0.001	NJ WQC	--	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Mirex	µg/L	1.26E-06	1	--	0.001	NJ WQC	--	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00036	1	0.09	0.004	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00029	1	0.09	0.004	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.0003	1	0.09	0.004	NJ WQC	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00028	1	0.09	0.004	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00038	1	0.09	0.004	NJ WQC	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00028	1	0.09	0.004	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00029	1	0.09	0.004	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00032	1	0.09	0.004	NJ WQC	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00014	1	0.09	0.004	NJ WQC	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00037	1	0.09	0.004	NJ WQC	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00015	1	0.09	0.004	NJ WQC	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.000205	1	0.09	0.004	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00021	1	0.09	0.004	NJ WQC	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00025	1	0.09	0.004	NJ WQC	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00023	1	0.09	0.004	NJ WQC	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00042	1	0.09	0.004	NJ WQC	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.0003	1	0.09	0.004	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00018	1	0.09	0.004	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00021	1	0.09	0.004	NJ WQC	No	No
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total alpha + gamma chlordane	µg/L	0.00017	1	0.09	0.004	NJ WQC	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total alpha + gamma chlordane	µg/L	0.00025	1	0.09	0.004	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00029	1	0.09	0.004	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00023	1	0.09	0.004	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00046	1	0.09	0.004	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00039	1	0.09	0.004	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00036	1	0.09	0.004	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00025	1	0.09	0.004	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00034	1	0.09	0.004	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00047	1	0.09	0.004	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total alpha + gamma chlordane	µg/L	0.00035	1	0.09	0.004	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0006	1	0.13	0.001	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00056	1	0.13	0.001	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00071	1	0.13	0.001	NJ WQC	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.001	1	0.13	0.001	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0012	1	0.13	0.001	NJ WQC	No	Yes
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00062	1	0.13	0.001	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00047	1	0.13	0.001	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0034	1	0.13	0.001	NJ WQC	No	Yes
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0011	1	0.13	0.001	NJ WQC	No	Yes

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0011	1	0.13	0.001	NJ WQC	No	Yes
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0017	1	0.13	0.001	NJ WQC	No	Yes
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0016	1	0.13	0.001	NJ WQC	No	Yes
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0012	1	0.13	0.001	NJ WQC	No	Yes
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0017	1	0.13	0.001	NJ WQC	No	Yes
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0016	1	0.13	0.001	NJ WQC	No	Yes
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0058	1	0.13	0.001	NJ WQC	No	Yes
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00475	1	0.13	0.001	NJ WQC	No	Yes
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00096	1	0.13	0.001	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.01	1	0.13	0.001	NJ WQC	No	Yes
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0018	1	0.13	0.001	NJ WQC	No	Yes
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00063	1	0.13	0.001	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00077	1	0.13	0.001	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0007	1	0.13	0.001	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00066	1	0.13	0.001	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.0014	1	0.13	0.001	NJ WQC	No	Yes
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00068	1	0.13	0.001	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00072	1	0.13	0.001	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00072	1	0.13	0.001	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00084	1	0.13	0.001	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Pesticides	Total DDx (4,4) Total Fraction	µg/L	0.00064	1	0.13	0.001	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	2-Methylnaphthalene	ng/L	94.4	0	300,000	--	NOAA-SW	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	ng/L	76.21	0	300,000	--	NOAA-SW	ND	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	ng/L	75.74	0	300,000	--	NOAA-SW	ND	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	2-Methylnaphthalene	ng/L	79.47	0	300,000	--	NOAA-SW	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	2-Methylnaphthalene	ng/L	95.03	0	300,000	--	NOAA-SW	ND	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	80.29	0	300,000	--	NOAA-SW	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	79.99	0	300,000	--	NOAA-SW	ND	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	86.82	0	300,000	--	NOAA-SW	ND	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	91.37	0	300,000	--	NOAA-SW	ND	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	96.36	0	300,000	--	NOAA-SW	ND	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	97.75	0	300,000	--	NOAA-SW	ND	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	74.35	0	300,000	--	NOAA-SW	ND	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	88.08	0	300,000	--	NOAA-SW	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	107.19	0	300,000	--	NOAA-SW	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	69.01	0	300,000	--	NOAA-SW	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	427.6	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	80.22	0	300,000	--	NOAA-SW	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	104.83	0	300,000	--	NOAA-SW	ND	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	89.37	0	300,000	--	NOAA-SW	ND	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	2-Methylnaphthalene	ng/L	73.4	0	300,000	--	NOAA-SW	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	2-Methylnaphthalene	ng/L	90.69	0	300,000	--	NOAA-SW	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	2-Methylnaphthalene	ng/L	94.72	0	300,000	--	NOAA-SW	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	2-Methylnaphthalene	ng/L	100.75	0	300,000	--	NOAA-SW	ND	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	2-Methylnaphthalene	ng/L	76.55	0	300,000	--	NOAA-SW	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	2-Methylnaphthalene	ng/L	274.28	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	ng/L	92.46	0	300,000	--	NOAA-SW	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	2-Methylnaphthalene	ng/L	89.09	0	300,000	--	NOAA-SW	ND	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	2-Methylnaphthalene	ng/L	81.99	0	300,000	--	NOAA-SW	ND	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	2-Methylnaphthalene	ng/L	72.96	0	300,000	--	NOAA-SW	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	2-Methylnaphthalene	ng/L	78.24	0	300,000	--	NOAA-SW	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Acenaphthene	ng/L	46.17	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthene	ng/L	37.28	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthene	ng/L	37.04	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthene	ng/L	38.87	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthene	ng/L	46.48	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthene	ng/L	39.27	0	970,000	40,000	NOAA-SW	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Acenaphthene	ng/L	95.86	1	970,000	40,000	NOAA-SW	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthene	ng/L	42.47	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Acenaphthene	ng/L	44.69	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthene	ng/L	471.28	1	970,000	40,000	NOAA-SW	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthene	ng/L	47.81	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthene	ng/L	36.37	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Acenaphthene	ng/L	43.08	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthene	ng/L	52.43	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Acenaphthene	ng/L	33.75	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthene	ng/L	41.83	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Acenaphthene	ng/L	39.24	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthene	ng/L	51.27	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthene	ng/L	43.71	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthene	ng/L	35.9	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthene	ng/L	44.36	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Acenaphthene	ng/L	46.33	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthene	ng/L	49.28	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthene	ng/L	37.44	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Acenaphthene	ng/L	49.69	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthene	ng/L	45.22	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthene	ng/L	169.93	1	970,000	40,000	NOAA-SW	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthene	ng/L	40.1	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthene	ng/L	35.68	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthene	ng/L	38.27	0	970,000	40,000	NOAA-SW	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Acenaphthylene	ng/L	597.01	0	300,000	--	NOAA-SW	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthylene	ng/L	481.97	0	300,000	--	NOAA-SW	ND	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthylene	ng/L	478.98	0	300,000	--	NOAA-SW	ND	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthylene	ng/L	502.6	0	300,000	--	NOAA-SW	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthylene	ng/L	600.99	0	300,000	--	NOAA-SW	ND	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	ng/L	507.79	0	300,000	--	NOAA-SW	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Acenaphthylene	ng/L	505.89	0	300,000	--	NOAA-SW	ND	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	ng/L	2,361	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	ng/L	577.85	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Acenaphthylene	ng/L	607.88	0	300,000	--	NOAA-SW	ND	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthylene	ng/L	1,020	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthylene	ng/L	799.23	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	ng/L	557	0	300,000	--	NOAA-SW	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthylene	ng/L	677.91	0	300,000	--	NOAA-SW	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Acenaphthylene	ng/L	436.42	0	300,000	--	NOAA-SW	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	ng/L	1,325	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Acenaphthylene	ng/L	507.32	0	300,000	--	NOAA-SW	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	ng/L	662.94	0	300,000	--	NOAA-SW	ND	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Acenaphthylene	ng/L	3,108	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Acenaphthylene	ng/L	464.17	0	300,000	--	NOAA-SW	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Acenaphthylene	ng/L	573.56	0	300,000	--	NOAA-SW	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Acenaphthylene	ng/L	599	0	300,000	--	NOAA-SW	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Acenaphthylene	ng/L	3,186	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthylene	ng/L	484.13	0	300,000	--	NOAA-SW	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Acenaphthylene	ng/L	931.54	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Acenaphthylene	ng/L	584.73	0	300,000	--	NOAA-SW	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthylene	ng/L	563.39	0	300,000	--	NOAA-SW	ND	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Acenaphthylene	ng/L	518.52	0	300,000	--	NOAA-SW	ND	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Acenaphthylene	ng/L	461.4	0	300,000	--	NOAA-SW	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Acenaphthylene	ng/L	494.77	0	300,000	--	NOAA-SW	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Anthracene	ng/L	15.06	0	300,000	--	NOAA-SW	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Anthracene	ng/L	13.98	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Anthracene	ng/L	12.08	0	300,000	--	NOAA-SW	ND	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Anthracene	ng/L	12.68	0	300,000	--	NOAA-SW	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Anthracene	ng/L	15.16	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Anthracene	ng/L	12.81	0	300,000	--	NOAA-SW	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Anthracene	ng/L	27.43	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Anthracene	ng/L	22.16	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Anthracene	ng/L	42.27	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Anthracene	ng/L	75.59	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Anthracene	ng/L	24.17	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Anthracene	ng/L	50.305	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Anthracene	ng/L	25.99	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Anthracene	ng/L	17.1	0	300,000	--	NOAA-SW	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Anthracene	ng/L	11.01	0	300,000	--	NOAA-SW	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Anthracene	ng/L	334.22	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Anthracene	ng/L	12.8	0	300,000	--	NOAA-SW	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Anthracene	ng/L	16.72	0	300,000	--	NOAA-SW	ND	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Anthracene	ng/L	128.3	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Anthracene	ng/L	11.71	0	300,000	--	NOAA-SW	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Anthracene	ng/L	14.47	0	300,000	--	NOAA-SW	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Anthracene	ng/L	15.11	0	300,000	--	NOAA-SW	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Anthracene	ng/L	40.98	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Anthracene	ng/L	12.21	0	300,000	--	NOAA-SW	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Anthracene	ng/L	16.2	0	300,000	--	NOAA-SW	ND	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Anthracene	ng/L	14.75	0	300,000	--	NOAA-SW	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Anthracene	ng/L	62.53	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Anthracene	ng/L	34	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Anthracene	ng/L	11.64	0	300,000	--	NOAA-SW	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Anthracene	ng/L	12.48	0	300,000	--	NOAA-SW	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(a)anthracene	ng/L	1.22	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	ng/L	2.47	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	ng/L	1.45	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)anthracene	ng/L	1.52	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)anthracene	ng/L	2.9	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	0.86	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	2.26	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	9.86	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	3.85	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	7.37	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	3.8	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	6.165	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	4	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	2.61	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	2.46	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	23.58	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	1.65	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	1.7	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	16.23	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)anthracene	ng/L	2.14	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)anthracene	ng/L	1.88	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(a)anthracene	ng/L	1.23	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)anthracene	ng/L	6.86	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)anthracene	ng/L	1.66	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(a)anthracene	ng/L	3.62	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	ng/L	1.83	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)anthracene	ng/L	4.33	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)anthracene	ng/L	5.58	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)anthracene	ng/L	1.54	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)anthracene	ng/L	1.75	1	300,000	--	NOAA-SW	No	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(a)pyrene	ng/L	1.69	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	ng/L	2.3	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	ng/L	1.78	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)pyrene	ng/L	2.47	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)pyrene	ng/L	2.51	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	1.44	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	1.21	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	6.05	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	1.89	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	8.81	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	3.13	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	1.595	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	1.08	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	2.63	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	1.04	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	4.51	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	1.85	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	1.19	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	4.55	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(a)pyrene	ng/L	1.38	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(a)pyrene	ng/L	0.79	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(a)pyrene	ng/L	1.16	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(a)pyrene	ng/L	7.5	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)pyrene	ng/L	1.51	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(a)pyrene	ng/L	1.34	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	ng/L	1.31	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)pyrene	ng/L	1.51	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(a)pyrene	ng/L	2.55	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(a)pyrene	ng/L	1.44	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(a)pyrene	ng/L	2.43	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(b)fluoranthene	ng/L	1.48	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	ng/L	1.74	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	ng/L	1.5	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(b)fluoranthene	ng/L	1.72	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(b)fluoranthene	ng/L	1.83	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	1.16	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	1.01	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	3.24	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	1.37	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	7.57	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	1.88	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	1.275	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	0.9	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	1.74	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	0.87	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	2.62	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	1.225	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	0.82	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	2.74	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(b)fluoranthene	ng/L	1.24	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(b)fluoranthene	ng/L	0.6	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(b)fluoranthene	ng/L	0.85	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(b)fluoranthene	ng/L	3.21	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(b)fluoranthene	ng/L	1.1	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(b)fluoranthene	ng/L	1.1	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	ng/L	1.06	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(b)fluoranthene	ng/L	1.12	1	300,000	--	NOAA-SW	No	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(b)fluoranthene	ng/L	1.73	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(b)fluoranthene	ng/L	1.01	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(b)fluoranthene	ng/L	1.74	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.49	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.47	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.19	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.29	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.52	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	0.32	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	0.29	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	0.98	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	0.45	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	5.33	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	0.63	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.42	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.3	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.56	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.34	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.6	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.325	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.35	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.79	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(g,h,i)perylene	ng/L	0.38	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(g,h,i)perylene	ng/L	0.22	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.21	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.8	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.35	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.31	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.26	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.27	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.4	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.27	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(g,h,i)perylene	ng/L	0.53	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.86	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.08	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.95	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.99	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.51	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.73	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.68	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	2.91	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.68	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	4.16	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.605	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.41	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.34	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.39	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.51	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.825	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.47	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.83	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.75	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.35	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.5	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	2.52	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.61	1	300,000	--	NOAA-SW	No	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.87	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.63	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.61	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.03	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	0.62	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Benzo(j)fluoranthene/Benzo(k)fluoranthene	ng/L	1.24	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Chrysene	ng/L	2.71	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Chrysene	ng/L	4.42	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Chrysene	ng/L	1.23	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Chrysene	ng/L	2.07	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Chrysene	ng/L	4.13	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Chrysene	ng/L	1.84	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Chrysene	ng/L	2.78	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Chrysene	ng/L	10.07	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Chrysene	ng/L	4.5	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Chrysene	ng/L	6.03	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Chrysene	ng/L	3.97	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Chrysene	ng/L	6.86	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Chrysene	ng/L	4.6	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Chrysene	ng/L	2.49	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Chrysene	ng/L	3.4	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Chrysene	ng/L	22.8	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Chrysene	ng/L	1.755	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Chrysene	ng/L	2.61	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Chrysene	ng/L	15.8	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Chrysene	ng/L	2.34	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Chrysene	ng/L	2.31	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Chrysene	ng/L	1.95	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Chrysene	ng/L	10.51	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Chrysene	ng/L	2.66	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Chrysene	ng/L	2.3	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Chrysene	ng/L	2.68	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Chrysene	ng/L	4.65	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Chrysene	ng/L	5.94	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Chrysene	ng/L	2.11	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Chrysene	ng/L	2.49	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.04	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.07	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.04	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.13	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.57	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.08	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.045	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	0	300,000	--	NOAA-SW	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.07	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.07	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.04	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.09	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Dibenz(a,h)anthracene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	0	300,000	--	NOAA-SW	ND	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	0	300,000	--	NOAA-SW	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.12	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.04	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.04	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	0	300,000	--	NOAA-SW	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.03	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Dibenz(a,h)anthracene	ng/L	0.06	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Fluoranthene	ng/L	8.67	1	40,000	11,000	NOAA-SW	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluoranthene	ng/L	23.34	1	40,000	11,000	NOAA-SW	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluoranthene	ng/L	5.8	1	40,000	11,000	NOAA-SW	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluoranthene	ng/L	7.44	1	40,000	11,000	NOAA-SW	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluoranthene	ng/L	22.63	1	40,000	11,000	NOAA-SW	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluoranthene	ng/L	5.46	1	40,000	11,000	NOAA-SW	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Fluoranthene	ng/L	29.94	1	40,000	11,000	NOAA-SW	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluoranthene	ng/L	35.45	1	40,000	11,000	NOAA-SW	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Fluoranthene	ng/L	29.54	1	40,000	11,000	NOAA-SW	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluoranthene	ng/L	125.69	1	40,000	11,000	NOAA-SW	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluoranthene	ng/L	11.81	1	40,000	11,000	NOAA-SW	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluoranthene	ng/L	54.675	1	40,000	11,000	NOAA-SW	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Fluoranthene	ng/L	31.47	1	40,000	11,000	NOAA-SW	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluoranthene	ng/L	16.96	1	40,000	11,000	NOAA-SW	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Fluoranthene	ng/L	14.09	1	40,000	11,000	NOAA-SW	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluoranthene	ng/L	189.14	1	40,000	11,000	NOAA-SW	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Fluoranthene	ng/L	6.485	1	40,000	11,000	NOAA-SW	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluoranthene	ng/L	9.81	1	40,000	11,000	NOAA-SW	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluoranthene	ng/L	114.03	1	40,000	11,000	NOAA-SW	No	No
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluoranthene	ng/L	17.48	1	40,000	11,000	NOAA-SW	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluoranthene	ng/L	16.97	1	40,000	11,000	NOAA-SW	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Fluoranthene	ng/L	8.86	1	40,000	11,000	NOAA-SW	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluoranthene	ng/L	51.42	1	40,000	11,000	NOAA-SW	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluoranthene	ng/L	11.2	1	40,000	11,000	NOAA-SW	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Fluoranthene	ng/L	20.74	1	40,000	11,000	NOAA-SW	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluoranthene	ng/L	14.31	1	40,000	11,000	NOAA-SW	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluoranthene	ng/L	59.11	1	40,000	11,000	NOAA-SW	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluoranthene	ng/L	76.72	1	40,000	11,000	NOAA-SW	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluoranthene	ng/L	11.42	1	40,000	11,000	NOAA-SW	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluoranthene	ng/L	12.25	1	40,000	11,000	NOAA-SW	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Fluorene	ng/L	37	0	300,000	--	NOAA-SW	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluorene	ng/L	29.87	0	300,000	--	NOAA-SW	ND	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluorene	ng/L	29.68	0	300,000	--	NOAA-SW	ND	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluorene	ng/L	31.15	0	300,000	--	NOAA-SW	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluorene	ng/L	37.25	0	300,000	--	NOAA-SW	ND	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluorene	ng/L	31.47	0	300,000	--	NOAA-SW	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Fluorene	ng/L	68.97	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluorene	ng/L	34.03	0	300,000	--	NOAA-SW	ND	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Fluorene	ng/L	35.81	0	300,000	--	NOAA-SW	ND	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Fluorene	ng/L	111.34	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluorene	ng/L	38.31	0	300,000	--	NOAA-SW	ND	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluorene	ng/L	29.14	0	300,000	--	NOAA-SW	ND	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Fluorene	ng/L	34.52	0	300,000	--	NOAA-SW	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluorene	ng/L	42.01	0	300,000	--	NOAA-SW	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Fluorene	ng/L	27.05	0	300,000	--	NOAA-SW	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluorene	ng/L	33.52	0	300,000	--	NOAA-SW	ND	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Fluorene	ng/L	31.44	0	300,000	--	NOAA-SW	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluorene	ng/L	41.08	0	300,000	--	NOAA-SW	ND	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Fluorene	ng/L	35.02	0	300,000	--	NOAA-SW	ND	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Fluorene	ng/L	28.77	0	300,000	--	NOAA-SW	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Fluorene	ng/L	35.55	0	300,000	--	NOAA-SW	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Fluorene	ng/L	37.12	0	300,000	--	NOAA-SW	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Fluorene	ng/L	39.49	0	300,000	--	NOAA-SW	ND	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluorene	ng/L	30	0	300,000	--	NOAA-SW	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Fluorene	ng/L	39.81	0	300,000	--	NOAA-SW	ND	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Fluorene	ng/L	36.24	0	300,000	--	NOAA-SW	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluorene	ng/L	34.91	0	300,000	--	NOAA-SW	ND	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Fluorene	ng/L	32.13	0	300,000	--	NOAA-SW	ND	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Fluorene	ng/L	28.59	0	300,000	--	NOAA-SW	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Fluorene	ng/L	30.66	0	300,000	--	NOAA-SW	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.18	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.17	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.09	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.08	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.27	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.08	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.12	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.49	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.12	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	2.89	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.2	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.1	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.05	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.22	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.06	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.15	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.13	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.09	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.27	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.14	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.06	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.06	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.36	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.11	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.15	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.08	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.13	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.17	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.12	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Indeno(1,2,3-cd)pyrene	ng/L	0.21	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Naphthalene	ng/L	402.89	0	#######	1,400	NOAA-SW	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Naphthalene	ng/L	325.26	0	#######	1,400	NOAA-SW	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Naphthalene	ng/L	323.24	0	#######	1,400	NOAA-SW	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Naphthalene	ng/L	339.17	0	#######	1,400	NOAA-SW	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Naphthalene	ng/L	405.57	0	#######	1,400	NOAA-SW	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Naphthalene	ng/L	342.68	0	#######	1,400	NOAA-SW	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Naphthalene	ng/L	443.82	1	#######	1,400	NOAA-SW	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Naphthalene	ng/L	370.54	0	#######	1,400	NOAA-SW	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Naphthalene	ng/L	389.96	0	#######	1,400	NOAA-SW	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Naphthalene	ng/L	406.05	0	#######	1,400	NOAA-SW	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Naphthalene	ng/L	417.18	0	#######	1,400	NOAA-SW	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Naphthalene	ng/L	317.33	0	#######	1,400	NOAA-SW	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Naphthalene	ng/L	375.89	0	#######	1,400	NOAA-SW	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Naphthalene	ng/L	457.48	0	#######	1,400	NOAA-SW	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Naphthalene	ng/L	294.52	0	#######	1,400	NOAA-SW	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Naphthalene	ng/L	364.98	0	#######	1,400	NOAA-SW	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Naphthalene	ng/L	342.36	0	#######	1,400	NOAA-SW	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Naphthalene	ng/L	447.38	0	#######	1,400	NOAA-SW	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Naphthalene	ng/L	381.39	0	#######	1,400	NOAA-SW	ND	ND
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Naphthalene	ng/L	313.24	0	#######	1,400	NOAA-SW	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Naphthalene	ng/L	387.06	0	#######	1,400	NOAA-SW	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Naphthalene	ng/L	404.23	0	#######	1,400	NOAA-SW	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Naphthalene	ng/L	429.97	0	#######	1,400	NOAA-SW	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Naphthalene	ng/L	326.71	0	#######	1,400	NOAA-SW	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Naphthalene	ng/L	433.54	0	#######	1,400	NOAA-SW	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Naphthalene	ng/L	394.6	0	#######	1,400	NOAA-SW	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Naphthalene	ng/L	380.2	0	#######	1,400	NOAA-SW	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Naphthalene	ng/L	349.91	0	#######	1,400	NOAA-SW	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Naphthalene	ng/L	311.37	0	#######	1,400	NOAA-SW	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Naphthalene	ng/L	333.89	0	#######	1,400	NOAA-SW	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total Alkylated PAHs	ng/L	40.3	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total Alkylated PAHs	ng/L	68.3	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total Alkylated PAHs	ng/L	48.94	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total Alkylated PAHs	ng/L	72.24	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total Alkylated PAHs	ng/L	67.31	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	34.31	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	112.58	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	355.25	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	99.93	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	321.28	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	157.89	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	612.13	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	91.14	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	113.91	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	73.16	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	2,918	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	62.66	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	48.68	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	3,803	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total Alkylated PAHs	ng/L	62.69	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total Alkylated PAHs	ng/L	37.13	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total Alkylated PAHs	ng/L	43.83	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total Alkylated PAHs	ng/L	759.77	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total Alkylated PAHs	ng/L	61.93	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total Alkylated PAHs	ng/L	79.04	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total Alkylated PAHs	ng/L	49.37	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total Alkylated PAHs	ng/L	261.24	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total Alkylated PAHs	ng/L	201.82	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total Alkylated PAHs	ng/L	49.17	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total Alkylated PAHs	ng/L	46.09	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total HMW PAHs	ng/L	88	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total HMW PAHs	ng/L	170	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total HMW PAHs	ng/L	190	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total HMW PAHs	ng/L	140	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total HMW PAHs	ng/L	150	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	ng/L	74	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total HMW PAHs	ng/L	120	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	ng/L	530	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	ng/L	180	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total HMW PAHs	ng/L	670	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total HMW PAHs	ng/L	240	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total HMW PAHs	ng/L	250	1	300,000	--	NOAA-SW	No	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	ng/L	140	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total HMW PAHs	ng/L	230	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total HMW PAHs	ng/L	96	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	ng/L	930	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total HMW PAHs	ng/L	140	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	ng/L	79	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total HMW PAHs	ng/L	750	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total HMW PAHs	ng/L	110	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total HMW PAHs	ng/L	59	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total HMW PAHs	ng/L	78	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total HMW PAHs	ng/L	840	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total HMW PAHs	ng/L	160	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total HMW PAHs	ng/L	160	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total HMW PAHs	ng/L	94	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total HMW PAHs	ng/L	200	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total HMW PAHs	ng/L	440	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total HMW PAHs	ng/L	96	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total HMW PAHs	ng/L	150	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total LMW PAHs	ng/L	597.01	0	300,000	--	NOAA-SW	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total LMW PAHs	ng/L	14	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total LMW PAHs	ng/L	478.98	0	300,000	--	NOAA-SW	ND	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total LMW PAHs	ng/L	502.6	0	300,000	--	NOAA-SW	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total LMW PAHs	ng/L	15	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	ng/L	507.79	0	300,000	--	NOAA-SW	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total LMW PAHs	ng/L	680	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	ng/L	2,400	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	ng/L	620	1	300,000	--	NOAA-SW	No	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total LMW PAHs	ng/L	690	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total LMW PAHs	ng/L	1000	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total LMW PAHs	ng/L	850	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	ng/L	26	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total LMW PAHs	ng/L	677.91	0	300,000	--	NOAA-SW	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total LMW PAHs	ng/L	436.42	0	300,000	--	NOAA-SW	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	ng/L	2,100	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total LMW PAHs	ng/L	507.32	0	300,000	--	NOAA-SW	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	ng/L	662.94	0	300,000	--	NOAA-SW	ND	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total LMW PAHs	ng/L	3,200	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total LMW PAHs	ng/L	464.17	0	300,000	--	NOAA-SW	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total LMW PAHs	ng/L	573.56	0	300,000	--	NOAA-SW	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total LMW PAHs	ng/L	599	0	300,000	--	NOAA-SW	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total LMW PAHs	ng/L	3,200	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total LMW PAHs	ng/L	484.13	0	300,000	--	NOAA-SW	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total LMW PAHs	ng/L	1,200	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total LMW PAHs	ng/L	584.73	0	300,000	--	NOAA-SW	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total LMW PAHs	ng/L	230	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total LMW PAHs	ng/L	34	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total LMW PAHs	ng/L	461.4	0	300,000	--	NOAA-SW	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total LMW PAHs	ng/L	494.77	0	300,000	--	NOAA-SW	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	PAHs	Total PAH	ng/L	88	1	300,000	--	NOAA-SW	No	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total PAH	ng/L	180	1	300,000	--	NOAA-SW	No	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total PAH	ng/L	190	1	300,000	--	NOAA-SW	No	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total PAH	ng/L	140	1	300,000	--	NOAA-SW	No	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	PAHs	Total PAH	ng/L	160	1	300,000	--	NOAA-SW	No	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total PAH	ng/L	74	1	300,000	--	NOAA-SW	No	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	PAHs	Total PAH	ng/L	790	1	300,000	--	NOAA-SW	No	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total PAH	ng/L	2,900	1	300,000	--	NOAA-SW	No	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	PAHs	Total PAH	ng/L	800	1	300,000	--	NOAA-SW	No	--

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	PAHs	Total PAH	ng/L	1,400	1	300,000	--	NOAA-SW	No	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total PAH	ng/L	1,300	1	300,000	--	NOAA-SW	No	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total PAH	ng/L	1,100	1	300,000	--	NOAA-SW	No	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	PAHs	Total PAH	ng/L	170	1	300,000	--	NOAA-SW	No	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total PAH	ng/L	230	1	300,000	--	NOAA-SW	No	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	PAHs	Total PAH	ng/L	96	1	300,000	--	NOAA-SW	No	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total PAH	ng/L	3,000	1	300,000	--	NOAA-SW	No	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	PAHs	Total PAH	ng/L	140	1	300,000	--	NOAA-SW	No	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total PAH	ng/L	79	1	300,000	--	NOAA-SW	No	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	PAHs	Total PAH	ng/L	4,000	1	300,000	--	NOAA-SW	No	--
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	PAHs	Total PAH	ng/L	110	1	300,000	--	NOAA-SW	No	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	PAHs	Total PAH	ng/L	59	1	300,000	--	NOAA-SW	No	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	PAHs	Total PAH	ng/L	78	1	300,000	--	NOAA-SW	No	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	PAHs	Total PAH	ng/L	4,100	1	300,000	--	NOAA-SW	No	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total PAH	ng/L	160	1	300,000	--	NOAA-SW	No	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	PAHs	Total PAH	ng/L	1,400	1	300,000	--	NOAA-SW	No	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	PAHs	Total PAH	ng/L	94	1	300,000	--	NOAA-SW	No	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total PAH	ng/L	430	1	300,000	--	NOAA-SW	No	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	PAHs	Total PAH	ng/L	480	1	300,000	--	NOAA-SW	No	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	PAHs	Total PAH	ng/L	96	1	300,000	--	NOAA-SW	No	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	PAHs	Total PAH	ng/L	150	1	300,000	--	NOAA-SW	No	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Arsenic	mg/L	0.0191	1	0.069	0.036	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Arsenic	mg/L	0.0209	1	0.069	0.036	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Arsenic	mg/L	0.0371	1	0.069	0.036	NJ WQC	No	Yes
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Arsenic	mg/L	0.033	1	0.069	0.036	NJ WQC	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Arsenic	mg/L	0.0268	1	0.069	0.036	NJ WQC	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Arsenic	mg/L	0.0748	1	0.069	0.036	NJ WQC	Yes	Yes
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Arsenic	mg/L	0.0183	1	0.069	0.036	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Arsenic	mg/L	0.0227	1	0.069	0.036	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Arsenic	mg/L	0.05	1	0.069	0.036	NJ WQC	No	Yes
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Arsenic	mg/L	0.0054	0	0.069	0.036	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Cadmium	mg/L	0.0023	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Cadmium	mg/L	0.0012	0	0.04	0.0088	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Chromium	mg/L	0.0045	1	1.1	0.05	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Chromium	mg/L	0.0035	0	1.1	0.05	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Chromium	mg/L	0.0042	1	1.1	0.05	NJ WQC	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Chromium	mg/L	0.01	1	1.1	0.05	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Chromium	mg/L	0.0053	1	1.1	0.05	NJ WQC	No	No
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Chromium	mg/L	0.0044	1	1.1	0.05	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Chromium	mg/L	0.0044	1	1.1	0.05	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Chromium	mg/L	0.0076	1	1.1	0.05	NJ WQC	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Chromium	mg/L	0.0045	1	1.1	0.05	NJ WQC	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Chromium	mg/L	0.0058	1	1.1	0.05	NJ WQC	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Chromium	mg/L	0.0035	0	1.1	0.05	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Chromium	mg/L	0.00775	1	1.1	0.05	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Chromium	mg/L	0.0103	1	1.1	0.05	NJ WQC	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Chromium	mg/L	0.0035	0	1.1	0.05	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Chromium	mg/L	0.0064	1	1.1	0.05	NJ WQC	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Chromium	mg/L	0.0036	1	1.1	0.05	NJ WQC	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Chromium	mg/L	0.0038	1	1.1	0.05	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Chromium	mg/L	0.0045	1	1.1	0.05	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Chromium	mg/L	0.0039	1	1.1	0.05	NJ WQC	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Chromium	mg/L	0.0084	1	1.1	0.05	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Chromium	mg/L	0.0053	1	1.1	0.05	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Chromium	mg/L	0.0075	1	1.1	0.05	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Chromium	mg/L	0.0071	1	1.1	0.05	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Chromium	mg/L	0.0082	1	1.1	0.05	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Chromium	mg/L	0.0095	1	1.1	0.05	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Chromium	mg/L	0.0083	1	1.1	0.05	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Chromium	mg/L	0.0148	1	1.1	0.05	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Chromium	mg/L	0.0076	1	1.1	0.05	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Chromium	mg/L	0.0066	1	1.1	0.05	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Copper	mg/L	0.0042	1	0.0079	0.0056	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Copper	mg/L	0.0155	1	0.0079	0.0056	NJ WQC	Yes	Yes
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Copper	mg/L	0.0021	1	0.0079	0.0056	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Copper	mg/L	0.0022	1	0.0079	0.0056	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Copper	mg/L	0.0073	1	0.0079	0.0056	NJ WQC	No	Yes
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Copper	mg/L	0.002	0	0.0079	0.0056	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Lead	mg/L	0.006	1	0.21	0.024	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Lead	mg/L	0.0055	1	0.21	0.024	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Lead	mg/L	0.00097	1	0.21	0.024	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Lead	mg/L	0.0018	1	0.21	0.024	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Lead	mg/L	0.0015	1	0.21	0.024	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Lead	mg/L	0.0076	1	0.21	0.024	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Lead	mg/L	0.00065	0	0.21	0.024	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Mercury	ng/L	143	1	1,800	940	NJ WQC	No	No
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Mercury	ng/L	134	1	1,800	940	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Mercury	ng/L	125	1	1,800	940	NJ WQC	No	No
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Mercury	ng/L	276	1	1,800	940	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Mercury	ng/L	176	1	1,800	940	NJ WQC	No	No

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Mercury	ng/L	160	1	1,800	940	NJ WQC	No	No
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Mercury	ng/L	138	1	1,800	940	NJ WQC	No	No
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Mercury	ng/L	118	1	1,800	940	NJ WQC	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Mercury	ng/L	153	1	1,800	940	NJ WQC	No	No
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Mercury	ng/L	184	1	1,800	940	NJ WQC	No	No
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Mercury	ng/L	148	1	1,800	940	NJ WQC	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Mercury	ng/L	90.35	1	1,800	940	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Mercury	ng/L	134	1	1,800	940	NJ WQC	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Mercury	ng/L	59	1	1,800	940	NJ WQC	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Mercury	ng/L	118	1	1,800	940	NJ WQC	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Mercury	ng/L	348	1	1,800	940	NJ WQC	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Mercury	ng/L	125.9	1	1,800	940	NJ WQC	No	No
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Mercury	ng/L	122	1	1,800	940	NJ WQC	No	No
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Mercury	ng/L	114	1	1,800	940	NJ WQC	No	No
NB03SED155	NB03SED-POR155	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Mercury	ng/L	1.65	0	1,800	940	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Mercury	ng/L	117	1	1,800	940	NJ WQC	No	No
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Mercury	ng/L	126	1	1,800	940	NJ WQC	No	No
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Mercury	ng/L	146	1	1,800	940	NJ WQC	No	No
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Mercury	ng/L	113	1	1,800	940	NJ WQC	No	No
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Mercury	ng/L	149	1	1,800	940	NJ WQC	No	No
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Mercury	ng/L	106	1	1,800	940	NJ WQC	No	No
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Mercury	ng/L	52.9	1	1,800	940	NJ WQC	No	No
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Mercury	ng/L	174	1	1,800	940	NJ WQC	No	No
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Mercury	ng/L	115	1	1,800	940	NJ WQC	No	No
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Mercury	ng/L	200	1	1,800	940	NJ WQC	No	No
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Nickel	mg/L	0.0047	0	0.064	0.022	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Selenium	mg/L	0.0029	1	0.29	0.071	NJ WQC	No	No
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Selenium	mg/L	0.0025	1	0.29	0.071	NJ WQC	No	No
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Selenium	mg/L	0.0025	1	0.29	0.071	NJ WQC	No	No
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Selenium	mg/L	0.0034	1	0.29	0.071	NJ WQC	No	No
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Selenium	mg/L	0.003	1	0.29	0.071	NJ WQC	No	No
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Selenium	mg/L	0.003	1	0.29	0.071	NJ WQC	No	No
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Selenium	mg/L	0.0026	1	0.29	0.071	NJ WQC	No	No
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Selenium	mg/L	0.0033	1	0.29	0.071	NJ WQC	No	No
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Selenium	mg/L	0.0028	1	0.29	0.071	NJ WQC	No	No
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Selenium	mg/L	0.0032	1	0.29	0.071	NJ WQC	No	No
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Selenium	mg/L	0.0025	0	0.29	0.071	NJ WQC	ND	ND
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Silver	mg/L	0.00055	0	0.0019	--	NJ WQC	ND	--
NB03SED136	NB03SED-POR136	NORTH	INTERTIDAL AREA	4	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED137	NB03SED-POR137	NORTH	SUB-TIDAL FLATS	4	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Location ID	Sample ID	Geographic Area	Geomorphic Unit	USEPA Subunit	BERA Assessment Zone	Parameter Group	Chemical name	Units	Result	Detection (1 =Yes; 0=No)	Acute	Chronic	Source	Result Exceeds Acute?	Result Exceeds Chronic?
NB03SED138	NB03SED-POR138	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED139	NB03SED-POR139	NORTH	SUB-TIDAL FLATS	6	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED140	NB03SED-POR140	NORTH	INTERTIDAL AREA	6	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED141	NB03SED-POR141	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Zinc	mg/L	0.0967	1	0.09	0.081	NJ WQC	Yes	Yes
NB03SED142	NB03SED-POR142	CENTRAL	INDUSTRIAL WATERFRONT	5	Southeast	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED143	NB03SED-POR143	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED144	NB03SED-POR144	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	Southeast	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED145	NB03SED-POR145	CENTRAL	SUB-TIDAL FLATS	5	Southeast	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED146	NB03SED-POR146	SOUTH	TRANSITIONAL SLOPES	5	Southeast	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED147	NB03SED-POR147	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED148	NB03SED-POR148	SOUTH	SUB-TIDAL FLATS	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED149	NB03SED-POR149	SOUTH	INDUSTRIAL WATERFRONT	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED150	NB03SED-POR150	SOUTH	TRANSITIONAL SLOPES	1	Southwest	Metals	Zinc	mg/L	0.402	1	0.09	0.081	NJ WQC	Yes	Yes
NB03SED151	NB03SED-POR151	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED152	NB03SED-POR152	SOUTH	INTERTIDAL AREA	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED153	NB03SED-POR153	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED154	NB03SED-POR154	SOUTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	1	Southwest	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED156	NB03SED-POR156	CENTRAL	TRANSITIONAL SLOPES	5	Southeast	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED157	NB03SED-POR157	CENTRAL	HISTORICALLY DISTURBED SUBTIDAL FLATS	5	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED158	NB03SED-POR158	NORTH	SUB-TIDAL FLATS	6	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED159	NB03SED-POR159	NORTH	NAVIGATION CHANNEL	3	North	Metals	Zinc	mg/L	0.176	1	0.09	0.081	NJ WQC	Yes	Yes
NB03SED160	NB03SED-POR160	NORTH	INDUSTRIAL WATERFRONT	4	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED161	NB03SED-POR161	NORTH	HISTORICALLY DISTURBED SUBTIDAL FLATS	4	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED162	NB03SED-POR162	NORTH	NAVIGATION CHANNEL	3	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED163	NB03SED-POR163	NORTH	NAVIGATION CHANNEL	3	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED164	NB03SED-POR164	NORTH	INTERTIDAL AREA	6	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND
NB03SED165	NB03SED-POR165	NORTH	SUB-TIDAL FLATS	4	North	Metals	Zinc	mg/L	0.037	0	0.09	0.081	NJ WQC	ND	ND

Table A-3-2
SQT Porewater Screening Results

Notes:
Total alpha + gamma chlordane is compared to published criterion for chlordane (CAS Number 57-74-9).
Total DDx (4,4') is compared to published criterion for 4,4'-dichlorodiphenyltrichloroethane (CAS Number 50-29-3).

Acronyms and Abbreviations:
BHC = benzene hexachloride
CAS = Chemical Abstracts Service
HMW = high molecular weight
ID = Identification
LMW = low molecular weight
mg/L = milligrams per liter
'ND = Not Detected
ng/L = nanograms per liter
NJ WQC = New Jersey Surface Water Quality Standard
NOAA = National Oceanographic and Atmospheric Administration
NOAA-FW = Screening values reported in NOAA SQuiRT for fresh surface waters, used when marine values are not available.
NOAA-SW = Screening values reported in the NOAA SQuiRT for marine surface waters (Buchman 2008)
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/L = picograms per liter
SQT = Sediment Quality Triad
SQuiRT = Screening Quick Reference Tables
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
USEPA = United States Environmental Protection Agency
-- = not available
µg/L = micrograms per liter

References:
Buchman, M.F. 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1. National Oceanic and Atmospheric Administration, Office of Response and Restoration Division. Seattle, WA. 34 pages.
New Jersey Department of Environmental Protection. 2016. New Jersey Surface Water Quality Standards for the Protection of Aquatic Life in Saline Waters. New Jersey Administrative Code 7:9B. Re-adopted. October 17.

Table A-3-3
SQT and Phase III Sediment Summary Statistics for Selected Chemicals

Parameter Group	Chemical Name	Units	Sample Group	Number of Samples	Number of Detects	Frequency of Detection	Mean	Median	Standard Deviation	Minimum Detected Value	Maximum Detected Value
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	ng/kg	Sediment Quality Triad	30	30	100%	91.3	73.9	92.2	5.62	413
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	ng/kg	Remaining Phase III Samples	224	224	100%	86.6	37.3	191	0.12	1,710
PCB Congeners	Total PCBs congeners	ng/kg	Sediment Quality Triad	30	30	100%	588,000	443,000	772,000	50,600	4,370,000
PCB Congeners	Total PCBs congeners	ng/kg	Remaining Phase III Samples	224	224	100%	465,000	261,000	680,000	2,480	5,030,000
Pesticides	4,4'-DDD	pg/g	Sediment Quality Triad	30	30	100%	22,900	12,300	27,500	4,360	125,000
Pesticides	4,4'-DDD	pg/g	Remaining Phase III Samples	224	224	100%	23,300	9,170	39,600	35.7	235,000
Pesticides	4,4'-DDE	pg/g	Sediment Quality Triad	30	30	100%	45,100	20,300	73,200	4,590	336,000
Pesticides	4,4'-DDE	pg/g	Remaining Phase III Samples	223	223	100%	67,900	14,700	179,000	42.1	1,590,000
Pesticides	4,4'-DDT	pg/g	Sediment Quality Triad	30	30	100%	6,980	937	20,200	229	108,000
Pesticides	4,4'-DDT	pg/g	Remaining Phase III Samples	206	173	84%	5,340	621	33,300	15.4	451,000
Pesticides	Dieldrin	pg/g	Sediment Quality Triad	30	30	100%	1,540	1,260	1,440	106	7,830
Pesticides	Dieldrin	pg/g	Remaining Phase III Samples	223	210	94%	1,770	904	3,700	39.4	37,400
Pesticides	gamma-BHC (lindane)	pg/g	Sediment Quality Triad	30	15	50%	31.1	34.7	38	9.49	218
Pesticides	gamma-BHC (lindane)	pg/g	Remaining Phase III Samples	223	46	21%	70.9	<54.7	145	6.29	1,800
Pesticides	Hexachlorobenzene	pg/g	Sediment Quality Triad	30	30	100%	2,900	1,520	5,870	237	31,200
Pesticides	Hexachlorobenzene	pg/g	Remaining Phase III Samples	223	222	100%	2,870	966	6,310	13.2	46,200
Pesticides	Total alpha + gamma chlordane	pg/g	Sediment Quality Triad	30	30	100%	6,490	5,800	3,710	460	16,000
Pesticides	Total alpha + gamma chlordane	pg/g	Remaining Phase III Samples	223	214	96%	4,880	3,900	4,900	39	32,000
Pesticides	Total DDx (2,4 & 4,4)	pg/g	Sediment Quality Triad	30	30	100%	98,700	43,500	143,000	12,000	600,000
Pesticides	Total DDx (2,4 & 4,4)	pg/g	Remaining Phase III Samples	224	224	100%	135,000	34,000	316,000	120	2,600,000
PAHs	1-Methylnaphthalene	µg/kg	Sediment Quality Triad	30	28	93%	44	27	68	10	100
PAHs	1-Methylnaphthalene	µg/kg	Remaining Phase III Samples	224	196	88%	45	34	63	0.2	340
PAHs	2-Methylnaphthalene	µg/kg	Sediment Quality Triad	30	27	90%	52	40	67	16	100
PAHs	2-Methylnaphthalene	µg/kg	Remaining Phase III Samples	224	190	85%	60	46	68	0.34	370
PAHs	Acenaphthene	µg/kg	Sediment Quality Triad	30	25	83%	100	52	170	16	910
PAHs	Acenaphthene	µg/kg	Remaining Phase III Samples	224	183	82%	85	53	150	0.18	1,500
PAHs	Acenaphthylene	µg/kg	Sediment Quality Triad	30	29	97%	190	120	260	32	1,400
PAHs	Acenaphthylene	µg/kg	Remaining Phase III Samples	224	206	92%	210	140	210	1	1,500
PAHs	Anthracene	µg/kg	Sediment Quality Triad	30	30	100%	360	150	800	14	4,400
PAHs	Anthracene	µg/kg	Remaining Phase III Samples	224	212	95%	330	160	470	1.2	3,600
PAHs	Benzo(a)anthracene	µg/kg	Sediment Quality Triad	30	30	100%	1,200	600	2,200	120	12,000
PAHs	Benzo(a)anthracene	µg/kg	Remaining Phase III Samples	224	212	95%	1,100	650	1,400	3.6	7,800
PAHs	Benzo(a)pyrene	µg/kg	Sediment Quality Triad	30	30	100%	1,400	750	1,800	120	10,000
PAHs	Benzo(a)pyrene	µg/kg	Remaining Phase III Samples	224	219	98%	1,300	940	1,400	5.7	8,000
PAHs	Benzo(b)fluoranthene	µg/kg	Sediment Quality Triad	30	30	100%	1,200	790	1,600	95	8,900
PAHs	Benzo(b)fluoranthene	µg/kg	Remaining Phase III Samples	224	217	97%	1,100	830	1000	5.3	6,400
PAHs	Benzo(g,h,i)perylene	µg/kg	Sediment Quality Triad	30	30	100%	620	430	670	65	3,700
PAHs	Benzo(g,h,i)perylene	µg/kg	Remaining Phase III Samples	224	215	96%	660	490	660	3.6	4,000
PAHs	Benzo(k)fluoranthene	µg/kg	Sediment Quality Triad	30	30	100%	1,100	710	1,600	100	8,800
PAHs	Benzo(k)fluoranthene	µg/kg	Remaining Phase III Samples	224	214	96%	1000	760	1000	5.1	6,500
PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	Sediment Quality Triad	30	29	97%	620	310	920	70	4,700
PAHs	C1-Phenanthrenes/Anthracenes	µg/kg	Remaining Phase III Samples	224	202	90%	620	300	940	1.9	6,200
PAHs	C2-Naphthalenes	µg/kg	Sediment Quality Triad	30	29	97%	210	160	170	59	820
PAHs	C2-Naphthalenes	µg/kg	Remaining Phase III Samples	224	192	86%	260	160	350	1.2	2,700
PAHs	Chrysene	µg/kg	Sediment Quality Triad	30	30	100%	1,200	710	2,100	110	12,000
PAHs	Chrysene	µg/kg	Remaining Phase III Samples	224	222	99%	1,100	680	1,300	3.9	8,000
PAHs	Dibenz(a,h)anthracene	µg/kg	Sediment Quality Triad	30	30	100%	240	160	300	21	1,600
PAHs	Dibenz(a,h)anthracene	µg/kg	Remaining Phase III Samples	224	210	94%	260	190	260	1.3	1,600
PAHs	Fluoranthene	µg/kg	Sediment Quality Triad	30	30	100%	1,900	920	3,700	150	20,000

Table A-3-3
SQT and Phase III Sediment Summary Statistics for Selected Chemicals

Parameter Group	Chemical Name	Units	Sample Group	Number of Samples	Number of Detects	Frequency of Detection	Mean	Median	Standard Deviation	Minimum Detected Value	Maximum Detected Value
PAHs	Fluoranthene	µg/kg	Remaining Phase III Samples	224	214	96%	1,500	830	2,000	4.6	15,000
PAHs	Fluorene	µg/kg	Sediment Quality Triad	30	24	80%	81	46	130	16	570
PAHs	Fluorene	µg/kg	Remaining Phase III Samples	224	154	69%	80	53	140	0.41	1,100
PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	Sediment Quality Triad	30	30	100%	640	420	770	65	4,200
PAHs	Indeno(1,2,3-cd)pyrene	µg/kg	Remaining Phase III Samples	224	221	99%	660	470	670	3.6	4,200
PAHs	Naphthalene	µg/kg	Sediment Quality Triad	30	29	97%	88	75	77	20	430
PAHs	Naphthalene	µg/kg	Remaining Phase III Samples	224	195	87%	100	77	99	0.57	540
PAHs	Perylene	µg/kg	Sediment Quality Triad	30	30	100%	390	310	430	36	2,400
PAHs	Perylene	µg/kg	Remaining Phase III Samples	224	220	98%	630	320	3,700	2.2	56,000
PAHs	Phenanthrene	µg/kg	Sediment Quality Triad	30	30	100%	620	280	1000	27	4,300
PAHs	Phenanthrene	µg/kg	Remaining Phase III Samples	224	206	92%	520	250	1,200	1.5	11,000
PAHs	Pyrene	µg/kg	Sediment Quality Triad	30	30	100%	2,100	1,100	3,600	160	20,000
PAHs	Pyrene	µg/kg	Remaining Phase III Samples	224	220	98%	2,000	1,200	2,200	21	14,000
PAHs	Total Alkylated PAHs	µg/kg	Sediment Quality Triad	30	30	100%	9,300	5,300	10,000	220	38,000
PAHs	Total Alkylated PAHs	µg/kg	Remaining Phase III Samples	224	215	96%	13,000	6,000	22,000	38	170,000
PAHs	Total HMW PAHs	µg/kg	Sediment Quality Triad	30	30	100%	12,000	6,900	18,000	1000	100,000
PAHs	Total HMW PAHs	µg/kg	Remaining Phase III Samples	224	222	99%	11,000	7,000	12,000	37	75,000
PAHs	Total LMW PAHs	µg/kg	Sediment Quality Triad	30	30	100%	1,500	770	2,400	41	12,000
PAHs	Total LMW PAHs	µg/kg	Remaining Phase III Samples	224	215	96%	1,300	790	2,100	5.2	17,000
PAHs	Total PAH	µg/kg	Sediment Quality Triad	30	30	100%	13,000	7,800	20,000	1000	110,000
PAHs	Total PAH	µg/kg	Remaining Phase III Samples	224	222	99%	12,000	7,700	13,000	37	91,000
Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	Sediment Quality Triad	26	3	12%	36	<66	9.61	35	65
Semivolatiles	Biphenyl (1,1-Biphenyl)	µg/kg	Remaining Phase III Samples	221	38	17%	35.3	<60	18.2	25	160
Semivolatiles	bis(2-Ethylhexyl)phthalate	µg/kg	Sediment Quality Triad	29	26	90%	877	650	966	140	4,000
Semivolatiles	bis(2-Ethylhexyl)phthalate	µg/kg	Remaining Phase III Samples	224	172	77%	1,150	395	3,550	96	38,000
Metals	Antimony	mg/kg	Sediment Quality Triad	30	30	100%	1.14	0.649	1.09	0.264	4.43
Metals	Antimony	mg/kg	Remaining Phase III Samples	224	200	89%	0.905	0.48	1.18	0.126	8
Metals	Arsenic	mg/kg	Sediment Quality Triad	30	30	100%	14.6	11.4	11	5.59	61.5
Metals	Arsenic	mg/kg	Remaining Phase III Samples	224	224	100%	18.8	13.7	17.4	1.18	115
Metals	Barium	mg/kg	Sediment Quality Triad	30	30	100%	178	121	219	48.9	1,260
Metals	Barium	mg/kg	Remaining Phase III Samples	224	224	100%	153	116	153	5.5	1,190
Metals	Cadmium	mg/kg	Sediment Quality Triad	30	30	100%	2.12	1	3.61	0.292	17.8
Metals	Cadmium	mg/kg	Remaining Phase III Samples	224	222	99%	2.06	0.869	3.24	0.0592	24.6
Metals	Chromium	mg/kg	Sediment Quality Triad	30	30	100%	114	107	76.7	34.2	397
Metals	Chromium	mg/kg	Remaining Phase III Samples	224	224	100%	124	94.8	121	3.95	777
Metals	Copper	mg/kg	Sediment Quality Triad	30	30	100%	148	112	130	33.1	567
Metals	Copper	mg/kg	Remaining Phase III Samples	224	224	100%	149	99.6	155	1.5	924
Metals	Lead	mg/kg	Sediment Quality Triad	30	30	100%	164	114	164	38.8	875
Metals	Lead	mg/kg	Remaining Phase III Samples	224	224	100%	166	111	226	2.18	2,190
Metals	Mercury	ng/g	Sediment Quality Triad	30	30	100%	1,920	1,700	1,570	336	8,380
Metals	Mercury	ng/g	Remaining Phase III Samples	224	224	100%	2,410	1,460	2,970	5.11	22,100
Metals	Nickel	mg/kg	Sediment Quality Triad	30	30	100%	42.6	41	20.3	17.2	96
Metals	Nickel	mg/kg	Remaining Phase III Samples	224	224	100%	40.7	37.2	29.9	3.83	282
Metals	Silver	mg/kg	Sediment Quality Triad	30	30	100%	1.89	1.63	1.25	0.31	6
Metals	Silver	mg/kg	Remaining Phase III Samples	224	223	100%	1.8	1.44	1.69	0.0448	12
Metals	Zinc	mg/kg	Sediment Quality Triad	30	30	100%	268	230	155	88.1	681
Metals	Zinc	mg/kg	Remaining Phase III Samples	224	224	100%	304	218	514	8.18	6,810
Total Petroleum Hydrocarbons (C9-C40)		mg/kg	Sediment Quality Triad	30	30	100%	162	130	149	9.35	780
Total Petroleum Hydrocarbons (C9-C40)		mg/kg	Remaining Phase III Samples	224	216	96%	366	204	455	6.45	2,910

Table A-3-3
SQT and Phase III Sediment Summary Statistics for Selected Chemicals

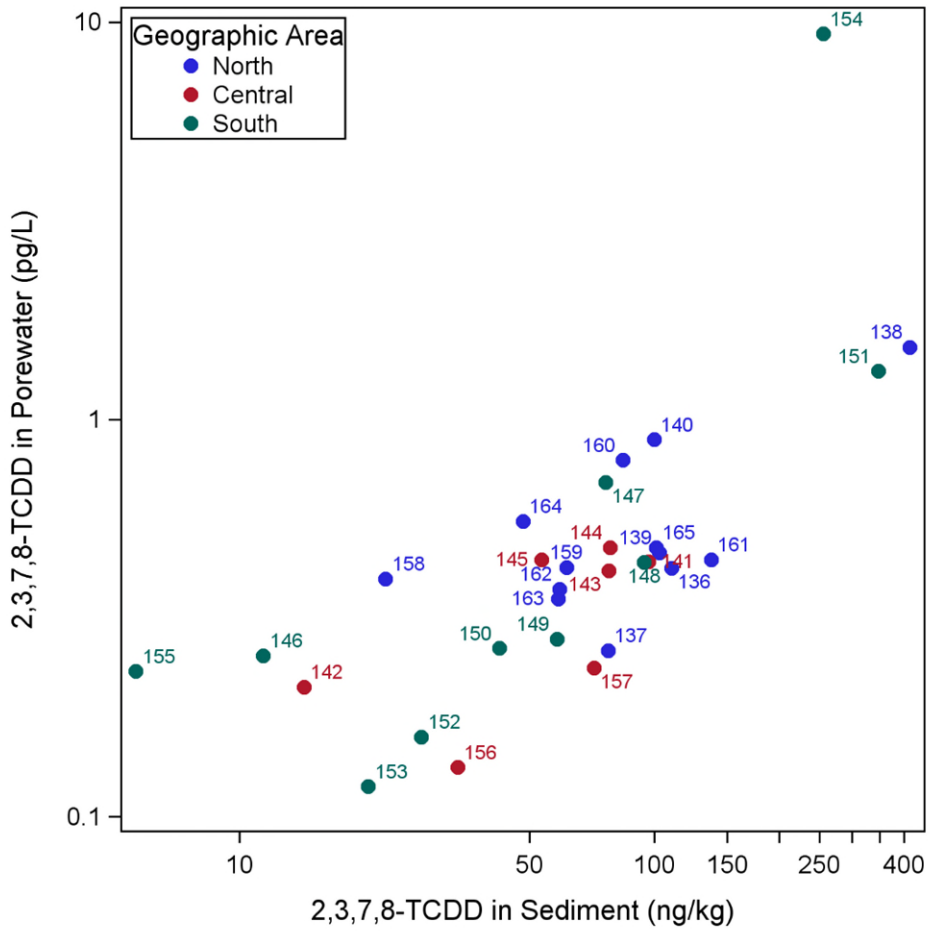
Parameter Group	Chemical Name	Units	Sample Group	Number of Samples	Number of Detects	Frequency of Detection	Mean	Median	Standard Deviation	Minimum Detected Value	Maximum Detected Value
Total organic carbon (TOC)		mg/kg	Sediment Quality Triad	30	30	100%	40,100	32,400	26,400	3,170	151,000
Total organic carbon (TOC)		mg/kg	Remaining Phase III Samples	224	222	99%	21,400	20,900	12,800	1,030	61,400
Percent Fines		%	Sediment Quality Triad	30	30	100%	60.3	65.9	24.6	13.7	96
Percent Fines		%	Remaining Phase III Samples	224	224	100%	55.5	60.8	27.3	2.6	97

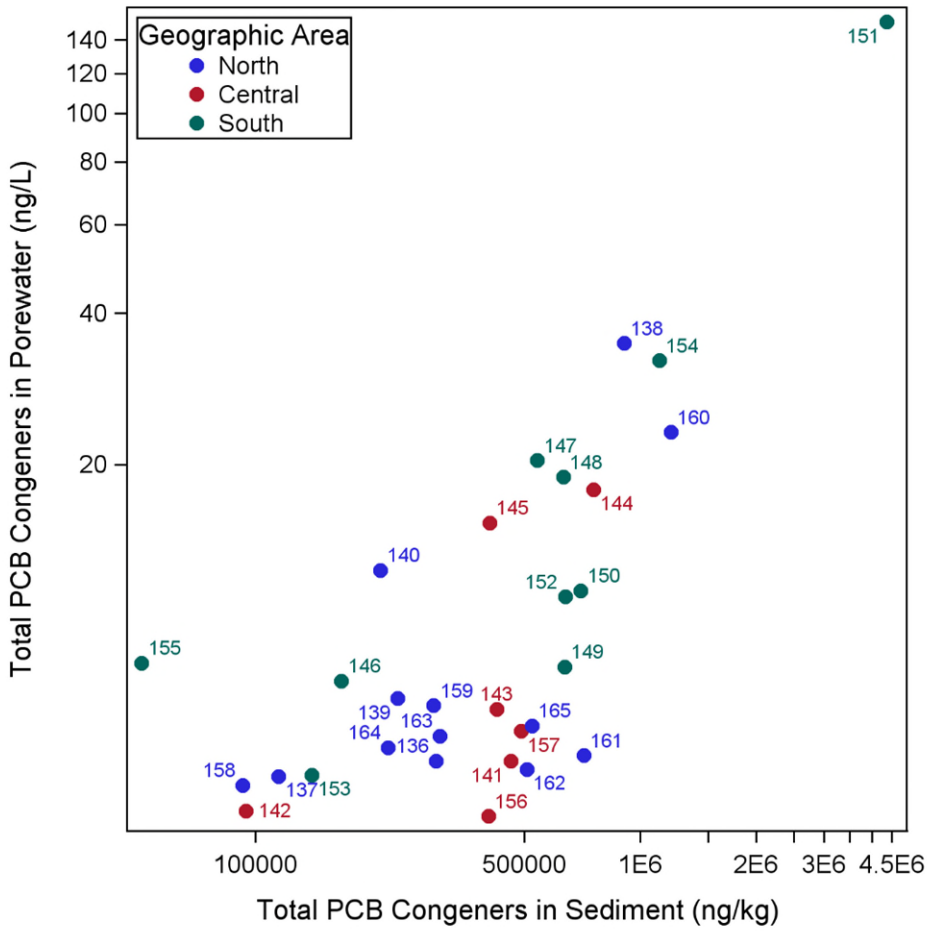
Notes:
Non-detects included at the 1/2 reporting limit for mean and standard deviation estimates.
Non-detects evaluated at full reporting limit for median estimate and reported as < reporting limit where frequency of detection is less than 50%.
Selected Chemicals include those with sediment quality guidelines and of potential concern to benthic invertebrates.

Acronyms and Abbreviations:
BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Total DDx = sum of DDE, DDD, and DDT
% = percent
< = less than
µg/kg = micrograms per kilogram

ATTACHMENT A-4

Porewater vs. Sediment Concentrations





NOTES:

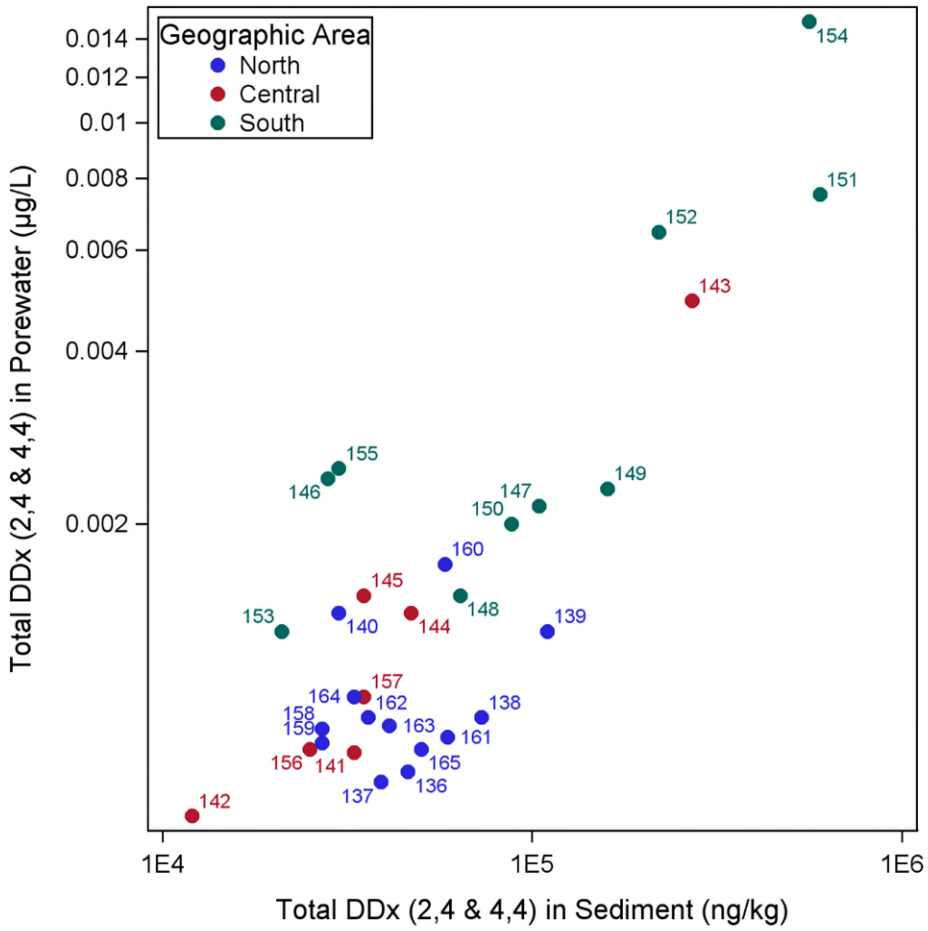
ng/kg = nanograms per kilogram
ng/L = nanograms per liter
PCB = polychlorinated biphenyl
pg/L = picograms per liter
TCDD = tetrachlorodibenzo-p-dioxin

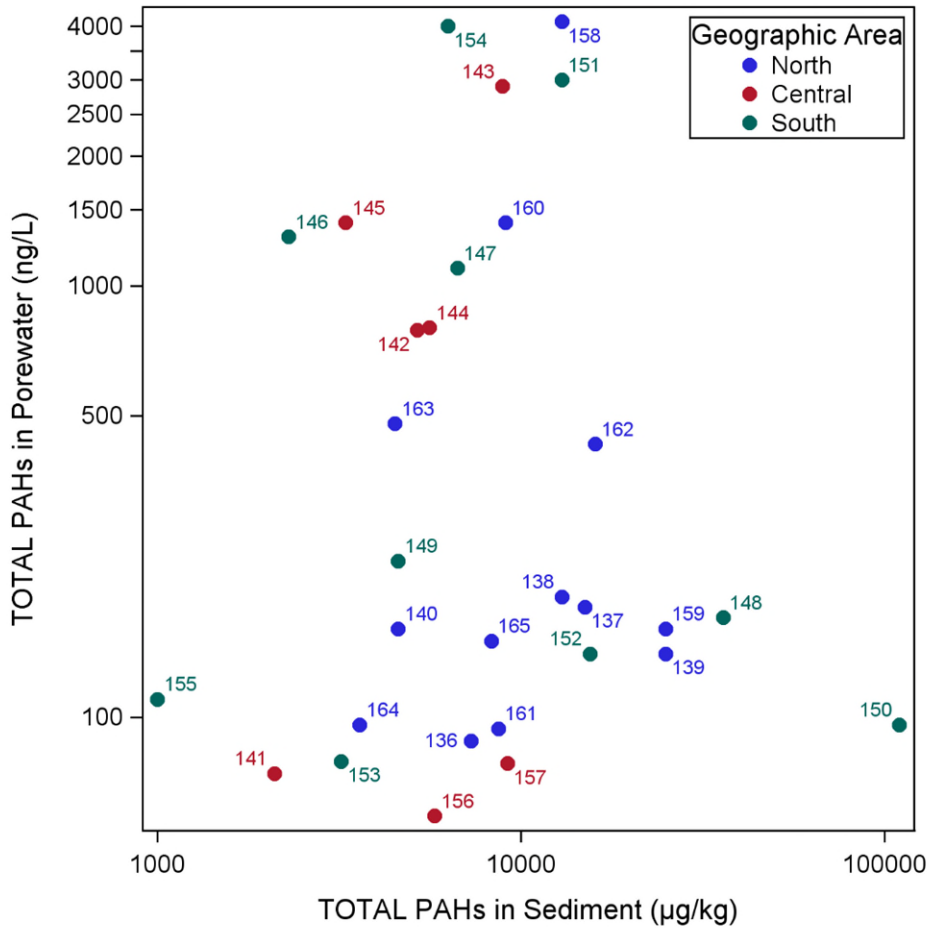
DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

Porewater versus Sediment Concentration: 2,3,7,8-TCDD and Total PCBs

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
A-4-1





NOTES:

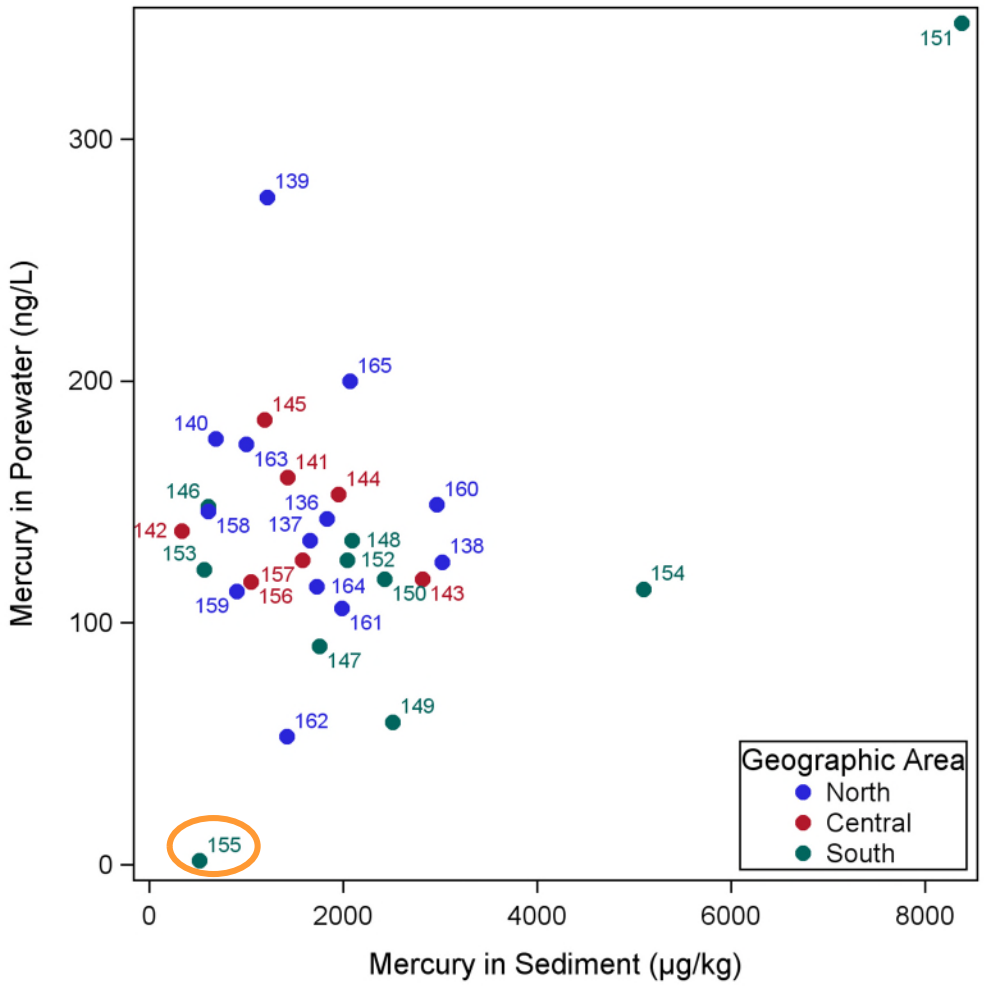
Total DDx = sum of 6 isomers of dichlorodiphenyltrichloroethane
ng/L = nanograms per liter
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
µg/L = micrograms per liter
µg/kg = micrograms per kilogram

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

Porewater versus Sediment Concentration: DDx and PAHs

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
A-4-2



NOTES:

Mercury detected in sediment only. Value plotted at the reporting limit for porewater.

ng/L = nanograms per liter
µg/kg = micrograms per kilogram

DIAMOND ALKALI SUPERFUND SITE
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION
BASELINE ECOLOGICAL RISK ASSESSMENT

Porewater versus Sediment Concentration: Mercury

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

FIGURE
A-4-3

ATTACHMENT A-5

Historical SQT Data for the NBSA

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB025	AVS-SEM	AVS	mmol	11.24	1
REMAP 1993/94	NB025	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB025	AVS-SEM	SEM Cd	ppm	1.1	1
REMAP 1993/94	NB025	AVS-SEM	SEM Cu	mmol	0.07	1
REMAP 1993/94	NB025	AVS-SEM	SEM Cu	ppm	4.4	1
REMAP 1993/94	NB025	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB025	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB025	AVS-SEM	SEM Ni	mmol	0.11	1
REMAP 1993/94	NB025	AVS-SEM	SEM Ni	ppm	6.7	1
REMAP 1993/94	NB025	AVS-SEM	SEM Pb	mmol	0.43	1
REMAP 1993/94	NB025	AVS-SEM	SEM Pb	ppm	89.9	1
REMAP 1993/94	NB025	AVS-SEM	SEM Zn	mmol	1.59	1
REMAP 1993/94	NB025	AVS-SEM	SEM Zn	ppm	103.9	1
REMAP 1993/94	NB025	Butyltins	Dibutyltin	ppb	22	1
REMAP 1993/94	NB025	Butyltins	Monobutyltin	ppb	8	1
REMAP 1993/94	NB025	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB025	Butyltins	Tributyltin	ppb	39	1
REMAP 1993/94	NB025	Metals	Aluminum	ppm	61646	1
REMAP 1993/94	NB025	Metals	Antimony	ppm	1.1	1
REMAP 1993/94	NB025	Metals	Arsenic	ppm	10.82	1
REMAP 1993/94	NB025	Metals	Cadmium	ppm	1.74	1
REMAP 1993/94	NB025	Metals	Chromium	ppm	165.9	1
REMAP 1993/94	NB025	Metals	Copper	ppm	110.2	1
REMAP 1993/94	NB025	Metals	Iron	ppm	30666	1
REMAP 1993/94	NB025	Metals	Lead	ppm	127.3	1
REMAP 1993/94	NB025	Metals	Mangenese	ppm	507	1
REMAP 1993/94	NB025	Metals	Mercury	ppm	2.54	1
REMAP 1993/94	NB025	Metals	Nickel	ppm	38.33	1
REMAP 1993/94	NB025	Metals	Selinium	ppm	0.69	1
REMAP 1993/94	NB025	Metals	Silicon	ppm	310612	1
REMAP 1993/94	NB025	Metals	Silver	ppm	2.13	1
REMAP 1993/94	NB025	Metals	Tin	ppm	16.31	1
REMAP 1993/94	NB025	Metals	Zinc	ppm	210	1
REMAP 1993/94	NB025	Metals (partial)	Aluminum partial	ppm	13200	1
REMAP 1993/94	NB025	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB025	Metals (partial)	Arsenic partial	ppm	7.9	1
REMAP 1993/94	NB025	Metals (partial)	Cadmium partial	ppm	1.5	1
REMAP 1993/94	NB025	Metals (partial)	Chromium partial	ppm	111	1
REMAP 1993/94	NB025	Metals (partial)	Copper partial	ppm	100	1
REMAP 1993/94	NB025	Metals (partial)	Iron partial	ppm	23800	1
REMAP 1993/94	NB025	Metals (partial)	Lead partial	ppm	104	1
REMAP 1993/94	NB025	Metals (partial)	Manganese partial	ppm	354	1
REMAP 1993/94	NB025	Metals (partial)	Mercury partial	ppm	2.55	1
REMAP 1993/94	NB025	Metals (partial)	Nickel partial	ppm	29	1
REMAP 1993/94	NB025	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB025	Metals (partial)	Silver partial	ppm	3.8	1
REMAP 1993/94	NB025	Metals (partial)	Zinc partial	ppm	169	1
REMAP 1993/94	NB025	Pesticides	Aldrin	ppb	0.48	1
REMAP 1993/94	NB025	Pesticides	Alpha-chlordane	ppb	2.32	1
REMAP 1993/94	NB025	Pesticides	Dieldrin	ppb	2	1
REMAP 1993/94	NB025	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB025	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB025	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB025	Pesticides	Hexachlorobenzene	ppb	3.88	1
REMAP 1993/94	NB025	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB025	Pesticides	Mirex	ppb	0.95	1
REMAP 1993/94	NB025	Pesticides	o,p, DDD	ppb	3.07	1
REMAP 1993/94	NB025	Pesticides	o,p, DDE	ppb	4.68	1
REMAP 1993/94	NB025	Pesticides	o,p, DDT	ppb	1.06	1
REMAP 1993/94	NB025	Pesticides	p,p, DDD	ppb	18.22	1
REMAP 1993/94	NB025	Pesticides	p,p, DDE	ppb	17.07	1
REMAP 1993/94	NB025	Pesticides	p,p, DDT	ppb	3.95	1
REMAP 1993/94	NB025	Pesticides	Total Chlordane	ppb	11.48	1
REMAP 1993/94	NB025	Pesticides	Total DDT	ppb	48.06	1
REMAP 1993/94	NB025	Pesticides	Total DDx (2,4 & 4,4)	ppb	48.05	1
REMAP 1993/94	NB025	Pesticides	Total DDx (4,4)	ppb	39.24	1
REMAP 1993/94	NB025	Pesticides	Trans-Nonachlor	ppb	1.67	1
REMAP 1993/94	NB025	PAHs	1-Methylnaphthalene	ppb	40	1
REMAP 1993/94	NB025	PAHs	1-Methylphenanthrene	ppb	220	1
REMAP 1993/94	NB025	PAHs	2,3,5 Trimethylnaphthalene	ppb	63	1
REMAP 1993/94	NB025	PAHs	2,6-Dimethylnaphthalene	ppb	67	1
REMAP 1993/94	NB025	PAHs	2-Methylnaphthalene	ppb	88	1
REMAP 1993/94	NB025	PAHs	Acenaphthene	ppb	110	1
REMAP 1993/94	NB025	PAHs	Acenaphthylene	ppb	240	1
REMAP 1993/94	NB025	PAHs	Anthracene	ppb	530	1
REMAP 1993/94	NB025	PAHs	Benzo[a]anthracene	ppb	1300	1
REMAP 1993/94	NB025	PAHs	Benzo[a]pyrene	ppb	1200	1
REMAP 1993/94	NB025	PAHs	Benzo[b,k]fluoranthene	ppb	2250	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB025	PAHs	Benzo[e]pyrene	ppb	920	1
REMAP 1993/94	NB025	PAHs	Benzo[g,h,i]perylene	ppb	780	1
REMAP 1993/94	NB025	PAHs	Biphenyl	ppb	29	1
REMAP 1993/94	NB025	PAHs	Chrysene	ppb	1300	1
REMAP 1993/94	NB025	PAHs	Dibenz[a,h]anthracene	ppb	160	1
REMAP 1993/94	NB025	PAHs	Fluoranthene	ppb	2000	1
REMAP 1993/94	NB025	PAHs	Fluorene	ppb	110	1
REMAP 1993/94	NB025	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	820	1
REMAP 1993/94	NB025	PAHs	Naphthalene	ppb	250	1
REMAP 1993/94	NB025	PAHs	Perylene	ppb	350	1
REMAP 1993/94	NB025	PAHs	Phenanthrene	ppb	630	1
REMAP 1993/94	NB025	PAHs	Pyrene	ppb	1700	1
REMAP 1993/94	NB025	PAHs	Total HMW PAHs	ppb	11510	1
REMAP 1993/94	NB025	PAHs	Total LMW PAHs	ppb	1958	1
REMAP 1993/94	NB025	PAHs	Total PAHs	ppb	13468	1
REMAP 1993/94	NB025	PCBs	PCB Congener 101	ppb	11.69	1
REMAP 1993/94	NB025	PCBs	PCB Congener 105	ppb	7.36	1
REMAP 1993/94	NB025	PCBs	PCB Congener 118	ppb	12.47	1
REMAP 1993/94	NB025	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB025	PCBs	PCB Congener 128	ppb	1.23	1
REMAP 1993/94	NB025	PCBs	PCB Congener 138	ppb	10.43	1
REMAP 1993/94	NB025	PCBs	PCB Congener 153	ppb	9.65	1
REMAP 1993/94	NB025	PCBs	PCB Congener 179	ppb	7.4	1
REMAP 1993/94	NB025	PCBs	PCB Congener 18	ppb	11.47	1
REMAP 1993/94	NB025	PCBs	PCB Congener 180	ppb	6.13	1
REMAP 1993/94	NB025	PCBs	PCB Congener 187	ppb	3.77	1
REMAP 1993/94	NB025	PCBs	PCB Congener 195	ppb	0.88	1
REMAP 1993/94	NB025	PCBs	PCB Congener 206	ppb	2.39	1
REMAP 1993/94	NB025	PCBs	PCB Congener 209	ppb	1.48	1
REMAP 1993/94	NB025	PCBs	PCB Congener 28	ppb	21.46	1
REMAP 1993/94	NB025	PCBs	PCB Congener 44	ppb	10.2	1
REMAP 1993/94	NB025	PCBs	PCB Congener 52	ppb	16.02	1
REMAP 1993/94	NB025	PCBs	PCB Congener 66	ppb	14.45	1
REMAP 1993/94	NB025	PCBs	PCB Congener 8	ppb	0	0
REMAP 1993/94	NB025	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	296.96	1
REMAP 1993/94	NB025	TOC	Total Organic Carbon	ppm	12200	1
REMAP 1993/94	NB027	AVS-SEM	AVS	mmol	7.57	1
REMAP 1993/94	NB027	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB027	AVS-SEM	SEM Cd	ppm	1.5	1
REMAP 1993/94	NB027	AVS-SEM	SEM Cu	mmol	0.5	1
REMAP 1993/94	NB027	AVS-SEM	SEM Cu	ppm	31.5	1
REMAP 1993/94	NB027	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB027	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB027	AVS-SEM	SEM Ni	mmol	0.13	1
REMAP 1993/94	NB027	AVS-SEM	SEM Ni	ppm	7.7	1
REMAP 1993/94	NB027	AVS-SEM	SEM Pb	mmol	0.55	1
REMAP 1993/94	NB027	AVS-SEM	SEM Pb	ppm	114.5	1
REMAP 1993/94	NB027	AVS-SEM	SEM Zn	mmol	2.13	1
REMAP 1993/94	NB027	AVS-SEM	SEM Zn	ppm	139.3	1
REMAP 1993/94	NB027	Butyltins	Dibutyltin	ppb	20	1
REMAP 1993/94	NB027	Butyltins	Monobutyltin	ppb	6	1
REMAP 1993/94	NB027	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB027	Butyltins	Tributyltin	ppb	38	1
REMAP 1993/94	NB027	Metals	Aluminum	ppm	58898	1
REMAP 1993/94	NB027	Metals	Antimony	ppm	1.4	1
REMAP 1993/94	NB027	Metals	Arsenic	ppm	10.59	1
REMAP 1993/94	NB027	Metals	Cadmium	ppm	2.76	1
REMAP 1993/94	NB027	Metals	Chromium	ppm	155	1
REMAP 1993/94	NB027	Metals	Copper	ppm	111.7	1
REMAP 1993/94	NB027	Metals	Iron	ppm	29970	1
REMAP 1993/94	NB027	Metals	Lead	ppm	141.4	1
REMAP 1993/94	NB027	Metals	Mangenese	ppm	458	1
REMAP 1993/94	NB027	Metals	Mercury	ppm	2.87	1
REMAP 1993/94	NB027	Metals	Nickel	ppm	42.52	1
REMAP 1993/94	NB027	Metals	Selinium	ppm	0.71	1
REMAP 1993/94	NB027	Metals	Silicon	ppm	322022	1
REMAP 1993/94	NB027	Metals	Silver	ppm	2.14	1
REMAP 1993/94	NB027	Metals	Tin	ppm	16.77	1
REMAP 1993/94	NB027	Metals	Zinc	ppm	235	1
REMAP 1993/94	NB027	Metals (partial)	Aluminum partial	ppm	11600	1
REMAP 1993/94	NB027	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB027	Metals (partial)	Arsenic partial	ppm	7.4	1
REMAP 1993/94	NB027	Metals (partial)	Cadmium partial	ppm	1.6	1
REMAP 1993/94	NB027	Metals (partial)	Chromium partial	ppm	114	1
REMAP 1993/94	NB027	Metals (partial)	Copper partial	ppm	105	1
REMAP 1993/94	NB027	Metals (partial)	Iron partial	ppm	21600	1
REMAP 1993/94	NB027	Metals (partial)	Lead partial	ppm	122	1
REMAP 1993/94	NB027	Metals (partial)	Manganese partial	ppm	302	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB027	Metals (partial)	Mercury partial	ppm	2.72	1
REMAP 1993/94	NB027	Metals (partial)	Nickel partial	ppm	34	1
REMAP 1993/94	NB027	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB027	Metals (partial)	Silver partial	ppm	3.1	1
REMAP 1993/94	NB027	Metals (partial)	Zinc partial	ppm	190	1
REMAP 1993/94	NB027	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB027	Pesticides	Alpha-chlordane	ppb	3.27	1
REMAP 1993/94	NB027	Pesticides	Dieldrin	ppb	3	1
REMAP 1993/94	NB027	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB027	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB027	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB027	Pesticides	Hexachlorobenzene	ppb	3.08	1
REMAP 1993/94	NB027	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB027	Pesticides	Mirex	ppb	1.88	1
REMAP 1993/94	NB027	Pesticides	o,p, DDD	ppb	4.87	1
REMAP 1993/94	NB027	Pesticides	o,p, DDE	ppb	7.81	1
REMAP 1993/94	NB027	Pesticides	o,p, DDT	ppb	1.78	1
REMAP 1993/94	NB027	Pesticides	p,p, DDD	ppb	28.35	1
REMAP 1993/94	NB027	Pesticides	p,p, DDE	ppb	25.79	1
REMAP 1993/94	NB027	Pesticides	p,p, DDT	ppb	87.69	1
REMAP 1993/94	NB027	Pesticides	Total Chlordane	ppb	17.03	1
REMAP 1993/94	NB027	Pesticides	Total DDT	ppb	156.3	1
REMAP 1993/94	NB027	Pesticides	Total DDx (2,4 & 4,4)	ppb	156.29	1
REMAP 1993/94	NB027	Pesticides	Total DDx (4,4)	ppb	141.83	1
REMAP 1993/94	NB027	Pesticides	Trans-Nonachlor	ppb	1.94	1
REMAP 1993/94	NB027	PAHs	1-Methylnaphthalene	ppb	58	1
REMAP 1993/94	NB027	PAHs	1-Methylphenanthrene	ppb	360	1
REMAP 1993/94	NB027	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB027	PAHs	2,6-Dimethylnaphthalene	ppb	96	1
REMAP 1993/94	NB027	PAHs	2-Methylnaphthalene	ppb	110	1
REMAP 1993/94	NB027	PAHs	Acenaphthene	ppb	200	1
REMAP 1993/94	NB027	PAHs	Acenaphthylene	ppb	430	1
REMAP 1993/94	NB027	PAHs	Anthracene	ppb	920	1
REMAP 1993/94	NB027	PAHs	Benzo[a]anthracene	ppb	2300	1
REMAP 1993/94	NB027	PAHs	Benzo[a]pyrene	ppb	2000	1
REMAP 1993/94	NB027	PAHs	Benzo[b,k]fluoranthene	ppb	3700	1
REMAP 1993/94	NB027	PAHs	Benzo[e]pyrene	ppb	1500	1
REMAP 1993/94	NB027	PAHs	Benzo[g,h,i]perylene	ppb	1700	1
REMAP 1993/94	NB027	PAHs	Biphenyl	ppb	41	1
REMAP 1993/94	NB027	PAHs	Chrysene	ppb	2300	1
REMAP 1993/94	NB027	PAHs	Dibenz[a,h]anthracene	ppb	0	0
REMAP 1993/94	NB027	PAHs	Fluoranthene	ppb	3400	1
REMAP 1993/94	NB027	PAHs	Fluorene	ppb	92	1
REMAP 1993/94	NB027	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	1300	1
REMAP 1993/94	NB027	PAHs	Naphthalene	ppb	350	1
REMAP 1993/94	NB027	PAHs	Perylene	ppb	530	1
REMAP 1993/94	NB027	PAHs	Phenanthrene	ppb	1000	1
REMAP 1993/94	NB027	PAHs	Pyrene	ppb	2900	1
REMAP 1993/94	NB027	PAHs	Total HMW PAHs	ppb	19600	1
REMAP 1993/94	NB027	PAHs	Total LMW PAHs	ppb	3102	1
REMAP 1993/94	NB027	PAHs	Total PAHs	ppb	22702	1
REMAP 1993/94	NB027	PCBs	PCB Congener 101	ppb	17.3	1
REMAP 1993/94	NB027	PCBs	PCB Congener 105	ppb	10.68	1
REMAP 1993/94	NB027	PCBs	PCB Congener 118	ppb	19.3	1
REMAP 1993/94	NB027	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB027	PCBs	PCB Congener 128	ppb	1.96	1
REMAP 1993/94	NB027	PCBs	PCB Congener 138	ppb	16.37	1
REMAP 1993/94	NB027	PCBs	PCB Congener 153	ppb	15.11	1
REMAP 1993/94	NB027	PCBs	PCB Congener 179	ppb	7.67	1
REMAP 1993/94	NB027	PCBs	PCB Congener 18	ppb	18.12	1
REMAP 1993/94	NB027	PCBs	PCB Congener 180	ppb	9.9	1
REMAP 1993/94	NB027	PCBs	PCB Congener 187	ppb	5.85	1
REMAP 1993/94	NB027	PCBs	PCB Congener 195	ppb	1.36	1
REMAP 1993/94	NB027	PCBs	PCB Congener 206	ppb	3.36	1
REMAP 1993/94	NB027	PCBs	PCB Congener 209	ppb	1.8	1
REMAP 1993/94	NB027	PCBs	PCB Congener 28	ppb	32.2	1
REMAP 1993/94	NB027	PCBs	PCB Congener 44	ppb	15.62	1
REMAP 1993/94	NB027	PCBs	PCB Congener 52	ppb	24.81	1
REMAP 1993/94	NB027	PCBs	PCB Congener 66	ppb	21.79	1
REMAP 1993/94	NB027	PCBs	PCB Congener 8	ppb	0	0
REMAP 1993/94	NB027	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	446.4	1
REMAP 1993/94	NB027	TOC	Total Organic Carbon	ppm	12500	1
REMAP 1993/94	NB036	AVS-SEM	AVS	mmol	4.82	1
REMAP 1993/94	NB036	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB036	AVS-SEM	SEM Cd	ppm	1.3	1
REMAP 1993/94	NB036	AVS-SEM	SEM Cu	mmol	0.68	1
REMAP 1993/94	NB036	AVS-SEM	SEM Cu	ppm	43.4	1
REMAP 1993/94	NB036	AVS-SEM	SEM Hg	ppm	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB036	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB036	AVS-SEM	SEM Ni	mmol	0.13	1
REMAP 1993/94	NB036	AVS-SEM	SEM Ni	ppm	7.6	1
REMAP 1993/94	NB036	AVS-SEM	SEM Pb	mmol	0.57	1
REMAP 1993/94	NB036	AVS-SEM	SEM Pb	ppm	119	1
REMAP 1993/94	NB036	AVS-SEM	SEM Zn	mmol	1.99	1
REMAP 1993/94	NB036	AVS-SEM	SEM Zn	ppm	130.3	1
REMAP 1993/94	NB036	Butyltins	Dibutyltin	ppb	32	1
REMAP 1993/94	NB036	Butyltins	Monobutyltin	ppb	11	1
REMAP 1993/94	NB036	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB036	Butyltins	Tributyltin	ppb	47	1
REMAP 1993/94	NB036	Metals	Aluminum	ppm	68491	1
REMAP 1993/94	NB036	Metals	Antimony	ppm	2.08	1
REMAP 1993/94	NB036	Metals	Arsenic	ppm	10.58	1
REMAP 1993/94	NB036	Metals	Cadmium	ppm	1.51	1
REMAP 1993/94	NB036	Metals	Chromium	ppm	180.6	1
REMAP 1993/94	NB036	Metals	Copper	ppm	126.72	1
REMAP 1993/94	NB036	Metals	Iron	ppm	33980	1
REMAP 1993/94	NB036	Metals	Lead	ppm	142	1
REMAP 1993/94	NB036	Metals	Mangenese	ppm	532	1
REMAP 1993/94	NB036	Metals	Mercury	ppm	2.94	1
REMAP 1993/94	NB036	Metals	Nickel	ppm	44.86	1
REMAP 1993/94	NB036	Metals	Selinium	ppm	0.85	1
REMAP 1993/94	NB036	Metals	Silicon	ppm	301241	1
REMAP 1993/94	NB036	Metals	Silver	ppm	3.58	1
REMAP 1993/94	NB036	Metals	Tin	ppm	19.05	1
REMAP 1993/94	NB036	Metals	Zinc	ppm	235	1
REMAP 1993/94	NB036	Metals (partial)	Aluminum partial	ppm	10200	1
REMAP 1993/94	NB036	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB036	Metals (partial)	Arsenic partial	ppm	8.2	1
REMAP 1993/94	NB036	Metals (partial)	Cadmium partial	ppm	0	0
REMAP 1993/94	NB036	Metals (partial)	Chromium partial	ppm	102	1
REMAP 1993/94	NB036	Metals (partial)	Copper partial	ppm	101	1
REMAP 1993/94	NB036	Metals (partial)	Iron partial	ppm	21600	1
REMAP 1993/94	NB036	Metals (partial)	Lead partial	ppm	111	1
REMAP 1993/94	NB036	Metals (partial)	Manganese partial	ppm	284	1
REMAP 1993/94	NB036	Metals (partial)	Mercury partial	ppm	2.28	1
REMAP 1993/94	NB036	Metals (partial)	Nickel partial	ppm	32	1
REMAP 1993/94	NB036	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB036	Metals (partial)	Silver partial	ppm	3.8	1
REMAP 1993/94	NB036	Metals (partial)	Zinc partial	ppm	165	1
REMAP 1993/94	NB036	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB036	Pesticides	Alpha-chlordane	ppb	14.74	1
REMAP 1993/94	NB036	Pesticides	Dieldrin	ppb	4.28	1
REMAP 1993/94	NB036	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB036	Pesticides	Heptachlor	ppb	1.5	1
REMAP 1993/94	NB036	Pesticides	Heptachlor Epoxide	ppb	0.23	1
REMAP 1993/94	NB036	Pesticides	Hexachlorobenzene	ppb	5.73	1
REMAP 1993/94	NB036	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB036	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB036	Pesticides	o,p, DDD	ppb	29.74	1
REMAP 1993/94	NB036	Pesticides	o,p, DDE	ppb	16.54	1
REMAP 1993/94	NB036	Pesticides	o,p, DDT	ppb	13.02	1
REMAP 1993/94	NB036	Pesticides	p,p, DDD	ppb	147.17	1
REMAP 1993/94	NB036	Pesticides	p,p, DDE	ppb	115.03	1
REMAP 1993/94	NB036	Pesticides	p,p, DDT	ppb	57.95	1
REMAP 1993/94	NB036	Pesticides	Total Chlordane	ppb	41.91	1
REMAP 1993/94	NB036	Pesticides	Total DDT	ppb	379.45	1
REMAP 1993/94	NB036	Pesticides	Total DDx (2,4 & 4,4)	ppb	379.45	1
REMAP 1993/94	NB036	Pesticides	Total DDx (4,4)	ppb	320.15	1
REMAP 1993/94	NB036	Pesticides	Trans-Nonachlor	ppb	8.11	1
REMAP 1993/94	NB036	PAHs	1-Methylnaphthalene	ppb	49	1
REMAP 1993/94	NB036	PAHs	1-Methylphenanthrene	ppb	140	1
REMAP 1993/94	NB036	PAHs	2,3,5 Trimethylnaphthalene	ppb	39	1
REMAP 1993/94	NB036	PAHs	2,6-Dimethylnaphthalene	ppb	220	1
REMAP 1993/94	NB036	PAHs	2-Methylnaphthalene	ppb	110	1
REMAP 1993/94	NB036	PAHs	Acenaphthene	ppb	76	1
REMAP 1993/94	NB036	PAHs	Acenaphthylene	ppb	320	1
REMAP 1993/94	NB036	PAHs	Anthracene	ppb	440	1
REMAP 1993/94	NB036	PAHs	Benzo[a]anthracene	ppb	870	1
REMAP 1993/94	NB036	PAHs	Benzo[a]pyrene	ppb	930	1
REMAP 1993/94	NB036	PAHs	Benzo[b,k]fluoranthene	ppb	1860	1
REMAP 1993/94	NB036	PAHs	Benzo[e]pyrene	ppb	720	1
REMAP 1993/94	NB036	PAHs	Benzo[g,h,i]perylene	ppb	510	1
REMAP 1993/94	NB036	PAHs	Biphenyl	ppb	54	1
REMAP 1993/94	NB036	PAHs	Chrysene	ppb	1100	1
REMAP 1993/94	NB036	PAHs	Dibenz[a,h]anthracene	ppb	160	1
REMAP 1993/94	NB036	PAHs	Fluoranthene	ppb	900	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB036	PAHs	Fluorene	ppb	130	1
REMAP 1993/94	NB036	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	550	1
REMAP 1993/94	NB036	PAHs	Naphthalene	ppb	260	1
REMAP 1993/94	NB036	PAHs	Perylene	ppb	300	1
REMAP 1993/94	NB036	PAHs	Phenanthrene	ppb	430	1
REMAP 1993/94	NB036	PAHs	Pyrene	ppb	1000	1
REMAP 1993/94	NB036	PAHs	Total HMW PAHs	ppb	7880	1
REMAP 1993/94	NB036	PAHs	Total LMW PAHs	ppb	1766	1
REMAP 1993/94	NB036	PAHs	Total PAHs	ppb	9646	1
REMAP 1993/94	NB036	PCBs	PCB Congener 101	ppb	77.57	1
REMAP 1993/94	NB036	PCBs	PCB Congener 105	ppb	20.2	1
REMAP 1993/94	NB036	PCBs	PCB Congener 110/77	ppb	168	1
REMAP 1993/94	NB036	PCBs	PCB Congener 118	ppb	64.7	1
REMAP 1993/94	NB036	PCBs	PCB Congener 126	ppb	26.16	1
REMAP 1993/94	NB036	PCBs	PCB Congener 128	ppb	9.89	1
REMAP 1993/94	NB036	PCBs	PCB Congener 138	ppb	77.06	1
REMAP 1993/94	NB036	PCBs	PCB Congener 153	ppb	114.12	1
REMAP 1993/94	NB036	PCBs	PCB Congener 179	ppb	0	0
REMAP 1993/94	NB036	PCBs	PCB Congener 18	ppb	34.88	1
REMAP 1993/94	NB036	PCBs	PCB Congener 180	ppb	47.24	1
REMAP 1993/94	NB036	PCBs	PCB Congener 187	ppb	23.17	1
REMAP 1993/94	NB036	PCBs	PCB Congener 195	ppb	5.28	1
REMAP 1993/94	NB036	PCBs	PCB Congener 206	ppb	9.97	1
REMAP 1993/94	NB036	PCBs	PCB Congener 209	ppb	13.45	1
REMAP 1993/94	NB036	PCBs	PCB Congener 28	ppb	83.95	1
REMAP 1993/94	NB036	PCBs	PCB Congener 44	ppb	53.09	1
REMAP 1993/94	NB036	PCBs	PCB Congener 52	ppb	89.42	1
REMAP 1993/94	NB036	PCBs	PCB Congener 66	ppb	66.93	1
REMAP 1993/94	NB036	PCBs	PCB Congener 8	ppb	7.74	1
REMAP 1993/94	NB036	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	1985.64	1
REMAP 1993/94	NB036	TOC	Total Organic Carbon	ppm	10500	1
REMAP 1993/94	NB039	AVS-SEM	AVS	mmol	3.98	1
REMAP 1993/94	NB039	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB039	AVS-SEM	SEM Cd	ppm	1.3	1
REMAP 1993/94	NB039	AVS-SEM	SEM Cu	mmol	0.81	1
REMAP 1993/94	NB039	AVS-SEM	SEM Cu	ppm	51.5	1
REMAP 1993/94	NB039	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB039	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB039	AVS-SEM	SEM Ni	mmol	0.12	1
REMAP 1993/94	NB039	AVS-SEM	SEM Ni	ppm	6.8	1
REMAP 1993/94	NB039	AVS-SEM	SEM Pb	mmol	0.55	1
REMAP 1993/94	NB039	AVS-SEM	SEM Pb	ppm	113.5	1
REMAP 1993/94	NB039	AVS-SEM	SEM Zn	mmol	1.96	1
REMAP 1993/94	NB039	AVS-SEM	SEM Zn	ppm	128	1
REMAP 1993/94	NB039	Butyltins	Dibutyltin	ppb	25	1
REMAP 1993/94	NB039	Butyltins	Monobutyltin	ppb	8	1
REMAP 1993/94	NB039	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB039	Butyltins	Tributyltin	ppb	39	1
REMAP 1993/94	NB039	Metals	Aluminum	ppm	66445	1
REMAP 1993/94	NB039	Metals	Antimony	ppm	3.66	1
REMAP 1993/94	NB039	Metals	Arsenic	ppm	11.79	1
REMAP 1993/94	NB039	Metals	Cadmium	ppm	2.8	1
REMAP 1993/94	NB039	Metals	Chromium	ppm	230	1
REMAP 1993/94	NB039	Metals	Copper	ppm	145.97	1
REMAP 1993/94	NB039	Metals	Iron	ppm	32544	1
REMAP 1993/94	NB039	Metals	Lead	ppm	163.9	1
REMAP 1993/94	NB039	Metals	Mangenese	ppm	474	1
REMAP 1993/94	NB039	Metals	Mercury	ppm	3.91	1
REMAP 1993/94	NB039	Metals	Nickel	ppm	52.58	1
REMAP 1993/94	NB039	Metals	Selinium	ppm	0.93	1
REMAP 1993/94	NB039	Metals	Silicon	ppm	305749	1
REMAP 1993/94	NB039	Metals	Silver	ppm	3.28	1
REMAP 1993/94	NB039	Metals	Tin	ppm	20.77	1
REMAP 1993/94	NB039	Metals	Zinc	ppm	267	1
REMAP 1993/94	NB039	Metals (partial)	Aluminum partial	ppm	13000	1
REMAP 1993/94	NB039	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB039	Metals (partial)	Arsenic partial	ppm	12	1
REMAP 1993/94	NB039	Metals (partial)	Cadmium partial	ppm	2.2	1
REMAP 1993/94	NB039	Metals (partial)	Chromium partial	ppm	147	1
REMAP 1993/94	NB039	Metals (partial)	Copper partial	ppm	140	1
REMAP 1993/94	NB039	Metals (partial)	Iron partial	ppm	24700	1
REMAP 1993/94	NB039	Metals (partial)	Lead partial	ppm	149	1
REMAP 1993/94	NB039	Metals (partial)	Manganese partial	ppm	331	1
REMAP 1993/94	NB039	Metals (partial)	Mercury partial	ppm	2.7	1
REMAP 1993/94	NB039	Metals (partial)	Nickel partial	ppm	37	1
REMAP 1993/94	NB039	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB039	Metals (partial)	Silver partial	ppm	5	1
REMAP 1993/94	NB039	Metals (partial)	Zinc partial	ppm	209	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB039	Pesticides	Aldrin	ppb	0.25	1
REMAP 1993/94	NB039	Pesticides	Alpha-chlordane	ppb	3.67	1
REMAP 1993/94	NB039	Pesticides	Dieldrin	ppb	2.93	1
REMAP 1993/94	NB039	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB039	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB039	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB039	Pesticides	Hexachlorobenzene	ppb	2.65	1
REMAP 1993/94	NB039	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB039	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB039	Pesticides	o,p, DDD	ppb	2.88	1
REMAP 1993/94	NB039	Pesticides	o,p, DDE	ppb	6.87	1
REMAP 1993/94	NB039	Pesticides	o,p, DDT	ppb	1.71	1
REMAP 1993/94	NB039	Pesticides	p,p, DDD	ppb	24.88	1
REMAP 1993/94	NB039	Pesticides	p,p, DDE	ppb	25.98	1
REMAP 1993/94	NB039	Pesticides	p,p, DDT	ppb	2.74	1
REMAP 1993/94	NB039	Pesticides	Total Chlordane	ppb	16.57	1
REMAP 1993/94	NB039	Pesticides	Total DDT	ppb	65.07	1
REMAP 1993/94	NB039	Pesticides	Total DDx (2,4 & 4,4)	ppb	65.06	1
REMAP 1993/94	NB039	Pesticides	Total DDx (4,4)	ppb	53.6	1
REMAP 1993/94	NB039	Pesticides	Trans-Nonachlor	ppb	2.47	1
REMAP 1993/94	NB039	PAHs	1-Methylnaphthalene	ppb	56	1
REMAP 1993/94	NB039	PAHs	1-Methylphenanthrene	ppb	100	1
REMAP 1993/94	NB039	PAHs	2,3,5 Trimethylnaphthalene	ppb	66	1
REMAP 1993/94	NB039	PAHs	2,6-Dimethylnaphthalene	ppb	120	1
REMAP 1993/94	NB039	PAHs	2-Methylnaphthalene	ppb	100	1
REMAP 1993/94	NB039	PAHs	Acenaphthene	ppb	58	1
REMAP 1993/94	NB039	PAHs	Acenaphthylene	ppb	190	1
REMAP 1993/94	NB039	PAHs	Anthracene	ppb	260	1
REMAP 1993/94	NB039	PAHs	Benzo[a]anthracene	ppb	580	1
REMAP 1993/94	NB039	PAHs	Benzo[a]pyrene	ppb	700	1
REMAP 1993/94	NB039	PAHs	Benzo[b,k]fluoranthene	ppb	1330	1
REMAP 1993/94	NB039	PAHs	Benzo[e]pyrene	ppb	600	1
REMAP 1993/94	NB039	PAHs	Benzo[g,h,i]perylene	ppb	520	1
REMAP 1993/94	NB039	PAHs	Biphenyl	ppb	44	1
REMAP 1993/94	NB039	PAHs	Chrysene	ppb	660	1
REMAP 1993/94	NB039	PAHs	Dibenz[a,h]anthracene	ppb	120	1
REMAP 1993/94	NB039	PAHs	Fluoranthene	ppb	740	1
REMAP 1993/94	NB039	PAHs	Fluorene	ppb	74	1
REMAP 1993/94	NB039	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	500	1
REMAP 1993/94	NB039	PAHs	Naphthalene	ppb	250	1
REMAP 1993/94	NB039	PAHs	Perylene	ppb	230	1
REMAP 1993/94	NB039	PAHs	Phenanthrene	ppb	270	1
REMAP 1993/94	NB039	PAHs	Pyrene	ppb	900	1
REMAP 1993/94	NB039	PAHs	Total HMW PAHs	ppb	6050	1
REMAP 1993/94	NB039	PAHs	Total LMW PAHs	ppb	1202	1
REMAP 1993/94	NB039	PAHs	Total PAHs	ppb	7252	1
REMAP 1993/94	NB039	PCBs	PCB Congener 101	ppb	17.95	1
REMAP 1993/94	NB039	PCBs	PCB Congener 105	ppb	11.51	1
REMAP 1993/94	NB039	PCBs	PCB Congener 118	ppb	19.28	1
REMAP 1993/94	NB039	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB039	PCBs	PCB Congener 128	ppb	2.78	1
REMAP 1993/94	NB039	PCBs	PCB Congener 138	ppb	17.29	1
REMAP 1993/94	NB039	PCBs	PCB Congener 153	ppb	14.92	1
REMAP 1993/94	NB039	PCBs	PCB Congener 179	ppb	9.26	1
REMAP 1993/94	NB039	PCBs	PCB Congener 18	ppb	13.08	1
REMAP 1993/94	NB039	PCBs	PCB Congener 180	ppb	8.8	1
REMAP 1993/94	NB039	PCBs	PCB Congener 187	ppb	5.68	1
REMAP 1993/94	NB039	PCBs	PCB Congener 195	ppb	2.09	1
REMAP 1993/94	NB039	PCBs	PCB Congener 206	ppb	3.14	1
REMAP 1993/94	NB039	PCBs	PCB Congener 209	ppb	2.46	1
REMAP 1993/94	NB039	PCBs	PCB Congener 28	ppb	33.66	1
REMAP 1993/94	NB039	PCBs	PCB Congener 44	ppb	17.08	1
REMAP 1993/94	NB039	PCBs	PCB Congener 52	ppb	24.71	1
REMAP 1993/94	NB039	PCBs	PCB Congener 66	ppb	20.28	1
REMAP 1993/94	NB039	PCBs	PCB Congener 8	ppb	5.44	1
REMAP 1993/94	NB039	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	458.82	1
REMAP 1993/94	NB039	TOC	Total Organic Carbon	ppm	8770	1
REMAP 1993/94	NB044	AVS-SEM	AVS	mmol	20.27	1
REMAP 1993/94	NB044	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB044	AVS-SEM	SEM Cd	ppm	1.4	1
REMAP 1993/94	NB044	AVS-SEM	SEM Cu	mmol	0	0
REMAP 1993/94	NB044	AVS-SEM	SEM Cu	ppm	0.2	1
REMAP 1993/94	NB044	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB044	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB044	AVS-SEM	SEM Ni	mmol	0.12	1
REMAP 1993/94	NB044	AVS-SEM	SEM Ni	ppm	7.3	1
REMAP 1993/94	NB044	AVS-SEM	SEM Pb	mmol	0.37	1
REMAP 1993/94	NB044	AVS-SEM	SEM Pb	ppm	76.9	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB044	AVS-SEM	SEM Zn	mmol	1.96	1
REMAP 1993/94	NB044	AVS-SEM	SEM Zn	ppm	127.8	1
REMAP 1993/94	NB044	Butyltins	Dibutyltin	ppb	35	1
REMAP 1993/94	NB044	Butyltins	Monobutyltin	ppb	13	1
REMAP 1993/94	NB044	Butyltins	Tetrabutyltin	ppb	1	1
REMAP 1993/94	NB044	Butyltins	Tributyltin	ppb	58	1
REMAP 1993/94	NB044	Metals	Aluminum	ppm	63531	1
REMAP 1993/94	NB044	Metals	Antimony	ppm	2.42	1
REMAP 1993/94	NB044	Metals	Arsenic	ppm	16.03	1
REMAP 1993/94	NB044	Metals	Cadmium	ppm	3.44	1
REMAP 1993/94	NB044	Metals	Chromium	ppm	153.9	1
REMAP 1993/94	NB044	Metals	Copper	ppm	168.56	1
REMAP 1993/94	NB044	Metals	Iron	ppm	28929	1
REMAP 1993/94	NB044	Metals	Lead	ppm	196.2	1
REMAP 1993/94	NB044	Metals	Manganese	ppm	438	1
REMAP 1993/94	NB044	Metals	Mercury	ppm	3.8	1
REMAP 1993/94	NB044	Metals	Nickel	ppm	57	1
REMAP 1993/94	NB044	Metals	Selinium	ppm	1.13	1
REMAP 1993/94	NB044	Metals	Silicon	ppm	317291	1
REMAP 1993/94	NB044	Metals	Silver	ppm	2.92	1
REMAP 1993/94	NB044	Metals	Tin	ppm	18.96	1
REMAP 1993/94	NB044	Metals	Zinc	ppm	271	1
REMAP 1993/94	NB044	Metals (partial)	Aluminum partial	ppm	12000	1
REMAP 1993/94	NB044	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB044	Metals (partial)	Arsenic partial	ppm	15	1
REMAP 1993/94	NB044	Metals (partial)	Cadmium partial	ppm	3.2	1
REMAP 1993/94	NB044	Metals (partial)	Chromium partial	ppm	123	1
REMAP 1993/94	NB044	Metals (partial)	Copper partial	ppm	184	1
REMAP 1993/94	NB044	Metals (partial)	Iron partial	ppm	23100	1
REMAP 1993/94	NB044	Metals (partial)	Lead partial	ppm	160	1
REMAP 1993/94	NB044	Metals (partial)	Manganese partial	ppm	317	1
REMAP 1993/94	NB044	Metals (partial)	Mercury partial	ppm	4.17	1
REMAP 1993/94	NB044	Metals (partial)	Nickel partial	ppm	44	1
REMAP 1993/94	NB044	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB044	Metals (partial)	Silver partial	ppm	5	1
REMAP 1993/94	NB044	Metals (partial)	Zinc partial	ppm	243	1
REMAP 1993/94	NB044	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB044	Pesticides	Alpha-chlordane	ppb	2.58	1
REMAP 1993/94	NB044	Pesticides	Dieldrin	ppb	3.01	1
REMAP 1993/94	NB044	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB044	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB044	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB044	Pesticides	Hexachlorobenzene	ppb	2.96	1
REMAP 1993/94	NB044	Pesticides	Lindane - Gamma-BHC	ppb	0.65	1
REMAP 1993/94	NB044	Pesticides	Mirex	ppb	0.75	1
REMAP 1993/94	NB044	Pesticides	o,p, DDD	ppb	5.39	1
REMAP 1993/94	NB044	Pesticides	o,p, DDE	ppb	19.62	1
REMAP 1993/94	NB044	Pesticides	o,p, DDT	ppb	1.74	1
REMAP 1993/94	NB044	Pesticides	p,p, DDD	ppb	48.23	1
REMAP 1993/94	NB044	Pesticides	p,p, DDE	ppb	45.04	1
REMAP 1993/94	NB044	Pesticides	p,p, DDT	ppb	42.16	1
REMAP 1993/94	NB044	Pesticides	Total Chlordane	ppb	15.89	1
REMAP 1993/94	NB044	Pesticides	Total DDT	ppb	162.19	1
REMAP 1993/94	NB044	Pesticides	Total DDx (2,4 & 4,4)	ppb	162.18	1
REMAP 1993/94	NB044	Pesticides	Total DDx (4,4)	ppb	135.43	1
REMAP 1993/94	NB044	Pesticides	Trans-Nonachlor	ppb	1.61	1
REMAP 1993/94	NB044	PAHs	1-Methylnaphthalene	ppb	29	1
REMAP 1993/94	NB044	PAHs	1-Methylphenanthrene	ppb	140	1
REMAP 1993/94	NB044	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB044	PAHs	2,6-Dimethylnaphthalene	ppb	66	1
REMAP 1993/94	NB044	PAHs	2-Methylnaphthalene	ppb	69	1
REMAP 1993/94	NB044	PAHs	Acenaphthene	ppb	32	1
REMAP 1993/94	NB044	PAHs	Acenaphthylene	ppb	110	1
REMAP 1993/94	NB044	PAHs	Anthracene	ppb	210	1
REMAP 1993/94	NB044	PAHs	Benzo[a]anthracene	ppb	550	1
REMAP 1993/94	NB044	PAHs	Benzo[a]pyrene	ppb	570	1
REMAP 1993/94	NB044	PAHs	Benzo[b,k]fluoranthene	ppb	1140	1
REMAP 1993/94	NB044	PAHs	Benzo[e]pyrene	ppb	440	1
REMAP 1993/94	NB044	PAHs	Benzo[g,h,i]perylene	ppb	410	1
REMAP 1993/94	NB044	PAHs	Biphenyl	ppb	24	1
REMAP 1993/94	NB044	PAHs	Chrysene	ppb	580	1
REMAP 1993/94	NB044	PAHs	Dibenz[a,h]anthracene	ppb	87	1
REMAP 1993/94	NB044	PAHs	Fluoranthene	ppb	800	1
REMAP 1993/94	NB044	PAHs	Fluorene	ppb	68	1
REMAP 1993/94	NB044	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	430	1
REMAP 1993/94	NB044	PAHs	Naphthalene	ppb	99	1
REMAP 1993/94	NB044	PAHs	Perylene	ppb	200	1
REMAP 1993/94	NB044	PAHs	Phenanthrene	ppb	250	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB044	PAHs	Pyrene	ppb	900	1
REMAP 1993/94	NB044	PAHs	Total HMW PAHs	ppb	5467	1
REMAP 1993/94	NB044	PAHs	Total LMW PAHs	ppb	838	1
REMAP 1993/94	NB044	PAHs	Total PAHs	ppb	6305	1
REMAP 1993/94	NB044	PCBs	PCB Congener 101	ppb	20.41	1
REMAP 1993/94	NB044	PCBs	PCB Congener 105	ppb	12.52	1
REMAP 1993/94	NB044	PCBs	PCB Congener 118	ppb	20.94	1
REMAP 1993/94	NB044	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB044	PCBs	PCB Congener 128	ppb	2.71	1
REMAP 1993/94	NB044	PCBs	PCB Congener 138	ppb	19.15	1
REMAP 1993/94	NB044	PCBs	PCB Congener 153	ppb	15.22	1
REMAP 1993/94	NB044	PCBs	PCB Congener 179	ppb	10.66	1
REMAP 1993/94	NB044	PCBs	PCB Congener 18	ppb	18.67	1
REMAP 1993/94	NB044	PCBs	PCB Congener 180	ppb	8.73	1
REMAP 1993/94	NB044	PCBs	PCB Congener 187	ppb	5.1	1
REMAP 1993/94	NB044	PCBs	PCB Congener 195	ppb	1.45	1
REMAP 1993/94	NB044	PCBs	PCB Congener 206	ppb	2.6	1
REMAP 1993/94	NB044	PCBs	PCB Congener 209	ppb	1.99	1
REMAP 1993/94	NB044	PCBs	PCB Congener 28	ppb	39.42	1
REMAP 1993/94	NB044	PCBs	PCB Congener 44	ppb	20.22	1
REMAP 1993/94	NB044	PCBs	PCB Congener 52	ppb	27.73	1
REMAP 1993/94	NB044	PCBs	PCB Congener 66	ppb	23.7	1
REMAP 1993/94	NB044	PCBs	PCB Congener 8	ppb	7.23	1
REMAP 1993/94	NB044	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	516.9	1
REMAP 1993/94	NB044	TOC	Total Organic Carbon	ppm	14000	1
REMAP 1993/94	NB045	AVS-SEM	AVS	mmol	11.05	1
REMAP 1993/94	NB045	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB045	AVS-SEM	SEM Cd	ppm	0.9	1
REMAP 1993/94	NB045	AVS-SEM	SEM Cu	mmol	0.07	1
REMAP 1993/94	NB045	AVS-SEM	SEM Cu	ppm	4.5	1
REMAP 1993/94	NB045	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB045	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB045	AVS-SEM	SEM Ni	mmol	0.17	1
REMAP 1993/94	NB045	AVS-SEM	SEM Ni	ppm	10.2	1
REMAP 1993/94	NB045	AVS-SEM	SEM Pb	mmol	0.39	1
REMAP 1993/94	NB045	AVS-SEM	SEM Pb	ppm	80	1
REMAP 1993/94	NB045	AVS-SEM	SEM Zn	mmol	1.66	1
REMAP 1993/94	NB045	AVS-SEM	SEM Zn	ppm	108.2	1
REMAP 1993/94	NB045	Butyltins	Dibutyltin	ppb	18	1
REMAP 1993/94	NB045	Butyltins	Monobutyltin	ppb	5	1
REMAP 1993/94	NB045	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB045	Butyltins	Tributyltin	ppb	51	1
REMAP 1993/94	NB045	Metals	Aluminum	ppm	59856	1
REMAP 1993/94	NB045	Metals	Antimony	ppm	0.97	1
REMAP 1993/94	NB045	Metals	Arsenic	ppm	10.94	1
REMAP 1993/94	NB045	Metals	Cadmium	ppm	1.16	1
REMAP 1993/94	NB045	Metals	Chromium	ppm	109.3	1
REMAP 1993/94	NB045	Metals	Copper	ppm	95.77	1
REMAP 1993/94	NB045	Metals	Iron	ppm	32546	1
REMAP 1993/94	NB045	Metals	Lead	ppm	110.8	1
REMAP 1993/94	NB045	Metals	Mangenese	ppm	502	1
REMAP 1993/94	NB045	Metals	Mercury	ppm	1.43	1
REMAP 1993/94	NB045	Metals	Nickel	ppm	55.47	1
REMAP 1993/94	NB045	Metals	Selinium	ppm	0.62	1
REMAP 1993/94	NB045	Metals	Silicon	ppm	337228	1
REMAP 1993/94	NB045	Metals	Silver	ppm	2.34	1
REMAP 1993/94	NB045	Metals	Tin	ppm	11.79	1
REMAP 1993/94	NB045	Metals	Zinc	ppm	175	1
REMAP 1993/94	NB045	Metals (partial)	Aluminum partial	ppm	15200	1
REMAP 1993/94	NB045	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB045	Metals (partial)	Arsenic partial	ppm	12	1
REMAP 1993/94	NB045	Metals (partial)	Cadmium partial	ppm	1.5	1
REMAP 1993/94	NB045	Metals (partial)	Chromium partial	ppm	86	1
REMAP 1993/94	NB045	Metals (partial)	Copper partial	ppm	108	1
REMAP 1993/94	NB045	Metals (partial)	Iron partial	ppm	26300	1
REMAP 1993/94	NB045	Metals (partial)	Lead partial	ppm	111	1
REMAP 1993/94	NB045	Metals (partial)	Manganese partial	ppm	382	1
REMAP 1993/94	NB045	Metals (partial)	Mercury partial	ppm	1.63	1
REMAP 1993/94	NB045	Metals (partial)	Nickel partial	ppm	49	1
REMAP 1993/94	NB045	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB045	Metals (partial)	Silver partial	ppm	3.5	1
REMAP 1993/94	NB045	Metals (partial)	Zinc partial	ppm	0	0
REMAP 1993/94	NB045	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB045	Pesticides	Alpha-chlordane	ppb	1.75	1
REMAP 1993/94	NB045	Pesticides	Dieldrin	ppb	1.36	1
REMAP 1993/94	NB045	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB045	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB045	Pesticides	Heptachlor Epoxide	ppb	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB045	Pesticides	Hexachlorobenzene	ppb	0.88	1
REMAP 1993/94	NB045	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB045	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB045	Pesticides	o,p, DDD	ppb	2.1	1
REMAP 1993/94	NB045	Pesticides	o,p, DDE	ppb	4.08	1
REMAP 1993/94	NB045	Pesticides	o,p, DDT	ppb	1.11	1
REMAP 1993/94	NB045	Pesticides	p,p, DDD	ppb	18.47	1
REMAP 1993/94	NB045	Pesticides	p,p, DDE	ppb	12.76	1
REMAP 1993/94	NB045	Pesticides	p,p, DDT	ppb	3.48	1
REMAP 1993/94	NB045	Pesticides	Total Chlordane	ppb	8.37	1
REMAP 1993/94	NB045	Pesticides	Total DDT	ppb	41.99	1
REMAP 1993/94	NB045	Pesticides	Total DDx (2,4 & 4,4)	ppb	42	1
REMAP 1993/94	NB045	Pesticides	Total DDx (4,4)	ppb	34.71	1
REMAP 1993/94	NB045	Pesticides	Trans-Nonachlor	ppb	1.36	1
REMAP 1993/94	NB045	PAHs	1-Methylnaphthalene	ppb	36	1
REMAP 1993/94	NB045	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB045	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB045	PAHs	2,6-Dimethylnaphthalene	ppb	160	1
REMAP 1993/94	NB045	PAHs	2-Methylnaphthalene	ppb	86	1
REMAP 1993/94	NB045	PAHs	Acenaphthene	ppb	47	1
REMAP 1993/94	NB045	PAHs	Acenaphthylene	ppb	140	1
REMAP 1993/94	NB045	PAHs	Anthracene	ppb	540	1
REMAP 1993/94	NB045	PAHs	Benzo[a]anthracene	ppb	490	1
REMAP 1993/94	NB045	PAHs	Benzo[a]pyrene	ppb	490	1
REMAP 1993/94	NB045	PAHs	Benzo[b,k]fluoranthene	ppb	1020	1
REMAP 1993/94	NB045	PAHs	Benzo[e]pyrene	ppb	400	1
REMAP 1993/94	NB045	PAHs	Benzo[g,h,i]perylene	ppb	290	1
REMAP 1993/94	NB045	PAHs	Biphenyl	ppb	36	1
REMAP 1993/94	NB045	PAHs	Chrysene	ppb	590	1
REMAP 1993/94	NB045	PAHs	Dibenz[a,h]anthracene	ppb	67	1
REMAP 1993/94	NB045	PAHs	Fluoranthene	ppb	700	1
REMAP 1993/94	NB045	PAHs	Fluorene	ppb	110	1
REMAP 1993/94	NB045	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	300	1
REMAP 1993/94	NB045	PAHs	Naphthalene	ppb	190	1
REMAP 1993/94	NB045	PAHs	Perylene	ppb	200	1
REMAP 1993/94	NB045	PAHs	Phenanthrene	ppb	410	1
REMAP 1993/94	NB045	PAHs	Pyrene	ppb	720	1
REMAP 1993/94	NB045	PAHs	Total HMW PAHs	ppb	4667	1
REMAP 1993/94	NB045	PAHs	Total LMW PAHs	ppb	1523	1
REMAP 1993/94	NB045	PAHs	Total PAHs	ppb	6190	1
REMAP 1993/94	NB045	PCBs	PCB Congener 101	ppb	9.05	1
REMAP 1993/94	NB045	PCBs	PCB Congener 105	ppb	6.07	1
REMAP 1993/94	NB045	PCBs	PCB Congener 118	ppb	10.33	1
REMAP 1993/94	NB045	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB045	PCBs	PCB Congener 128	ppb	1.54	1
REMAP 1993/94	NB045	PCBs	PCB Congener 138	ppb	8.93	1
REMAP 1993/94	NB045	PCBs	PCB Congener 153	ppb	7.92	1
REMAP 1993/94	NB045	PCBs	PCB Congener 179	ppb	5.17	1
REMAP 1993/94	NB045	PCBs	PCB Congener 18	ppb	6.93	1
REMAP 1993/94	NB045	PCBs	PCB Congener 180	ppb	4.95	1
REMAP 1993/94	NB045	PCBs	PCB Congener 187	ppb	3.06	1
REMAP 1993/94	NB045	PCBs	PCB Congener 195	ppb	0.9	1
REMAP 1993/94	NB045	PCBs	PCB Congener 206	ppb	1.26	1
REMAP 1993/94	NB045	PCBs	PCB Congener 209	ppb	1.26	1
REMAP 1993/94	NB045	PCBs	PCB Congener 28	ppb	21.56	1
REMAP 1993/94	NB045	PCBs	PCB Congener 44	ppb	7.46	1
REMAP 1993/94	NB045	PCBs	PCB Congener 52	ppb	12.38	1
REMAP 1993/94	NB045	PCBs	PCB Congener 66	ppb	11.75	1
REMAP 1993/94	NB045	PCBs	PCB Congener 8	ppb	2.18	1
REMAP 1993/94	NB045	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	245.4	1
REMAP 1993/94	NB045	TOC	Total Organic Carbon	ppm	9540	1
REMAP 1993/94	NB047	AVS-SEM	AVS	mmol	5.03	1
REMAP 1993/94	NB047	AVS-SEM	SEM Cd	mmol	0.02	1
REMAP 1993/94	NB047	AVS-SEM	SEM Cd	ppm	2.6	1
REMAP 1993/94	NB047	AVS-SEM	SEM Cu	mmol	0.03	1
REMAP 1993/94	NB047	AVS-SEM	SEM Cu	ppm	2.1	1
REMAP 1993/94	NB047	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB047	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB047	AVS-SEM	SEM Ni	mmol	0.28	1
REMAP 1993/94	NB047	AVS-SEM	SEM Ni	ppm	16.6	1
REMAP 1993/94	NB047	AVS-SEM	SEM Pb	mmol	1.06	1
REMAP 1993/94	NB047	AVS-SEM	SEM Pb	ppm	220.4	1
REMAP 1993/94	NB047	AVS-SEM	SEM Zn	mmol	4.37	1
REMAP 1993/94	NB047	AVS-SEM	SEM Zn	ppm	285.4	1
REMAP 1993/94	NB047	Butyltins	Dibutyltin	ppb	61	1
REMAP 1993/94	NB047	Butyltins	Monobutyltin	ppb	26	1
REMAP 1993/94	NB047	Butyltins	Tetrabutyltin	ppb	1	1
REMAP 1993/94	NB047	Butyltins	Tributyltin	ppb	94	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB047	Metals	Aluminum	ppm	65389	1
REMAP 1993/94	NB047	Metals	Antimony	ppm	3.44	1
REMAP 1993/94	NB047	Metals	Arsenic	ppm	21.57	1
REMAP 1993/94	NB047	Metals	Cadmium	ppm	5.26	1
REMAP 1993/94	NB047	Metals	Chromium	ppm	195.4	1
REMAP 1993/94	NB047	Metals	Copper	ppm	283	1
REMAP 1993/94	NB047	Metals	Iron	ppm	37351	1
REMAP 1993/94	NB047	Metals	Lead	ppm	266.4	1
REMAP 1993/94	NB047	Metals	Mangenese	ppm	481	1
REMAP 1993/94	NB047	Metals	Mercury	ppm	5.36	1
REMAP 1993/94	NB047	Metals	Nickel	ppm	50.06	1
REMAP 1993/94	NB047	Metals	Selinium	ppm	2.82	1
REMAP 1993/94	NB047	Metals	Silicon	ppm	247264	1
REMAP 1993/94	NB047	Metals	Silver	ppm	4.32	1
REMAP 1993/94	NB047	Metals	Tin	ppm	25.14	1
REMAP 1993/94	NB047	Metals	Zinc	ppm	349	1
REMAP 1993/94	NB047	Metals (partial)	Aluminum partial	ppm	13700	1
REMAP 1993/94	NB047	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB047	Metals (partial)	Arsenic partial	ppm	24	1
REMAP 1993/94	NB047	Metals (partial)	Cadmium partial	ppm	3.2	1
REMAP 1993/94	NB047	Metals (partial)	Chromium partial	ppm	145	1
REMAP 1993/94	NB047	Metals (partial)	Copper partial	ppm	386	1
REMAP 1993/94	NB047	Metals (partial)	Iron partial	ppm	32000	1
REMAP 1993/94	NB047	Metals (partial)	Lead partial	ppm	235	1
REMAP 1993/94	NB047	Metals (partial)	Manganese partial	ppm	399	1
REMAP 1993/94	NB047	Metals (partial)	Mercury partial	ppm	4.33	1
REMAP 1993/94	NB047	Metals (partial)	Nickel partial	ppm	43	1
REMAP 1993/94	NB047	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB047	Metals (partial)	Silver partial	ppm	6.7	1
REMAP 1993/94	NB047	Metals (partial)	Zinc partial	ppm	332	1
REMAP 1993/94	NB047	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB047	Pesticides	Alpha-chlordane	ppb	6.36	1
REMAP 1993/94	NB047	Pesticides	Dieldrin	ppb	6.67	1
REMAP 1993/94	NB047	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB047	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB047	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB047	Pesticides	Hexachlorobenzene	ppb	4.64	1
REMAP 1993/94	NB047	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB047	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB047	Pesticides	o,p, DDD	ppb	90.81	1
REMAP 1993/94	NB047	Pesticides	o,p, DDE	ppb	88.3	1
REMAP 1993/94	NB047	Pesticides	o,p, DDT	ppb	14.22	1
REMAP 1993/94	NB047	Pesticides	p,p, DDD	ppb	353.42	1
REMAP 1993/94	NB047	Pesticides	p,p, DDE	ppb	86.14	1
REMAP 1993/94	NB047	Pesticides	p,p, DDT	ppb	452.11	1
REMAP 1993/94	NB047	Pesticides	Total Chlordane	ppb	42.43	1
REMAP 1993/94	NB047	Pesticides	Total DDT	ppb	1085	1
REMAP 1993/94	NB047	Pesticides	Total DDx (2,4 & 4,4)	ppb	1085	1
REMAP 1993/94	NB047	Pesticides	Total DDx (4,4)	ppb	891.67	1
REMAP 1993/94	NB047	Pesticides	Trans-Nonachlor	ppb	8.97	1
REMAP 1993/94	NB047	PAHs	1-Methylnaphthalene	ppb	45	1
REMAP 1993/94	NB047	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB047	PAHs	2,3,5 Trimethylnaphthalene	ppb	50	1
REMAP 1993/94	NB047	PAHs	2,6-Dimethylnaphthalene	ppb	140	1
REMAP 1993/94	NB047	PAHs	2-Methylnaphthalene	ppb	99	1
REMAP 1993/94	NB047	PAHs	Acenaphthene	ppb	52	1
REMAP 1993/94	NB047	PAHs	Acenaphthylene	ppb	190	1
REMAP 1993/94	NB047	PAHs	Anthracene	ppb	330	1
REMAP 1993/94	NB047	PAHs	Benzo[a]anthracene	ppb	590	1
REMAP 1993/94	NB047	PAHs	Benzo[a]pyrene	ppb	630	1
REMAP 1993/94	NB047	PAHs	Benzo[b,k]fluoranthene	ppb	1330	1
REMAP 1993/94	NB047	PAHs	Benzo[e]pyrene	ppb	550	1
REMAP 1993/94	NB047	PAHs	Benzo[g,h,i]perylene	ppb	420	1
REMAP 1993/94	NB047	PAHs	Biphenyl	ppb	36	1
REMAP 1993/94	NB047	PAHs	Chrysene	ppb	770	1
REMAP 1993/94	NB047	PAHs	Dibenz[a,h]anthracene	ppb	88	1
REMAP 1993/94	NB047	PAHs	Fluoranthene	ppb	930	1
REMAP 1993/94	NB047	PAHs	Fluorene	ppb	93	1
REMAP 1993/94	NB047	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	420	1
REMAP 1993/94	NB047	PAHs	Naphthalene	ppb	210	1
REMAP 1993/94	NB047	PAHs	Perylene	ppb	220	1
REMAP 1993/94	NB047	PAHs	Phenanthrene	ppb	45	1
REMAP 1993/94	NB047	PAHs	Pyrene	ppb	990	1
REMAP 1993/94	NB047	PAHs	Total HMW PAHs	ppb	6168	1
REMAP 1993/94	NB047	PAHs	Total LMW PAHs	ppb	1019	1
REMAP 1993/94	NB047	PAHs	Total PAHs	ppb	7187	1
REMAP 1993/94	NB047	PCBs	PCB Congener 101	ppb	27.75	1
REMAP 1993/94	NB047	PCBs	PCB Congener 105	ppb	17.1	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB047	PCBs	PCB Congener 118	ppb	28.52	1
REMAP 1993/94	NB047	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB047	PCBs	PCB Congener 128	ppb	4.47	1
REMAP 1993/94	NB047	PCBs	PCB Congener 138	ppb	27.23	1
REMAP 1993/94	NB047	PCBs	PCB Congener 153	ppb	24.73	1
REMAP 1993/94	NB047	PCBs	PCB Congener 179	ppb	18.76	1
REMAP 1993/94	NB047	PCBs	PCB Congener 18	ppb	14.89	1
REMAP 1993/94	NB047	PCBs	PCB Congener 180	ppb	18.88	1
REMAP 1993/94	NB047	PCBs	PCB Congener 187	ppb	9.67	1
REMAP 1993/94	NB047	PCBs	PCB Congener 195	ppb	2.78	1
REMAP 1993/94	NB047	PCBs	PCB Congener 206	ppb	6.52	1
REMAP 1993/94	NB047	PCBs	PCB Congener 209	ppb	4.07	1
REMAP 1993/94	NB047	PCBs	PCB Congener 28	ppb	43.16	1
REMAP 1993/94	NB047	PCBs	PCB Congener 44	ppb	23.35	1
REMAP 1993/94	NB047	PCBs	PCB Congener 52	ppb	35.52	1
REMAP 1993/94	NB047	PCBs	PCB Congener 66	ppb	33.48	1
REMAP 1993/94	NB047	PCBs	PCB Congener 8	ppb	6.18	1
REMAP 1993/94	NB047	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	694.12	1
REMAP 1993/94	NB047	TOC	Total Organic Carbon	ppm	17700	1
REMAP 1993/94	NB052	AVS-SEM	AVS	mmol	11.08	1
REMAP 1993/94	NB052	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB052	AVS-SEM	SEM Cd	ppm	0.5	1
REMAP 1993/94	NB052	AVS-SEM	SEM Cu	mmol	0.01	1
REMAP 1993/94	NB052	AVS-SEM	SEM Cu	ppm	0.7	1
REMAP 1993/94	NB052	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB052	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB052	AVS-SEM	SEM Ni	mmol	0.09	1
REMAP 1993/94	NB052	AVS-SEM	SEM Ni	ppm	5	1
REMAP 1993/94	NB052	AVS-SEM	SEM Pb	mmol	0.16	1
REMAP 1993/94	NB052	AVS-SEM	SEM Pb	ppm	32.8	1
REMAP 1993/94	NB052	AVS-SEM	SEM Zn	mmol	0.75	1
REMAP 1993/94	NB052	AVS-SEM	SEM Zn	ppm	49.3	1
REMAP 1993/94	NB052	Butyltins	Dibutyltin	ppb	8	1
REMAP 1993/94	NB052	Butyltins	Monobutyltin	ppb	4	1
REMAP 1993/94	NB052	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB052	Butyltins	Tributyltin	ppb	20	1
REMAP 1993/94	NB052	Metals	Aluminum	ppm	60230	1
REMAP 1993/94	NB052	Metals	Antimony	ppm	0.56	1
REMAP 1993/94	NB052	Metals	Arsenic	ppm	7.2	1
REMAP 1993/94	NB052	Metals	Cadmium	ppm	0.78	1
REMAP 1993/94	NB052	Metals	Chromium	ppm	61.7	1
REMAP 1993/94	NB052	Metals	Copper	ppm	57.96	1
REMAP 1993/94	NB052	Metals	Iron	ppm	28043	1
REMAP 1993/94	NB052	Metals	Lead	ppm	63.8	1
REMAP 1993/94	NB052	Metals	Mangenese	ppm	513	1
REMAP 1993/94	NB052	Metals	Mercury	ppm	0.63	1
REMAP 1993/94	NB052	Metals	Nickel	ppm	34.83	1
REMAP 1993/94	NB052	Metals	Selinium	ppm	0.32	1
REMAP 1993/94	NB052	Metals	Silicon	ppm	339133	1
REMAP 1993/94	NB052	Metals	Silver	ppm	0.99	1
REMAP 1993/94	NB052	Metals	Tin	ppm	6.56	1
REMAP 1993/94	NB052	Metals	Zinc	ppm	139	1
REMAP 1993/94	NB052	Metals (partial)	Aluminum partial	ppm	8470	1
REMAP 1993/94	NB052	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB052	Metals (partial)	Arsenic partial	ppm	5.6	1
REMAP 1993/94	NB052	Metals (partial)	Cadmium partial	ppm	0.53	1
REMAP 1993/94	NB052	Metals (partial)	Chromium partial	ppm	42	1
REMAP 1993/94	NB052	Metals (partial)	Copper partial	ppm	54	1
REMAP 1993/94	NB052	Metals (partial)	Iron partial	ppm	18100	1
REMAP 1993/94	NB052	Metals (partial)	Lead partial	ppm	64	1
REMAP 1993/94	NB052	Metals (partial)	Manganese partial	ppm	317	1
REMAP 1993/94	NB052	Metals (partial)	Mercury partial	ppm	0.71	1
REMAP 1993/94	NB052	Metals (partial)	Nickel partial	ppm	28	1
REMAP 1993/94	NB052	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB052	Metals (partial)	Silver partial	ppm	1.7	1
REMAP 1993/94	NB052	Metals (partial)	Zinc partial	ppm	99	1
REMAP 1993/94	NB052	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB052	Pesticides	Alpha-chlordane	ppb	1.07	1
REMAP 1993/94	NB052	Pesticides	Dieldrin	ppb	0.93	1
REMAP 1993/94	NB052	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB052	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB052	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB052	Pesticides	Hexachlorobenzene	ppb	0.51	1
REMAP 1993/94	NB052	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB052	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB052	Pesticides	o,p, DDD	ppb	1.52	1
REMAP 1993/94	NB052	Pesticides	o,p, DDE	ppb	3.11	1
REMAP 1993/94	NB052	Pesticides	o,p, DDT	ppb	0.6	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB052	Pesticides	p,p, DDD	ppb	11.32	1
REMAP 1993/94	NB052	Pesticides	p,p, DDE	ppb	8.64	1
REMAP 1993/94	NB052	Pesticides	p,p, DDT	ppb	2.94	1
REMAP 1993/94	NB052	Pesticides	Total Chlordane	ppb	5.28	1
REMAP 1993/94	NB052	Pesticides	Total DDT	ppb	28.12	1
REMAP 1993/94	NB052	Pesticides	Total DDx (2,4 & 4,4)	ppb	28.13	1
REMAP 1993/94	NB052	Pesticides	Total DDx (4,4)	ppb	22.9	1
REMAP 1993/94	NB052	Pesticides	Trans-Nonachlor	ppb	0.87	1
REMAP 1993/94	NB052	PAHs	1-Methylnaphthalene	ppb	24	1
REMAP 1993/94	NB052	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB052	PAHs	2,3,5 Trimethylnaphthalene	ppb	27	1
REMAP 1993/94	NB052	PAHs	2,6-Dimethylnaphthalene	ppb	45	1
REMAP 1993/94	NB052	PAHs	2-Methylnaphthalene	ppb	0	0
REMAP 1993/94	NB052	PAHs	Acenaphthene	ppb	42	1
REMAP 1993/94	NB052	PAHs	Acenaphthylene	ppb	82	1
REMAP 1993/94	NB052	PAHs	Anthracene	ppb	320	1
REMAP 1993/94	NB052	PAHs	Benzo[a]anthracene	ppb	340	1
REMAP 1993/94	NB052	PAHs	Benzo[a]pyrene	ppb	280	1
REMAP 1993/94	NB052	PAHs	Benzo[b,k]fluoranthene	ppb	560	1
REMAP 1993/94	NB052	PAHs	Benzo[e]pyrene	ppb	220	1
REMAP 1993/94	NB052	PAHs	Benzo[g,h,i]perylene	ppb	170	1
REMAP 1993/94	NB052	PAHs	Biphenyl	ppb	20	1
REMAP 1993/94	NB052	PAHs	Chrysene	ppb	350	1
REMAP 1993/94	NB052	PAHs	Dibenz[a,h]anthracene	ppb	37	1
REMAP 1993/94	NB052	PAHs	Fluoranthene	ppb	550	1
REMAP 1993/94	NB052	PAHs	Fluorene	ppb	85	1
REMAP 1993/94	NB052	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	180	1
REMAP 1993/94	NB052	PAHs	Naphthalene	ppb	140	1
REMAP 1993/94	NB052	PAHs	Perylene	ppb	110	1
REMAP 1993/94	NB052	PAHs	Phenanthrene	ppb	400	1
REMAP 1993/94	NB052	PAHs	Pyrene	ppb	530	1
REMAP 1993/94	NB052	PAHs	Total HMW PAHs	ppb	2997	1
REMAP 1993/94	NB052	PAHs	Total LMW PAHs	ppb	1069	1
REMAP 1993/94	NB052	PAHs	Total PAHs	ppb	4066	1
REMAP 1993/94	NB052	PCBs	PCB Congener 101	ppb	6.03	1
REMAP 1993/94	NB052	PCBs	PCB Congener 105	ppb	4.01	1
REMAP 1993/94	NB052	PCBs	PCB Congener 118	ppb	5.97	1
REMAP 1993/94	NB052	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB052	PCBs	PCB Congener 128	ppb	1.01	1
REMAP 1993/94	NB052	PCBs	PCB Congener 138	ppb	5.88	1
REMAP 1993/94	NB052	PCBs	PCB Congener 153	ppb	4.91	1
REMAP 1993/94	NB052	PCBs	PCB Congener 179	ppb	4.34	1
REMAP 1993/94	NB052	PCBs	PCB Congener 18	ppb	5.82	1
REMAP 1993/94	NB052	PCBs	PCB Congener 180	ppb	3.18	1
REMAP 1993/94	NB052	PCBs	PCB Congener 187	ppb	1.97	1
REMAP 1993/94	NB052	PCBs	PCB Congener 195	ppb	0.61	1
REMAP 1993/94	NB052	PCBs	PCB Congener 206	ppb	1.02	1
REMAP 1993/94	NB052	PCBs	PCB Congener 209	ppb	0.9	1
REMAP 1993/94	NB052	PCBs	PCB Congener 28	ppb	14.79	1
REMAP 1993/94	NB052	PCBs	PCB Congener 44	ppb	4.97	1
REMAP 1993/94	NB052	PCBs	PCB Congener 52	ppb	8.15	1
REMAP 1993/94	NB052	PCBs	PCB Congener 66	ppb	7.95	1
REMAP 1993/94	NB052	PCBs	PCB Congener 8	ppb	1.7	1
REMAP 1993/94	NB052	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	166.42	1
REMAP 1993/94	NB052	TOC	Total Organic Carbon	ppm	7620	1
REMAP 1993/94	NB053	AVS-SEM	AVS	mmol	25.69	1
REMAP 1993/94	NB053	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB053	AVS-SEM	SEM Cd	ppm	0.9	1
REMAP 1993/94	NB053	AVS-SEM	SEM Cu	mmol	0.01	1
REMAP 1993/94	NB053	AVS-SEM	SEM Cu	ppm	0.6	1
REMAP 1993/94	NB053	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB053	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB053	AVS-SEM	SEM Ni	mmol	0.18	1
REMAP 1993/94	NB053	AVS-SEM	SEM Ni	ppm	10.8	1
REMAP 1993/94	NB053	AVS-SEM	SEM Pb	mmol	0.43	1
REMAP 1993/94	NB053	AVS-SEM	SEM Pb	ppm	88.1	1
REMAP 1993/94	NB053	AVS-SEM	SEM Zn	mmol	1.85	1
REMAP 1993/94	NB053	AVS-SEM	SEM Zn	ppm	121.1	1
REMAP 1993/94	NB053	Butyltins	Dibutyltin	ppb	28	1
REMAP 1993/94	NB053	Butyltins	Monobutyltin	ppb	8	1
REMAP 1993/94	NB053	Butyltins	Tetrabutyltin	ppb	1	1
REMAP 1993/94	NB053	Butyltins	Tributyltin	ppb	84	1
REMAP 1993/94	NB053	Metals	Aluminum	ppm	64280	1
REMAP 1993/94	NB053	Metals	Antimony	ppm	1.31	1
REMAP 1993/94	NB053	Metals	Arsenic	ppm	11.25	1
REMAP 1993/94	NB053	Metals	Cadmium	ppm	1.36	1
REMAP 1993/94	NB053	Metals	Chromium	ppm	124.3	1
REMAP 1993/94	NB053	Metals	Copper	ppm	112.88	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB053	Metals	Iron	ppm	33933	1
REMAP 1993/94	NB053	Metals	Lead	ppm	133.7	1
REMAP 1993/94	NB053	Metals	Mangenese	ppm	545	1
REMAP 1993/94	NB053	Metals	Mercury	ppm	1.8	1
REMAP 1993/94	NB053	Metals	Nickel	ppm	56.99	1
REMAP 1993/94	NB053	Metals	Selinium	ppm	0.72	1
REMAP 1993/94	NB053	Metals	Silicon	ppm	290742	1
REMAP 1993/94	NB053	Metals	Silver	ppm	2.79	1
REMAP 1993/94	NB053	Metals	Tin	ppm	11.51	1
REMAP 1993/94	NB053	Metals	Zinc	ppm	215	1
REMAP 1993/94	NB053	Metals (partial)	Aluminum partial	ppm	13600	1
REMAP 1993/94	NB053	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB053	Metals (partial)	Arsenic partial	ppm	6.9	1
REMAP 1993/94	NB053	Metals (partial)	Cadmium partial	ppm	0.74	1
REMAP 1993/94	NB053	Metals (partial)	Chromium partial	ppm	92	1
REMAP 1993/94	NB053	Metals (partial)	Copper partial	ppm	118	1
REMAP 1993/94	NB053	Metals (partial)	Iron partial	ppm	26900	1
REMAP 1993/94	NB053	Metals (partial)	Lead partial	ppm	128	1
REMAP 1993/94	NB053	Metals (partial)	Manganese partial	ppm	415	1
REMAP 1993/94	NB053	Metals (partial)	Mercury partial	ppm	1.78	1
REMAP 1993/94	NB053	Metals (partial)	Nickel partial	ppm	47	1
REMAP 1993/94	NB053	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB053	Metals (partial)	Silver partial	ppm	4.2	1
REMAP 1993/94	NB053	Metals (partial)	Zinc partial	ppm	0	0
REMAP 1993/94	NB053	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB053	Pesticides	Alpha-chlordane	ppb	2.36	1
REMAP 1993/94	NB053	Pesticides	Dieldrin	ppb	1.91	1
REMAP 1993/94	NB053	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB053	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB053	Pesticides	Heptachlor Epoxide	ppb	0	0
REMAP 1993/94	NB053	Pesticides	Hexachlorobenzene	ppb	0.9	1
REMAP 1993/94	NB053	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB053	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB053	Pesticides	o,p, DDD	ppb	2.68	1
REMAP 1993/94	NB053	Pesticides	o,p, DDE	ppb	5.34	1
REMAP 1993/94	NB053	Pesticides	o,p, DDT	ppb	1.2	1
REMAP 1993/94	NB053	Pesticides	p,p, DDD	ppb	22.72	1
REMAP 1993/94	NB053	Pesticides	p,p, DDE	ppb	16.5	1
REMAP 1993/94	NB053	Pesticides	p,p, DDT	ppb	3.19	1
REMAP 1993/94	NB053	Pesticides	Total Chlordane	ppb	11.85	1
REMAP 1993/94	NB053	Pesticides	Total DDT	ppb	51.63	1
REMAP 1993/94	NB053	Pesticides	Total DDx (2,4 & 4,4)	ppb	51.63	1
REMAP 1993/94	NB053	Pesticides	Total DDx (4,4)	ppb	42.41	1
REMAP 1993/94	NB053	Pesticides	Trans-Nonachlor	ppb	2.05	1
REMAP 1993/94	NB053	PAHs	1-Methylnaphthalene	ppb	46	1
REMAP 1993/94	NB053	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB053	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB053	PAHs	2,6-Dimethylnaphthalene	ppb	180	1
REMAP 1993/94	NB053	PAHs	2-Methylnaphthalene	ppb	0	0
REMAP 1993/94	NB053	PAHs	Acenaphthene	ppb	59	1
REMAP 1993/94	NB053	PAHs	Acenaphthylene	ppb	180	1
REMAP 1993/94	NB053	PAHs	Anthracene	ppb	1100	1
REMAP 1993/94	NB053	PAHs	Benzo[a]anthracene	ppb	580	1
REMAP 1993/94	NB053	PAHs	Benzo[a]pyrene	ppb	590	1
REMAP 1993/94	NB053	PAHs	Benzo[b,k]fluoranthene	ppb	1220	1
REMAP 1993/94	NB053	PAHs	Benzo[e]pyrene	ppb	490	1
REMAP 1993/94	NB053	PAHs	Benzo[g,h,i]perylene	ppb	380	1
REMAP 1993/94	NB053	PAHs	Biphenyl	ppb	44	1
REMAP 1993/94	NB053	PAHs	Chrysene	ppb	680	1
REMAP 1993/94	NB053	PAHs	Dibenz[a,h]anthracene	ppb	78	1
REMAP 1993/94	NB053	PAHs	Fluoranthene	ppb	820	1
REMAP 1993/94	NB053	PAHs	Fluorene	ppb	190	1
REMAP 1993/94	NB053	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	380	1
REMAP 1993/94	NB053	PAHs	Naphthalene	ppb	210	1
REMAP 1993/94	NB053	PAHs	Perylene	ppb	230	1
REMAP 1993/94	NB053	PAHs	Phenanthrene	ppb	560	1
REMAP 1993/94	NB053	PAHs	Pyrene	ppb	820	1
REMAP 1993/94	NB053	PAHs	Total HMW PAHs	ppb	5548	1
REMAP 1993/94	NB053	PAHs	Total LMW PAHs	ppb	2299	1
REMAP 1993/94	NB053	PAHs	Total PAHs	ppb	7847	1
REMAP 1993/94	NB053	PCBs	PCB Congener 101	ppb	11.86	1
REMAP 1993/94	NB053	PCBs	PCB Congener 105	ppb	7.97	1
REMAP 1993/94	NB053	PCBs	PCB Congener 118	ppb	13	1
REMAP 1993/94	NB053	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB053	PCBs	PCB Congener 128	ppb	2.11	1
REMAP 1993/94	NB053	PCBs	PCB Congener 138	ppb	11.7	1
REMAP 1993/94	NB053	PCBs	PCB Congener 153	ppb	10.58	1
REMAP 1993/94	NB053	PCBs	PCB Congener 179	ppb	6.8	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB053	PCBs	PCB Congener 18	ppb	8.65	1
REMAP 1993/94	NB053	PCBs	PCB Congener 180	ppb	6.48	1
REMAP 1993/94	NB053	PCBs	PCB Congener 187	ppb	3.99	1
REMAP 1993/94	NB053	PCBs	PCB Congener 195	ppb	1.15	1
REMAP 1993/94	NB053	PCBs	PCB Congener 206	ppb	2.19	1
REMAP 1993/94	NB053	PCBs	PCB Congener 209	ppb	1.75	1
REMAP 1993/94	NB053	PCBs	PCB Congener 28	ppb	28.73	1
REMAP 1993/94	NB053	PCBs	PCB Congener 44	ppb	9.67	1
REMAP 1993/94	NB053	PCBs	PCB Congener 52	ppb	15.44	1
REMAP 1993/94	NB053	PCBs	PCB Congener 66	ppb	16.68	1
REMAP 1993/94	NB053	PCBs	PCB Congener 8	ppb	3.43	1
REMAP 1993/94	NB053	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	324.36	1
REMAP 1993/94	NB053	TOC	Total Organic Carbon	ppm	9940	1
REMAP 1993/94	NB065	AVS-SEM	AVS	mmol	2.63	1
REMAP 1993/94	NB065	AVS-SEM	SEM Cd	mmol	0	0
REMAP 1993/94	NB065	AVS-SEM	SEM Cd	ppm	0.1	1
REMAP 1993/94	NB065	AVS-SEM	SEM Cu	mmol	0.09	1
REMAP 1993/94	NB065	AVS-SEM	SEM Cu	ppm	5.4	1
REMAP 1993/94	NB065	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB065	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB065	AVS-SEM	SEM Ni	mmol	0.02	1
REMAP 1993/94	NB065	AVS-SEM	SEM Ni	ppm	0.9	1
REMAP 1993/94	NB065	AVS-SEM	SEM Pb	mmol	0.07	1
REMAP 1993/94	NB065	AVS-SEM	SEM Pb	ppm	13.4	1
REMAP 1993/94	NB065	AVS-SEM	SEM Zn	mmol	0.39	1
REMAP 1993/94	NB065	AVS-SEM	SEM Zn	ppm	25.4	1
REMAP 1993/94	NB065	Butyltins	Dibutyltin	ppb	2	1
REMAP 1993/94	NB065	Butyltins	Monobutyltin	ppb	1	1
REMAP 1993/94	NB065	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB065	Butyltins	Tributyltin	ppb	3	1
REMAP 1993/94	NB065	Metals	Aluminum	ppm	35647	1
REMAP 1993/94	NB065	Metals	Antimony	ppm	0.54	1
REMAP 1993/94	NB065	Metals	Arsenic	ppm	4.13	1
REMAP 1993/94	NB065	Metals	Cadmium	ppm	0.22	1
REMAP 1993/94	NB065	Metals	Chromium	ppm	45.1	1
REMAP 1993/94	NB065	Metals	Copper	ppm	18.88	1
REMAP 1993/94	NB065	Metals	Iron	ppm	8374	1
REMAP 1993/94	NB065	Metals	Lead	ppm	21.4	1
REMAP 1993/94	NB065	Metals	Mangenese	ppm	174	1
REMAP 1993/94	NB065	Metals	Mercury	ppm	0.41	1
REMAP 1993/94	NB065	Metals	Nickel	ppm	10.46	1
REMAP 1993/94	NB065	Metals	Selinium	ppm	0.32	1
REMAP 1993/94	NB065	Metals	Silicon	ppm	375173	1
REMAP 1993/94	NB065	Metals	Silver	ppm	0.19	1
REMAP 1993/94	NB065	Metals	Tin	ppm	8.86	1
REMAP 1993/94	NB065	Metals	Zinc	ppm	56	1
REMAP 1993/94	NB065	Metals (partial)	Aluminum partial	ppm	3540	1
REMAP 1993/94	NB065	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB065	Metals (partial)	Arsenic partial	ppm	3.4	1
REMAP 1993/94	NB065	Metals (partial)	Cadmium partial	ppm	0	0
REMAP 1993/94	NB065	Metals (partial)	Chromium partial	ppm	29	1
REMAP 1993/94	NB065	Metals (partial)	Copper partial	ppm	16	1
REMAP 1993/94	NB065	Metals (partial)	Iron partial	ppm	7260	1
REMAP 1993/94	NB065	Metals (partial)	Lead partial	ppm	28	1
REMAP 1993/94	NB065	Metals (partial)	Manganese partial	ppm	74	1
REMAP 1993/94	NB065	Metals (partial)	Mercury partial	ppm	0.22	1
REMAP 1993/94	NB065	Metals (partial)	Nickel partial	ppm	8	1
REMAP 1993/94	NB065	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB065	Metals (partial)	Silver partial	ppm	1.3	1
REMAP 1993/94	NB065	Metals (partial)	Zinc partial	ppm	49	1
REMAP 1993/94	NB065	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB065	Pesticides	Alpha-chlordane	ppb	0.27	1
REMAP 1993/94	NB065	Pesticides	Dieldrin	ppb	0.75	1
REMAP 1993/94	NB065	Pesticides	Endrin	ppb	14.32	1
REMAP 1993/94	NB065	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB065	Pesticides	Heptachlor Epoxide	ppb	0.46	1
REMAP 1993/94	NB065	Pesticides	Hexachlorobenzene	ppb	3.69	1
REMAP 1993/94	NB065	Pesticides	Lindane - Gamma-BHC	ppb	0.14	1
REMAP 1993/94	NB065	Pesticides	Mirex	ppb	1.44	1
REMAP 1993/94	NB065	Pesticides	o,p, DDD	ppb	0.36	1
REMAP 1993/94	NB065	Pesticides	o,p, DDE	ppb	0.14	1
REMAP 1993/94	NB065	Pesticides	o,p, DDT	ppb	0.03	1
REMAP 1993/94	NB065	Pesticides	p,p, DDD	ppb	3.61	1
REMAP 1993/94	NB065	Pesticides	p,p, DDE	ppb	2.67	1
REMAP 1993/94	NB065	Pesticides	p,p, DDT	ppb	1.29	1
REMAP 1993/94	NB065	Pesticides	Total Chlordane	ppb	3.1	1
REMAP 1993/94	NB065	Pesticides	Total DDT	ppb	8.1	1
REMAP 1993/94	NB065	Pesticides	Total DDx (2,4 & 4,4)	ppb	8.1	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB065	Pesticides	Total DDx (4,4)	ppb	7.57	1
REMAP 1993/94	NB065	Pesticides	Trans-Nonachlor	ppb	0.05	1
REMAP 1993/94	NB065	PAHs	1-Methylnaphthalene	ppb	36	1
REMAP 1993/94	NB065	PAHs	1-Methylphenanthrene	ppb	320	1
REMAP 1993/94	NB065	PAHs	2,3,5 Trimethylnaphthalene	ppb	82	1
REMAP 1993/94	NB065	PAHs	2,6-Dimethylnaphthalene	ppb	56	1
REMAP 1993/94	NB065	PAHs	2-Methylnaphthalene	ppb	61	1
REMAP 1993/94	NB065	PAHs	Acenaphthene	ppb	250	1
REMAP 1993/94	NB065	PAHs	Acenaphthylene	ppb	600	1
REMAP 1993/94	NB065	PAHs	Anthracene	ppb	560	1
REMAP 1993/94	NB065	PAHs	Benzo[a]anthracene	ppb	2500	1
REMAP 1993/94	NB065	PAHs	Benzo[a]pyrene	ppb	2000	1
REMAP 1993/94	NB065	PAHs	Benzo[b,k]fluoranthene	ppb	3320	1
REMAP 1993/94	NB065	PAHs	Benzo[e]pyrene	ppb	1200	1
REMAP 1993/94	NB065	PAHs	Benzo[g,h,i]perylene	ppb	880	1
REMAP 1993/94	NB065	PAHs	Biphenyl	ppb	29	1
REMAP 1993/94	NB065	PAHs	Chrysene	ppb	2400	1
REMAP 1993/94	NB065	PAHs	Dibenz[a,h]anthracene	ppb	240	1
REMAP 1993/94	NB065	PAHs	Fluoranthene	ppb	1700	1
REMAP 1993/94	NB065	PAHs	Fluorene	ppb	120	1
REMAP 1993/94	NB065	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	980	1
REMAP 1993/94	NB065	PAHs	Naphthalene	ppb	360	1
REMAP 1993/94	NB065	PAHs	Perylene	ppb	410	1
REMAP 1993/94	NB065	PAHs	Phenanthrene	ppb	680	1
REMAP 1993/94	NB065	PAHs	Pyrene	ppb	1600	1
REMAP 1993/94	NB065	PAHs	Total HMW PAHs	ppb	15620	1
REMAP 1993/94	NB065	PAHs	Total LMW PAHs	ppb	2631	1
REMAP 1993/94	NB065	PAHs	Total PAHs	ppb	18251	1
REMAP 1993/94	NB065	PCBs	PCB Congener 101	ppb	1.86	1
REMAP 1993/94	NB065	PCBs	PCB Congener 105	ppb	1.1	1
REMAP 1993/94	NB065	PCBs	PCB Congener 110/77	ppb	75.1	1
REMAP 1993/94	NB065	PCBs	PCB Congener 118	ppb	2.88	1
REMAP 1993/94	NB065	PCBs	PCB Congener 126	ppb	22.53	1
REMAP 1993/94	NB065	PCBs	PCB Congener 128	ppb	22.12	1
REMAP 1993/94	NB065	PCBs	PCB Congener 138	ppb	3.08	1
REMAP 1993/94	NB065	PCBs	PCB Congener 153	ppb	2.79	1
REMAP 1993/94	NB065	PCBs	PCB Congener 179	ppb	0	0
REMAP 1993/94	NB065	PCBs	PCB Congener 18	ppb	6	1
REMAP 1993/94	NB065	PCBs	PCB Congener 180	ppb	4.05	1
REMAP 1993/94	NB065	PCBs	PCB Congener 187	ppb	0.56	1
REMAP 1993/94	NB065	PCBs	PCB Congener 195	ppb	0.32	1
REMAP 1993/94	NB065	PCBs	PCB Congener 206	ppb	0.81	1
REMAP 1993/94	NB065	PCBs	PCB Congener 209	ppb	1.26	1
REMAP 1993/94	NB065	PCBs	PCB Congener 28	ppb	3.59	1
REMAP 1993/94	NB065	PCBs	PCB Congener 44	ppb	2.2	1
REMAP 1993/94	NB065	PCBs	PCB Congener 52	ppb	3.59	1
REMAP 1993/94	NB065	PCBs	PCB Congener 66	ppb	8.82	1
REMAP 1993/94	NB065	PCBs	PCB Congener 8	ppb	0.15	1
REMAP 1993/94	NB065	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	325.62	1
REMAP 1993/94	NB065	TOC	Total Organic Carbon	ppm	6030	1
REMAP 1993/94	NB102	AVS-SEM	AVS	mmol	109.78	1
REMAP 1993/94	NB102	AVS-SEM	SEM Cd	mmol	0.05	1
REMAP 1993/94	NB102	AVS-SEM	SEM Cd	ppm	6.07	1
REMAP 1993/94	NB102	AVS-SEM	SEM Cu	mmol	2.22	1
REMAP 1993/94	NB102	AVS-SEM	SEM Cu	ppm	141	1
REMAP 1993/94	NB102	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB102	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB102	AVS-SEM	SEM Ni	mmol	0.3	1
REMAP 1993/94	NB102	AVS-SEM	SEM Ni	ppm	17.4	1
REMAP 1993/94	NB102	AVS-SEM	SEM Pb	mmol	2.51	1
REMAP 1993/94	NB102	AVS-SEM	SEM Pb	ppm	520	1
REMAP 1993/94	NB102	AVS-SEM	SEM Zn	mmol	9.71	1
REMAP 1993/94	NB102	AVS-SEM	SEM Zn	ppm	635	1
REMAP 1993/94	NB102	Butyltins	Dibutyltin	ppb	18.1	1
REMAP 1993/94	NB102	Butyltins	Monobutyltin	ppb	7.3	1
REMAP 1993/94	NB102	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB102	Butyltins	Tributyltin	ppb	143.6	1
REMAP 1993/94	NB102	Metals	Aluminum	ppm	77600	1
REMAP 1993/94	NB102	Metals	Antimony	ppm	3.18	1
REMAP 1993/94	NB102	Metals	Arsenic	ppm	13.4	1
REMAP 1993/94	NB102	Metals	Cadmium	ppm	12.9	1
REMAP 1993/94	NB102	Metals	Chromium	ppm	244	1
REMAP 1993/94	NB102	Metals	Copper	ppm	218	1
REMAP 1993/94	NB102	Metals	Iron	ppm	47100	1
REMAP 1993/94	NB102	Metals	Lead	ppm	550	1
REMAP 1993/94	NB102	Metals	Mangenese	ppm	525	1
REMAP 1993/94	NB102	Metals	Mercury	ppm	2.41	1
REMAP 1993/94	NB102	Metals	Nickel	ppm	56.2	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB102	Metals	Selinium	ppm	14.4	1
REMAP 1993/94	NB102	Metals	Silicon	ppm	265000	1
REMAP 1993/94	NB102	Metals	Silver	ppm	3.64	1
REMAP 1993/94	NB102	Metals	Tin	ppm	1.07	1
REMAP 1993/94	NB102	Metals	Zinc	ppm	786	1
REMAP 1993/94	NB102	Metals (partial)	Aluminum partial	ppm	19300	1
REMAP 1993/94	NB102	Metals (partial)	Antimony partial	ppm	4.19	1
REMAP 1993/94	NB102	Metals (partial)	Arsenic partial	ppm	8	1
REMAP 1993/94	NB102	Metals (partial)	Cadmium partial	ppm	7.75	1
REMAP 1993/94	NB102	Metals (partial)	Chromium partial	ppm	178	1
REMAP 1993/94	NB102	Metals (partial)	Copper partial	ppm	198	1
REMAP 1993/94	NB102	Metals (partial)	Iron partial	ppm	33000	1
REMAP 1993/94	NB102	Metals (partial)	Lead partial	ppm	418	1
REMAP 1993/94	NB102	Metals (partial)	Manganese partial	ppm	358	1
REMAP 1993/94	NB102	Metals (partial)	Mercury partial	ppm	4.24	1
REMAP 1993/94	NB102	Metals (partial)	Nickel partial	ppm	37	1
REMAP 1993/94	NB102	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB102	Metals (partial)	Silver partial	ppm	4	1
REMAP 1993/94	NB102	Metals (partial)	Zinc partial	ppm	586	1
REMAP 1993/94	NB102	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB102	Pesticides	Alpha-chlordane	ppb	10.4	1
REMAP 1993/94	NB102	Pesticides	Dieldrin	ppb	4.29	1
REMAP 1993/94	NB102	Pesticides	Endrin	ppb	0.82	1
REMAP 1993/94	NB102	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB102	Pesticides	Heptachlor Epoxide	ppb	0.57	1
REMAP 1993/94	NB102	Pesticides	Hexachlorobenzene	ppb	7.04	1
REMAP 1993/94	NB102	Pesticides	Lindane - Gamma-BHC	ppb	0.13	1
REMAP 1993/94	NB102	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB102	Pesticides	o,p, DDD	ppb	4.21	1
REMAP 1993/94	NB102	Pesticides	o,p, DDE	ppb	7.81	1
REMAP 1993/94	NB102	Pesticides	o,p, DDT	ppb	0	0
REMAP 1993/94	NB102	Pesticides	p,p, DDD	ppb	30.09	1
REMAP 1993/94	NB102	Pesticides	p,p, DDE	ppb	40.23	1
REMAP 1993/94	NB102	Pesticides	p,p, DDT	ppb	20.27	1
REMAP 1993/94	NB102	Pesticides	Total Chlordane	ppb	42.23	1
REMAP 1993/94	NB102	Pesticides	Total DDT	ppb	102.62	1
REMAP 1993/94	NB102	Pesticides	Total DDx (2,4 & 4,4)	ppb	102.61	1
REMAP 1993/94	NB102	Pesticides	Total DDx (4,4)	ppb	90.59	1
REMAP 1993/94	NB102	Pesticides	Trans-Nonachlor	ppb	5.56	1
REMAP 1993/94	NB102	PAHs	1-Methylnaphthalene	ppb	67	1
REMAP 1993/94	NB102	PAHs	1-Methylphenanthrene	ppb	280	1
REMAP 1993/94	NB102	PAHs	2,3,5 Trimethylnaphthalene	ppb	110	1
REMAP 1993/94	NB102	PAHs	2,6-Dimethylnaphthalene	ppb	300	1
REMAP 1993/94	NB102	PAHs	2-Methylnaphthalene	ppb	160	1
REMAP 1993/94	NB102	PAHs	Acenaphthene	ppb	84	1
REMAP 1993/94	NB102	PAHs	Acenaphthylene	ppb	58	1
REMAP 1993/94	NB102	PAHs	Anthracene	ppb	230	1
REMAP 1993/94	NB102	PAHs	Benzo[a]anthracene	ppb	300	1
REMAP 1993/94	NB102	PAHs	Benzo[a]pyrene	ppb	780	1
REMAP 1993/94	NB102	PAHs	Benzo[b,k]fluoranthene	ppb	1110	1
REMAP 1993/94	NB102	PAHs	Benzo[e]pyrene	ppb	410	1
REMAP 1993/94	NB102	PAHs	Benzo[g,h,i]perylene	ppb	270	1
REMAP 1993/94	NB102	PAHs	Biphenyl	ppb	52	1
REMAP 1993/94	NB102	PAHs	Chrysene	ppb	640	1
REMAP 1993/94	NB102	PAHs	Dibenz[a,h]anthracene	ppb	0	0
REMAP 1993/94	NB102	PAHs	Fluoranthene	ppb	420	1
REMAP 1993/94	NB102	PAHs	Fluorene	ppb	110	1
REMAP 1993/94	NB102	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	280	1
REMAP 1993/94	NB102	PAHs	Naphthalene	ppb	250	1
REMAP 1993/94	NB102	PAHs	Perylene	ppb	910	1
REMAP 1993/94	NB102	PAHs	Phenanthrene	ppb	420	1
REMAP 1993/94	NB102	PAHs	Pyrene	ppb	210	1
REMAP 1993/94	NB102	PAHs	Total HMW PAHs	ppb	4010	1
REMAP 1993/94	NB102	PAHs	Total LMW PAHs	ppb	1312	1
REMAP 1993/94	NB102	PAHs	Total PAHs	ppb	5322	1
REMAP 1993/94	NB102	PCBs	PCB Congener 101	ppb	102.01	1
REMAP 1993/94	NB102	PCBs	PCB Congener 105	ppb	19.25	1
REMAP 1993/94	NB102	PCBs	PCB Congener 110/77	ppb	366.21	1
REMAP 1993/94	NB102	PCBs	PCB Congener 118	ppb	58.1	1
REMAP 1993/94	NB102	PCBs	PCB Congener 126	ppb	4.93	1
REMAP 1993/94	NB102	PCBs	PCB Congener 128	ppb	10.66	1
REMAP 1993/94	NB102	PCBs	PCB Congener 138	ppb	88.69	1
REMAP 1993/94	NB102	PCBs	PCB Congener 153	ppb	111.42	1
REMAP 1993/94	NB102	PCBs	PCB Congener 179	ppb	76.58	1
REMAP 1993/94	NB102	PCBs	PCB Congener 18	ppb	52.08	1
REMAP 1993/94	NB102	PCBs	PCB Congener 180	ppb	54.15	1
REMAP 1993/94	NB102	PCBs	PCB Congener 187	ppb	28.22	1
REMAP 1993/94	NB102	PCBs	PCB Congener 195	ppb	4.36	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB102	PCBs	PCB Congener 206	ppb	6.11	1
REMAP 1993/94	NB102	PCBs	PCB Congener 209	ppb	30.99	1
REMAP 1993/94	NB102	PCBs	PCB Congener 28	ppb	70.83	1
REMAP 1993/94	NB102	PCBs	PCB Congener 44	ppb	63.46	1
REMAP 1993/94	NB102	PCBs	PCB Congener 52	ppb	151.73	1
REMAP 1993/94	NB102	PCBs	PCB Congener 66	ppb	115.72	1
REMAP 1993/94	NB102	PCBs	PCB Congener 8	ppb	19.6	1
REMAP 1993/94	NB102	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	2870.2	1
REMAP 1993/94	NB102	TOC	Total Organic Carbon	ppm	91500	1
REMAP 1993/94	NB103	AVS-SEM	AVS	mmol	0.53	1
REMAP 1993/94	NB103	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB103	AVS-SEM	SEM Cd	ppm	1.3	1
REMAP 1993/94	NB103	AVS-SEM	SEM Cu	mmol	1.34	1
REMAP 1993/94	NB103	AVS-SEM	SEM Cu	ppm	85.2	1
REMAP 1993/94	NB103	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB103	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB103	AVS-SEM	SEM Ni	mmol	0.14	1
REMAP 1993/94	NB103	AVS-SEM	SEM Ni	ppm	8.06	1
REMAP 1993/94	NB103	AVS-SEM	SEM Pb	mmol	0.71	1
REMAP 1993/94	NB103	AVS-SEM	SEM Pb	ppm	146	1
REMAP 1993/94	NB103	AVS-SEM	SEM Zn	mmol	2.72	1
REMAP 1993/94	NB103	AVS-SEM	SEM Zn	ppm	178	1
REMAP 1993/94	NB103	Butyltins	Dibutyltin	ppb	49.7	1
REMAP 1993/94	NB103	Butyltins	Monobutyltin	ppb	18.7	1
REMAP 1993/94	NB103	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB103	Butyltins	Tributyltin	ppb	67	1
REMAP 1993/94	NB103	Metals	Aluminum	ppm	66200	1
REMAP 1993/94	NB103	Metals	Antimony	ppm	1.94	1
REMAP 1993/94	NB103	Metals	Arsenic	ppm	13.8	1
REMAP 1993/94	NB103	Metals	Cadmium	ppm	1.59	1
REMAP 1993/94	NB103	Metals	Chromium	ppm	149	1
REMAP 1993/94	NB103	Metals	Copper	ppm	127	1
REMAP 1993/94	NB103	Metals	Iron	ppm	38300	1
REMAP 1993/94	NB103	Metals	Lead	ppm	143	1
REMAP 1993/94	NB103	Metals	Mangenese	ppm	501	1
REMAP 1993/94	NB103	Metals	Mercury	ppm	2.35	1
REMAP 1993/94	NB103	Metals	Nickel	ppm	65.8	1
REMAP 1993/94	NB103	Metals	Selinium	ppm	16.1	1
REMAP 1993/94	NB103	Metals	Silicon	ppm	343000	1
REMAP 1993/94	NB103	Metals	Silver	ppm	3.62	1
REMAP 1993/94	NB103	Metals	Tin	ppm	0.9	1
REMAP 1993/94	NB103	Metals	Zinc	ppm	252	1
REMAP 1993/94	NB103	Metals (partial)	Aluminum partial	ppm	26800	1
REMAP 1993/94	NB103	Metals (partial)	Antimony partial	ppm	1.64	1
REMAP 1993/94	NB103	Metals (partial)	Arsenic partial	ppm	8	1
REMAP 1993/94	NB103	Metals (partial)	Cadmium partial	ppm	1.99	1
REMAP 1993/94	NB103	Metals (partial)	Chromium partial	ppm	143	1
REMAP 1993/94	NB103	Metals (partial)	Copper partial	ppm	159	1
REMAP 1993/94	NB103	Metals (partial)	Iron partial	ppm	35700	1
REMAP 1993/94	NB103	Metals (partial)	Lead partial	ppm	139	1
REMAP 1993/94	NB103	Metals (partial)	Manganese partial	ppm	444	1
REMAP 1993/94	NB103	Metals (partial)	Mercury partial	ppm	1.85	1
REMAP 1993/94	NB103	Metals (partial)	Nickel partial	ppm	48	1
REMAP 1993/94	NB103	Metals (partial)	Selinium partial	ppm	1.4	1
REMAP 1993/94	NB103	Metals (partial)	Silver partial	ppm	4	1
REMAP 1993/94	NB103	Metals (partial)	Zinc partial	ppm	221	1
REMAP 1993/94	NB103	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB103	Pesticides	Alpha-chlordane	ppb	5.1	1
REMAP 1993/94	NB103	Pesticides	Dieldrin	ppb	2.45	1
REMAP 1993/94	NB103	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB103	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB103	Pesticides	Heptachlor Epoxide	ppb	0.59	1
REMAP 1993/94	NB103	Pesticides	Hexachlorobenzene	ppb	1.88	1
REMAP 1993/94	NB103	Pesticides	Lindane - Gamma-BHC	ppb	0.65	1
REMAP 1993/94	NB103	Pesticides	Mirex	ppb	0.2	1
REMAP 1993/94	NB103	Pesticides	o,p, DDD	ppb	5.56	1
REMAP 1993/94	NB103	Pesticides	o,p, DDE	ppb	7.53	1
REMAP 1993/94	NB103	Pesticides	o,p, DDT	ppb	0.85	1
REMAP 1993/94	NB103	Pesticides	p,p, DDD	ppb	64.73	1
REMAP 1993/94	NB103	Pesticides	p,p, DDE	ppb	30.23	1
REMAP 1993/94	NB103	Pesticides	p,p, DDT	ppb	6.47	1
REMAP 1993/94	NB103	Pesticides	Total Chlordane	ppb	21.91	1
REMAP 1993/94	NB103	Pesticides	Total DDT	ppb	115.37	1
REMAP 1993/94	NB103	Pesticides	Total DDx (2,4 & 4,4)	ppb	115.37	1
REMAP 1993/94	NB103	Pesticides	Total DDx (4,4)	ppb	101.43	1
REMAP 1993/94	NB103	Pesticides	Trans-Nonachlor	ppb	3.06	1
REMAP 1993/94	NB103	PAHs	1-Methylnaphthalene	ppb	39	1
REMAP 1993/94	NB103	PAHs	1-Methylphenanthrene	ppb	83	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB103	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB103	PAHs	2,6-Dimethylnaphthalene	ppb	260	1
REMAP 1993/94	NB103	PAHs	2-Methylnaphthalene	ppb	120	1
REMAP 1993/94	NB103	PAHs	Acenaphthene	ppb	58	1
REMAP 1993/94	NB103	PAHs	Acenaphthylene	ppb	190	1
REMAP 1993/94	NB103	PAHs	Anthracene	ppb	330	1
REMAP 1993/94	NB103	PAHs	Benzo[a]anthracene	ppb	660	1
REMAP 1993/94	NB103	PAHs	Benzo[a]pyrene	ppb	720	1
REMAP 1993/94	NB103	PAHs	Benzo[b,k]fluoranthene	ppb	1690	1
REMAP 1993/94	NB103	PAHs	Benzo[e]pyrene	ppb	400	1
REMAP 1993/94	NB103	PAHs	Benzo[g,h,i]perylene	ppb	440	1
REMAP 1993/94	NB103	PAHs	Biphenyl	ppb	48	1
REMAP 1993/94	NB103	PAHs	Chrysene	ppb	780	1
REMAP 1993/94	NB103	PAHs	Dibenz[a,h]anthracene	ppb	110	1
REMAP 1993/94	NB103	PAHs	Fluoranthene	ppb	850	1
REMAP 1993/94	NB103	PAHs	Fluorene	ppb	90	1
REMAP 1993/94	NB103	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	530	1
REMAP 1993/94	NB103	PAHs	Naphthalene	ppb	200	1
REMAP 1993/94	NB103	PAHs	Perylene	ppb	860	1
REMAP 1993/94	NB103	PAHs	Phenanthrene	ppb	360	1
REMAP 1993/94	NB103	PAHs	Pyrene	ppb	850	1
REMAP 1993/94	NB103	PAHs	Total HMW PAHs	ppb	6630	1
REMAP 1993/94	NB103	PAHs	Total LMW PAHs	ppb	1348	1
REMAP 1993/94	NB103	PAHs	Total PAHs	ppb	7978	1
REMAP 1993/94	NB103	PCBs	PCB Congener 101	ppb	22.81	1
REMAP 1993/94	NB103	PCBs	PCB Congener 105	ppb	6.03	1
REMAP 1993/94	NB103	PCBs	PCB Congener 110/77	ppb	53	1
REMAP 1993/94	NB103	PCBs	PCB Congener 118	ppb	17.36	1
REMAP 1993/94	NB103	PCBs	PCB Congener 126	ppb	0	0
REMAP 1993/94	NB103	PCBs	PCB Congener 128	ppb	3.55	1
REMAP 1993/94	NB103	PCBs	PCB Congener 138	ppb	18.86	1
REMAP 1993/94	NB103	PCBs	PCB Congener 153	ppb	29.48	1
REMAP 1993/94	NB103	PCBs	PCB Congener 179	ppb	58.17	1
REMAP 1993/94	NB103	PCBs	PCB Congener 18	ppb	26.6	1
REMAP 1993/94	NB103	PCBs	PCB Congener 180	ppb	11.57	1
REMAP 1993/94	NB103	PCBs	PCB Congener 187	ppb	6.34	1
REMAP 1993/94	NB103	PCBs	PCB Congener 195	ppb	1.67	1
REMAP 1993/94	NB103	PCBs	PCB Congener 206	ppb	2.75	1
REMAP 1993/94	NB103	PCBs	PCB Congener 209	ppb	2.86	1
REMAP 1993/94	NB103	PCBs	PCB Congener 28	ppb	31.26	1
REMAP 1993/94	NB103	PCBs	PCB Congener 44	ppb	15.86	1
REMAP 1993/94	NB103	PCBs	PCB Congener 52	ppb	31.08	1
REMAP 1993/94	NB103	PCBs	PCB Congener 66	ppb	37.37	1
REMAP 1993/94	NB103	PCBs	PCB Congener 8	ppb	4.06	1
REMAP 1993/94	NB103	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	761.36	1
REMAP 1993/94	NB103	TOC	Total Organic Carbon	ppm	31000	1
REMAP 1993/94	NB104	AVS-SEM	AVS	mmol	0.22	1
REMAP 1993/94	NB104	AVS-SEM	SEM Cd	ppm	0	0
REMAP 1993/94	NB104	AVS-SEM	SEM Cd	mmol	0	0
REMAP 1993/94	NB104	AVS-SEM	SEM Cu	mmol	0.07	1
REMAP 1993/94	NB104	AVS-SEM	SEM Cu	ppm	4.58	1
REMAP 1993/94	NB104	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB104	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB104	AVS-SEM	SEM Ni	mmol	0.02	1
REMAP 1993/94	NB104	AVS-SEM	SEM Ni	ppm	0.91	1
REMAP 1993/94	NB104	AVS-SEM	SEM Pb	mmol	0.05	1
REMAP 1993/94	NB104	AVS-SEM	SEM Pb	ppm	10	1
REMAP 1993/94	NB104	AVS-SEM	SEM Zn	mmol	0.26	1
REMAP 1993/94	NB104	AVS-SEM	SEM Zn	ppm	17	1
REMAP 1993/94	NB104	Butyltins	Dibutyltin	ppb	2.2	1
REMAP 1993/94	NB104	Butyltins	Monobutyltin	ppb	0	0
REMAP 1993/94	NB104	Butyltins	Tetrabutyltin	ppb	0.1	1
REMAP 1993/94	NB104	Butyltins	Tributyltin	ppb	33.2	1
REMAP 1993/94	NB104	Metals	Aluminum	ppm	39400	1
REMAP 1993/94	NB104	Metals	Antimony	ppm	1.09	1
REMAP 1993/94	NB104	Metals	Arsenic	ppm	3.98	1
REMAP 1993/94	NB104	Metals	Cadmium	ppm	0.13	1
REMAP 1993/94	NB104	Metals	Chromium	ppm	26.5	1
REMAP 1993/94	NB104	Metals	Copper	ppm	12.2	1
REMAP 1993/94	NB104	Metals	Iron	ppm	15400	1
REMAP 1993/94	NB104	Metals	Lead	ppm	12	1
REMAP 1993/94	NB104	Metals	Mangenese	ppm	270	1
REMAP 1993/94	NB104	Metals	Mercury	ppm	0.17	1
REMAP 1993/94	NB104	Metals	Nickel	ppm	13.3	1
REMAP 1993/94	NB104	Metals	Selinium	ppm	1.34	1
REMAP 1993/94	NB104	Metals	Silicon	ppm	401000	1
REMAP 1993/94	NB104	Metals	Silver	ppm	0.11	1
REMAP 1993/94	NB104	Metals	Tin	ppm	0.51	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB104	Metals	Zinc	ppm	46.2	1
REMAP 1993/94	NB104	Metals (partial)	Aluminum partial	ppm	5890	1
REMAP 1993/94	NB104	Metals (partial)	Antimony partial	ppm	0	0
REMAP 1993/94	NB104	Metals (partial)	Arsenic partial	ppm	2	1
REMAP 1993/94	NB104	Metals (partial)	Cadmium partial	ppm	0.15	1
REMAP 1993/94	NB104	Metals (partial)	Chromium partial	ppm	15	1
REMAP 1993/94	NB104	Metals (partial)	Copper partial	ppm	11	1
REMAP 1993/94	NB104	Metals (partial)	Iron partial	ppm	9040	1
REMAP 1993/94	NB104	Metals (partial)	Lead partial	ppm	14.2	1
REMAP 1993/94	NB104	Metals (partial)	Manganese partial	ppm	158	1
REMAP 1993/94	NB104	Metals (partial)	Mercury partial	ppm	0.11	1
REMAP 1993/94	NB104	Metals (partial)	Nickel partial	ppm	7	1
REMAP 1993/94	NB104	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB104	Metals (partial)	Silver partial	ppm	0	0
REMAP 1993/94	NB104	Metals (partial)	Zinc partial	ppm	27	1
REMAP 1993/94	NB104	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB104	Pesticides	Alpha-chlordane	ppb	0.27	1
REMAP 1993/94	NB104	Pesticides	Dieldrin	ppb	0.34	1
REMAP 1993/94	NB104	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB104	Pesticides	Heptachlor	ppb	0.09	1
REMAP 1993/94	NB104	Pesticides	Heptachlor Epoxide	ppb	0.01	1
REMAP 1993/94	NB104	Pesticides	Hexachlorobenzene	ppb	0.19	1
REMAP 1993/94	NB104	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB104	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB104	Pesticides	o,p, DDD	ppb	0.29	1
REMAP 1993/94	NB104	Pesticides	o,p, DDE	ppb	0.34	1
REMAP 1993/94	NB104	Pesticides	o,p, DDT	ppb	0.08	1
REMAP 1993/94	NB104	Pesticides	p,p, DDD	ppb	1.46	1
REMAP 1993/94	NB104	Pesticides	p,p, DDE	ppb	1.52	1
REMAP 1993/94	NB104	Pesticides	p,p, DDT	ppb	0.08	1
REMAP 1993/94	NB104	Pesticides	Total Chlordane	ppb	1.04	1
REMAP 1993/94	NB104	Pesticides	Total DDT	ppb	3.77	1
REMAP 1993/94	NB104	Pesticides	Total DDx (2,4 & 4,4)	ppb	3.77	1
REMAP 1993/94	NB104	Pesticides	Total DDx (4,4)	ppb	3.06	1
REMAP 1993/94	NB104	Pesticides	Trans-Nonachlor	ppb	0.17	1
REMAP 1993/94	NB104	PAHs	1-Methylnaphthalene	ppb	3.6	1
REMAP 1993/94	NB104	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB104	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB104	PAHs	2,6-Dimethylnaphthalene	ppb	6.8	1
REMAP 1993/94	NB104	PAHs	2-Methylnaphthalene	ppb	12	1
REMAP 1993/94	NB104	PAHs	Acenaphthene	ppb	10	1
REMAP 1993/94	NB104	PAHs	Acenaphthylene	ppb	17	1
REMAP 1993/94	NB104	PAHs	Anthracene	ppb	33	1
REMAP 1993/94	NB104	PAHs	Benzo[a]anthracene	ppb	82	1
REMAP 1993/94	NB104	PAHs	Benzo[a]pyrene	ppb	67	1
REMAP 1993/94	NB104	PAHs	Benzo[b,k]fluoranthene	ppb	165	1
REMAP 1993/94	NB104	PAHs	Benzo[e]pyrene	ppb	110	1
REMAP 1993/94	NB104	PAHs	Benzo[g,h,i]perylene	ppb	51	1
REMAP 1993/94	NB104	PAHs	Biphenyl	ppb	5.2	1
REMAP 1993/94	NB104	PAHs	Chrysene	ppb	90	1
REMAP 1993/94	NB104	PAHs	Dibenz[a,h]anthracene	ppb	16	1
REMAP 1993/94	NB104	PAHs	Fluoranthene	ppb	120	1
REMAP 1993/94	NB104	PAHs	Fluorene	ppb	14	1
REMAP 1993/94	NB104	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	63	1
REMAP 1993/94	NB104	PAHs	Naphthalene	ppb	36	1
REMAP 1993/94	NB104	PAHs	Perylene	ppb	83	1
REMAP 1993/94	NB104	PAHs	Phenanthrene	ppb	54	1
REMAP 1993/94	NB104	PAHs	Pyrene	ppb	100	1
REMAP 1993/94	NB104	PAHs	Total HMW PAHs	ppb	754	1
REMAP 1993/94	NB104	PAHs	Total LMW PAHs	ppb	176	1
REMAP 1993/94	NB104	PAHs	Total PAHs	ppb	930	1
REMAP 1993/94	NB104	PCBs	PCB Congener 101	ppb	1.16	1
REMAP 1993/94	NB104	PCBs	PCB Congener 105	ppb	0.41	1
REMAP 1993/94	NB104	PCBs	PCB Congener 110/77	ppb	2.79	1
REMAP 1993/94	NB104	PCBs	PCB Congener 118	ppb	1.05	1
REMAP 1993/94	NB104	PCBs	PCB Congener 126	ppb	1.22	1
REMAP 1993/94	NB104	PCBs	PCB Congener 128	ppb	0.69	1
REMAP 1993/94	NB104	PCBs	PCB Congener 138	ppb	1.05	1
REMAP 1993/94	NB104	PCBs	PCB Congener 153	ppb	1.29	1
REMAP 1993/94	NB104	PCBs	PCB Congener 179	ppb	5.33	1
REMAP 1993/94	NB104	PCBs	PCB Congener 18	ppb	0.28	1
REMAP 1993/94	NB104	PCBs	PCB Congener 180	ppb	0.64	1
REMAP 1993/94	NB104	PCBs	PCB Congener 187	ppb	0.28	1
REMAP 1993/94	NB104	PCBs	PCB Congener 195	ppb	0.12	1
REMAP 1993/94	NB104	PCBs	PCB Congener 206	ppb	0.19	1
REMAP 1993/94	NB104	PCBs	PCB Congener 209	ppb	0.1	1
REMAP 1993/94	NB104	PCBs	PCB Congener 28	ppb	1.53	1
REMAP 1993/94	NB104	PCBs	PCB Congener 44	ppb	0.97	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB104	PCBs	PCB Congener 52	ppb	1.67	1
REMAP 1993/94	NB104	PCBs	PCB Congener 66	ppb	1.02	1
REMAP 1993/94	NB104	PCBs	PCB Congener 8	ppb	0.15	1
REMAP 1993/94	NB104	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	43.88	1
REMAP 1993/94	NB104	TOC	Total Organic Carbon	ppm	24200	1
REMAP 1993/94	NB105	AVS-SEM	AVS	mmol	9.61	1
REMAP 1993/94	NB105	AVS-SEM	SEM Cd	mmol	0.02	1
REMAP 1993/94	NB105	AVS-SEM	SEM Cd	ppm	1.65	1
REMAP 1993/94	NB105	AVS-SEM	SEM Cu	mmol	1.28	1
REMAP 1993/94	NB105	AVS-SEM	SEM Cu	ppm	81	1
REMAP 1993/94	NB105	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB105	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB105	AVS-SEM	SEM Ni	mmol	0.18	1
REMAP 1993/94	NB105	AVS-SEM	SEM Ni	ppm	10.8	1
REMAP 1993/94	NB105	AVS-SEM	SEM Pb	mmol	0.61	1
REMAP 1993/94	NB105	AVS-SEM	SEM Pb	ppm	127	1
REMAP 1993/94	NB105	AVS-SEM	SEM Zn	mmol	2.77	1
REMAP 1993/94	NB105	AVS-SEM	SEM Zn	ppm	181	1
REMAP 1993/94	NB105	Butyltins	Dibutyltin	ppb	36	1
REMAP 1993/94	NB105	Butyltins	Monobutyltin	ppb	13.5	1
REMAP 1993/94	NB105	Butyltins	Tetrabutyltin	ppb	0	0
REMAP 1993/94	NB105	Butyltins	Tributyltin	ppb	99.6	1
REMAP 1993/94	NB105	Metals	Aluminum	ppm	71600	1
REMAP 1993/94	NB105	Metals	Antimony	ppm	0.83	1
REMAP 1993/94	NB105	Metals	Arsenic	ppm	13.4	1
REMAP 1993/94	NB105	Metals	Cadmium	ppm	1.48	1
REMAP 1993/94	NB105	Metals	Chromium	ppm	132	1
REMAP 1993/94	NB105	Metals	Copper	ppm	54.7	1
REMAP 1993/94	NB105	Metals	Iron	ppm	32300	1
REMAP 1993/94	NB105	Metals	Lead	ppm	119	1
REMAP 1993/94	NB105	Metals	Mangenese	ppm	505	1
REMAP 1993/94	NB105	Metals	Mercury	ppm	2.17	1
REMAP 1993/94	NB105	Metals	Nickel	ppm	37.5	1
REMAP 1993/94	NB105	Metals	Selinium	ppm	11.3	1
REMAP 1993/94	NB105	Metals	Silicon	ppm	336000	1
REMAP 1993/94	NB105	Metals	Silver	ppm	2.52	1
REMAP 1993/94	NB105	Metals	Tin	ppm	0.88	1
REMAP 1993/94	NB105	Metals	Zinc	ppm	227	1
REMAP 1993/94	NB105	Metals (partial)	Aluminum partial	ppm	14300	1
REMAP 1993/94	NB105	Metals (partial)	Antimony partial	ppm	0.84	1
REMAP 1993/94	NB105	Metals (partial)	Arsenic partial	ppm	6	1
REMAP 1993/94	NB105	Metals (partial)	Cadmium partial	ppm	1.6	1
REMAP 1993/94	NB105	Metals (partial)	Chromium partial	ppm	89	1
REMAP 1993/94	NB105	Metals (partial)	Copper partial	ppm	91	1
REMAP 1993/94	NB105	Metals (partial)	Iron partial	ppm	23000	1
REMAP 1993/94	NB105	Metals (partial)	Lead partial	ppm	83	1
REMAP 1993/94	NB105	Metals (partial)	Manganese partial	ppm	323	1
REMAP 1993/94	NB105	Metals (partial)	Mercury partial	ppm	3.07	1
REMAP 1993/94	NB105	Metals (partial)	Nickel partial	ppm	25	1
REMAP 1993/94	NB105	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB105	Metals (partial)	Silver partial	ppm	3	1
REMAP 1993/94	NB105	Metals (partial)	Zinc partial	ppm	140	1
REMAP 1993/94	NB105	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB105	Pesticides	Alpha-chlordane	ppb	3.4	1
REMAP 1993/94	NB105	Pesticides	Dieldrin	ppb	2.07	1
REMAP 1993/94	NB105	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB105	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB105	Pesticides	Heptachlor Epoxide	ppb	0.3	1
REMAP 1993/94	NB105	Pesticides	Hexachlorobenzene	ppb	1.91	1
REMAP 1993/94	NB105	Pesticides	Lindane - Gamma-BHC	ppb	0.71	1
REMAP 1993/94	NB105	Pesticides	Mirex	ppb	0.01	1
REMAP 1993/94	NB105	Pesticides	o,p, DDD	ppb	3.83	1
REMAP 1993/94	NB105	Pesticides	o,p, DDE	ppb	6.1	1
REMAP 1993/94	NB105	Pesticides	o,p, DDT	ppb	1.04	1
REMAP 1993/94	NB105	Pesticides	p,p, DDD	ppb	19.88	1
REMAP 1993/94	NB105	Pesticides	p,p, DDE	ppb	24.15	1
REMAP 1993/94	NB105	Pesticides	p,p, DDT	ppb	2.81	1
REMAP 1993/94	NB105	Pesticides	Total Chlordane	ppb	14.27	1
REMAP 1993/94	NB105	Pesticides	Total DDT	ppb	57.81	1
REMAP 1993/94	NB105	Pesticides	Total DDx (2,4 & 4,4)	ppb	57.81	1
REMAP 1993/94	NB105	Pesticides	Total DDx (4,4)	ppb	46.84	1
REMAP 1993/94	NB105	Pesticides	Trans-Nonachlor	ppb	2.07	1
REMAP 1993/94	NB105	PAHs	1-Methylnaphthalene	ppb	34	1
REMAP 1993/94	NB105	PAHs	1-Methylphenanthrene	ppb	70	1
REMAP 1993/94	NB105	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB105	PAHs	2,6-Dimethylnaphthalene	ppb	160	1
REMAP 1993/94	NB105	PAHs	2-Methylnaphthalene	ppb	98	1
REMAP 1993/94	NB105	PAHs	Acenaphthene	ppb	42	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB105	PAHs	Acenaphthylene	ppb	110	1
REMAP 1993/94	NB105	PAHs	Anthracene	ppb	220	1
REMAP 1993/94	NB105	PAHs	Benzo[a]anthracene	ppb	250	1
REMAP 1993/94	NB105	PAHs	Benzo[a]pyrene	ppb	380	1
REMAP 1993/94	NB105	PAHs	Benzo[b,k]fluoranthene	ppb	690	1
REMAP 1993/94	NB105	PAHs	Benzo[e]pyrene	ppb	550	1
REMAP 1993/94	NB105	PAHs	Benzo[g,h,i]perylene	ppb	490	1
REMAP 1993/94	NB105	PAHs	Biphenyl	ppb	34	1
REMAP 1993/94	NB105	PAHs	Chrysene	ppb	500	1
REMAP 1993/94	NB105	PAHs	Dibenz[a,h]anthracene	ppb	190	1
REMAP 1993/94	NB105	PAHs	Fluoranthene	ppb	170	1
REMAP 1993/94	NB105	PAHs	Fluorene	ppb	71	1
REMAP 1993/94	NB105	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	490	1
REMAP 1993/94	NB105	PAHs	Naphthalene	ppb	220	1
REMAP 1993/94	NB105	PAHs	Perylene	ppb	630	1
REMAP 1993/94	NB105	PAHs	Phenanthrene	ppb	150	1
REMAP 1993/94	NB105	PAHs	Pyrene	ppb	140	1
REMAP 1993/94	NB105	PAHs	Total HMW PAHs	ppb	3300	1
REMAP 1993/94	NB105	PAHs	Total LMW PAHs	ppb	911	1
REMAP 1993/94	NB105	PAHs	Total PAHs	ppb	4211	1
REMAP 1993/94	NB105	PCBs	PCB Congener 101	ppb	17.71	1
REMAP 1993/94	NB105	PCBs	PCB Congener 105	ppb	3.69	1
REMAP 1993/94	NB105	PCBs	PCB Congener 110/77	ppb	38.66	1
REMAP 1993/94	NB105	PCBs	PCB Congener 118	ppb	13.82	1
REMAP 1993/94	NB105	PCBs	PCB Congener 126	ppb	1.62	1
REMAP 1993/94	NB105	PCBs	PCB Congener 128	ppb	1.85	1
REMAP 1993/94	NB105	PCBs	PCB Congener 138	ppb	15.08	1
REMAP 1993/94	NB105	PCBs	PCB Congener 153	ppb	23.15	1
REMAP 1993/94	NB105	PCBs	PCB Congener 179	ppb	59.74	1
REMAP 1993/94	NB105	PCBs	PCB Congener 18	ppb	12.4	1
REMAP 1993/94	NB105	PCBs	PCB Congener 180	ppb	9.49	1
REMAP 1993/94	NB105	PCBs	PCB Congener 187	ppb	5.27	1
REMAP 1993/94	NB105	PCBs	PCB Congener 195	ppb	0.89	1
REMAP 1993/94	NB105	PCBs	PCB Congener 206	ppb	1.85	1
REMAP 1993/94	NB105	PCBs	PCB Congener 209	ppb	2.67	1
REMAP 1993/94	NB105	PCBs	PCB Congener 28	ppb	21.13	1
REMAP 1993/94	NB105	PCBs	PCB Congener 44	ppb	12.18	1
REMAP 1993/94	NB105	PCBs	PCB Congener 52	ppb	22.23	1
REMAP 1993/94	NB105	PCBs	PCB Congener 66	ppb	16.03	1
REMAP 1993/94	NB105	PCBs	PCB Congener 8	ppb	3.29	1
REMAP 1993/94	NB105	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	565.5	1
REMAP 1993/94	NB105	TOC	Total Organic Carbon	ppm	26200	1
REMAP 1993/94	NB106	AVS-SEM	AVS	mmol	10.11	1
REMAP 1993/94	NB106	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB106	AVS-SEM	SEM Cd	ppm	1.36	1
REMAP 1993/94	NB106	AVS-SEM	SEM Cu	mmol	0.25	1
REMAP 1993/94	NB106	AVS-SEM	SEM Cu	ppm	15.9	1
REMAP 1993/94	NB106	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB106	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB106	AVS-SEM	SEM Ni	mmol	0.08	1
REMAP 1993/94	NB106	AVS-SEM	SEM Ni	ppm	4.76	1
REMAP 1993/94	NB106	AVS-SEM	SEM Pb	mmol	0.55	1
REMAP 1993/94	NB106	AVS-SEM	SEM Pb	ppm	113	1
REMAP 1993/94	NB106	AVS-SEM	SEM Zn	mmol	2.4	1
REMAP 1993/94	NB106	AVS-SEM	SEM Zn	ppm	157	1
REMAP 1993/94	NB106	Butyltins	Dibutyltin	ppb	111.1	1
REMAP 1993/94	NB106	Butyltins	Monobutyltin	ppb	56.4	1
REMAP 1993/94	NB106	Butyltins	Tetrabutyltin	ppb	62	1
REMAP 1993/94	NB106	Butyltins	Tributyltin	ppb	289.8	1
REMAP 1993/94	NB106	Metals	Aluminum	ppm	62900	1
REMAP 1993/94	NB106	Metals	Antimony	ppm	1.99	1
REMAP 1993/94	NB106	Metals	Arsenic	ppm	13.4	1
REMAP 1993/94	NB106	Metals	Cadmium	ppm	2.25	1
REMAP 1993/94	NB106	Metals	Chromium	ppm	177	1
REMAP 1993/94	NB106	Metals	Copper	ppm	163	1
REMAP 1993/94	NB106	Metals	Iron	ppm	36100	1
REMAP 1993/94	NB106	Metals	Lead	ppm	167	1
REMAP 1993/94	NB106	Metals	Mangenese	ppm	402	1
REMAP 1993/94	NB106	Metals	Mercury	ppm	3.42	1
REMAP 1993/94	NB106	Metals	Nickel	ppm	48.9	1
REMAP 1993/94	NB106	Metals	Selinium	ppm	17.4	1
REMAP 1993/94	NB106	Metals	Silicon	ppm	341000	1
REMAP 1993/94	NB106	Metals	Silver	ppm	0.4	1
REMAP 1993/94	NB106	Metals	Tin	ppm	0.81	1
REMAP 1993/94	NB106	Metals	Zinc	ppm	326	1
REMAP 1993/94	NB106	Metals (partial)	Aluminum partial	ppm	20300	1
REMAP 1993/94	NB106	Metals (partial)	Antimony partial	ppm	1.59	1
REMAP 1993/94	NB106	Metals (partial)	Arsenic partial	ppm	8	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB106	Metals (partial)	Cadmium partial	ppm	3.3	1
REMAP 1993/94	NB106	Metals (partial)	Chromium partial	ppm	158	1
REMAP 1993/94	NB106	Metals (partial)	Copper partial	ppm	168	1
REMAP 1993/94	NB106	Metals (partial)	Iron partial	ppm	29700	1
REMAP 1993/94	NB106	Metals (partial)	Lead partial	ppm	155	1
REMAP 1993/94	NB106	Metals (partial)	Manganese partial	ppm	311	1
REMAP 1993/94	NB106	Metals (partial)	Mercury partial	ppm	4.52	1
REMAP 1993/94	NB106	Metals (partial)	Nickel partial	ppm	37	1
REMAP 1993/94	NB106	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB106	Metals (partial)	Silver partial	ppm	5	1
REMAP 1993/94	NB106	Metals (partial)	Zinc partial	ppm	242	1
REMAP 1993/94	NB106	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB106	Pesticides	Alpha-chlordane	ppb	8.05	1
REMAP 1993/94	NB106	Pesticides	Dieldrin	ppb	5.22	1
REMAP 1993/94	NB106	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB106	Pesticides	Heptachlor	ppb	3.35	1
REMAP 1993/94	NB106	Pesticides	Heptachlor Epoxide	ppb	0.49	1
REMAP 1993/94	NB106	Pesticides	Hexachlorobenzene	ppb	2.95	1
REMAP 1993/94	NB106	Pesticides	Lindane - Gamma-BHC	ppb	0.4	1
REMAP 1993/94	NB106	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB106	Pesticides	o,p, DDD	ppb	6.82	1
REMAP 1993/94	NB106	Pesticides	o,p, DDE	ppb	6.91	1
REMAP 1993/94	NB106	Pesticides	o,p, DDT	ppb	1.26	1
REMAP 1993/94	NB106	Pesticides	p,p, DDD	ppb	31.23	1
REMAP 1993/94	NB106	Pesticides	p,p, DDE	ppb	41.1	1
REMAP 1993/94	NB106	Pesticides	p,p, DDT	ppb	4.68	1
REMAP 1993/94	NB106	Pesticides	Total Chlordane	ppb	32.22	1
REMAP 1993/94	NB106	Pesticides	Total DDT	ppb	92	1
REMAP 1993/94	NB106	Pesticides	Total DDx (2,4 & 4,4)	ppb	92	1
REMAP 1993/94	NB106	Pesticides	Total DDx (4,4)	ppb	77.01	1
REMAP 1993/94	NB106	Pesticides	Trans-Nonachlor	ppb	4.37	1
REMAP 1993/94	NB106	PAHs	1-Methylnaphthalene	ppb	36	1
REMAP 1993/94	NB106	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB106	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB106	PAHs	2,6-Dimethylnaphthalene	ppb	160	1
REMAP 1993/94	NB106	PAHs	2-Methylnaphthalene	ppb	110	1
REMAP 1993/94	NB106	PAHs	Acenaphthene	ppb	28	1
REMAP 1993/94	NB106	PAHs	Acenaphthylene	ppb	100	1
REMAP 1993/94	NB106	PAHs	Anthracene	ppb	130	1
REMAP 1993/94	NB106	PAHs	Benzo[a]anthracene	ppb	690	1
REMAP 1993/94	NB106	PAHs	Benzo[a]pyrene	ppb	800	1
REMAP 1993/94	NB106	PAHs	Benzo[b,k]fluoranthene	ppb	1540	1
REMAP 1993/94	NB106	PAHs	Benzo[e]pyrene	ppb	520	1
REMAP 1993/94	NB106	PAHs	Benzo[g,h,i]perylene	ppb	410	1
REMAP 1993/94	NB106	PAHs	Biphenyl	ppb	38	1
REMAP 1993/94	NB106	PAHs	Chrysene	ppb	1100	1
REMAP 1993/94	NB106	PAHs	Dibenz[a,h]anthracene	ppb	140	1
REMAP 1993/94	NB106	PAHs	Fluoranthene	ppb	190	1
REMAP 1993/94	NB106	PAHs	Fluorene	ppb	23	1
REMAP 1993/94	NB106	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	470	1
REMAP 1993/94	NB106	PAHs	Naphthalene	ppb	200	1
REMAP 1993/94	NB106	PAHs	Perylene	ppb	910	1
REMAP 1993/94	NB106	PAHs	Phenanthrene	ppb	130	1
REMAP 1993/94	NB106	PAHs	Pyrene	ppb	200	1
REMAP 1993/94	NB106	PAHs	Total HMW PAHs	ppb	5540	1
REMAP 1993/94	NB106	PAHs	Total LMW PAHs	ppb	721	1
REMAP 1993/94	NB106	PAHs	Total PAHs	ppb	6261	1
REMAP 1993/94	NB106	PCBs	PCB Congener 101	ppb	32.1	1
REMAP 1993/94	NB106	PCBs	PCB Congener 105	ppb	10.45	1
REMAP 1993/94	NB106	PCBs	PCB Congener 110/77	ppb	107.49	1
REMAP 1993/94	NB106	PCBs	PCB Congener 118	ppb	25.96	1
REMAP 1993/94	NB106	PCBs	PCB Congener 126	ppb	2.01	1
REMAP 1993/94	NB106	PCBs	PCB Congener 128	ppb	4.37	1
REMAP 1993/94	NB106	PCBs	PCB Congener 138	ppb	29.96	1
REMAP 1993/94	NB106	PCBs	PCB Congener 153	ppb	39.86	1
REMAP 1993/94	NB106	PCBs	PCB Congener 179	ppb	228.92	1
REMAP 1993/94	NB106	PCBs	PCB Congener 18	ppb	28.51	1
REMAP 1993/94	NB106	PCBs	PCB Congener 180	ppb	14.12	1
REMAP 1993/94	NB106	PCBs	PCB Congener 187	ppb	8.08	1
REMAP 1993/94	NB106	PCBs	PCB Congener 195	ppb	1.49	1
REMAP 1993/94	NB106	PCBs	PCB Congener 206	ppb	2.65	1
REMAP 1993/94	NB106	PCBs	PCB Congener 209	ppb	2.76	1
REMAP 1993/94	NB106	PCBs	PCB Congener 28	ppb	38.1	1
REMAP 1993/94	NB106	PCBs	PCB Congener 44	ppb	24.19	1
REMAP 1993/94	NB106	PCBs	PCB Congener 52	ppb	41	1
REMAP 1993/94	NB106	PCBs	PCB Congener 66	ppb	30.37	1
REMAP 1993/94	NB106	PCBs	PCB Congener 8	ppb	6.09	1
REMAP 1993/94	NB106	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	1356.96	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB106	TOC	Total Organic Carbon	ppm	57000	1
REMAP 1993/94	NB110	AVS-SEM	AVS	mmol	2.65	1
REMAP 1993/94	NB110	AVS-SEM	SEM Cd	mmol	0	0
REMAP 1993/94	NB110	AVS-SEM	SEM Cd	ppm	0.24	1
REMAP 1993/94	NB110	AVS-SEM	SEM Cu	mmol	0.14	1
REMAP 1993/94	NB110	AVS-SEM	SEM Cu	ppm	8.63	1
REMAP 1993/94	NB110	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB110	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB110	AVS-SEM	SEM Ni	mmol	0.02	1
REMAP 1993/94	NB110	AVS-SEM	SEM Ni	ppm	1.4	1
REMAP 1993/94	NB110	AVS-SEM	SEM Pb	mmol	0.1	1
REMAP 1993/94	NB110	AVS-SEM	SEM Pb	ppm	20	1
REMAP 1993/94	NB110	AVS-SEM	SEM Zn	mmol	0.54	1
REMAP 1993/94	NB110	AVS-SEM	SEM Zn	ppm	35	1
REMAP 1993/94	NB110	Butyltins	Dibutyltin	ppb	6.8	1
REMAP 1993/94	NB110	Butyltins	Monobutyltin	ppb	1.5	1
REMAP 1993/94	NB110	Butyltins	Tetrabutyltin	ppb	1.1	1
REMAP 1993/94	NB110	Butyltins	Tributyltin	ppb	23.3	1
REMAP 1993/94	NB110	Metals	Aluminum	ppm	36000	1
REMAP 1993/94	NB110	Metals	Antimony	ppm	0.94	1
REMAP 1993/94	NB110	Metals	Arsenic	ppm	4.7	1
REMAP 1993/94	NB110	Metals	Cadmium	ppm	0.41	1
REMAP 1993/94	NB110	Metals	Chromium	ppm	49.6	1
REMAP 1993/94	NB110	Metals	Copper	ppm	23.1	1
REMAP 1993/94	NB110	Metals	Iron	ppm	11200	1
REMAP 1993/94	NB110	Metals	Lead	ppm	32.5	1
REMAP 1993/94	NB110	Metals	Mangenese	ppm	145	1
REMAP 1993/94	NB110	Metals	Mercury	ppm	0.52	1
REMAP 1993/94	NB110	Metals	Nickel	ppm	11.6	1
REMAP 1993/94	NB110	Metals	Selinium	ppm	3.35	1
REMAP 1993/94	NB110	Metals	Silicon	ppm	450000	1
REMAP 1993/94	NB110	Metals	Silver	ppm	0.46	1
REMAP 1993/94	NB110	Metals	Tin	ppm	0.28	1
REMAP 1993/94	NB110	Metals	Zinc	ppm	70.8	1
REMAP 1993/94	NB110	Metals (partial)	Aluminum partial	ppm	4720	1
REMAP 1993/94	NB110	Metals (partial)	Antimony partial	ppm	0.36	1
REMAP 1993/94	NB110	Metals (partial)	Arsenic partial	ppm	3	1
REMAP 1993/94	NB110	Metals (partial)	Cadmium partial	ppm	0.41	1
REMAP 1993/94	NB110	Metals (partial)	Chromium partial	ppm	38	1
REMAP 1993/94	NB110	Metals (partial)	Copper partial	ppm	28	1
REMAP 1993/94	NB110	Metals (partial)	Iron partial	ppm	8980	1
REMAP 1993/94	NB110	Metals (partial)	Lead partial	ppm	29	1
REMAP 1993/94	NB110	Metals (partial)	Manganese partial	ppm	97	1
REMAP 1993/94	NB110	Metals (partial)	Mercury partial	ppm	0.43	1
REMAP 1993/94	NB110	Metals (partial)	Nickel partial	ppm	10	1
REMAP 1993/94	NB110	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB110	Metals (partial)	Silver partial	ppm	0	0
REMAP 1993/94	NB110	Metals (partial)	Zinc partial	ppm	53	1
REMAP 1993/94	NB110	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB110	Pesticides	Alpha-chlordane	ppb	0.8	1
REMAP 1993/94	NB110	Pesticides	Dieldrin	ppb	0.6	1
REMAP 1993/94	NB110	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB110	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB110	Pesticides	Heptachlor Epoxide	ppb	0.3	1
REMAP 1993/94	NB110	Pesticides	Hexachlorobenzene	ppb	0.4	1
REMAP 1993/94	NB110	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB110	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB110	Pesticides	o,p, DDD	ppb	1	1
REMAP 1993/94	NB110	Pesticides	o,p, DDE	ppb	0.9	1
REMAP 1993/94	NB110	Pesticides	o,p, DDT	ppb	0	0
REMAP 1993/94	NB110	Pesticides	p,p, DDD	ppb	5.3	1
REMAP 1993/94	NB110	Pesticides	p,p, DDE	ppb	5.2	1
REMAP 1993/94	NB110	Pesticides	p,p, DDT	ppb	0.3	1
REMAP 1993/94	NB110	Pesticides	Total Chlordane	ppb	4.5	1
REMAP 1993/94	NB110	Pesticides	Total DDT	ppb	12.8	1
REMAP 1993/94	NB110	Pesticides	Total DDx (2,4 & 4,4)	ppb	12.7	1
REMAP 1993/94	NB110	Pesticides	Total DDx (4,4)	ppb	10.8	1
REMAP 1993/94	NB110	Pesticides	Trans-Nonachlor	ppb	0.6	1
REMAP 1993/94	NB110	PAHs	1-Methylnaphthalene	ppb	11	1
REMAP 1993/94	NB110	PAHs	1-Methylphenanthrene	ppb	42	1
REMAP 1993/94	NB110	PAHs	2,3,5 Trimethylnaphthalene	ppb	10	1
REMAP 1993/94	NB110	PAHs	2,6-Dimethylnaphthalene	ppb	31	1
REMAP 1993/94	NB110	PAHs	2-Methylnaphthalene	ppb	25	1
REMAP 1993/94	NB110	PAHs	Acenaphthene	ppb	17	1
REMAP 1993/94	NB110	PAHs	Acenaphthylene	ppb	51	1
REMAP 1993/94	NB110	PAHs	Anthracene	ppb	69	1
REMAP 1993/94	NB110	PAHs	Benzo[a]anthracene	ppb	140	1
REMAP 1993/94	NB110	PAHs	Benzo[a]pyrene	ppb	140	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB110	PAHs	Benzo[b,k]fluoranthene	ppb	360	1
REMAP 1993/94	NB110	PAHs	Benzo[e]pyrene	ppb	76	1
REMAP 1993/94	NB110	PAHs	Benzo[g,h,i]perylene	ppb	98	1
REMAP 1993/94	NB110	PAHs	Biphenyl	ppb	9.7	1
REMAP 1993/94	NB110	PAHs	Chrysene	ppb	160	1
REMAP 1993/94	NB110	PAHs	Dibenz[a,h]anthracene	ppb	46	1
REMAP 1993/94	NB110	PAHs	Fluoranthene	ppb	200	1
REMAP 1993/94	NB110	PAHs	Fluorene	ppb	24	1
REMAP 1993/94	NB110	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	150	1
REMAP 1993/94	NB110	PAHs	Naphthalene	ppb	69	1
REMAP 1993/94	NB110	PAHs	Perylene	ppb	200	1
REMAP 1993/94	NB110	PAHs	Phenanthrene	ppb	89	1
REMAP 1993/94	NB110	PAHs	Pyrene	ppb	210	1
REMAP 1993/94	NB110	PAHs	Total HMW PAHs	ppb	1504	1
REMAP 1993/94	NB110	PAHs	Total LMW PAHs	ppb	344	1
REMAP 1993/94	NB110	PAHs	Total PAHs	ppb	1848	1
REMAP 1993/94	NB110	PCBs	PCB Congener 101	ppb	4	1
REMAP 1993/94	NB110	PCBs	PCB Congener 105	ppb	1.4	1
REMAP 1993/94	NB110	PCBs	PCB Congener 110/77	ppb	19	1
REMAP 1993/94	NB110	PCBs	PCB Congener 118	ppb	3.9	1
REMAP 1993/94	NB110	PCBs	PCB Congener 126	ppb	4.6	1
REMAP 1993/94	NB110	PCBs	PCB Congener 128	ppb	2.3	1
REMAP 1993/94	NB110	PCBs	PCB Congener 138	ppb	3.9	1
REMAP 1993/94	NB110	PCBs	PCB Congener 153	ppb	4.5	1
REMAP 1993/94	NB110	PCBs	PCB Congener 179	ppb	15.9	1
REMAP 1993/94	NB110	PCBs	PCB Congener 18	ppb	2.3	1
REMAP 1993/94	NB110	PCBs	PCB Congener 180	ppb	2.3	1
REMAP 1993/94	NB110	PCBs	PCB Congener 187	ppb	1	1
REMAP 1993/94	NB110	PCBs	PCB Congener 195	ppb	0.5	1
REMAP 1993/94	NB110	PCBs	PCB Congener 206	ppb	0.5	1
REMAP 1993/94	NB110	PCBs	PCB Congener 209	ppb	0.6	1
REMAP 1993/94	NB110	PCBs	PCB Congener 28	ppb	4.6	1
REMAP 1993/94	NB110	PCBs	PCB Congener 44	ppb	2.7	1
REMAP 1993/94	NB110	PCBs	PCB Congener 52	ppb	4.3	1
REMAP 1993/94	NB110	PCBs	PCB Congener 66	ppb	4.3	1
REMAP 1993/94	NB110	PCBs	PCB Congener 8	ppb	0.5	1
REMAP 1993/94	NB110	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	166.2	1
REMAP 1993/94	NB110	TOC	Total Organic Carbon	ppm	23600	1
REMAP 1993/94	NB112	AVS-SEM	AVS	mmol	1.93	1
REMAP 1993/94	NB112	AVS-SEM	SEM Cd	mmol	0.02	1
REMAP 1993/94	NB112	AVS-SEM	SEM Cd	ppm	1.82	1
REMAP 1993/94	NB112	AVS-SEM	SEM Cu	mmol	1.22	1
REMAP 1993/94	NB112	AVS-SEM	SEM Cu	ppm	77.4	1
REMAP 1993/94	NB112	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB112	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB112	AVS-SEM	SEM Ni	mmol	0.11	1
REMAP 1993/94	NB112	AVS-SEM	SEM Ni	ppm	6.61	1
REMAP 1993/94	NB112	AVS-SEM	SEM Pb	mmol	0.77	1
REMAP 1993/94	NB112	AVS-SEM	SEM Pb	ppm	159	1
REMAP 1993/94	NB112	AVS-SEM	SEM Zn	mmol	3.17	1
REMAP 1993/94	NB112	AVS-SEM	SEM Zn	ppm	207	1
REMAP 1993/94	NB112	Butyltins	Dibutyltin	ppb	29.8	1
REMAP 1993/94	NB112	Butyltins	Monobutyltin	ppb	13.4	1
REMAP 1993/94	NB112	Butyltins	Tetrabutyltin	ppb	2.1	1
REMAP 1993/94	NB112	Butyltins	Tributyltin	ppb	110	1
REMAP 1993/94	NB112	Metals	Aluminum	ppm	73700	1
REMAP 1993/94	NB112	Metals	Antimony	ppm	1.89	1
REMAP 1993/94	NB112	Metals	Arsenic	ppm	14.7	1
REMAP 1993/94	NB112	Metals	Cadmium	ppm	1.71	1
REMAP 1993/94	NB112	Metals	Chromium	ppm	162	1
REMAP 1993/94	NB112	Metals	Copper	ppm	154	1
REMAP 1993/94	NB112	Metals	Iron	ppm	39800	1
REMAP 1993/94	NB112	Metals	Lead	ppm	150	1
REMAP 1993/94	NB112	Metals	Manganese	ppm	527	1
REMAP 1993/94	NB112	Metals	Mercury	ppm	2.75	1
REMAP 1993/94	NB112	Metals	Nickel	ppm	49.4	1
REMAP 1993/94	NB112	Metals	Selinium	ppm	20.2	1
REMAP 1993/94	NB112	Metals	Silicon	ppm	326000	1
REMAP 1993/94	NB112	Metals	Silver	ppm	2.74	1
REMAP 1993/94	NB112	Metals	Tin	ppm	0.56	1
REMAP 1993/94	NB112	Metals	Zinc	ppm	309	1
REMAP 1993/94	NB112	Metals (partial)	Aluminum partial	ppm	21500	1
REMAP 1993/94	NB112	Metals (partial)	Antimony partial	ppm	1.4	1
REMAP 1993/94	NB112	Metals (partial)	Arsenic partial	ppm	10	1
REMAP 1993/94	NB112	Metals (partial)	Cadmium partial	ppm	3.03	1
REMAP 1993/94	NB112	Metals (partial)	Chromium partial	ppm	135	1
REMAP 1993/94	NB112	Metals (partial)	Copper partial	ppm	172	1
REMAP 1993/94	NB112	Metals (partial)	Iron partial	ppm	31800	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB112	Metals (partial)	Lead partial	ppm	129	1
REMAP 1993/94	NB112	Metals (partial)	Manganese partial	ppm	413	1
REMAP 1993/94	NB112	Metals (partial)	Mercury partial	ppm	4.18	1
REMAP 1993/94	NB112	Metals (partial)	Nickel partial	ppm	35	1
REMAP 1993/94	NB112	Metals (partial)	Selinium partial	ppm	0	0
REMAP 1993/94	NB112	Metals (partial)	Silver partial	ppm	4	1
REMAP 1993/94	NB112	Metals (partial)	Zinc partial	ppm	221	1
REMAP 1993/94	NB112	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB112	Pesticides	Alpha-chlordane	ppb	2.49	1
REMAP 1993/94	NB112	Pesticides	Dieldrin	ppb	1.3	1
REMAP 1993/94	NB112	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB112	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB112	Pesticides	Heptachlor Epoxide	ppb	0.1	1
REMAP 1993/94	NB112	Pesticides	Hexachlorobenzene	ppb	1.09	1
REMAP 1993/94	NB112	Pesticides	Lindane - Gamma-BHC	ppb	0	0
REMAP 1993/94	NB112	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB112	Pesticides	o,p, DDD	ppb	4.79	1
REMAP 1993/94	NB112	Pesticides	o,p, DDE	ppb	6.74	1
REMAP 1993/94	NB112	Pesticides	o,p, DDT	ppb	0	0
REMAP 1993/94	NB112	Pesticides	p,p, DDD	ppb	34.1	1
REMAP 1993/94	NB112	Pesticides	p,p, DDE	ppb	38.2	1
REMAP 1993/94	NB112	Pesticides	p,p, DDT	ppb	2.9	1
REMAP 1993/94	NB112	Pesticides	Total Chlordane	ppb	13	1
REMAP 1993/94	NB112	Pesticides	Total DDT	ppb	86.73	1
REMAP 1993/94	NB112	Pesticides	Total DDx (2,4 & 4,4)	ppb	86.73	1
REMAP 1993/94	NB112	Pesticides	Total DDx (4,4)	ppb	75.2	1
REMAP 1993/94	NB112	Pesticides	Trans-Nonachlor	ppb	1.46	1
REMAP 1993/94	NB112	PAHs	1-Methylnaphthalene	ppb	46	1
REMAP 1993/94	NB112	PAHs	1-Methylphenanthrene	ppb	110	1
REMAP 1993/94	NB112	PAHs	2,3,5 Trimethylnaphthalene	ppb	0	0
REMAP 1993/94	NB112	PAHs	2,6-Dimethylnaphthalene	ppb	230	1
REMAP 1993/94	NB112	PAHs	2-Methylnaphthalene	ppb	130	1
REMAP 1993/94	NB112	PAHs	Acenaphthene	ppb	39	1
REMAP 1993/94	NB112	PAHs	Acenaphthylene	ppb	100	1
REMAP 1993/94	NB112	PAHs	Anthracene	ppb	340	1
REMAP 1993/94	NB112	PAHs	Benzo[a]anthracene	ppb	270	1
REMAP 1993/94	NB112	PAHs	Benzo[a]pyrene	ppb	480	1
REMAP 1993/94	NB112	PAHs	Benzo[b,k]fluoranthene	ppb	820	1
REMAP 1993/94	NB112	PAHs	Benzo[e]pyrene	ppb	650	1
REMAP 1993/94	NB112	PAHs	Benzo[g,h,i]perylene	ppb	580	1
REMAP 1993/94	NB112	PAHs	Biphenyl	ppb	46	1
REMAP 1993/94	NB112	PAHs	Chrysene	ppb	490	1
REMAP 1993/94	NB112	PAHs	Dibenz[a,h]anthracene	ppb	150	1
REMAP 1993/94	NB112	PAHs	Fluoranthene	ppb	230	1
REMAP 1993/94	NB112	PAHs	Fluorene	ppb	120	1
REMAP 1993/94	NB112	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	510	1
REMAP 1993/94	NB112	PAHs	Naphthalene	ppb	240	1
REMAP 1993/94	NB112	PAHs	Perylene	ppb	700	1
REMAP 1993/94	NB112	PAHs	Phenanthrene	ppb	260	1
REMAP 1993/94	NB112	PAHs	Pyrene	ppb	200	1
REMAP 1993/94	NB112	PAHs	Total HMW PAHs	ppb	3730	1
REMAP 1993/94	NB112	PAHs	Total LMW PAHs	ppb	1229	1
REMAP 1993/94	NB112	PAHs	Total PAHs	ppb	4959	1
REMAP 1993/94	NB112	PCBs	PCB Congener 101	ppb	18.33	1
REMAP 1993/94	NB112	PCBs	PCB Congener 105	ppb	7.19	1
REMAP 1993/94	NB112	PCBs	PCB Congener 110/77	ppb	56.74	1
REMAP 1993/94	NB112	PCBs	PCB Congener 118	ppb	18.22	1
REMAP 1993/94	NB112	PCBs	PCB Congener 126	ppb	9.42	1
REMAP 1993/94	NB112	PCBs	PCB Congener 128	ppb	0	0
REMAP 1993/94	NB112	PCBs	PCB Congener 138	ppb	19.07	1
REMAP 1993/94	NB112	PCBs	PCB Congener 153	ppb	25.42	1
REMAP 1993/94	NB112	PCBs	PCB Congener 179	ppb	25.5	1
REMAP 1993/94	NB112	PCBs	PCB Congener 18	ppb	8.71	1
REMAP 1993/94	NB112	PCBs	PCB Congener 180	ppb	13.7	1
REMAP 1993/94	NB112	PCBs	PCB Congener 187	ppb	5.53	1
REMAP 1993/94	NB112	PCBs	PCB Congener 195	ppb	3.17	1
REMAP 1993/94	NB112	PCBs	PCB Congener 206	ppb	2.72	1
REMAP 1993/94	NB112	PCBs	PCB Congener 209	ppb	3.9	1
REMAP 1993/94	NB112	PCBs	PCB Congener 28	ppb	24.55	1
REMAP 1993/94	NB112	PCBs	PCB Congener 44	ppb	12.7	1
REMAP 1993/94	NB112	PCBs	PCB Congener 52	ppb	20.92	1
REMAP 1993/94	NB112	PCBs	PCB Congener 66	ppb	35.07	1
REMAP 1993/94	NB112	PCBs	PCB Congener 8	ppb	2.52	1
REMAP 1993/94	NB112	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	626.76	1
REMAP 1993/94	NB112	TOC	Total Organic Carbon	ppm	61000	1
REMAP 1993/94	NB113	AVS-SEM	AVS	mmol	6.3	1
REMAP 1993/94	NB113	AVS-SEM	SEM Cd	mmol	0.01	1
REMAP 1993/94	NB113	AVS-SEM	SEM Cd	ppm	0.78	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB113	AVS-SEM	SEM Cu	mmol	0.3	1
REMAP 1993/94	NB113	AVS-SEM	SEM Cu	ppm	19	1
REMAP 1993/94	NB113	AVS-SEM	SEM Hg	ppm	0	0
REMAP 1993/94	NB113	AVS-SEM	SEM Hg	mmol	0	0
REMAP 1993/94	NB113	AVS-SEM	SEM Ni	mmol	0.1	1
REMAP 1993/94	NB113	AVS-SEM	SEM Ni	ppm	6.07	1
REMAP 1993/94	NB113	AVS-SEM	SEM Pb	mmol	0.31	1
REMAP 1993/94	NB113	AVS-SEM	SEM Pb	ppm	65	1
REMAP 1993/94	NB113	AVS-SEM	SEM Zn	mmol	1.55	1
REMAP 1993/94	NB113	AVS-SEM	SEM Zn	ppm	101	1
REMAP 1993/94	NB113	Butyltins	Dibutyltin	ppb	31.9	1
REMAP 1993/94	NB113	Butyltins	Monobutyltin	ppb	8.4	1
REMAP 1993/94	NB113	Butyltins	Tetrabutyltin	ppb	1.6	1
REMAP 1993/94	NB113	Butyltins	Tributyltin	ppb	81.3	1
REMAP 1993/94	NB113	Metals	Aluminum	ppm	62200	1
REMAP 1993/94	NB113	Metals	Antimony	ppm	1.86	1
REMAP 1993/94	NB113	Metals	Arsenic	ppm	12.7	1
REMAP 1993/94	NB113	Metals	Cadmium	ppm	1.75	1
REMAP 1993/94	NB113	Metals	Chromium	ppm	116	1
REMAP 1993/94	NB113	Metals	Copper	ppm	99.3	1
REMAP 1993/94	NB113	Metals	Iron	ppm	25200	1
REMAP 1993/94	NB113	Metals	Lead	ppm	100	1
REMAP 1993/94	NB113	Metals	Mangenese	ppm	386	1
REMAP 1993/94	NB113	Metals	Mercury	ppm	2.15	1
REMAP 1993/94	NB113	Metals	Nickel	ppm	62.3	1
REMAP 1993/94	NB113	Metals	Selinium	ppm	12.9	1
REMAP 1993/94	NB113	Metals	Silicon	ppm	356000	1
REMAP 1993/94	NB113	Metals	Silver	ppm	1.96	1
REMAP 1993/94	NB113	Metals	Tin	ppm	1.24	1
REMAP 1993/94	NB113	Metals	Zinc	ppm	229	1
REMAP 1993/94	NB113	Metals (partial)	Aluminum partial	ppm	9640	1
REMAP 1993/94	NB113	Metals (partial)	Antimony partial	ppm	1.19	1
REMAP 1993/94	NB113	Metals (partial)	Arsenic partial	ppm	7	1
REMAP 1993/94	NB113	Metals (partial)	Cadmium partial	ppm	1.89	1
REMAP 1993/94	NB113	Metals (partial)	Chromium partial	ppm	73	1
REMAP 1993/94	NB113	Metals (partial)	Copper partial	ppm	110	1
REMAP 1993/94	NB113	Metals (partial)	Iron partial	ppm	18000	1
REMAP 1993/94	NB113	Metals (partial)	Lead partial	ppm	81	1
REMAP 1993/94	NB113	Metals (partial)	Manganese partial	ppm	209	1
REMAP 1993/94	NB113	Metals (partial)	Mercury partial	ppm	1.58	1
REMAP 1993/94	NB113	Metals (partial)	Nickel partial	ppm	43	1
REMAP 1993/94	NB113	Metals (partial)	Selinium partial	ppm	0.5	1
REMAP 1993/94	NB113	Metals (partial)	Silver partial	ppm	2	1
REMAP 1993/94	NB113	Metals (partial)	Zinc partial	ppm	144	1
REMAP 1993/94	NB113	Pesticides	Aldrin	ppb	0	0
REMAP 1993/94	NB113	Pesticides	Alpha-chlordane	ppb	2	1
REMAP 1993/94	NB113	Pesticides	Dieldrin	ppb	2	1
REMAP 1993/94	NB113	Pesticides	Endrin	ppb	0	0
REMAP 1993/94	NB113	Pesticides	Heptachlor	ppb	0	0
REMAP 1993/94	NB113	Pesticides	Heptachlor Epoxide	ppb	0.3	1
REMAP 1993/94	NB113	Pesticides	Hexachlorobenzene	ppb	2.7	1
REMAP 1993/94	NB113	Pesticides	Lindane - Gamma-BHC	ppb	0.3	1
REMAP 1993/94	NB113	Pesticides	Mirex	ppb	0	0
REMAP 1993/94	NB113	Pesticides	o,p, DDD	ppb	8.2	1
REMAP 1993/94	NB113	Pesticides	o,p, DDE	ppb	11.5	1
REMAP 1993/94	NB113	Pesticides	o,p, DDT	ppb	0	0
REMAP 1993/94	NB113	Pesticides	p,p, DDD	ppb	57.9	1
REMAP 1993/94	NB113	Pesticides	p,p, DDE	ppb	41.5	1
REMAP 1993/94	NB113	Pesticides	p,p, DDT	ppb	24.1	1
REMAP 1993/94	NB113	Pesticides	Total Chlordane	ppb	15.4	1
REMAP 1993/94	NB113	Pesticides	Total DDT	ppb	143.3	1
REMAP 1993/94	NB113	Pesticides	Total DDx (2,4 & 4,4)	ppb	143.2	1
REMAP 1993/94	NB113	Pesticides	Total DDx (4,4)	ppb	123.5	1
REMAP 1993/94	NB113	Pesticides	Trans-Nonachlor	ppb	1.2	1
REMAP 1993/94	NB113	PAHs	1-Methylnaphthalene	ppb	36	1
REMAP 1993/94	NB113	PAHs	1-Methylphenanthrene	ppb	0	0
REMAP 1993/94	NB113	PAHs	2,3,5 Trimethylnaphthalene	ppb	76	1
REMAP 1993/94	NB113	PAHs	2,6-Dimethylnaphthalene	ppb	180	1
REMAP 1993/94	NB113	PAHs	2-Methylnaphthalene	ppb	92	1
REMAP 1993/94	NB113	PAHs	Acenaphthene	ppb	54	1
REMAP 1993/94	NB113	PAHs	Acenaphthylene	ppb	210	1
REMAP 1993/94	NB113	PAHs	Anthracene	ppb	360	1
REMAP 1993/94	NB113	PAHs	Benzo[a]anthracene	ppb	710	1
REMAP 1993/94	NB113	PAHs	Benzo[a]pyrene	ppb	580	1
REMAP 1993/94	NB113	PAHs	Benzo[b,k]fluoranthene	ppb	1440	1
REMAP 1993/94	NB113	PAHs	Benzo[e]pyrene	ppb	260	1
REMAP 1993/94	NB113	PAHs	Benzo[g,h,i]perylene	ppb	370	1
REMAP 1993/94	NB113	PAHs	Biphenyl	ppb	36	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1993/94	NB113	PAHs	Chrysene	ppb	820	1
REMAP 1993/94	NB113	PAHs	Dibenz[a,h]anthracene	ppb	130	1
REMAP 1993/94	NB113	PAHs	Fluoranthene	ppb	910	1
REMAP 1993/94	NB113	PAHs	Fluorene	ppb	83	1
REMAP 1993/94	NB113	PAHs	Indeno[1,2,3-C,D]pyrene	ppb	570	1
REMAP 1993/94	NB113	PAHs	Naphthalene	ppb	160	1
REMAP 1993/94	NB113	PAHs	Perylene	ppb	860	1
REMAP 1993/94	NB113	PAHs	Phenanthrene	ppb	390	1
REMAP 1993/94	NB113	PAHs	Pyrene	ppb	1000	1
REMAP 1993/94	NB113	PAHs	Total HMW PAHs	ppb	6530	1
REMAP 1993/94	NB113	PAHs	Total LMW PAHs	ppb	1349	1
REMAP 1993/94	NB113	PAHs	Total PAHs	ppb	7879	1
REMAP 1993/94	NB113	PCBs	PCB Congener 101	ppb	16.9	1
REMAP 1993/94	NB113	PCBs	PCB Congener 105	ppb	6.6	1
REMAP 1993/94	NB113	PCBs	PCB Congener 110/77	ppb	59.3	1
REMAP 1993/94	NB113	PCBs	PCB Congener 118	ppb	15.7	1
REMAP 1993/94	NB113	PCBs	PCB Congener 126	ppb	7	1
REMAP 1993/94	NB113	PCBs	PCB Congener 128	ppb	6.7	1
REMAP 1993/94	NB113	PCBs	PCB Congener 138	ppb	15.2	1
REMAP 1993/94	NB113	PCBs	PCB Congener 153	ppb	20.5	1
REMAP 1993/94	NB113	PCBs	PCB Congener 179	ppb	20.8	1
REMAP 1993/94	NB113	PCBs	PCB Congener 18	ppb	17.8	1
REMAP 1993/94	NB113	PCBs	PCB Congener 180	ppb	9.6	1
REMAP 1993/94	NB113	PCBs	PCB Congener 187	ppb	4.1	1
REMAP 1993/94	NB113	PCBs	PCB Congener 195	ppb	2.1	1
REMAP 1993/94	NB113	PCBs	PCB Congener 206	ppb	2.1	1
REMAP 1993/94	NB113	PCBs	PCB Congener 209	ppb	2.9	1
REMAP 1993/94	NB113	PCBs	PCB Congener 28	ppb	20.8	1
REMAP 1993/94	NB113	PCBs	PCB Congener 44	ppb	14	1
REMAP 1993/94	NB113	PCBs	PCB Congener 52	ppb	19.2	1
REMAP 1993/94	NB113	PCBs	PCB Congener 66	ppb	20.4	1
REMAP 1993/94	NB113	PCBs	PCB Congener 8	ppb	3.2	1
REMAP 1993/94	NB113	PCBs	Total PCBs – Congeners (NOAA[a])	ppb	569.8	1
REMAP 1993/94	NB113	TOC	Total Organic Carbon	ppm	19900	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	273.05	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	205.53	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	8.18	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	6.41	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	40.34	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	19.18	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	12.35	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	11.63	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	3.18	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	4	1
REMAP 1998	NB201	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	6.37	1
REMAP 1998	NB201	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	12.38	1
REMAP 1998	NB201	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	17.8	1
REMAP 1998	NB201	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	37.89	1
REMAP 1998	NB201	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	17.73	1
REMAP 1998	NB201	Dioxins/Furans	OCDD	ng/kg	2905.86	1
REMAP 1998	NB201	Dioxins/Furans	OCDF	ng/kg	328.57	1
REMAP 1998	NB201	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	65.58	1
REMAP 1998	NB201	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	1750	1
REMAP 1998	NB201	Metals (Total Recoverable)	Aluminum	mg/kg	23500	1
REMAP 1998	NB201	Metals (Total Recoverable)	Antimony	mg/kg	0	0
REMAP 1998	NB201	Metals (Total Recoverable)	Arsenic	mg/kg	10	1
REMAP 1998	NB201	Metals (Total Recoverable)	Cadmium	mg/kg	0.7	1
REMAP 1998	NB201	Metals (Total Recoverable)	Chromium	mg/kg	72	1
REMAP 1998	NB201	Metals (Total Recoverable)	Copper	mg/kg	82	1
REMAP 1998	NB201	Metals (Total Recoverable)	Iron	mg/kg	25200	1
REMAP 1998	NB201	Metals (Total Recoverable)	Lead	mg/kg	81	1
REMAP 1998	NB201	Metals (Total Recoverable)	Manganese	mg/kg	458	1
REMAP 1998	NB201	Metals (Total Recoverable)	Mercury	mg/kg	1.32	1
REMAP 1998	NB201	Metals (Total Recoverable)	Nickel	mg/kg	33	1
REMAP 1998	NB201	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB201	Metals (Total Recoverable)	Silver	mg/kg	1.6	1
REMAP 1998	NB201	Metals (Total Recoverable)	Zinc	mg/kg	166	1
REMAP 1998	NB201	Metals (Total)	Acid Volatile Sulfide	mg/kg	1750	1
REMAP 1998	NB201	Metals (Total)	Aluminum	mg/kg	57600	1
REMAP 1998	NB201	Metals (Total)	Antimony	mg/kg	0.99	1
REMAP 1998	NB201	Metals (Total)	Arsenic	mg/kg	8.45	1
REMAP 1998	NB201	Metals (Total)	Cadmium	mg/kg	0.98	1
REMAP 1998	NB201	Metals (Total)	Chromium	mg/kg	102	1
REMAP 1998	NB201	Metals (Total)	Lead	mg/kg	100	1
REMAP 1998	NB201	Metals (Total)	Manganese	mg/kg	538	1
REMAP 1998	NB201	Metals (Total)	Mercury	mg/kg	1.63	1
REMAP 1998	NB201	Metals (Total)	Nickel	mg/kg	41.1	1
REMAP 1998	NB201	Metals (Total)	Selenium	mg/kg	0.54	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB201	Metals (Total)	Silica	mg/kg	316000	1
REMAP 1998	NB201	Metals (Total)	Silver	mg/kg	2.04	1
REMAP 1998	NB201	Metals (Total)	Thallium	mg/kg	0.33	1
REMAP 1998	NB201	Metals (Total)	Tin	mg/kg	15.2	1
REMAP 1998	NB201	Metals (Total)	Zinc	mg/kg	199	1
REMAP 1998	NB201	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB201	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB201	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB201	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB201	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB201	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB201	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB201	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB201	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB201	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB201	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB201	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB201	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB201	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB201	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB201	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB201	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB201	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB201	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB201	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB201	Pesticides	P,P'-DDD	µg/kg	4.8	1
REMAP 1998	NB201	Pesticides	P,P'-DDE	µg/kg	5.5	1
REMAP 1998	NB201	Pesticides	P,P'-DDT	µg/kg	9.2	1
REMAP 1998	NB201	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB201	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	19.5	1
REMAP 1998	NB201	Pesticides	Total DDx (4,4)	µg/kg	19.5	1
REMAP 1998	NB201	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB201	PAHs	1-METHYLNAPTHALENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	2-METHYLNAPHTHALENE	µg/kg	29	1
REMAP 1998	NB201	PAHs	ACENAPHTHENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	ACENAPHTHYLENE	µg/kg	71	1
REMAP 1998	NB201	PAHs	ANTHRACENE	µg/kg	110	1
REMAP 1998	NB201	PAHs	BENZ(A)ANTHRACENE	µg/kg	200	1
REMAP 1998	NB201	PAHs	BENZO(A)PYRENE	µg/kg	260	1
REMAP 1998	NB201	PAHs	BENZO(B)FLUORANTHENE	µg/kg	260	1
REMAP 1998	NB201	PAHs	BENZO(E)PYRENE	µg/kg	78	1
REMAP 1998	NB201	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	180	1
REMAP 1998	NB201	PAHs	BENZO(K)FLUORANTHENE	µg/kg	100	1
REMAP 1998	NB201	PAHs	BIPHENYL	µg/kg	0	0
REMAP 1998	NB201	PAHs	CHRYSENE	µg/kg	230	1
REMAP 1998	NB201	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	FLUORANTHENE	µg/kg	310	1
REMAP 1998	NB201	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB201	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	160	1
REMAP 1998	NB201	PAHs	NAPHTHALENE	µg/kg	70	1
REMAP 1998	NB201	PAHs	PERYLENE	µg/kg	140	1
REMAP 1998	NB201	PAHs	PHENANTHRENE	µg/kg	140	1
REMAP 1998	NB201	PAHs	PYRENE	µg/kg	340	1
REMAP 1998	NB201	PAHs	Total HMW PAHs	µg/kg	2040	1
REMAP 1998	NB201	PAHs	Total LMW PAHs	µg/kg	420	1
REMAP 1998	NB201	PAHs	Total PAHs	µg/kg	2460	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	140.18	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	87.09	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	5.23	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	2.8	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	17.52	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	9.55	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	6.77	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	5.56	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	3.27	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.9	1
REMAP 1998	NB202	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	5.87	1
REMAP 1998	NB202	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	7.02	1
REMAP 1998	NB202	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	8.95	1
REMAP 1998	NB202	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	17.46	1
REMAP 1998	NB202	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	10.09	1
REMAP 1998	NB202	Dioxins/Furans	OCDD	ng/kg	1382.89	1
REMAP 1998	NB202	Dioxins/Furans	OCDF	ng/kg	152.5	1
REMAP 1998	NB202	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	32.26	1
REMAP 1998	NB202	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	2740	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB202	Metals (Total Recoverable)	Aluminum	mg/kg	22400	1
REMAP 1998	NB202	Metals (Total Recoverable)	Antimony	mg/kg	3	1
REMAP 1998	NB202	Metals (Total Recoverable)	Arsenic	mg/kg	19	1
REMAP 1998	NB202	Metals (Total Recoverable)	Cadmium	mg/kg	2.2	1
REMAP 1998	NB202	Metals (Total Recoverable)	Chromium	mg/kg	115	1
REMAP 1998	NB202	Metals (Total Recoverable)	Copper	mg/kg	221	1
REMAP 1998	NB202	Metals (Total Recoverable)	Iron	mg/kg	28100	1
REMAP 1998	NB202	Metals (Total Recoverable)	Lead	mg/kg	184	1
REMAP 1998	NB202	Metals (Total Recoverable)	Manganese	mg/kg	400	1
REMAP 1998	NB202	Metals (Total Recoverable)	Mercury	mg/kg	3.56	1
REMAP 1998	NB202	Metals (Total Recoverable)	Nickel	mg/kg	41	1
REMAP 1998	NB202	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB202	Metals (Total Recoverable)	Silver	mg/kg	3.6	1
REMAP 1998	NB202	Metals (Total Recoverable)	Zinc	mg/kg	355	1
REMAP 1998	NB202	Metals (Total)	Acid Volatile Sulfide	mg/kg	2740	1
REMAP 1998	NB202	Metals (Total)	Aluminum	mg/kg	58700	1
REMAP 1998	NB202	Metals (Total)	Antimony	mg/kg	2.36	1
REMAP 1998	NB202	Metals (Total)	Arsenic	mg/kg	18	1
REMAP 1998	NB202	Metals (Total)	Cadmium	mg/kg	2.59	1
REMAP 1998	NB202	Metals (Total)	Chromium	mg/kg	162	1
REMAP 1998	NB202	Metals (Total)	Lead	mg/kg	200	1
REMAP 1998	NB202	Metals (Total)	Manganese	mg/kg	494	1
REMAP 1998	NB202	Metals (Total)	Mercury	mg/kg	4.3	1
REMAP 1998	NB202	Metals (Total)	Nickel	mg/kg	52.2	1
REMAP 1998	NB202	Metals (Total)	Selenium	mg/kg	1.27	1
REMAP 1998	NB202	Metals (Total)	Silica	mg/kg	288000	1
REMAP 1998	NB202	Metals (Total)	Silver	mg/kg	3.74	1
REMAP 1998	NB202	Metals (Total)	Thallium	mg/kg	0.46	1
REMAP 1998	NB202	Metals (Total)	Tin	mg/kg	14.9	1
REMAP 1998	NB202	Metals (Total)	Zinc	mg/kg	410	1
REMAP 1998	NB202	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB202	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB202	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB202	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB202	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB202	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB202	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB202	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB202	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB202	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB202	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB202	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB202	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB202	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB202	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB202	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB202	Pesticides	O,P'-DDD	µg/kg	8	1
REMAP 1998	NB202	Pesticides	O,P'-DDE	µg/kg	34.4	1
REMAP 1998	NB202	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB202	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB202	Pesticides	P,P'-DDD	µg/kg	72	1
REMAP 1998	NB202	Pesticides	P,P'-DDE	µg/kg	54.5	1
REMAP 1998	NB202	Pesticides	P,P'-DDT	µg/kg	184	1
REMAP 1998	NB202	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB202	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	352.9	1
REMAP 1998	NB202	Pesticides	Total DDx (4,4)	µg/kg	310.5	1
REMAP 1998	NB202	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB202	PAHs	1-METHYLNAPTHALENE	µg/kg	38	1
REMAP 1998	NB202	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	2-METHYLNAPHTHALENE	µg/kg	64	1
REMAP 1998	NB202	PAHs	ACENAPHTHENE	µg/kg	37	1
REMAP 1998	NB202	PAHs	ACENAPHTHYLENE	µg/kg	130	1
REMAP 1998	NB202	PAHs	ANTHRACENE	µg/kg	190	1
REMAP 1998	NB202	PAHs	BENZ(A)ANTHRACENE	µg/kg	420	1
REMAP 1998	NB202	PAHs	BENZO(A)PYRENE	µg/kg	600	1
REMAP 1998	NB202	PAHs	BENZO(B)FLUORANTHENE	µg/kg	670	1
REMAP 1998	NB202	PAHs	BENZO(E)PYRENE	µg/kg	180	1
REMAP 1998	NB202	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	BENZO(K)FLUORANTHENE	µg/kg	260	1
REMAP 1998	NB202	PAHs	BIPHENYL	µg/kg	0	0
REMAP 1998	NB202	PAHs	CHRYSENE	µg/kg	500	1
REMAP 1998	NB202	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	FLUORANTHENE	µg/kg	840	1
REMAP 1998	NB202	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB202	PAHs	NAPHTHALENE	µg/kg	98	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB202	PAHs	PERYLENE	µg/kg	350	1
REMAP 1998	NB202	PAHs	PHENANTHRENE	µg/kg	350	1
REMAP 1998	NB202	PAHs	PYRENE	µg/kg	690	1
REMAP 1998	NB202	PAHs	Total HMW PAHs	µg/kg	3980	1
REMAP 1998	NB202	PAHs	Total LMW PAHs	µg/kg	869	1
REMAP 1998	NB202	PAHs	Total PAHs	µg/kg	4849	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	107.7	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	74.48	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	3.4	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	1.49	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	15.22	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	7.64	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	5.48	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	4.65	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	1.15	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	1.77	1
REMAP 1998	NB206	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	4.58	1
REMAP 1998	NB206	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	4.42	1
REMAP 1998	NB206	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	5.71	1
REMAP 1998	NB206	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	17.34	1
REMAP 1998	NB206	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	9.76	1
REMAP 1998	NB206	Dioxins/Furans	OCDD	ng/kg	1066.27	1
REMAP 1998	NB206	Dioxins/Furans	OCDF	ng/kg	122.02	1
REMAP 1998	NB206	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	28.15	1
REMAP 1998	NB206	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	2250	1
REMAP 1998	NB206	Metals (Total Recoverable)	Aluminum	mg/kg	35900	1
REMAP 1998	NB206	Metals (Total Recoverable)	Antimony	mg/kg	2	1
REMAP 1998	NB206	Metals (Total Recoverable)	Arsenic	mg/kg	13	1
REMAP 1998	NB206	Metals (Total Recoverable)	Cadmium	mg/kg	0	0
REMAP 1998	NB206	Metals (Total Recoverable)	Chromium	mg/kg	107	1
REMAP 1998	NB206	Metals (Total Recoverable)	Copper	mg/kg	113	1
REMAP 1998	NB206	Metals (Total Recoverable)	Iron	mg/kg	33100	1
REMAP 1998	NB206	Metals (Total Recoverable)	Lead	mg/kg	109	1
REMAP 1998	NB206	Metals (Total Recoverable)	Manganese	mg/kg	604	1
REMAP 1998	NB206	Metals (Total Recoverable)	Mercury	mg/kg	2.07	1
REMAP 1998	NB206	Metals (Total Recoverable)	Nickel	mg/kg	35	1
REMAP 1998	NB206	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB206	Metals (Total Recoverable)	Silver	mg/kg	2.4	1
REMAP 1998	NB206	Metals (Total Recoverable)	Zinc	mg/kg	213	1
REMAP 1998	NB206	Metals (Total)	Acid Volatile Sulfide	mg/kg	2250	1
REMAP 1998	NB206	Metals (Total)	Aluminum	mg/kg	58200	1
REMAP 1998	NB206	Metals (Total)	Antimony	mg/kg	1.04	1
REMAP 1998	NB206	Metals (Total)	Arsenic	mg/kg	10.6	1
REMAP 1998	NB206	Metals (Total)	Cadmium	mg/kg	1.04	1
REMAP 1998	NB206	Metals (Total)	Chromium	mg/kg	129	1
REMAP 1998	NB206	Metals (Total)	Lead	mg/kg	109	1
REMAP 1998	NB206	Metals (Total)	Manganese	mg/kg	599	1
REMAP 1998	NB206	Metals (Total)	Mercury	mg/kg	1.89	1
REMAP 1998	NB206	Metals (Total)	Nickel	mg/kg	40.6	1
REMAP 1998	NB206	Metals (Total)	Selenium	mg/kg	0.72	1
REMAP 1998	NB206	Metals (Total)	Silica	mg/kg	290000	1
REMAP 1998	NB206	Metals (Total)	Silver	mg/kg	2.82	1
REMAP 1998	NB206	Metals (Total)	Thallium	mg/kg	0.34	1
REMAP 1998	NB206	Metals (Total)	Tin	mg/kg	12.2	1
REMAP 1998	NB206	Metals (Total)	Zinc	mg/kg	233	1
REMAP 1998	NB206	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB206	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB206	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB206	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB206	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB206	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB206	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB206	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB206	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB206	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB206	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB206	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB206	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB206	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB206	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB206	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB206	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB206	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB206	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB206	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB206	Pesticides	P,P'-DDD	µg/kg	0	0
REMAP 1998	NB206	Pesticides	P,P'-DDE	µg/kg	7.3	1
REMAP 1998	NB206	Pesticides	P,P'-DDT	µg/kg	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB206	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB206	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	7.3	1
REMAP 1998	NB206	Pesticides	Total DDx (4,4)	µg/kg	7.3	1
REMAP 1998	NB206	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB206	PAHs	1-METHYLNAPTHALENE	µg/kg	47	1
REMAP 1998	NB206	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB206	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	47	1
REMAP 1998	NB206	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	47	1
REMAP 1998	NB206	PAHs	2-METHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB206	PAHs	ACENAPHTHENE	µg/kg	47	1
REMAP 1998	NB206	PAHs	ACENAPHTHYLENE	µg/kg	47	1
REMAP 1998	NB206	PAHs	ANTHRACENE	µg/kg	100	1
REMAP 1998	NB206	PAHs	BENZ(A)ANTHRACENE	µg/kg	120	1
REMAP 1998	NB206	PAHs	BENZO(A)PYRENE	µg/kg	160	1
REMAP 1998	NB206	PAHs	BENZO(B)FLUORANTHENE	µg/kg	180	1
REMAP 1998	NB206	PAHs	BENZO(E)PYRENE	µg/kg	57	1
REMAP 1998	NB206	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	120	1
REMAP 1998	NB206	PAHs	BENZO(K)FLUORANTHENE	µg/kg	62	1
REMAP 1998	NB206	PAHs	BIPHENYL	µg/kg	47	1
REMAP 1998	NB206	PAHs	CHRYSENE	µg/kg	150	1
REMAP 1998	NB206	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB206	PAHs	FLUORANTHENE	µg/kg	210	1
REMAP 1998	NB206	PAHs	FLUORENE	µg/kg	47	1
REMAP 1998	NB206	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	110	1
REMAP 1998	NB206	PAHs	NAPHTHALENE	µg/kg	65	1
REMAP 1998	NB206	PAHs	PERYLENE	µg/kg	96	1
REMAP 1998	NB206	PAHs	PHENANTHRENE	µg/kg	100	1
REMAP 1998	NB206	PAHs	PYRENE	µg/kg	220	1
REMAP 1998	NB206	PAHs	Total HMW PAHs	µg/kg	1332	1
REMAP 1998	NB206	PAHs	Total LMW PAHs	µg/kg	406	1
REMAP 1998	NB206	PAHs	Total PAHs	µg/kg	1738	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	281.78	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	148.98	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	11.24	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.18	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	25.85	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	15.21	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	12.62	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	8.48	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	5.14	1
REMAP 1998	NB211	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	0	0
REMAP 1998	NB211	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	9.99	1
REMAP 1998	NB211	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	12.4	1
REMAP 1998	NB211	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	22.68	1
REMAP 1998	NB211	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	29.4	1
REMAP 1998	NB211	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	17.94	1
REMAP 1998	NB211	Dioxins/Furans	OCDD	ng/kg	2738.36	1
REMAP 1998	NB211	Dioxins/Furans	OCDF	ng/kg	294.84	1
REMAP 1998	NB211	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	51.92	1
REMAP 1998	NB211	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	133	1
REMAP 1998	NB211	Metals (Total Recoverable)	Aluminum	mg/kg	11700	1
REMAP 1998	NB211	Metals (Total Recoverable)	Antimony	mg/kg	4	1
REMAP 1998	NB211	Metals (Total Recoverable)	Arsenic	mg/kg	17	1
REMAP 1998	NB211	Metals (Total Recoverable)	Cadmium	mg/kg	3.8	1
REMAP 1998	NB211	Metals (Total Recoverable)	Chromium	mg/kg	77	1
REMAP 1998	NB211	Metals (Total Recoverable)	Copper	mg/kg	206	1
REMAP 1998	NB211	Metals (Total Recoverable)	Iron	mg/kg	17500	1
REMAP 1998	NB211	Metals (Total Recoverable)	Lead	mg/kg	178	1
REMAP 1998	NB211	Metals (Total Recoverable)	Manganese	mg/kg	244	1
REMAP 1998	NB211	Metals (Total Recoverable)	Mercury	mg/kg	4.58	1
REMAP 1998	NB211	Metals (Total Recoverable)	Nickel	mg/kg	32	1
REMAP 1998	NB211	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB211	Metals (Total Recoverable)	Silver	mg/kg	1.5	1
REMAP 1998	NB211	Metals (Total Recoverable)	Zinc	mg/kg	297	1
REMAP 1998	NB211	Metals (Total)	Acid Volatile Sulfide	mg/kg	133	1
REMAP 1998	NB211	Metals (Total)	Aluminum	mg/kg	41600	1
REMAP 1998	NB211	Metals (Total)	Antimony	mg/kg	2.01	1
REMAP 1998	NB211	Metals (Total)	Arsenic	mg/kg	16	1
REMAP 1998	NB211	Metals (Total)	Cadmium	mg/kg	4.14	1
REMAP 1998	NB211	Metals (Total)	Chromium	mg/kg	155	1
REMAP 1998	NB211	Metals (Total)	Lead	mg/kg	187	1
REMAP 1998	NB211	Metals (Total)	Manganese	mg/kg	444	1
REMAP 1998	NB211	Metals (Total)	Mercury	mg/kg	5.21	1
REMAP 1998	NB211	Metals (Total)	Nickel	mg/kg	70.4	1
REMAP 1998	NB211	Metals (Total)	Selenium	mg/kg	1.8	1
REMAP 1998	NB211	Metals (Total)	Silica	mg/kg	357000	1
REMAP 1998	NB211	Metals (Total)	Silver	mg/kg	2.52	1
REMAP 1998	NB211	Metals (Total)	Thallium	mg/kg	0.66	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB211	Metals (Total)	Tin	mg/kg	16.8	1
REMAP 1998	NB211	Metals (Total)	Zinc	mg/kg	376	1
REMAP 1998	NB211	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB211	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB211	Pesticides	ALPHA-BHC	µg/kg	1.9	1
REMAP 1998	NB211	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB211	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB211	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB211	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB211	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB211	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB211	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB211	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB211	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB211	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB211	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB211	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB211	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB211	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB211	Pesticides	O,P'-DDE	µg/kg	51.8	1
REMAP 1998	NB211	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB211	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB211	Pesticides	P,P'-DDD	µg/kg	100.1	1
REMAP 1998	NB211	Pesticides	P,P'-DDE	µg/kg	73.6	1
REMAP 1998	NB211	Pesticides	P,P'-DDT	µg/kg	551.9	1
REMAP 1998	NB211	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB211	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	777.4	1
REMAP 1998	NB211	Pesticides	Total DDx (4,4)	µg/kg	725.6	1
REMAP 1998	NB211	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB211	PAHs	1-METHYLNAPTHALENE	µg/kg	84	1
REMAP 1998	NB211	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB211	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB211	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	270	1
REMAP 1998	NB211	PAHs	2-METHYLNAPHTHALENE	µg/kg	150	1
REMAP 1998	NB211	PAHs	ACENAPHTHENE	µg/kg	150	1
REMAP 1998	NB211	PAHs	ACENAPHTHYLENE	µg/kg	230	1
REMAP 1998	NB211	PAHs	ANTHRACENE	µg/kg	660	1
REMAP 1998	NB211	PAHs	BENZ(A)ANTHRACENE	µg/kg	890	1
REMAP 1998	NB211	PAHs	BENZO(A)PYRENE	µg/kg	1100	1
REMAP 1998	NB211	PAHs	BENZO(B)FLUORANTHENE	µg/kg	1300	1
REMAP 1998	NB211	PAHs	BENZO(E)PYRENE	µg/kg	300	1
REMAP 1998	NB211	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB211	PAHs	BENZO(K)FLUORANTHENE	µg/kg	390	1
REMAP 1998	NB211	PAHs	BIPHENYL	µg/kg	45	1
REMAP 1998	NB211	PAHs	CHRYSENE	µg/kg	1000	1
REMAP 1998	NB211	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB211	PAHs	FLUORANTHENE	µg/kg	2100	1
REMAP 1998	NB211	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB211	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB211	PAHs	NAPHTHALENE	µg/kg	230	1
REMAP 1998	NB211	PAHs	PERYLENE	µg/kg	630	1
REMAP 1998	NB211	PAHs	PHENANTHRENE	µg/kg	1100	1
REMAP 1998	NB211	PAHs	PYRENE	µg/kg	1900	1
REMAP 1998	NB211	PAHs	Total HMW PAHs	µg/kg	8680	1
REMAP 1998	NB211	PAHs	Total LMW PAHs	µg/kg	2520	1
REMAP 1998	NB211	PAHs	Total PAHs	µg/kg	11200	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	221.34	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	145.68	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	5.78	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.71	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	25.91	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	13.06	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	9.36	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	9.39	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	2.04	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	3	1
REMAP 1998	NB212	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	6.34	1
REMAP 1998	NB212	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	7.61	1
REMAP 1998	NB212	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	13.36	1
REMAP 1998	NB212	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	50.43	1
REMAP 1998	NB212	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	12.26	1
REMAP 1998	NB212	Dioxins/Furans	OCDD	ng/kg	2121.22	1
REMAP 1998	NB212	Dioxins/Furans	OCDF	ng/kg	254.48	1
REMAP 1998	NB212	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	70.4	1
REMAP 1998	NB212	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	835	1
REMAP 1998	NB212	Metals (Total Recoverable)	Aluminum	mg/kg	25300	1
REMAP 1998	NB212	Metals (Total Recoverable)	Antimony	mg/kg	0	0
REMAP 1998	NB212	Metals (Total Recoverable)	Arsenic	mg/kg	11	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB212	Metals (Total Recoverable)	Cadmium	mg/kg	0.9	1
REMAP 1998	NB212	Metals (Total Recoverable)	Chromium	mg/kg	82	1
REMAP 1998	NB212	Metals (Total Recoverable)	Copper	mg/kg	87	1
REMAP 1998	NB212	Metals (Total Recoverable)	Iron	mg/kg	26200	1
REMAP 1998	NB212	Metals (Total Recoverable)	Lead	mg/kg	88	1
REMAP 1998	NB212	Metals (Total Recoverable)	Manganese	mg/kg	451	1
REMAP 1998	NB212	Metals (Total Recoverable)	Mercury	mg/kg	1.72	1
REMAP 1998	NB212	Metals (Total Recoverable)	Nickel	mg/kg	32	1
REMAP 1998	NB212	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB212	Metals (Total Recoverable)	Silver	mg/kg	1.8	1
REMAP 1998	NB212	Metals (Total Recoverable)	Zinc	mg/kg	190	1
REMAP 1998	NB212	Metals (Total)	Acid Volatile Sulfide	mg/kg	835	1
REMAP 1998	NB212	Metals (Total)	Aluminum	mg/kg	55600	1
REMAP 1998	NB212	Metals (Total)	Antimony	mg/kg	0.7	1
REMAP 1998	NB212	Metals (Total)	Arsenic	mg/kg	11	1
REMAP 1998	NB212	Metals (Total)	Cadmium	mg/kg	1.02	1
REMAP 1998	NB212	Metals (Total)	Chromium	mg/kg	117	1
REMAP 1998	NB212	Metals (Total)	Lead	mg/kg	97.1	1
REMAP 1998	NB212	Metals (Total)	Manganese	mg/kg	536	1
REMAP 1998	NB212	Metals (Total)	Mercury	mg/kg	1.59	1
REMAP 1998	NB212	Metals (Total)	Nickel	mg/kg	40.5	1
REMAP 1998	NB212	Metals (Total)	Selenium	mg/kg	0.5	1
REMAP 1998	NB212	Metals (Total)	Silica	mg/kg	310000	1
REMAP 1998	NB212	Metals (Total)	Silver	mg/kg	2.78	1
REMAP 1998	NB212	Metals (Total)	Thallium	mg/kg	0.58	1
REMAP 1998	NB212	Metals (Total)	Tin	mg/kg	11.3	1
REMAP 1998	NB212	Metals (Total)	Zinc	mg/kg	209	1
REMAP 1998	NB212	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB212	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB212	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB212	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB212	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB212	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB212	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB212	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB212	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB212	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB212	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB212	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB212	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB212	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB212	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB212	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB212	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB212	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB212	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB212	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB212	Pesticides	P,P'-DDD	µg/kg	19.3	1
REMAP 1998	NB212	Pesticides	P,P'-DDE	µg/kg	15.2	1
REMAP 1998	NB212	Pesticides	P,P'-DDT	µg/kg	58.4	1
REMAP 1998	NB212	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB212	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	92.9	1
REMAP 1998	NB212	Pesticides	Total DDx (4,4)	µg/kg	92.9	1
REMAP 1998	NB212	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB212	PAHs	1-METHYLNAPTHALENE	µg/kg	0	0
REMAP 1998	NB212	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB212	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB212	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	64	1
REMAP 1998	NB212	PAHs	2-METHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB212	PAHs	ACENAPHTHENE	µg/kg	40	1
REMAP 1998	NB212	PAHs	ACENAPHTHYLENE	µg/kg	160	1
REMAP 1998	NB212	PAHs	ANTHRACENE	µg/kg	350	1
REMAP 1998	NB212	PAHs	BENZ(A)ANTHRACENE	µg/kg	820	1
REMAP 1998	NB212	PAHs	BENZO(A)PYRENE	µg/kg	900	1
REMAP 1998	NB212	PAHs	BENZO(B)FLUORANTHENE	µg/kg	990	1
REMAP 1998	NB212	PAHs	BENZO(E)PYRENE	µg/kg	280	1
REMAP 1998	NB212	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	310	1
REMAP 1998	NB212	PAHs	BENZO(K)FLUORANTHENE	µg/kg	390	1
REMAP 1998	NB212	PAHs	BIPHENYL	µg/kg	22	1
REMAP 1998	NB212	PAHs	CHRYSENE	µg/kg	860	1
REMAP 1998	NB212	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB212	PAHs	FLUORANTHENE	µg/kg	1400	1
REMAP 1998	NB212	PAHs	FLUORENE	µg/kg	74	1
REMAP 1998	NB212	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB212	PAHs	NAPHTHALENE	µg/kg	100	1
REMAP 1998	NB212	PAHs	PERYLENE	µg/kg	530	1
REMAP 1998	NB212	PAHs	PHENANTHRENE	µg/kg	350	1
REMAP 1998	NB212	PAHs	PYRENE	µg/kg	1200	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB212	PAHs	Total HMW PAHs	µg/kg	6870	1
REMAP 1998	NB212	PAHs	Total LMW PAHs	µg/kg	1074	1
REMAP 1998	NB212	PAHs	Total PAHs	µg/kg	7944	1
REMAP 1998	NB213	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	2300	1
REMAP 1998	NB213	Metals (Total Recoverable)	Aluminum	mg/kg	29100	1
REMAP 1998	NB213	Metals (Total Recoverable)	Antimony	mg/kg	3	1
REMAP 1998	NB213	Metals (Total Recoverable)	Arsenic	mg/kg	17	1
REMAP 1998	NB213	Metals (Total Recoverable)	Cadmium	mg/kg	0.9	1
REMAP 1998	NB213	Metals (Total Recoverable)	Chromium	mg/kg	130	1
REMAP 1998	NB213	Metals (Total Recoverable)	Copper	mg/kg	240	1
REMAP 1998	NB213	Metals (Total Recoverable)	Iron	mg/kg	33900	1
REMAP 1998	NB213	Metals (Total Recoverable)	Lead	mg/kg	221	1
REMAP 1998	NB213	Metals (Total Recoverable)	Manganese	mg/kg	494	1
REMAP 1998	NB213	Metals (Total Recoverable)	Mercury	mg/kg	3.78	1
REMAP 1998	NB213	Metals (Total Recoverable)	Nickel	mg/kg	43	1
REMAP 1998	NB213	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB213	Metals (Total Recoverable)	Silver	mg/kg	3.6	1
REMAP 1998	NB213	Metals (Total Recoverable)	Zinc	mg/kg	450	1
REMAP 1998	NB213	Metals (Total)	Acid Volatile Sulfide	mg/kg	2300	1
REMAP 1998	NB213	Metals (Total)	Aluminum	mg/kg	61200	1
REMAP 1998	NB213	Metals (Total)	Antimony	mg/kg	2.41	1
REMAP 1998	NB213	Metals (Total)	Arsenic	mg/kg	13.1	1
REMAP 1998	NB213	Metals (Total)	Cadmium	mg/kg	2.26	1
REMAP 1998	NB213	Metals (Total)	Chromium	mg/kg	182	1
REMAP 1998	NB213	Metals (Total)	Lead	mg/kg	206	1
REMAP 1998	NB213	Metals (Total)	Manganese	mg/kg	566	1
REMAP 1998	NB213	Metals (Total)	Mercury	mg/kg	3.37	1
REMAP 1998	NB213	Metals (Total)	Nickel	mg/kg	51.8	1
REMAP 1998	NB213	Metals (Total)	Selenium	mg/kg	1.26	1
REMAP 1998	NB213	Metals (Total)	Silica	mg/kg	267000	1
REMAP 1998	NB213	Metals (Total)	Silver	mg/kg	4.3	1
REMAP 1998	NB213	Metals (Total)	Thallium	mg/kg	0.59	1
REMAP 1998	NB213	Metals (Total)	Tin	mg/kg	21.8	1
REMAP 1998	NB213	Metals (Total)	Zinc	mg/kg	550	1
REMAP 1998	NB213	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB213	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB213	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB213	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB213	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB213	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB213	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB213	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB213	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB213	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB213	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB213	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB213	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB213	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB213	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB213	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB213	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB213	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB213	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB213	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB213	Pesticides	P,P'-DDD	µg/kg	11.2	1
REMAP 1998	NB213	Pesticides	P,P'-DDE	µg/kg	6.5	1
REMAP 1998	NB213	Pesticides	P,P'-DDT	µg/kg	5.7	1
REMAP 1998	NB213	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB213	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	23.4	1
REMAP 1998	NB213	Pesticides	Total DDx (4,4)	µg/kg	23.4	1
REMAP 1998	NB213	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB213	PAHs	1-METHYLNAPTHALENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	2-METHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	ACENAPHTHENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	ACENAPHTHYLENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	ANTHRACENE	µg/kg	68	1
REMAP 1998	NB213	PAHs	BENZ(A)ANTHRACENE	µg/kg	170	1
REMAP 1998	NB213	PAHs	BENZO(A)PYRENE	µg/kg	200	1
REMAP 1998	NB213	PAHs	BENZO(B)FLUORANTHENE	µg/kg	260	1
REMAP 1998	NB213	PAHs	BENZO(E)PYRENE	µg/kg	58	1
REMAP 1998	NB213	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	130	1
REMAP 1998	NB213	PAHs	BENZO(K)FLUORANTHENE	µg/kg	77	1
REMAP 1998	NB213	PAHs	BIPHENYL	µg/kg	0	0
REMAP 1998	NB213	PAHs	CHRYSENE	µg/kg	210	1
REMAP 1998	NB213	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB213	PAHs	FLUORANTHENE	µg/kg	350	1
REMAP 1998	NB213	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB213	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	130	1
REMAP 1998	NB213	PAHs	NAPHTHALENE	µg/kg	58	1
REMAP 1998	NB213	PAHs	PERYLENE	µg/kg	130	1
REMAP 1998	NB213	PAHs	PHENANTHRENE	µg/kg	170	1
REMAP 1998	NB213	PAHs	PYRENE	µg/kg	330	1
REMAP 1998	NB213	PAHs	Total HMW PAHs	µg/kg	1857	1
REMAP 1998	NB213	PAHs	Total LMW PAHs	µg/kg	296	1
REMAP 1998	NB213	PAHs	Total PAHs	µg/kg	2153	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	512.59	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	952.49	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	21.02	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	8.77	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	150.51	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	34.6	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	38.27	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	24.48	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	6.68	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	9.97	1
REMAP 1998	NB216	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	18.23	1
REMAP 1998	NB216	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	25.47	1
REMAP 1998	NB216	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	40.59	1
REMAP 1998	NB216	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	118.99	1
REMAP 1998	NB216	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	29.44	1
REMAP 1998	NB216	Dioxins/Furans	OCDD	ng/kg	5146.18	1
REMAP 1998	NB216	Dioxins/Furans	OCDF	ng/kg	1990.47	1
REMAP 1998	NB216	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	190.51	1
REMAP 1998	NB216	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	841	1
REMAP 1998	NB216	Metals (Total Recoverable)	Aluminum	mg/kg	31200	1
REMAP 1998	NB216	Metals (Total Recoverable)	Antimony	mg/kg	2	1
REMAP 1998	NB216	Metals (Total Recoverable)	Arsenic	mg/kg	17	1
REMAP 1998	NB216	Metals (Total Recoverable)	Cadmium	mg/kg	0	0
REMAP 1998	NB216	Metals (Total Recoverable)	Chromium	mg/kg	144	1
REMAP 1998	NB216	Metals (Total Recoverable)	Copper	mg/kg	149	1
REMAP 1998	NB216	Metals (Total Recoverable)	Iron	mg/kg	37200	1
REMAP 1998	NB216	Metals (Total Recoverable)	Lead	mg/kg	149	1
REMAP 1998	NB216	Metals (Total Recoverable)	Manganese	mg/kg	615	1
REMAP 1998	NB216	Metals (Total Recoverable)	Mercury	mg/kg	3.28	1
REMAP 1998	NB216	Metals (Total Recoverable)	Nickel	mg/kg	36	1
REMAP 1998	NB216	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB216	Metals (Total Recoverable)	Silver	mg/kg	3.2	1
REMAP 1998	NB216	Metals (Total Recoverable)	Zinc	mg/kg	271	1
REMAP 1998	NB216	Metals (Total)	Acid Volatile Sulfide	mg/kg	841	1
REMAP 1998	NB216	Metals (Total)	Aluminum	mg/kg	63800	1
REMAP 1998	NB216	Metals (Total)	Antimony	mg/kg	1.42	1
REMAP 1998	NB216	Metals (Total)	Arsenic	mg/kg	15.9	1
REMAP 1998	NB216	Metals (Total)	Cadmium	mg/kg	1.43	1
REMAP 1998	NB216	Metals (Total)	Chromium	mg/kg	179	1
REMAP 1998	NB216	Metals (Total)	Lead	mg/kg	151	1
REMAP 1998	NB216	Metals (Total)	Manganese	mg/kg	665	1
REMAP 1998	NB216	Metals (Total)	Mercury	mg/kg	3.67	1
REMAP 1998	NB216	Metals (Total)	Nickel	mg/kg	43.2	1
REMAP 1998	NB216	Metals (Total)	Selenium	mg/kg	0.8	1
REMAP 1998	NB216	Metals (Total)	Silica	mg/kg	274000	1
REMAP 1998	NB216	Metals (Total)	Silver	mg/kg	3.64	1
REMAP 1998	NB216	Metals (Total)	Thallium	mg/kg	0.7	1
REMAP 1998	NB216	Metals (Total)	Tin	mg/kg	16.3	1
REMAP 1998	NB216	Metals (Total)	Zinc	mg/kg	291	1
REMAP 1998	NB216	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB216	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB216	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB216	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB216	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB216	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB216	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB216	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB216	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB216	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB216	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB216	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB216	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB216	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	O,P'-DDT	µg/kg	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB216	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	P,P'-DDD	µg/kg	0	0
REMAP 1998	NB216	Pesticides	P,P'-DDE	µg/kg	0	0
REMAP 1998	NB216	Pesticides	P,P'-DDT	µg/kg	0	0
REMAP 1998	NB216	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB216	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	0	0
REMAP 1998	NB216	Pesticides	Total DDx (4,4)	µg/kg	0	0
REMAP 1998	NB216	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB216	PAHs	1-METHYLNAPTHALENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	2-METHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	ACENAPHTHENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	ACENAPHTHYLENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	ANTHRACENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BENZ(A)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BENZO(A)PYRENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BENZO(B)FLUORANTHENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BENZO(E)PYRENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BENZO(K)FLUORANTHENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	BIPHENYL	µg/kg	0	0
REMAP 1998	NB216	PAHs	CHRYSENE	µg/kg	43	1
REMAP 1998	NB216	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	FLUORANTHENE	µg/kg	64	1
REMAP 1998	NB216	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	NAPHTHALENE	µg/kg	48	1
REMAP 1998	NB216	PAHs	PERYLENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	PHENANTHRENE	µg/kg	0	0
REMAP 1998	NB216	PAHs	PYRENE	µg/kg	57	1
REMAP 1998	NB216	PAHs	Total HMW PAHs	µg/kg	164	1
REMAP 1998	NB216	PAHs	Total LMW PAHs	µg/kg	48	1
REMAP 1998	NB216	PAHs	Total PAHs	µg/kg	212	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	78.2	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	173.75	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	4.1	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	0	0
REMAP 1998	NB217	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	42.01	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	6.02	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	9.33	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	3.44	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0	0
REMAP 1998	NB217	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	1.73	1
REMAP 1998	NB217	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	3.7	1
REMAP 1998	NB217	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	4.49	1
REMAP 1998	NB217	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	7.63	1
REMAP 1998	NB217	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	65.93	1
REMAP 1998	NB217	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	7.44	1
REMAP 1998	NB217	Dioxins/Furans	OCDD	ng/kg	963.62	1
REMAP 1998	NB217	Dioxins/Furans	OCDF	ng/kg	238.58	1
REMAP 1998	NB217	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	80.25	1
REMAP 1998	NB217	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	37.4	1
REMAP 1998	NB217	Metals (Total Recoverable)	Aluminum	mg/kg	8810	1
REMAP 1998	NB217	Metals (Total Recoverable)	Antimony	mg/kg	0	0
REMAP 1998	NB217	Metals (Total Recoverable)	Arsenic	mg/kg	11	1
REMAP 1998	NB217	Metals (Total Recoverable)	Cadmium	mg/kg	0	0
REMAP 1998	NB217	Metals (Total Recoverable)	Chromium	mg/kg	68	1
REMAP 1998	NB217	Metals (Total Recoverable)	Copper	mg/kg	56	1
REMAP 1998	NB217	Metals (Total Recoverable)	Iron	mg/kg	12800	1
REMAP 1998	NB217	Metals (Total Recoverable)	Lead	mg/kg	64	1
REMAP 1998	NB217	Metals (Total Recoverable)	Manganese	mg/kg	162	1
REMAP 1998	NB217	Metals (Total Recoverable)	Mercury	mg/kg	1.48	1
REMAP 1998	NB217	Metals (Total Recoverable)	Nickel	mg/kg	18	1
REMAP 1998	NB217	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB217	Metals (Total Recoverable)	Silver	mg/kg	0.6	1
REMAP 1998	NB217	Metals (Total Recoverable)	Zinc	mg/kg	101	1
REMAP 1998	NB217	Metals (Total)	Acid Volatile Sulfide	mg/kg	37.4	1
REMAP 1998	NB217	Metals (Total)	Aluminum	mg/kg	38200	1
REMAP 1998	NB217	Metals (Total)	Antimony	mg/kg	0.98	1
REMAP 1998	NB217	Metals (Total)	Arsenic	mg/kg	9.02	1
REMAP 1998	NB217	Metals (Total)	Cadmium	mg/kg	0.67	1
REMAP 1998	NB217	Metals (Total)	Chromium	mg/kg	97.6	1
REMAP 1998	NB217	Metals (Total)	Lead	mg/kg	77.3	1
REMAP 1998	NB217	Metals (Total)	Manganese	mg/kg	296	1
REMAP 1998	NB217	Metals (Total)	Mercury	mg/kg	6.97	1
REMAP 1998	NB217	Metals (Total)	Nickel	mg/kg	24	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB217	Metals (Total)	Selenium	mg/kg	0.43	1
REMAP 1998	NB217	Metals (Total)	Silica	mg/kg	355000	1
REMAP 1998	NB217	Metals (Total)	Silver	mg/kg	0.99	1
REMAP 1998	NB217	Metals (Total)	Thallium	mg/kg	0.25	1
REMAP 1998	NB217	Metals (Total)	Tin	mg/kg	24.6	1
REMAP 1998	NB217	Metals (Total)	Zinc	mg/kg	123	1
REMAP 1998	NB217	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB217	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB217	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB217	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB217	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB217	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB217	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB217	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB217	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB217	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB217	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB217	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB217	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB217	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB217	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB217	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB217	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB217	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB217	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB217	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB217	Pesticides	P,P'-DDD	µg/kg	11.5	1
REMAP 1998	NB217	Pesticides	P,P'-DDE	µg/kg	7.6	1
REMAP 1998	NB217	Pesticides	P,P'-DDT	µg/kg	0	0
REMAP 1998	NB217	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB217	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	19.1	1
REMAP 1998	NB217	Pesticides	Total DDx (4,4)	µg/kg	19.1	1
REMAP 1998	NB217	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB217	PAHs	1-METHYLNAPTHALENE	µg/kg	57	1
REMAP 1998	NB217	PAHs	1-METHYLPHENANTHRENE	µg/kg	190	1
REMAP 1998	NB217	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB217	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	100	1
REMAP 1998	NB217	PAHs	2-METHYLNAPHTHALENE	µg/kg	100	1
REMAP 1998	NB217	PAHs	ACENAPHTHENE	µg/kg	76	1
REMAP 1998	NB217	PAHs	ACENAPHTHYLENE	µg/kg	630	1
REMAP 1998	NB217	PAHs	ANTHRACENE	µg/kg	520	1
REMAP 1998	NB217	PAHs	BENZ(A)ANTHRACENE	µg/kg	1500	1
REMAP 1998	NB217	PAHs	BENZO(A)PYRENE	µg/kg	3000	1
REMAP 1998	NB217	PAHs	BENZO(B)FLUORANTHENE	µg/kg	2500	1
REMAP 1998	NB217	PAHs	BENZO(E)PYRENE	µg/kg	620	1
REMAP 1998	NB217	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB217	PAHs	BENZO(K)FLUORANTHENE	µg/kg	740	1
REMAP 1998	NB217	PAHs	BIPHENYL	µg/kg	41	1
REMAP 1998	NB217	PAHs	CHRYSENE	µg/kg	1400	1
REMAP 1998	NB217	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB217	PAHs	FLUORANTHENE	µg/kg	1600	1
REMAP 1998	NB217	PAHs	FLUORENE	µg/kg	160	1
REMAP 1998	NB217	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB217	PAHs	NAPHTHALENE	µg/kg	190	1
REMAP 1998	NB217	PAHs	PERYLENE	µg/kg	1300	1
REMAP 1998	NB217	PAHs	PHENANTHRENE	µg/kg	660	1
REMAP 1998	NB217	PAHs	PYRENE	µg/kg	2500	1
REMAP 1998	NB217	PAHs	Total HMW PAHs	µg/kg	13240	1
REMAP 1998	NB217	PAHs	Total LMW PAHs	µg/kg	2336	1
REMAP 1998	NB217	PAHs	Total PAHs	µg/kg	15576	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	346.05	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	245.27	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	10.08	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.96	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	49.61	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	25.04	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	16.65	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	14.4	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0	0
REMAP 1998	NB222	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	6.94	1
REMAP 1998	NB222	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	9.36	1
REMAP 1998	NB222	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	13.64	1
REMAP 1998	NB222	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	18.58	1
REMAP 1998	NB222	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	92.98	1
REMAP 1998	NB222	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	27.68	1
REMAP 1998	NB222	Dioxins/Furans	OCDD	ng/kg	3197.11	1
REMAP 1998	NB222	Dioxins/Furans	OCDF	ng/kg	416.79	1
REMAP 1998	NB222	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	127.97	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB222	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	1610	1
REMAP 1998	NB222	Metals (Total Recoverable)	Aluminum	mg/kg	21000	1
REMAP 1998	NB222	Metals (Total Recoverable)	Antimony	mg/kg	2	1
REMAP 1998	NB222	Metals (Total Recoverable)	Arsenic	mg/kg	12	1
REMAP 1998	NB222	Metals (Total Recoverable)	Cadmium	mg/kg	1.5	1
REMAP 1998	NB222	Metals (Total Recoverable)	Chromium	mg/kg	113	1
REMAP 1998	NB222	Metals (Total Recoverable)	Copper	mg/kg	160	1
REMAP 1998	NB222	Metals (Total Recoverable)	Iron	mg/kg	25800	1
REMAP 1998	NB222	Metals (Total Recoverable)	Lead	mg/kg	130	1
REMAP 1998	NB222	Metals (Total Recoverable)	Manganese	mg/kg	334	1
REMAP 1998	NB222	Metals (Total Recoverable)	Mercury	mg/kg	2.91	1
REMAP 1998	NB222	Metals (Total Recoverable)	Nickel	mg/kg	36	1
REMAP 1998	NB222	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB222	Metals (Total Recoverable)	Silver	mg/kg	2.7	1
REMAP 1998	NB222	Metals (Total Recoverable)	Zinc	mg/kg	258	1
REMAP 1998	NB222	Metals (Total)	Acid Volatile Sulfide	mg/kg	1610	1
REMAP 1998	NB222	Metals (Total)	Aluminum	mg/kg	56900	1
REMAP 1998	NB222	Metals (Total)	Antimony	mg/kg	2.4	1
REMAP 1998	NB222	Metals (Total)	Arsenic	mg/kg	13.3	1
REMAP 1998	NB222	Metals (Total)	Cadmium	mg/kg	1.84	1
REMAP 1998	NB222	Metals (Total)	Chromium	mg/kg	162	1
REMAP 1998	NB222	Metals (Total)	Lead	mg/kg	172	1
REMAP 1998	NB222	Metals (Total)	Manganese	mg/kg	450	1
REMAP 1998	NB222	Metals (Total)	Mercury	mg/kg	2.88	1
REMAP 1998	NB222	Metals (Total)	Nickel	mg/kg	46.5	1
REMAP 1998	NB222	Metals (Total)	Selenium	mg/kg	0.98	1
REMAP 1998	NB222	Metals (Total)	Silica	mg/kg	295000	1
REMAP 1998	NB222	Metals (Total)	Silver	mg/kg	3.59	1
REMAP 1998	NB222	Metals (Total)	Thallium	mg/kg	0.38	1
REMAP 1998	NB222	Metals (Total)	Tin	mg/kg	17	1
REMAP 1998	NB222	Metals (Total)	Zinc	mg/kg	273	1
REMAP 1998	NB222	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB222	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB222	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB222	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB222	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB222	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB222	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB222	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB222	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB222	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB222	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB222	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB222	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB222	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB222	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB222	Pesticides	MIREX	µg/kg	4.5	1
REMAP 1998	NB222	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB222	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB222	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB222	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB222	Pesticides	P,P'-DDD	µg/kg	23.8	1
REMAP 1998	NB222	Pesticides	P,P'-DDE	µg/kg	33.7	1
REMAP 1998	NB222	Pesticides	P,P'-DDT	µg/kg	0	0
REMAP 1998	NB222	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB222	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	57.5	1
REMAP 1998	NB222	Pesticides	Total DDx (4,4)	µg/kg	57.5	1
REMAP 1998	NB222	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB222	PAHs	1-METHYLNAPTHALENE	µg/kg	65	1
REMAP 1998	NB222	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB222	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB222	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	260	1
REMAP 1998	NB222	PAHs	2-METHYLNAPHTHALENE	µg/kg	140	1
REMAP 1998	NB222	PAHs	ACENAPHTHENE	µg/kg	65	1
REMAP 1998	NB222	PAHs	ACENAPHTHYLENE	µg/kg	250	1
REMAP 1998	NB222	PAHs	ANTHRACENE	µg/kg	380	1
REMAP 1998	NB222	PAHs	BENZ(A)ANTHRACENE	µg/kg	610	1
REMAP 1998	NB222	PAHs	BENZO(A)PYRENE	µg/kg	1100	1
REMAP 1998	NB222	PAHs	BENZO(B)FLUORANTHENE	µg/kg	1300	1
REMAP 1998	NB222	PAHs	BENZO(E)PYRENE	µg/kg	510	1
REMAP 1998	NB222	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB222	PAHs	BENZO(K)FLUORANTHENE	µg/kg	490	1
REMAP 1998	NB222	PAHs	BIPHENYL	µg/kg	53	1
REMAP 1998	NB222	PAHs	CHRYSENE	µg/kg	760	1
REMAP 1998	NB222	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB222	PAHs	FLUORANTHENE	µg/kg	950	1
REMAP 1998	NB222	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB222	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB222	PAHs	NAPHTHALENE	µg/kg	240	1
REMAP 1998	NB222	PAHs	PERYLENE	µg/kg	690	1
REMAP 1998	NB222	PAHs	PHENANTHRENE	µg/kg	470	1
REMAP 1998	NB222	PAHs	PYRENE	µg/kg	1300	1
REMAP 1998	NB222	PAHs	Total HMW PAHs	µg/kg	6510	1
REMAP 1998	NB222	PAHs	Total LMW PAHs	µg/kg	1545	1
REMAP 1998	NB222	PAHs	Total PAHs	µg/kg	8055	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	542.26	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	402.64	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	53.05	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	8.39	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	84.08	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	33.11	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	37.95	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	20.12	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	13.74	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	8.14	1
REMAP 1998	NB223	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	23.53	1
REMAP 1998	NB223	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	36.15	1
REMAP 1998	NB223	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	29.28	1
REMAP 1998	NB223	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	109.29	1
REMAP 1998	NB223	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	39.44	1
REMAP 1998	NB223	Dioxins/Furans	OCDD	ng/kg	6140.67	1
REMAP 1998	NB223	Dioxins/Furans	OCDF	ng/kg	838.62	1
REMAP 1998	NB223	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	166.29	1
REMAP 1998	NB223	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	3670	1
REMAP 1998	NB223	Metals (Total Recoverable)	Aluminum	mg/kg	19900	1
REMAP 1998	NB223	Metals (Total Recoverable)	Antimony	mg/kg	3	1
REMAP 1998	NB223	Metals (Total Recoverable)	Arsenic	mg/kg	24	1
REMAP 1998	NB223	Metals (Total Recoverable)	Cadmium	mg/kg	4.3	1
REMAP 1998	NB223	Metals (Total Recoverable)	Chromium	mg/kg	147	1
REMAP 1998	NB223	Metals (Total Recoverable)	Copper	mg/kg	300	1
REMAP 1998	NB223	Metals (Total Recoverable)	Iron	mg/kg	25700	1
REMAP 1998	NB223	Metals (Total Recoverable)	Lead	mg/kg	182	1
REMAP 1998	NB223	Metals (Total Recoverable)	Manganese	mg/kg	331	1
REMAP 1998	NB223	Metals (Total Recoverable)	Mercury	mg/kg	7.42	1
REMAP 1998	NB223	Metals (Total Recoverable)	Nickel	mg/kg	43	1
REMAP 1998	NB223	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB223	Metals (Total Recoverable)	Silver	mg/kg	3.5	1
REMAP 1998	NB223	Metals (Total Recoverable)	Zinc	mg/kg	368	1
REMAP 1998	NB223	Metals (Total)	Acid Volatile Sulfide	mg/kg	3670	1
REMAP 1998	NB223	Metals (Total)	Aluminum	mg/kg	57200	1
REMAP 1998	NB223	Metals (Total)	Antimony	mg/kg	3.19	1
REMAP 1998	NB223	Metals (Total)	Arsenic	mg/kg	21.4	1
REMAP 1998	NB223	Metals (Total)	Cadmium	mg/kg	4.27	1
REMAP 1998	NB223	Metals (Total)	Chromium	mg/kg	188	1
REMAP 1998	NB223	Metals (Total)	Lead	mg/kg	192	1
REMAP 1998	NB223	Metals (Total)	Manganese	mg/kg	425	1
REMAP 1998	NB223	Metals (Total)	Mercury	mg/kg	2.57	1
REMAP 1998	NB223	Metals (Total)	Nickel	mg/kg	51.4	1
REMAP 1998	NB223	Metals (Total)	Selenium	mg/kg	1.54	1
REMAP 1998	NB223	Metals (Total)	Silica	mg/kg	303000	1
REMAP 1998	NB223	Metals (Total)	Silver	mg/kg	3.95	1
REMAP 1998	NB223	Metals (Total)	Thallium	mg/kg	0.61	1
REMAP 1998	NB223	Metals (Total)	Tin	mg/kg	17.3	1
REMAP 1998	NB223	Metals (Total)	Zinc	mg/kg	401	1
REMAP 1998	NB223	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB223	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB223	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB223	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB223	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB223	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB223	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB223	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB223	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB223	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB223	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB223	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB223	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB223	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB223	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB223	Pesticides	MIREX	µg/kg	0.8	1
REMAP 1998	NB223	Pesticides	O,P'-DDD	µg/kg	78.3	1
REMAP 1998	NB223	Pesticides	O,P'-DDE	µg/kg	70.9	1
REMAP 1998	NB223	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB223	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB223	Pesticides	P,P'-DDD	µg/kg	129	1
REMAP 1998	NB223	Pesticides	P,P'-DDE	µg/kg	101.8	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB223	Pesticides	P,P'-DDT	µg/kg	444.2	1
REMAP 1998	NB223	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB223	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	824.2	1
REMAP 1998	NB223	Pesticides	Total DDx (4,4)	µg/kg	675	1
REMAP 1998	NB223	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB223	PAHs	1-METHYLNAPTHALENE	µg/kg	66	1
REMAP 1998	NB223	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB223	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB223	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	180	1
REMAP 1998	NB223	PAHs	2-METHYLNAPHTHALENE	µg/kg	140	1
REMAP 1998	NB223	PAHs	ACENAPHTHENE	µg/kg	99	1
REMAP 1998	NB223	PAHs	ACENAPHTHYLENE	µg/kg	300	1
REMAP 1998	NB223	PAHs	ANTHRACENE	µg/kg	500	1
REMAP 1998	NB223	PAHs	BENZ(A)ANTHRACENE	µg/kg	850	1
REMAP 1998	NB223	PAHs	BENZO(A)PYRENE	µg/kg	1400	1
REMAP 1998	NB223	PAHs	BENZO(B)FLUORANTHENE	µg/kg	1700	1
REMAP 1998	NB223	PAHs	BENZO(E)PYRENE	µg/kg	460	1
REMAP 1998	NB223	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	700	1
REMAP 1998	NB223	PAHs	BENZO(K)FLUORANTHENE	µg/kg	490	1
REMAP 1998	NB223	PAHs	BIPHENYL	µg/kg	48	1
REMAP 1998	NB223	PAHs	CHRYSENE	µg/kg	1000	1
REMAP 1998	NB223	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB223	PAHs	FLUORANTHENE	µg/kg	1800	1
REMAP 1998	NB223	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB223	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB223	PAHs	NAPHTHALENE	µg/kg	180	1
REMAP 1998	NB223	PAHs	PERYLENE	µg/kg	830	1
REMAP 1998	NB223	PAHs	PHENANTHRENE	µg/kg	770	1
REMAP 1998	NB223	PAHs	PYRENE	µg/kg	1900	1
REMAP 1998	NB223	PAHs	Total HMW PAHs	µg/kg	9840	1
REMAP 1998	NB223	PAHs	Total LMW PAHs	µg/kg	1989	1
REMAP 1998	NB223	PAHs	Total PAHs	µg/kg	11829	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	144.1	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	189.19	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	6.46	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	1.96	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	47.39	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	9.96	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	10.5	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	6.11	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0	0
REMAP 1998	NB226	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.35	1
REMAP 1998	NB226	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	4.08	1
REMAP 1998	NB226	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	6.09	1
REMAP 1998	NB226	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	10.42	1
REMAP 1998	NB226	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	40.05	1
REMAP 1998	NB226	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	11.55	1
REMAP 1998	NB226	Dioxins/Furans	OCDD	ng/kg	1589.16	1
REMAP 1998	NB226	Dioxins/Furans	OCDF	ng/kg	349.69	1
REMAP 1998	NB226	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	58.98	1
REMAP 1998	NB226	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	302	1
REMAP 1998	NB226	Metals (Total Recoverable)	Aluminum	mg/kg	25200	1
REMAP 1998	NB226	Metals (Total Recoverable)	Antimony	mg/kg	2	1
REMAP 1998	NB226	Metals (Total Recoverable)	Arsenic	mg/kg	12	1
REMAP 1998	NB226	Metals (Total Recoverable)	Cadmium	mg/kg	0.9	1
REMAP 1998	NB226	Metals (Total Recoverable)	Chromium	mg/kg	100	1
REMAP 1998	NB226	Metals (Total Recoverable)	Copper	mg/kg	98	1
REMAP 1998	NB226	Metals (Total Recoverable)	Iron	mg/kg	29400	1
REMAP 1998	NB226	Metals (Total Recoverable)	Lead	mg/kg	102	1
REMAP 1998	NB226	Metals (Total Recoverable)	Manganese	mg/kg	443	1
REMAP 1998	NB226	Metals (Total Recoverable)	Mercury	mg/kg	2.07	1
REMAP 1998	NB226	Metals (Total Recoverable)	Nickel	mg/kg	31	1
REMAP 1998	NB226	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB226	Metals (Total Recoverable)	Silver	mg/kg	2.2	1
REMAP 1998	NB226	Metals (Total Recoverable)	Zinc	mg/kg	182	1
REMAP 1998	NB226	Metals (Total)	Acid Volatile Sulfide	mg/kg	302	1
REMAP 1998	NB226	Metals (Total)	Aluminum	mg/kg	59700	1
REMAP 1998	NB226	Metals (Total)	Antimony	mg/kg	1.16	1
REMAP 1998	NB226	Metals (Total)	Arsenic	mg/kg	10.6	1
REMAP 1998	NB226	Metals (Total)	Cadmium	mg/kg	1.02	1
REMAP 1998	NB226	Metals (Total)	Chromium	mg/kg	135	1
REMAP 1998	NB226	Metals (Total)	Lead	mg/kg	135	1
REMAP 1998	NB226	Metals (Total)	Manganese	mg/kg	530	1
REMAP 1998	NB226	Metals (Total)	Mercury	mg/kg	2.11	1
REMAP 1998	NB226	Metals (Total)	Nickel	mg/kg	39.4	1
REMAP 1998	NB226	Metals (Total)	Selenium	mg/kg	0.73	1
REMAP 1998	NB226	Metals (Total)	Silica	mg/kg	292000	1
REMAP 1998	NB226	Metals (Total)	Silver	mg/kg	2.93	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB226	Metals (Total)	Thallium	mg/kg	0.49	1
REMAP 1998	NB226	Metals (Total)	Tin	mg/kg	16.3	1
REMAP 1998	NB226	Metals (Total)	Zinc	mg/kg	219	1
REMAP 1998	NB226	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB226	Pesticides	ALPHA CHLORDANE	µg/kg	4.4	1
REMAP 1998	NB226	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB226	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB226	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB226	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB226	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB226	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB226	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB226	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB226	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB226	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB226	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB226	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB226	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB226	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB226	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB226	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB226	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB226	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB226	Pesticides	P,P'-DDD	µg/kg	14.4	1
REMAP 1998	NB226	Pesticides	P,P'-DDE	µg/kg	16.5	1
REMAP 1998	NB226	Pesticides	P,P'-DDT	µg/kg	47.2	1
REMAP 1998	NB226	Pesticides	Total alpha + gamma chlordane	µg/kg	4.4	1
REMAP 1998	NB226	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	78.1	1
REMAP 1998	NB226	Pesticides	Total DDx (4,4)	µg/kg	78.1	1
REMAP 1998	NB226	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB226	PAHs	1-METHYLNAPTHALENE	µg/kg	70	1
REMAP 1998	NB226	PAHs	1-METHYLPHENANTHRENE	µg/kg	1500	1
REMAP 1998	NB226	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB226	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	290	1
REMAP 1998	NB226	PAHs	2-METHYLNAPHTHALENE	µg/kg	140	1
REMAP 1998	NB226	PAHs	ACENAPHTHENE	µg/kg	92	1
REMAP 1998	NB226	PAHs	ACENAPHTHYLENE	µg/kg	340	1
REMAP 1998	NB226	PAHs	ANTHRACENE	µg/kg	590	1
REMAP 1998	NB226	PAHs	BENZ(A)ANTHRACENE	µg/kg	910	1
REMAP 1998	NB226	PAHs	BENZO(A)PYRENE	µg/kg	1500	1
REMAP 1998	NB226	PAHs	BENZO(B)FLUORANTHENE	µg/kg	1700	1
REMAP 1998	NB226	PAHs	BENZO(E)PYRENE	µg/kg	620	1
REMAP 1998	NB226	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB226	PAHs	BENZO(K)FLUORANTHENE	µg/kg	610	1
REMAP 1998	NB226	PAHs	BIPHENYL	µg/kg	52	1
REMAP 1998	NB226	PAHs	CHRYSENE	µg/kg	1100	1
REMAP 1998	NB226	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB226	PAHs	FLUORANTHENE	µg/kg	0	0
REMAP 1998	NB226	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB226	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB226	PAHs	NAPHTHALENE	µg/kg	310	1
REMAP 1998	NB226	PAHs	PERYLENE	µg/kg	920	1
REMAP 1998	NB226	PAHs	PHENANTHRENE	µg/kg	660	1
REMAP 1998	NB226	PAHs	PYRENE	µg/kg	1600	1
REMAP 1998	NB226	PAHs	Total HMW PAHs	µg/kg	7420	1
REMAP 1998	NB226	PAHs	Total LMW PAHs	µg/kg	2132	1
REMAP 1998	NB226	PAHs	Total PAHs	µg/kg	9552	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	146.71	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	473.29	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	12.85	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	2.55	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	127.37	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	10.14	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	22.38	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	5.88	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	4.62	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	4.34	1
REMAP 1998	NB227	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	7.13	1
REMAP 1998	NB227	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	11.91	1
REMAP 1998	NB227	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	24.92	1
REMAP 1998	NB227	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	75.11	1
REMAP 1998	NB227	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	16.1	1
REMAP 1998	NB227	Dioxins/Furans	OCDD	ng/kg	1411.27	1
REMAP 1998	NB227	Dioxins/Furans	OCDF	ng/kg	908.54	1
REMAP 1998	NB227	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	114.26	1
REMAP 1998	NB227	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	633	1
REMAP 1998	NB227	Metals (Total Recoverable)	Aluminum	mg/kg	14000	1
REMAP 1998	NB227	Metals (Total Recoverable)	Antimony	mg/kg	2	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB227	Metals (Total Recoverable)	Arsenic	mg/kg	7	1
REMAP 1998	NB227	Metals (Total Recoverable)	Cadmium	mg/kg	0	0
REMAP 1998	NB227	Metals (Total Recoverable)	Chromium	mg/kg	79	1
REMAP 1998	NB227	Metals (Total Recoverable)	Copper	mg/kg	53	1
REMAP 1998	NB227	Metals (Total Recoverable)	Iron	mg/kg	19200	1
REMAP 1998	NB227	Metals (Total Recoverable)	Lead	mg/kg	56	1
REMAP 1998	NB227	Metals (Total Recoverable)	Manganese	mg/kg	279	1
REMAP 1998	NB227	Metals (Total Recoverable)	Mercury	mg/kg	1.37	1
REMAP 1998	NB227	Metals (Total Recoverable)	Nickel	mg/kg	19	1
REMAP 1998	NB227	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB227	Metals (Total Recoverable)	Silver	mg/kg	0.7	1
REMAP 1998	NB227	Metals (Total Recoverable)	Zinc	mg/kg	115	1
REMAP 1998	NB227	Metals (Total)	Acid Volatile Sulfide	mg/kg	633	1
REMAP 1998	NB227	Metals (Total)	Aluminum	mg/kg	45300	1
REMAP 1998	NB227	Metals (Total)	Antimony	mg/kg	0.96	1
REMAP 1998	NB227	Metals (Total)	Arsenic	mg/kg	6.84	1
REMAP 1998	NB227	Metals (Total)	Cadmium	mg/kg	0.84	1
REMAP 1998	NB227	Metals (Total)	Chromium	mg/kg	122	1
REMAP 1998	NB227	Metals (Total)	Lead	mg/kg	83.5	1
REMAP 1998	NB227	Metals (Total)	Manganese	mg/kg	409	1
REMAP 1998	NB227	Metals (Total)	Mercury	mg/kg	1.86	1
REMAP 1998	NB227	Metals (Total)	Nickel	mg/kg	27.8	1
REMAP 1998	NB227	Metals (Total)	Selenium	mg/kg	0.34	1
REMAP 1998	NB227	Metals (Total)	Silica	mg/kg	353000	1
REMAP 1998	NB227	Metals (Total)	Silver	mg/kg	1.03	1
REMAP 1998	NB227	Metals (Total)	Thallium	mg/kg	0.41	1
REMAP 1998	NB227	Metals (Total)	Tin	mg/kg	5.94	1
REMAP 1998	NB227	Metals (Total)	Zinc	mg/kg	140	1
REMAP 1998	NB227	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB227	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB227	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB227	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB227	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB227	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB227	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB227	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB227	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB227	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB227	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB227	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB227	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB227	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB227	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB227	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB227	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB227	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB227	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB227	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB227	Pesticides	P,P'-DDD	µg/kg	0	0
REMAP 1998	NB227	Pesticides	P,P'-DDE	µg/kg	17.8	1
REMAP 1998	NB227	Pesticides	P,P'-DDT	µg/kg	0	0
REMAP 1998	NB227	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB227	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	17.8	1
REMAP 1998	NB227	Pesticides	Total DDx (4,4)	µg/kg	17.8	1
REMAP 1998	NB227	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB227	PAHs	1-METHYLNAPTHALENE	µg/kg	80	1
REMAP 1998	NB227	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB227	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB227	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	130	1
REMAP 1998	NB227	PAHs	2-METHYLNAPHTHALENE	µg/kg	130	1
REMAP 1998	NB227	PAHs	ACENAPHTHENE	µg/kg	360	1
REMAP 1998	NB227	PAHs	ACENAPHTHYLENE	µg/kg	890	1
REMAP 1998	NB227	PAHs	ANTHRACENE	µg/kg	1600	1
REMAP 1998	NB227	PAHs	BENZ(A)ANTHRACENE	µg/kg	3000	1
REMAP 1998	NB227	PAHs	BENZO(A)PYRENE	µg/kg	3900	1
REMAP 1998	NB227	PAHs	BENZO(B)FLUORANTHENE	µg/kg	4100	1
REMAP 1998	NB227	PAHs	BENZO(E)PYRENE	µg/kg	950	1
REMAP 1998	NB227	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	1500	1
REMAP 1998	NB227	PAHs	BENZO(K)FLUORANTHENE	µg/kg	1400	1
REMAP 1998	NB227	PAHs	BIPHENYL	µg/kg	53	1
REMAP 1998	NB227	PAHs	CHRYSENE	µg/kg	3100	1
REMAP 1998	NB227	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	410	1
REMAP 1998	NB227	PAHs	FLUORANTHENE	µg/kg	6100	1
REMAP 1998	NB227	PAHs	FLUORENE	µg/kg	340	1
REMAP 1998	NB227	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	1900	1
REMAP 1998	NB227	PAHs	NAPHTHALENE	µg/kg	560	1
REMAP 1998	NB227	PAHs	PERYLENE	µg/kg	1800	1
REMAP 1998	NB227	PAHs	PHENANTHRENE	µg/kg	2200	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB227	PAHs	PYRENE	µg/kg	4700	1
REMAP 1998	NB227	PAHs	Total HMW PAHs	µg/kg	30110	1
REMAP 1998	NB227	PAHs	Total LMW PAHs	µg/kg	6080	1
REMAP 1998	NB227	PAHs	Total PAHs	µg/kg	36190	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	363.14	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	219.88	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	7.99	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	4.82	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	44.58	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	19.74	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	13.15	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	12.41	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	3.39	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	4.39	1
REMAP 1998	NB231	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	8.11	1
REMAP 1998	NB231	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	12.64	1
REMAP 1998	NB231	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	19.31	1
REMAP 1998	NB231	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	133.14	1
REMAP 1998	NB231	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	20.38	1
REMAP 1998	NB231	Dioxins/Furans	OCDD	ng/kg	3427.67	1
REMAP 1998	NB231	Dioxins/Furans	OCDF	ng/kg	361.17	1
REMAP 1998	NB231	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	163.72	1
REMAP 1998	NB231	Metals (Total Recoverable)	Acid Volatile Sulfide	mg/kg	449	1
REMAP 1998	NB231	Metals (Total Recoverable)	Aluminum	mg/kg	24000	1
REMAP 1998	NB231	Metals (Total Recoverable)	Antimony	mg/kg	2	1
REMAP 1998	NB231	Metals (Total Recoverable)	Arsenic	mg/kg	13	1
REMAP 1998	NB231	Metals (Total Recoverable)	Cadmium	mg/kg	1	1
REMAP 1998	NB231	Metals (Total Recoverable)	Chromium	mg/kg	113	1
REMAP 1998	NB231	Metals (Total Recoverable)	Copper	mg/kg	122	1
REMAP 1998	NB231	Metals (Total Recoverable)	Iron	mg/kg	27300	1
REMAP 1998	NB231	Metals (Total Recoverable)	Lead	mg/kg	0	0
REMAP 1998	NB231	Metals (Total Recoverable)	Manganese	mg/kg	383	1
REMAP 1998	NB231	Metals (Total Recoverable)	Mercury	mg/kg	2.74	1
REMAP 1998	NB231	Metals (Total Recoverable)	Nickel	mg/kg	115	1
REMAP 1998	NB231	Metals (Total Recoverable)	Selenium	mg/kg	0	0
REMAP 1998	NB231	Metals (Total Recoverable)	Silver	mg/kg	2.5	1
REMAP 1998	NB231	Metals (Total Recoverable)	Zinc	mg/kg	198	1
REMAP 1998	NB231	Metals (Total)	Acid Volatile Sulfide	mg/kg	449	1
REMAP 1998	NB231	Metals (Total)	Aluminum	mg/kg	57000	1
REMAP 1998	NB231	Metals (Total)	Antimony	mg/kg	1.05	1
REMAP 1998	NB231	Metals (Total)	Arsenic	mg/kg	9.07	1
REMAP 1998	NB231	Metals (Total)	Cadmium	mg/kg	1.64	1
REMAP 1998	NB231	Metals (Total)	Chromium	mg/kg	143	1
REMAP 1998	NB231	Metals (Total)	Lead	mg/kg	142	1
REMAP 1998	NB231	Metals (Total)	Manganese	mg/kg	463	1
REMAP 1998	NB231	Metals (Total)	Mercury	mg/kg	2.58	1
REMAP 1998	NB231	Metals (Total)	Nickel	mg/kg	40.1	1
REMAP 1998	NB231	Metals (Total)	Selenium	mg/kg	0.75	1
REMAP 1998	NB231	Metals (Total)	Silica	mg/kg	312000	1
REMAP 1998	NB231	Metals (Total)	Silver	mg/kg	2.83	1
REMAP 1998	NB231	Metals (Total)	Thallium	mg/kg	0.22	1
REMAP 1998	NB231	Metals (Total)	Tin	mg/kg	22.9	1
REMAP 1998	NB231	Metals (Total)	Zinc	mg/kg	233	1
REMAP 1998	NB231	Pesticides	ALDRIN	µg/kg	0	0
REMAP 1998	NB231	Pesticides	ALPHA CHLORDANE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	ALPHA-BHC	µg/kg	0	0
REMAP 1998	NB231	Pesticides	BETA-BHC	µg/kg	0	0
REMAP 1998	NB231	Pesticides	CIS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB231	Pesticides	DELTA-BHC	µg/kg	0	0
REMAP 1998	NB231	Pesticides	DIELDRIN	µg/kg	0	0
REMAP 1998	NB231	Pesticides	ENDOSULFAN I	µg/kg	0	0
REMAP 1998	NB231	Pesticides	ENDRIN	µg/kg	0	0
REMAP 1998	NB231	Pesticides	GAMMA CHLORDANE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	GAMMA-BHC	µg/kg	0	0
REMAP 1998	NB231	Pesticides	HEPTACHLOR	µg/kg	0	0
REMAP 1998	NB231	Pesticides	HEPTACHLOR EPOXIDE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	HEXACHLOROBENZENE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	METHOXYCHLOR	µg/kg	0	0
REMAP 1998	NB231	Pesticides	MIREX	µg/kg	0	0
REMAP 1998	NB231	Pesticides	O,P'-DDD	µg/kg	0	0
REMAP 1998	NB231	Pesticides	O,P'-DDE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	O,P'-DDT	µg/kg	0	0
REMAP 1998	NB231	Pesticides	OXYCHLORDANE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	P,P'-DDD	µg/kg	0	0
REMAP 1998	NB231	Pesticides	P,P'-DDE	µg/kg	0	0
REMAP 1998	NB231	Pesticides	P,P'-DDT	µg/kg	0	0
REMAP 1998	NB231	Pesticides	Total alpha + gamma chlordane	µg/kg	0	0
REMAP 1998	NB231	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	0	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 1998	NB231	Pesticides	Total DDx (4,4)	µg/kg	0	0
REMAP 1998	NB231	Pesticides	TRANS-NONACHLOR	µg/kg	0	0
REMAP 1998	NB231	PAHs	1-METHYLNAPTHALENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	1-METHYLPHENANTHRENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	2,3,5-TRIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	2,6-DIMETHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	2-METHYLNAPHTHALENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	ACENAPHTHENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	ACENAPHTHYLENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	ANTHRACENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	BENZ(A)ANTHRACENE	µg/kg	46	1
REMAP 1998	NB231	PAHs	BENZO(A)PYRENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	BENZO(B)FLUORANTHENE	µg/kg	68	1
REMAP 1998	NB231	PAHs	BENZO(E)PYRENE	µg/kg	13	1
REMAP 1998	NB231	PAHs	BENZO(G,H,I)PERYLENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	BENZO(K)FLUORANTHENE	µg/kg	25	1
REMAP 1998	NB231	PAHs	BIPHENYL	µg/kg	0	0
REMAP 1998	NB231	PAHs	CHRYSENE	µg/kg	54	1
REMAP 1998	NB231	PAHs	DIBENZO(A,H)ANTHRACENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	FLUORANTHENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	FLUORENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	INDENO(1,2,3-C,D)PYRENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	NAPHTHALENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	PERYLENE	µg/kg	37	1
REMAP 1998	NB231	PAHs	PHENANTHRENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	PYRENE	µg/kg	0	0
REMAP 1998	NB231	PAHs	Total HMW PAHs	µg/kg	193	1
REMAP 1998	NB231	PAHs	Total LMW PAHs	µg/kg	0	0
REMAP 1998	NB231	PAHs	Total PAHs	µg/kg	193	1
REMAP 2003	NB301	Butyltins	Dibutyltin	ppb	33.23	1
REMAP 2003	NB301	Butyltins	Monobutyltin	ppb	3.45	1
REMAP 2003	NB301	Butyltins	Tetrabutyltin	ppb	5.64	1
REMAP 2003	NB301	Butyltins	Tributyltin	ppb	124.82	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	85.83	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	57.4	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	11.77	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	5.23	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	13.98	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	8.54	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	5.54	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	7.92	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	4.6	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.03	1
REMAP 2003	NB301	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	2.23	1
REMAP 2003	NB301	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	7.17	1
REMAP 2003	NB301	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	4.41	1
REMAP 2003	NB301	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	26.43	1
REMAP 2003	NB301	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	5.74	1
REMAP 2003	NB301	Dioxins/Furans	OCDD	ng/kg	735.83	1
REMAP 2003	NB301	Dioxins/Furans	OCDF	ng/kg	102.04	1
REMAP 2003	NB301	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	201.94	1
REMAP 2003	NB301	Dioxins/Furans	Total Hepta-Furans	ng/kg	105.51	1
REMAP 2003	NB301	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	57.69	1
REMAP 2003	NB301	Dioxins/Furans	Total Hexa-Furans	ng/kg	66.23	1
REMAP 2003	NB301	Dioxins/Furans	Total Penta-Dioxins	ng/kg	13.27	1
REMAP 2003	NB301	Dioxins/Furans	Total Penta-Furans	ng/kg	53.36	1
REMAP 2003	NB301	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	43.05	1
REMAP 2003	NB301	Dioxins/Furans	Total Tetra-Furans	ng/kg	49.12	1
REMAP 2003	NB301	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	37.52	1
REMAP 2003	NB301	Metals	Aluminum	mg/kg	29200	1
REMAP 2003	NB301	Metals	Antimony	mg/kg	1.1	1
REMAP 2003	NB301	Metals	Arsenic	mg/kg	11.1	1
REMAP 2003	NB301	Metals	Cadmium	mg/kg	2.3	1
REMAP 2003	NB301	Metals	Chromium	mg/kg	95.3	1
REMAP 2003	NB301	Metals	Copper	mg/kg	87.2	1
REMAP 2003	NB301	Metals	Iron	mg/kg	35300	1
REMAP 2003	NB301	Metals	Lead	mg/kg	99.7	1
REMAP 2003	NB301	Metals	Manganese	mg/kg	609	1
REMAP 2003	NB301	Metals	Mercury	mg/kg	1.1	1
REMAP 2003	NB301	Metals	Nickel	mg/kg	37.7	1
REMAP 2003	NB301	Metals	Selenium	mg/kg	1.1	1
REMAP 2003	NB301	Metals	Silver	mg/kg	2	1
REMAP 2003	NB301	Metals	Tin	mg/kg	19.5	1
REMAP 2003	NB301	Metals	Zinc	mg/kg	168	1
REMAP 2003	NB301	Pesticides	2,4'-DDD	µg/kg	2.9	1
REMAP 2003	NB301	Pesticides	2,4'-DDE	µg/kg	4.7	1
REMAP 2003	NB301	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	4,4'-DDD	µg/kg	9.2	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB301	Pesticides	4,4'-DDE	µg/kg	13	1
REMAP 2003	NB301	Pesticides	4,4'-DDT	µg/kg	10	1
REMAP 2003	NB301	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	alpha-Chlordane	µg/kg	3.9	1
REMAP 2003	NB301	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Hexachlorobenzene	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB301	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	39.8	1
REMAP 2003	NB301	Pesticides	Total DDx (4,4)	µg/kg	32.2	1
REMAP 2003	NB301	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB301	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB301	PAHs	1-methylnaphthalene	µg/kg	17	1
REMAP 2003	NB301	PAHs	1-methylphenanthrene	µg/kg	51	1
REMAP 2003	NB301	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB301	PAHs	2,6-dimethylnaphthalene	µg/kg	130	1
REMAP 2003	NB301	PAHs	2-methylnaphthalene	µg/kg	36	1
REMAP 2003	NB301	PAHs	Acenaphthene	µg/kg	39	1
REMAP 2003	NB301	PAHs	Acenaphthylene	µg/kg	65	1
REMAP 2003	NB301	PAHs	Anthracene	µg/kg	150	1
REMAP 2003	NB301	PAHs	Benzo(a)anthracene	µg/kg	260	1
REMAP 2003	NB301	PAHs	Benzo(a)pyrene	µg/kg	270	1
REMAP 2003	NB301	PAHs	Benzo(b)fluoranthene	µg/kg	340	1
REMAP 2003	NB301	PAHs	Benzo(g,h,i)perylene	µg/kg	210	1
REMAP 2003	NB301	PAHs	Benzo(k)fluoranthene	µg/kg	130	1
REMAP 2003	NB301	PAHs	Biphenyl	µg/kg	16	1
REMAP 2003	NB301	PAHs	Chrysene	µg/kg	260	1
REMAP 2003	NB301	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB301	PAHs	Dibenzothiophene	µg/kg	29	1
REMAP 2003	NB301	PAHs	Fluoranthene	µg/kg	310	1
REMAP 2003	NB301	PAHs	Fluorene	µg/kg	53	1
REMAP 2003	NB301	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	170	1
REMAP 2003	NB301	PAHs	Naphthalene	µg/kg	54	1
REMAP 2003	NB301	PAHs	Phenanthrene	µg/kg	200	1
REMAP 2003	NB301	PAHs	Pyrene	µg/kg	380	1
REMAP 2003	NB301	PAHs	Total HMW PAHs	µg/kg	2330	1
REMAP 2003	NB301	PAHs	Total LMW PAHs	µg/kg	597	1
REMAP 2003	NB301	PAHs	Total PAHs	µg/kg	2927	1
REMAP 2003	NB301	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.5	1
REMAP 2003	NB301	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	0.85	1
REMAP 2003	NB301	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	4.7	1
REMAP 2003	NB301	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	7.9	1
REMAP 2003	NB301	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	7.6	1
REMAP 2003	NB301	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	2.8	1
REMAP 2003	NB301	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB301	PCBs	decachlorobiphenyl	µg/kg	2.6	1
REMAP 2003	NB301	PCBs	PCB 110/77	µg/kg	6.9	1
REMAP 2003	NB301	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	55.9	1
REMAP 2003	NB305	Butyltins	Dibutyltin	ppb	72.8	1
REMAP 2003	NB305	Butyltins	Monobutyltin	ppb	5.81	1
REMAP 2003	NB305	Butyltins	Tetrabutyltin	ppb	1.44	0
REMAP 2003	NB305	Butyltins	Tributyltin	ppb	97.85	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	486.08	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	434.19	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	21.08	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	7.84	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	102.32	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	24.79	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	24.2	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	18.98	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB305	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	1.32	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	5.39	1
REMAP 2003	NB305	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	8.22	1
REMAP 2003	NB305	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	11.41	1
REMAP 2003	NB305	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	17.18	1
REMAP 2003	NB305	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	235.81	1
REMAP 2003	NB305	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	17.18	1
REMAP 2003	NB305	Dioxins/Furans	OCDD	ng/kg	4861.21	1
REMAP 2003	NB305	Dioxins/Furans	OCDF	ng/kg	645.6	1
REMAP 2003	NB305	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	1157.9	1
REMAP 2003	NB305	Dioxins/Furans	Total Hepta-Furans	ng/kg	670.85	1
REMAP 2003	NB305	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	195.83	1
REMAP 2003	NB305	Dioxins/Furans	Total Hexa-Furans	ng/kg	398.34	1
REMAP 2003	NB305	Dioxins/Furans	Total Penta-Dioxins	ng/kg	52.34	1
REMAP 2003	NB305	Dioxins/Furans	Total Penta-Furans	ng/kg	369.9	1
REMAP 2003	NB305	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	262.87	1
REMAP 2003	NB305	Dioxins/Furans	Total Tetra-Furans	ng/kg	241.92	1
REMAP 2003	NB305	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	278.47	1
REMAP 2003	NB305	Metals	Aluminum	mg/kg	26500	1
REMAP 2003	NB305	Metals	Antimony	mg/kg	3	1
REMAP 2003	NB305	Metals	Arsenic	mg/kg	10.1	1
REMAP 2003	NB305	Metals	Cadmium	mg/kg	5.8	1
REMAP 2003	NB305	Metals	Chromium	mg/kg	152	1
REMAP 2003	NB305	Metals	Copper	mg/kg	192	1
REMAP 2003	NB305	Metals	Iron	mg/kg	38700	1
REMAP 2003	NB305	Metals	Lead	mg/kg	293	1
REMAP 2003	NB305	Metals	Manganese	mg/kg	712	1
REMAP 2003	NB305	Metals	Mercury	mg/kg	2.1	1
REMAP 2003	NB305	Metals	Nickel	mg/kg	45	1
REMAP 2003	NB305	Metals	Selenium	mg/kg	1.4	1
REMAP 2003	NB305	Metals	Silver	mg/kg	3.9	1
REMAP 2003	NB305	Metals	Tin	mg/kg	74.9	1
REMAP 2003	NB305	Metals	Zinc	mg/kg	576	1
REMAP 2003	NB305	Pesticides	2,4'-DDD	µg/kg	14	1
REMAP 2003	NB305	Pesticides	2,4'-DDE	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	4,4'-DDD	µg/kg	46	1
REMAP 2003	NB305	Pesticides	4,4'-DDE	µg/kg	36	1
REMAP 2003	NB305	Pesticides	4,4'-DDT	µg/kg	37	1
REMAP 2003	NB305	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	alpha-Chlordane	µg/kg	28	1
REMAP 2003	NB305	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Hexachlorobenzene	µg/kg	5	1
REMAP 2003	NB305	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB305	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	133	1
REMAP 2003	NB305	Pesticides	Total DDx (4,4)	µg/kg	119	1
REMAP 2003	NB305	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB305	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB305	PAHs	1-methylnaphthalene	µg/kg	58	1
REMAP 2003	NB305	PAHs	1-methylphenanthrene	µg/kg	10	0
REMAP 2003	NB305	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB305	PAHs	2,6-dimethylnaphthalene	µg/kg	140	1
REMAP 2003	NB305	PAHs	2-methylnaphthalene	µg/kg	74	1
REMAP 2003	NB305	PAHs	Acenaphthene	µg/kg	130	1
REMAP 2003	NB305	PAHs	Acenaphthylene	µg/kg	210	1
REMAP 2003	NB305	PAHs	Anthracene	µg/kg	240	1
REMAP 2003	NB305	PAHs	Benzo(a)anthracene	µg/kg	1300	1
REMAP 2003	NB305	PAHs	Benzo(a)pyrene	µg/kg	1000	1
REMAP 2003	NB305	PAHs	Benzo(b)fluoranthene	µg/kg	1800	1
REMAP 2003	NB305	PAHs	Benzo(g,h,i)perylene	µg/kg	750	1
REMAP 2003	NB305	PAHs	Benzo(k)fluoranthene	µg/kg	230	1
REMAP 2003	NB305	PAHs	Biphenyl	µg/kg	65	1
REMAP 2003	NB305	PAHs	Chrysene	µg/kg	2100	1
REMAP 2003	NB305	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB305	PAHs	Dibenzothiophene	µg/kg	67	1
REMAP 2003	NB305	PAHs	Fluoranthene	µg/kg	870	1
REMAP 2003	NB305	PAHs	Fluorene	µg/kg	140	1
REMAP 2003	NB305	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	680	1
REMAP 2003	NB305	PAHs	Naphthalene	µg/kg	98	1
REMAP 2003	NB305	PAHs	Phenanthrene	µg/kg	770	1
REMAP 2003	NB305	PAHs	Pyrene	µg/kg	1900	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB305	PAHs	Total HMW PAHs	µg/kg	10630	1
REMAP 2003	NB305	PAHs	Total LMW PAHs	µg/kg	1662	1
REMAP 2003	NB305	PAHs	Total PAHs	µg/kg	12292	1
REMAP 2003	NB305	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	2.6	1
REMAP 2003	NB305	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1.6	1
REMAP 2003	NB305	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	7.6	1
REMAP 2003	NB305	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	2.5	1
REMAP 2003	NB305	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	18	1
REMAP 2003	NB305	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	41	1
REMAP 2003	NB305	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	10	1
REMAP 2003	NB305	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	38	1
REMAP 2003	NB305	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	11	1
REMAP 2003	NB305	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB305	PCBs	decachlorobiphenyl	µg/kg	2.5	1
REMAP 2003	NB305	PCBs	PCB 110/77	µg/kg	24	1
REMAP 2003	NB305	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	269.6	1
REMAP 2003	NB306	Butyltins	Dibutyltin	ppb	30.93	1
REMAP 2003	NB306	Butyltins	Monobutyltin	ppb	3.93	1
REMAP 2003	NB306	Butyltins	Tetrabutyltin	ppb	7.46	1
REMAP 2003	NB306	Butyltins	Tributyltin	ppb	212.07	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	61.31	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	49.71	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	2.42	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	0.81	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	13.39	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.43	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	3.28	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	2.7	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0.2	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	0.73	1
REMAP 2003	NB306	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	3.22	1
REMAP 2003	NB306	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	1.86	1
REMAP 2003	NB306	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	3.99	1
REMAP 2003	NB306	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	52.58	1
REMAP 2003	NB306	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	7.12	1
REMAP 2003	NB306	Dioxins/Furans	OCDD	ng/kg	621.25	1
REMAP 2003	NB306	Dioxins/Furans	OCDF	ng/kg	78.24	1
REMAP 2003	NB306	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	151.46	1
REMAP 2003	NB306	Dioxins/Furans	Total Hepta-Furans	ng/kg	74.82	1
REMAP 2003	NB306	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	38.3	1
REMAP 2003	NB306	Dioxins/Furans	Total Hexa-Furans	ng/kg	47.79	1
REMAP 2003	NB306	Dioxins/Furans	Total Penta-Dioxins	ng/kg	8.79	1
REMAP 2003	NB306	Dioxins/Furans	Total Penta-Furans	ng/kg	51.69	1
REMAP 2003	NB306	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	61.79	1
REMAP 2003	NB306	Dioxins/Furans	Total Tetra-Furans	ng/kg	48.71	1
REMAP 2003	NB306	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	59.23	1
REMAP 2003	NB306	Metals	Aluminum	mg/kg	26400	1
REMAP 2003	NB306	Metals	Antimony	mg/kg	1	1
REMAP 2003	NB306	Metals	Arsenic	mg/kg	12.1	1
REMAP 2003	NB306	Metals	Cadmium	mg/kg	2.4	1
REMAP 2003	NB306	Metals	Chromium	mg/kg	91	1
REMAP 2003	NB306	Metals	Copper	mg/kg	80.9	1
REMAP 2003	NB306	Metals	Iron	mg/kg	33300	1
REMAP 2003	NB306	Metals	Lead	mg/kg	102	1
REMAP 2003	NB306	Metals	Manganese	mg/kg	524	1
REMAP 2003	NB306	Metals	Mercury	mg/kg	1.2	1
REMAP 2003	NB306	Metals	Nickel	mg/kg	38	1
REMAP 2003	NB306	Metals	Selenium	mg/kg	0.91	1
REMAP 2003	NB306	Metals	Silver	mg/kg	1.7	1
REMAP 2003	NB306	Metals	Tin	mg/kg	21.8	1
REMAP 2003	NB306	Metals	Zinc	mg/kg	162	1
REMAP 2003	NB306	Pesticides	2,4'-DDD	µg/kg	2.5	1
REMAP 2003	NB306	Pesticides	2,4'-DDE	µg/kg	3.2	1
REMAP 2003	NB306	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	4,4'-DDD	µg/kg	7.8	1
REMAP 2003	NB306	Pesticides	4,4'-DDE	µg/kg	9.5	1
REMAP 2003	NB306	Pesticides	4,4'-DDT	µg/kg	14	1
REMAP 2003	NB306	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	alpha-Chlordane	µg/kg	2.5	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB306	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Hexachlorobenzene	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB306	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	37	1
REMAP 2003	NB306	Pesticides	Total DDx (4,4)	µg/kg	31.3	1
REMAP 2003	NB306	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB306	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB306	PAHs	1-methylnaphthalene	µg/kg	20	1
REMAP 2003	NB306	PAHs	1-methylphenanthrene	µg/kg	62	1
REMAP 2003	NB306	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB306	PAHs	2,6-dimethylnaphthalene	µg/kg	110	1
REMAP 2003	NB306	PAHs	2-methylnaphthalene	µg/kg	45	1
REMAP 2003	NB306	PAHs	Acenaphthene	µg/kg	36	1
REMAP 2003	NB306	PAHs	Acenaphthylene	µg/kg	78	1
REMAP 2003	NB306	PAHs	Anthracene	µg/kg	170	1
REMAP 2003	NB306	PAHs	Benzo(a)anthracene	µg/kg	370	1
REMAP 2003	NB306	PAHs	Benzo(a)pyrene	µg/kg	380	1
REMAP 2003	NB306	PAHs	Benzo(b)fluoranthene	µg/kg	430	1
REMAP 2003	NB306	PAHs	Benzo(g,h,i)perylene	µg/kg	220	1
REMAP 2003	NB306	PAHs	Benzo(k)fluoranthene	µg/kg	180	1
REMAP 2003	NB306	PAHs	Biphenyl	µg/kg	15	1
REMAP 2003	NB306	PAHs	Chrysene	µg/kg	370	1
REMAP 2003	NB306	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB306	PAHs	Dibenzothiophene	µg/kg	26	1
REMAP 2003	NB306	PAHs	Fluoranthene	µg/kg	370	1
REMAP 2003	NB306	PAHs	Fluorene	µg/kg	52	1
REMAP 2003	NB306	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	200	1
REMAP 2003	NB306	PAHs	Naphthalene	µg/kg	67	1
REMAP 2003	NB306	PAHs	Phenanthrene	µg/kg	210	1
REMAP 2003	NB306	PAHs	Pyrene	µg/kg	470	1
REMAP 2003	NB306	PAHs	Total HMW PAHs	µg/kg	2990	1
REMAP 2003	NB306	PAHs	Total LMW PAHs	µg/kg	658	1
REMAP 2003	NB306	PAHs	Total PAHs	µg/kg	3648	1
REMAP 2003	NB306	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.3	1
REMAP 2003	NB306	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	0.46	1
REMAP 2003	NB306	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	2.2	1
REMAP 2003	NB306	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	0.78	1
REMAP 2003	NB306	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	4.3	1
REMAP 2003	NB306	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	15	1
REMAP 2003	NB306	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	2.7	1
REMAP 2003	NB306	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	7.6	1
REMAP 2003	NB306	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	2.6	1
REMAP 2003	NB306	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB306	PCBs	decachlorobiphenyl	µg/kg	1.5	1
REMAP 2003	NB306	PCBs	PCB 110/77	µg/kg	6.4	1
REMAP 2003	NB306	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	76.88	1
REMAP 2003	NB307	Butyltins	Dibutyltin	ppb	37.61	1
REMAP 2003	NB307	Butyltins	Monobutyltin	ppb	2.63	1
REMAP 2003	NB307	Butyltins	Tetrabutyltin	ppb	0.81	0
REMAP 2003	NB307	Butyltins	Tributyltin	ppb	382.6	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	223.19	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	86.29	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	5.17	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	1.73	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	18.78	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	12.31	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	6.33	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	8.06	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0.47	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.95	1
REMAP 2003	NB307	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	4.43	1
REMAP 2003	NB307	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	4.84	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB307	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	7.1	1
REMAP 2003	NB307	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	48.48	1
REMAP 2003	NB307	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	13.2	1
REMAP 2003	NB307	Dioxins/Furans	OCDD	ng/kg	2422.09	1
REMAP 2003	NB307	Dioxins/Furans	OCDF	ng/kg	196.37	1
REMAP 2003	NB307	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	485.12	1
REMAP 2003	NB307	Dioxins/Furans	Total Hepta-Furans	ng/kg	186.56	1
REMAP 2003	NB307	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	111.07	1
REMAP 2003	NB307	Dioxins/Furans	Total Hexa-Furans	ng/kg	110.55	1
REMAP 2003	NB307	Dioxins/Furans	Total Penta-Dioxins	ng/kg	28.25	1
REMAP 2003	NB307	Dioxins/Furans	Total Penta-Furans	ng/kg	227.81	1
REMAP 2003	NB307	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	59.03	1
REMAP 2003	NB307	Dioxins/Furans	Total Tetra-Furans	ng/kg	365.91	1
REMAP 2003	NB307	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	64.2	1
REMAP 2003	NB307	Metals	Aluminum	mg/kg	23700	1
REMAP 2003	NB307	Metals	Antimony	mg/kg	2.3	1
REMAP 2003	NB307	Metals	Arsenic	mg/kg	19.6	1
REMAP 2003	NB307	Metals	Cadmium	mg/kg	4.9	1
REMAP 2003	NB307	Metals	Chromium	mg/kg	133	1
REMAP 2003	NB307	Metals	Copper	mg/kg	148	1
REMAP 2003	NB307	Metals	Iron	mg/kg	25200	1
REMAP 2003	NB307	Metals	Lead	mg/kg	221	1
REMAP 2003	NB307	Metals	Manganese	mg/kg	315	1
REMAP 2003	NB307	Metals	Mercury	mg/kg	2.7	1
REMAP 2003	NB307	Metals	Nickel	mg/kg	43.8	1
REMAP 2003	NB307	Metals	Selenium	mg/kg	1.4	1
REMAP 2003	NB307	Metals	Silver	mg/kg	3.6	1
REMAP 2003	NB307	Metals	Tin	mg/kg	57.7	1
REMAP 2003	NB307	Metals	Zinc	mg/kg	241	1
REMAP 2003	NB307	Pesticides	2,4'-DDD	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	2,4'-DDE	µg/kg	18	1
REMAP 2003	NB307	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	4,4'-DDD	µg/kg	14	1
REMAP 2003	NB307	Pesticides	4,4'-DDE	µg/kg	36	1
REMAP 2003	NB307	Pesticides	4,4'-DDT	µg/kg	35	1
REMAP 2003	NB307	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	alpha-Chlordane	µg/kg	7.5	1
REMAP 2003	NB307	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Hexachlorobenzene	µg/kg	7.7	1
REMAP 2003	NB307	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB307	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	103	1
REMAP 2003	NB307	Pesticides	Total DDx (4,4)	µg/kg	85	1
REMAP 2003	NB307	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB307	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB307	PAHs	1-methylnaphthalene	µg/kg	35	1
REMAP 2003	NB307	PAHs	1-methylphenanthrene	µg/kg	10	0
REMAP 2003	NB307	PAHs	2,3,5-trimethylnaphthalene	µg/kg	980	1
REMAP 2003	NB307	PAHs	2,6-dimethylnaphthalene	µg/kg	430	1
REMAP 2003	NB307	PAHs	2-methylnaphthalene	µg/kg	220	1
REMAP 2003	NB307	PAHs	Acenaphthene	µg/kg	600	1
REMAP 2003	NB307	PAHs	Acenaphthylene	µg/kg	330	1
REMAP 2003	NB307	PAHs	Anthracene	µg/kg	900	1
REMAP 2003	NB307	PAHs	Benzo(a)anthracene	µg/kg	2400	1
REMAP 2003	NB307	PAHs	Benzo(a)pyrene	µg/kg	1000	1
REMAP 2003	NB307	PAHs	Benzo(b)fluoranthene	µg/kg	1100	1
REMAP 2003	NB307	PAHs	Benzo(g,h,i)perylene	µg/kg	440	1
REMAP 2003	NB307	PAHs	Benzo(k)fluoranthene	µg/kg	350	1
REMAP 2003	NB307	PAHs	Biphenyl	µg/kg	95	1
REMAP 2003	NB307	PAHs	Chrysene	µg/kg	1300	1
REMAP 2003	NB307	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB307	PAHs	Dibenzothiophene	µg/kg	170	1
REMAP 2003	NB307	PAHs	Fluoranthene	µg/kg	1200	1
REMAP 2003	NB307	PAHs	Fluorene	µg/kg	1000	1
REMAP 2003	NB307	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	390	1
REMAP 2003	NB307	PAHs	Naphthalene	µg/kg	270	1
REMAP 2003	NB307	PAHs	Phenanthrene	µg/kg	2600	1
REMAP 2003	NB307	PAHs	Pyrene	µg/kg	2200	1
REMAP 2003	NB307	PAHs	Total HMW PAHs	µg/kg	10380	1
REMAP 2003	NB307	PAHs	Total LMW PAHs	µg/kg	5920	1
REMAP 2003	NB307	PAHs	Total PAHs	µg/kg	16300	1
REMAP 2003	NB307	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.9	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB307	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	5.5	1
REMAP 2003	NB307	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	2.9	1
REMAP 2003	NB307	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	12	1
REMAP 2003	NB307	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	30	1
REMAP 2003	NB307	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	7.6	1
REMAP 2003	NB307	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	32	1
REMAP 2003	NB307	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	12	1
REMAP 2003	NB307	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB307	PCBs	decachlorobiphenyl	µg/kg	3.5	1
REMAP 2003	NB307	PCBs	PCB 110/77	µg/kg	34	1
REMAP 2003	NB307	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	214.8	1
REMAP 2003	NB309	Butyltins	Dibutyltin	ppb	75.98	1
REMAP 2003	NB309	Butyltins	Monobutyltin	ppb	6.98	0
REMAP 2003	NB309	Butyltins	Tetrabutyltin	ppb	353.03	1
REMAP 2003	NB309	Butyltins	Tributyltin	ppb	253.74	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	324.63	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	119.83	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	9.88	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	4.52	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	27.45	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	16.86	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	10.07	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	12.24	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	1.35	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	3.24	1
REMAP 2003	NB309	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	8	1
REMAP 2003	NB309	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	8.16	1
REMAP 2003	NB309	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	10.36	1
REMAP 2003	NB309	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	17.77	1
REMAP 2003	NB309	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	16.19	1
REMAP 2003	NB309	Dioxins/Furans	OCDD	ng/kg	3766.62	1
REMAP 2003	NB309	Dioxins/Furans	OCDF	ng/kg	244.5	1
REMAP 2003	NB309	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	706.34	1
REMAP 2003	NB309	Dioxins/Furans	Total Hepta-Furans	ng/kg	257.88	1
REMAP 2003	NB309	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	152.09	1
REMAP 2003	NB309	Dioxins/Furans	Total Hexa-Furans	ng/kg	156.24	1
REMAP 2003	NB309	Dioxins/Furans	Total Penta-Dioxins	ng/kg	39.47	1
REMAP 2003	NB309	Dioxins/Furans	Total Penta-Furans	ng/kg	154.83	1
REMAP 2003	NB309	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	62.37	1
REMAP 2003	NB309	Dioxins/Furans	Total Tetra-Furans	ng/kg	144.69	1
REMAP 2003	NB309	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	39.79	1
REMAP 2003	NB309	Metals	Aluminum	mg/kg	40500	1
REMAP 2003	NB309	Metals	Antimony	mg/kg	4.4	1
REMAP 2003	NB309	Metals	Arsenic	mg/kg	25.7	1
REMAP 2003	NB309	Metals	Cadmium	mg/kg	3.7	1
REMAP 2003	NB309	Metals	Chromium	mg/kg	160	1
REMAP 2003	NB309	Metals	Copper	mg/kg	263	1
REMAP 2003	NB309	Metals	Iron	mg/kg	48900	1
REMAP 2003	NB309	Metals	Lead	mg/kg	238	1
REMAP 2003	NB309	Metals	Manganese	mg/kg	598	1
REMAP 2003	NB309	Metals	Mercury	mg/kg	3.2	1
REMAP 2003	NB309	Metals	Nickel	mg/kg	50.8	1
REMAP 2003	NB309	Metals	Selenium	mg/kg	2.8	1
REMAP 2003	NB309	Metals	Silver	mg/kg	4.8	1
REMAP 2003	NB309	Metals	Tin	mg/kg	47.3	1
REMAP 2003	NB309	Metals	Zinc	mg/kg	363	1
REMAP 2003	NB309	Pesticides	2,4'-DDD	µg/kg	28	1
REMAP 2003	NB309	Pesticides	2,4'-DDE	µg/kg	17	1
REMAP 2003	NB309	Pesticides	2,4'-DDT	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	4,4'-DDD	µg/kg	96	1
REMAP 2003	NB309	Pesticides	4,4'-DDE	µg/kg	46	1
REMAP 2003	NB309	Pesticides	4,4'-DDT	µg/kg	39	1
REMAP 2003	NB309	Pesticides	Aldrin	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	alpha-Chlordane	µg/kg	6.5	1
REMAP 2003	NB309	Pesticides	alpha-Endosulfan	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	beta-Endosulfan	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Dieldrin	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Endosulfan sulfate	µg/kg	2.5	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB309	Pesticides	Endrin	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Heptachlor	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Heptachlor epoxide	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Hexachlorobenzene	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Lindane (gamma-BHC)	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Mirex	µg/kg	2.5	0
REMAP 2003	NB309	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	226	1
REMAP 2003	NB309	Pesticides	Total DDx (4,4)	µg/kg	181	1
REMAP 2003	NB309	Pesticides	Toxaphene	µg/kg	250	0
REMAP 2003	NB309	Pesticides	trans-Nonachlor	µg/kg	2.5	0
REMAP 2003	NB309	PAHs	1-methylnaphthalene	µg/kg	20	1
REMAP 2003	NB309	PAHs	1-methylphenanthrene	µg/kg	10	0
REMAP 2003	NB309	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB309	PAHs	2,6-dimethylnaphthalene	µg/kg	220	1
REMAP 2003	NB309	PAHs	2-methylnaphthalene	µg/kg	42	1
REMAP 2003	NB309	PAHs	Acenaphthene	µg/kg	29	1
REMAP 2003	NB309	PAHs	Acenaphthylene	µg/kg	65	1
REMAP 2003	NB309	PAHs	Anthracene	µg/kg	120	1
REMAP 2003	NB309	PAHs	Benzo(a)anthracene	µg/kg	290	1
REMAP 2003	NB309	PAHs	Benzo(a)pyrene	µg/kg	310	1
REMAP 2003	NB309	PAHs	Benzo(b)fluoranthene	µg/kg	460	1
REMAP 2003	NB309	PAHs	Benzo(g,h,i)perylene	µg/kg	170	1
REMAP 2003	NB309	PAHs	Benzo(k)fluoranthene	µg/kg	150	1
REMAP 2003	NB309	PAHs	Biphenyl	µg/kg	19	1
REMAP 2003	NB309	PAHs	Chrysene	µg/kg	310	1
REMAP 2003	NB309	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB309	PAHs	Dibenzothiophene	µg/kg	25	1
REMAP 2003	NB309	PAHs	Fluoranthene	µg/kg	310	1
REMAP 2003	NB309	PAHs	Fluorene	µg/kg	40	1
REMAP 2003	NB309	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	150	1
REMAP 2003	NB309	PAHs	Naphthalene	µg/kg	61	1
REMAP 2003	NB309	PAHs	Phenanthrene	µg/kg	200	1
REMAP 2003	NB309	PAHs	Pyrene	µg/kg	400	1
REMAP 2003	NB309	PAHs	Total HMW PAHs	µg/kg	2550	1
REMAP 2003	NB309	PAHs	Total LMW PAHs	µg/kg	557	1
REMAP 2003	NB309	PAHs	Total PAHs	µg/kg	3107	1
REMAP 2003	NB309	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	2.3	1
REMAP 2003	NB309	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1.5	1
REMAP 2003	NB309	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	7.6	1
REMAP 2003	NB309	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	2	1
REMAP 2003	NB309	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	16	1
REMAP 2003	NB309	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	88	1
REMAP 2003	NB309	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	9.2	1
REMAP 2003	NB309	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	21	1
REMAP 2003	NB309	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,2',5-trichlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	5.7	1
REMAP 2003	NB309	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	2,4'-dichlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	2	0
REMAP 2003	NB309	PCBs	decachlorobiphenyl	µg/kg	4.2	1
REMAP 2003	NB309	PCBs	PCB 110/77	µg/kg	12	1
REMAP 2003	NB309	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	315	1
REMAP 2003	NB310	Butyltins	Dibutyltin	ppb	66.02	1
REMAP 2003	NB310	Butyltins	Monobutyltin	ppb	8.63	1
REMAP 2003	NB310	Butyltins	Tetrabutyltin	ppb	49.52	1
REMAP 2003	NB310	Butyltins	Tributyltin	ppb	230.57	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	286.14	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	129.54	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	9.12	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.31	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	30.72	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	13.97	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	10.67	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	10.66	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0.68	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.87	1
REMAP 2003	NB310	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	8.85	1
REMAP 2003	NB310	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	8.41	1
REMAP 2003	NB310	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	10.82	1
REMAP 2003	NB310	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	13.95	1
REMAP 2003	NB310	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	17	1
REMAP 2003	NB310	Dioxins/Furans	OCDD	ng/kg	3551.51	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB310	Dioxins/Furans	OCDF	ng/kg	246.65	1
REMAP 2003	NB310	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	636.78	1
REMAP 2003	NB310	Dioxins/Furans	Total Hepta-Furans	ng/kg	247.75	1
REMAP 2003	NB310	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	145.64	1
REMAP 2003	NB310	Dioxins/Furans	Total Hexa-Furans	ng/kg	155.6	1
REMAP 2003	NB310	Dioxins/Furans	Total Penta-Dioxins	ng/kg	40.73	1
REMAP 2003	NB310	Dioxins/Furans	Total Penta-Furans	ng/kg	152.89	1
REMAP 2003	NB310	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	56.64	1
REMAP 2003	NB310	Dioxins/Furans	Total Tetra-Furans	ng/kg	146.68	1
REMAP 2003	NB310	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	35.26	1
REMAP 2003	NB310	Metals	Aluminum	mg/kg	35900	1
REMAP 2003	NB310	Metals	Antimony	mg/kg	3.4	1
REMAP 2003	NB310	Metals	Arsenic	mg/kg	23.5	1
REMAP 2003	NB310	Metals	Cadmium	mg/kg	3.2	1
REMAP 2003	NB310	Metals	Chromium	mg/kg	138	1
REMAP 2003	NB310	Metals	Copper	mg/kg	229	1
REMAP 2003	NB310	Metals	Iron	mg/kg	43000	1
REMAP 2003	NB310	Metals	Lead	mg/kg	207	1
REMAP 2003	NB310	Metals	Manganese	mg/kg	479	1
REMAP 2003	NB310	Metals	Mercury	mg/kg	3.1	1
REMAP 2003	NB310	Metals	Nickel	mg/kg	42.2	1
REMAP 2003	NB310	Metals	Selenium	mg/kg	2.3	1
REMAP 2003	NB310	Metals	Silver	mg/kg	4.3	1
REMAP 2003	NB310	Metals	Tin	mg/kg	40.2	1
REMAP 2003	NB310	Metals	Zinc	mg/kg	308	1
REMAP 2003	NB310	Pesticides	2,4'-DDD	µg/kg	28	1
REMAP 2003	NB310	Pesticides	2,4'-DDE	µg/kg	15	1
REMAP 2003	NB310	Pesticides	2,4'-DDT	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	4,4'-DDD	µg/kg	120	1
REMAP 2003	NB310	Pesticides	4,4'-DDE	µg/kg	40	1
REMAP 2003	NB310	Pesticides	4,4'-DDT	µg/kg	57	1
REMAP 2003	NB310	Pesticides	Aldrin	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	alpha-Chlordane	µg/kg	6.8	1
REMAP 2003	NB310	Pesticides	alpha-Endosulfan	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	beta-Endosulfan	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Dieldrin	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Endosulfan sulfate	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Endrin	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Heptachlor	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Heptachlor epoxide	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Hexachlorobenzene	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Lindane (gamma-BHC)	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Mirex	µg/kg	2.5	0
REMAP 2003	NB310	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	260	1
REMAP 2003	NB310	Pesticides	Total DDx (4,4)	µg/kg	217	1
REMAP 2003	NB310	Pesticides	Toxaphene	µg/kg	250	0
REMAP 2003	NB310	Pesticides	trans-Nonachlor	µg/kg	2.5	0
REMAP 2003	NB310	PAHs	1-methylnaphthalene	µg/kg	19	1
REMAP 2003	NB310	PAHs	1-methylphenanthrene	µg/kg	10	0
REMAP 2003	NB310	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB310	PAHs	2,6-dimethylnaphthalene	µg/kg	170	1
REMAP 2003	NB310	PAHs	2-methylnaphthalene	µg/kg	40	1
REMAP 2003	NB310	PAHs	Acenaphthene	µg/kg	29	1
REMAP 2003	NB310	PAHs	Acenaphthylene	µg/kg	75	1
REMAP 2003	NB310	PAHs	Anthracene	µg/kg	140	1
REMAP 2003	NB310	PAHs	Benzo(a)anthracene	µg/kg	330	1
REMAP 2003	NB310	PAHs	Benzo(a)pyrene	µg/kg	350	1
REMAP 2003	NB310	PAHs	Benzo(b)fluoranthene	µg/kg	560	1
REMAP 2003	NB310	PAHs	Benzo(g,h,i)perylene	µg/kg	190	1
REMAP 2003	NB310	PAHs	Benzo(k)fluoranthene	µg/kg	200	1
REMAP 2003	NB310	PAHs	Biphenyl	µg/kg	19	1
REMAP 2003	NB310	PAHs	Chrysene	µg/kg	400	1
REMAP 2003	NB310	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB310	PAHs	Dibenzothiophene	µg/kg	26	1
REMAP 2003	NB310	PAHs	Fluoranthene	µg/kg	360	1
REMAP 2003	NB310	PAHs	Fluorene	µg/kg	42	1
REMAP 2003	NB310	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	170	1
REMAP 2003	NB310	PAHs	Naphthalene	µg/kg	55	1
REMAP 2003	NB310	PAHs	Phenanthrene	µg/kg	220	1
REMAP 2003	NB310	PAHs	Pyrene	µg/kg	470	1
REMAP 2003	NB310	PAHs	Total HMW PAHs	µg/kg	3030	1
REMAP 2003	NB310	PAHs	Total LMW PAHs	µg/kg	601	1
REMAP 2003	NB310	PAHs	Total PAHs	µg/kg	3631	1
REMAP 2003	NB310	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.9	1
REMAP 2003	NB310	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	0.88	1
REMAP 2003	NB310	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	4.6	1
REMAP 2003	NB310	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	1.5	1
REMAP 2003	NB310	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	9.5	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB310	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	170	1
REMAP 2003	NB310	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	5.7	1
REMAP 2003	NB310	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	16	1
REMAP 2003	NB310	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	5.1	1
REMAP 2003	NB310	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB310	PCBs	decachlorobiphenyl	µg/kg	3.4	1
REMAP 2003	NB310	PCBs	PCB 110/77	µg/kg	12	1
REMAP 2003	NB310	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	437.16	1
REMAP 2003	NB312	Butyltins	Dibutyltin	ppb	27.61	1
REMAP 2003	NB312	Butyltins	Monobutyltin	ppb	3.6	1
REMAP 2003	NB312	Butyltins	Tetrabutyltin	ppb	0.93	0
REMAP 2003	NB312	Butyltins	Tributyltin	ppb	135.15	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	78.09	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	45.59	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	2.14	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	0.86	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	12.15	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	4.46	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	3.15	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	3.17	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0.21	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	0.97	1
REMAP 2003	NB312	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	2.03	1
REMAP 2003	NB312	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	1.99	1
REMAP 2003	NB312	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	3.36	1
REMAP 2003	NB312	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	13.47	1
REMAP 2003	NB312	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	5.3	1
REMAP 2003	NB312	Dioxins/Furans	OCDD	ng/kg	581.7	1
REMAP 2003	NB312	Dioxins/Furans	OCDF	ng/kg	81.65	1
REMAP 2003	NB312	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	178.16	1
REMAP 2003	NB312	Dioxins/Furans	Total Hepta-Furans	ng/kg	80.74	1
REMAP 2003	NB312	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	43.49	1
REMAP 2003	NB312	Dioxins/Furans	Total Hexa-Furans	ng/kg	50.03	1
REMAP 2003	NB312	Dioxins/Furans	Total Penta-Dioxins	ng/kg	12.14	1
REMAP 2003	NB312	Dioxins/Furans	Total Penta-Furans	ng/kg	53.48	1
REMAP 2003	NB312	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	29.98	1
REMAP 2003	NB312	Dioxins/Furans	Total Tetra-Furans	ng/kg	57.48	1
REMAP 2003	NB312	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	20.1	1
REMAP 2003	NB312	Metals	Aluminum	mg/kg	26700	1
REMAP 2003	NB312	Metals	Antimony	mg/kg	0.98	1
REMAP 2003	NB312	Metals	Arsenic	mg/kg	9.7	1
REMAP 2003	NB312	Metals	Cadmium	mg/kg	2.3	1
REMAP 2003	NB312	Metals	Chromium	mg/kg	85.8	1
REMAP 2003	NB312	Metals	Copper	mg/kg	71	1
REMAP 2003	NB312	Metals	Iron	mg/kg	34200	1
REMAP 2003	NB312	Metals	Lead	mg/kg	81.9	1
REMAP 2003	NB312	Metals	Manganese	mg/kg	596	1
REMAP 2003	NB312	Metals	Mercury	mg/kg	0.86	1
REMAP 2003	NB312	Metals	Nickel	mg/kg	35.8	1
REMAP 2003	NB312	Metals	Selenium	mg/kg	0.83	1
REMAP 2003	NB312	Metals	Silver	mg/kg	1.7	1
REMAP 2003	NB312	Metals	Tin	mg/kg	16.4	1
REMAP 2003	NB312	Metals	Zinc	mg/kg	148	1
REMAP 2003	NB312	Pesticides	2,4'-DDD	µg/kg	2.7	1
REMAP 2003	NB312	Pesticides	2,4'-DDE	µg/kg	3.5	1
REMAP 2003	NB312	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	4,4'-DDD	µg/kg	10	1
REMAP 2003	NB312	Pesticides	4,4'-DDE	µg/kg	9.9	1
REMAP 2003	NB312	Pesticides	4,4'-DDT	µg/kg	22	1
REMAP 2003	NB312	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	alpha-Chlordane	µg/kg	2.5	1
REMAP 2003	NB312	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Hexachlorobenzene	µg/kg	0.5	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB312	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB312	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	48.1	1
REMAP 2003	NB312	Pesticides	Total DDx (4,4)	µg/kg	41.9	1
REMAP 2003	NB312	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB312	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB312	PAHs	1-methylnaphthalene	µg/kg	16	1
REMAP 2003	NB312	PAHs	1-methylphenanthrene	µg/kg	10	0
REMAP 2003	NB312	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB312	PAHs	2,6-dimethylnaphthalene	µg/kg	120	1
REMAP 2003	NB312	PAHs	2-methylnaphthalene	µg/kg	34	1
REMAP 2003	NB312	PAHs	Acenaphthene	µg/kg	33	1
REMAP 2003	NB312	PAHs	Acenaphthylene	µg/kg	71	1
REMAP 2003	NB312	PAHs	Anthracene	µg/kg	150	1
REMAP 2003	NB312	PAHs	Benzo(a)anthracene	µg/kg	290	1
REMAP 2003	NB312	PAHs	Benzo(a)pyrene	µg/kg	280	1
REMAP 2003	NB312	PAHs	Benzo(b)fluoranthene	µg/kg	360	1
REMAP 2003	NB312	PAHs	Benzo(g,h,i)perylene	µg/kg	120	1
REMAP 2003	NB312	PAHs	Benzo(k)fluoranthene	µg/kg	130	1
REMAP 2003	NB312	PAHs	Biphenyl	µg/kg	16	1
REMAP 2003	NB312	PAHs	Chrysene	µg/kg	260	1
REMAP 2003	NB312	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB312	PAHs	Dibenzothiophene	µg/kg	22	1
REMAP 2003	NB312	PAHs	Fluoranthene	µg/kg	300	1
REMAP 2003	NB312	PAHs	Fluorene	µg/kg	46	1
REMAP 2003	NB312	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	110	1
REMAP 2003	NB312	PAHs	Naphthalene	µg/kg	54	1
REMAP 2003	NB312	PAHs	Phenanthrene	µg/kg	180	1
REMAP 2003	NB312	PAHs	Pyrene	µg/kg	380	1
REMAP 2003	NB312	PAHs	Total HMW PAHs	µg/kg	2230	1
REMAP 2003	NB312	PAHs	Total LMW PAHs	µg/kg	568	1
REMAP 2003	NB312	PAHs	Total PAHs	µg/kg	2798	1
REMAP 2003	NB312	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.7	1
REMAP 2003	NB312	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	1.8	1
REMAP 2003	NB312	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	0.82	1
REMAP 2003	NB312	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	4.4	1
REMAP 2003	NB312	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	20	1
REMAP 2003	NB312	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	2.5	1
REMAP 2003	NB312	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	7.2	1
REMAP 2003	NB312	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	2.5	1
REMAP 2003	NB312	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB312	PCBs	decachlorobiphenyl	µg/kg	2.1	1
REMAP 2003	NB312	PCBs	PCB 110/77	µg/kg	7.2	1
REMAP 2003	NB312	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	86.04	1
REMAP 2003	NB325	Butyltins	Dibutyltin	ppb	8.66	1
REMAP 2003	NB325	Butyltins	Monobutyltin	ppb	2.34	1
REMAP 2003	NB325	Butyltins	Tetrabutyltin	ppb	0.64	0
REMAP 2003	NB325	Butyltins	Tributyltin	ppb	15.78	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	36.35	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	134.17	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	3.12	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	0.52	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	28.8	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	1.93	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	5.54	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	1.41	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0.1	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	0.58	1
REMAP 2003	NB325	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	1.7	1
REMAP 2003	NB325	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	1.9	1
REMAP 2003	NB325	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	3.44	1
REMAP 2003	NB325	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	10.91	1
REMAP 2003	NB325	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	2.61	1
REMAP 2003	NB325	Dioxins/Furans	OCDD	ng/kg	351.35	1
REMAP 2003	NB325	Dioxins/Furans	OCDF	ng/kg	316.02	1
REMAP 2003	NB325	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	85.34	1
REMAP 2003	NB325	Dioxins/Furans	Total Hepta-Furans	ng/kg	157.66	1
REMAP 2003	NB325	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	19.62	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB325	Dioxins/Furans	Total Hexa-Furans	ng/kg	71.58	1
REMAP 2003	NB325	Dioxins/Furans	Total Penta-Dioxins	ng/kg	7.43	1
REMAP 2003	NB325	Dioxins/Furans	Total Penta-Furans	ng/kg	46.14	1
REMAP 2003	NB325	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	18.48	1
REMAP 2003	NB325	Dioxins/Furans	Total Tetra-Furans	ng/kg	42.32	1
REMAP 2003	NB325	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	18.79	1
REMAP 2003	NB325	Metals	Aluminum	mg/kg	21200	1
REMAP 2003	NB325	Metals	Antimony	mg/kg	0.41	1
REMAP 2003	NB325	Metals	Arsenic	mg/kg	4.5	1
REMAP 2003	NB325	Metals	Cadmium	mg/kg	0.41	1
REMAP 2003	NB325	Metals	Chromium	mg/kg	44.5	1
REMAP 2003	NB325	Metals	Copper	mg/kg	25.6	1
REMAP 2003	NB325	Metals	Iron	mg/kg	13100	1
REMAP 2003	NB325	Metals	Lead	mg/kg	133	1
REMAP 2003	NB325	Metals	Manganese	mg/kg	167	1
REMAP 2003	NB325	Metals	Mercury	mg/kg	0.69	1
REMAP 2003	NB325	Metals	Nickel	mg/kg	11	1
REMAP 2003	NB325	Metals	Selenium	mg/kg	0.34	0
REMAP 2003	NB325	Metals	Silver	mg/kg	0.27	1
REMAP 2003	NB325	Metals	Tin	mg/kg	9.2	1
REMAP 2003	NB325	Metals	Zinc	mg/kg	61.8	1
REMAP 2003	NB325	Pesticides	2,4'-DDD	µg/kg	1.1	1
REMAP 2003	NB325	Pesticides	2,4'-DDE	µg/kg	1.1	1
REMAP 2003	NB325	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	4,4'-DDD	µg/kg	4.2	1
REMAP 2003	NB325	Pesticides	4,4'-DDE	µg/kg	3.2	1
REMAP 2003	NB325	Pesticides	4,4'-DDT	µg/kg	6.1	1
REMAP 2003	NB325	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	alpha-Chlordane	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Hexachlorobenzene	µg/kg	5	1
REMAP 2003	NB325	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB325	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	15.7	1
REMAP 2003	NB325	Pesticides	Total DDx (4,4)	µg/kg	13.5	1
REMAP 2003	NB325	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB325	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB325	PAHs	1-methylnaphthalene	µg/kg	21	1
REMAP 2003	NB325	PAHs	1-methylphenanthrene	µg/kg	250	1
REMAP 2003	NB325	PAHs	2,3,5-trimethylnaphthalene	µg/kg	14	1
REMAP 2003	NB325	PAHs	2,6-dimethylnaphthalene	µg/kg	46	1
REMAP 2003	NB325	PAHs	2-methylnaphthalene	µg/kg	37	1
REMAP 2003	NB325	PAHs	Acenaphthene	µg/kg	130	1
REMAP 2003	NB325	PAHs	Acenaphthylene	µg/kg	280	1
REMAP 2003	NB325	PAHs	Anthracene	µg/kg	480	1
REMAP 2003	NB325	PAHs	Benzo(a)anthracene	µg/kg	1300	1
REMAP 2003	NB325	PAHs	Benzo(a)pyrene	µg/kg	1300	1
REMAP 2003	NB325	PAHs	Benzo(b)fluoranthene	µg/kg	1600	1
REMAP 2003	NB325	PAHs	Benzo(g,h,i)perylene	µg/kg	370	1
REMAP 2003	NB325	PAHs	Benzo(k)fluoranthene	µg/kg	470	1
REMAP 2003	NB325	PAHs	Biphenyl	µg/kg	15	1
REMAP 2003	NB325	PAHs	Chrysene	µg/kg	960	1
REMAP 2003	NB325	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB325	PAHs	Dibenzothiophene	µg/kg	50	1
REMAP 2003	NB325	PAHs	Fluoranthene	µg/kg	830	1
REMAP 2003	NB325	PAHs	Fluorene	µg/kg	120	1
REMAP 2003	NB325	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	360	1
REMAP 2003	NB325	PAHs	Naphthalene	µg/kg	110	1
REMAP 2003	NB325	PAHs	Phenanthrene	µg/kg	420	1
REMAP 2003	NB325	PAHs	Pyrene	µg/kg	1000	1
REMAP 2003	NB325	PAHs	Total HMW PAHs	µg/kg	8190	1
REMAP 2003	NB325	PAHs	Total LMW PAHs	µg/kg	1577	1
REMAP 2003	NB325	PAHs	Total PAHs	µg/kg	9767	1
REMAP 2003	NB325	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	0.62	1
REMAP 2003	NB325	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	1.1	1
REMAP 2003	NB325	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	0.22	1
REMAP 2003	NB325	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	1.6	1
REMAP 2003	NB325	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	3.8	1
REMAP 2003	NB325	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	1.2	1
REMAP 2003	NB325	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	2.1	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB325	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	0.93	1
REMAP 2003	NB325	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB325	PCBs	decachlorobiphenyl	µg/kg	0.35	1
REMAP 2003	NB325	PCBs	PCB 110/77	µg/kg	2.5	1
REMAP 2003	NB325	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	23.84	1
REMAP 2003	NB326	Butyltins	Dibutyltin	ppb	76.41	1
REMAP 2003	NB326	Butyltins	Monobutyltin	ppb	8.11	1
REMAP 2003	NB326	Butyltins	Tetrabutyltin	ppb	11.85	1
REMAP 2003	NB326	Butyltins	Tributyltin	ppb	905.97	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	138.24	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	127.68	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	4.9	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	1.58	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	35.19	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	8.23	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	7.89	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	5.5	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	0.37	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	1.71	1
REMAP 2003	NB326	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	3.64	1
REMAP 2003	NB326	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	4.19	1
REMAP 2003	NB326	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	7.22	1
REMAP 2003	NB326	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	31.07	1
REMAP 2003	NB326	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	8.69	1
REMAP 2003	NB326	Dioxins/Furans	OCDD	ng/kg	1053.75	1
REMAP 2003	NB326	Dioxins/Furans	OCDF	ng/kg	214.9	1
REMAP 2003	NB326	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	338.29	1
REMAP 2003	NB326	Dioxins/Furans	Total Hepta-Furans	ng/kg	194.74	1
REMAP 2003	NB326	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	82.39	1
REMAP 2003	NB326	Dioxins/Furans	Total Hexa-Furans	ng/kg	120.05	1
REMAP 2003	NB326	Dioxins/Furans	Total Penta-Dioxins	ng/kg	22.96	1
REMAP 2003	NB326	Dioxins/Furans	Total Penta-Furans	ng/kg	114.63	1
REMAP 2003	NB326	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	57.9	1
REMAP 2003	NB326	Dioxins/Furans	Total Tetra-Furans	ng/kg	116.47	1
REMAP 2003	NB326	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	45.31	1
REMAP 2003	NB326	Metals	Aluminum	mg/kg	29800	1
REMAP 2003	NB326	Metals	Antimony	mg/kg	1.2	1
REMAP 2003	NB326	Metals	Arsenic	mg/kg	11.2	1
REMAP 2003	NB326	Metals	Cadmium	mg/kg	2.3	1
REMAP 2003	NB326	Metals	Chromium	mg/kg	115	1
REMAP 2003	NB326	Metals	Copper	mg/kg	97.3	1
REMAP 2003	NB326	Metals	Iron	mg/kg	35200	1
REMAP 2003	NB326	Metals	Lead	mg/kg	120	1
REMAP 2003	NB326	Metals	Manganese	mg/kg	481	1
REMAP 2003	NB326	Metals	Mercury	mg/kg	1.4	1
REMAP 2003	NB326	Metals	Nickel	mg/kg	41.5	1
REMAP 2003	NB326	Metals	Selenium	mg/kg	0.83	1
REMAP 2003	NB326	Metals	Silver	mg/kg	2.5	1
REMAP 2003	NB326	Metals	Tin	mg/kg	24.1	1
REMAP 2003	NB326	Metals	Zinc	mg/kg	186	1
REMAP 2003	NB326	Pesticides	2,4'-DDD	µg/kg	6.1	1
REMAP 2003	NB326	Pesticides	2,4'-DDE	µg/kg	8.3	1
REMAP 2003	NB326	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	4,4'-DDD	µg/kg	26	1
REMAP 2003	NB326	Pesticides	4,4'-DDE	µg/kg	24	1
REMAP 2003	NB326	Pesticides	4,4'-DDT	µg/kg	33	1
REMAP 2003	NB326	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	alpha-Chlordane	µg/kg	6.5	1
REMAP 2003	NB326	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Hexachlorobenzene	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB326	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	97.4	1
REMAP 2003	NB326	Pesticides	Total DDx (4,4)	µg/kg	83	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB326	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB326	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB326	PAHs	1-methylnaphthalene	µg/kg	35	1
REMAP 2003	NB326	PAHs	1-methylphenanthrene	µg/kg	270	1
REMAP 2003	NB326	PAHs	2,3,5-trimethylnaphthalene	µg/kg	10	0
REMAP 2003	NB326	PAHs	2,6-dimethylnaphthalene	µg/kg	230	1
REMAP 2003	NB326	PAHs	2-methylnaphthalene	µg/kg	75	1
REMAP 2003	NB326	PAHs	Acenaphthene	µg/kg	63	1
REMAP 2003	NB326	PAHs	Acenaphthylene	µg/kg	160	1
REMAP 2003	NB326	PAHs	Anthracene	µg/kg	300	1
REMAP 2003	NB326	PAHs	Benzo(a)anthracene	µg/kg	700	1
REMAP 2003	NB326	PAHs	Benzo(a)pyrene	µg/kg	740	1
REMAP 2003	NB326	PAHs	Benzo(b)fluoranthene	µg/kg	1100	1
REMAP 2003	NB326	PAHs	Benzo(g,h,i)perylene	µg/kg	290	1
REMAP 2003	NB326	PAHs	Benzo(k)fluoranthene	µg/kg	400	1
REMAP 2003	NB326	PAHs	Biphenyl	µg/kg	32	1
REMAP 2003	NB326	PAHs	Chrysene	µg/kg	590	1
REMAP 2003	NB326	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB326	PAHs	Dibenzothiophene	µg/kg	41	1
REMAP 2003	NB326	PAHs	Fluoranthene	µg/kg	570	1
REMAP 2003	NB326	PAHs	Fluorene	µg/kg	92	1
REMAP 2003	NB326	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	280	1
REMAP 2003	NB326	PAHs	Naphthalene	µg/kg	130	1
REMAP 2003	NB326	PAHs	Phenanthrene	µg/kg	370	1
REMAP 2003	NB326	PAHs	Pyrene	µg/kg	860	1
REMAP 2003	NB326	PAHs	Total HMW PAHs	µg/kg	5530	1
REMAP 2003	NB326	PAHs	Total LMW PAHs	µg/kg	1190	1
REMAP 2003	NB326	PAHs	Total PAHs	µg/kg	6720	1
REMAP 2003	NB326	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	2.5	1
REMAP 2003	NB326	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	1	1
REMAP 2003	NB326	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	4.5	1
REMAP 2003	NB326	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	1.7	1
REMAP 2003	NB326	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	10	1
REMAP 2003	NB326	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	35	1
REMAP 2003	NB326	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	5.8	1
REMAP 2003	NB326	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	18	1
REMAP 2003	NB326	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	6	1
REMAP 2003	NB326	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB326	PCBs	decachlorobiphenyl	µg/kg	2.5	1
REMAP 2003	NB326	PCBs	PCB 110/77	µg/kg	15	1
REMAP 2003	NB326	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	174	1
REMAP 2003	NB327	Butyltins	Dibutyltin	ppb	66.54	1
REMAP 2003	NB327	Butyltins	Monobutyltin	ppb	3.03	1
REMAP 2003	NB327	Butyltins	Tetrabutyltin	ppb	1.01	0
REMAP 2003	NB327	Butyltins	Tributyltin	ppb	149.24	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	164.59	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	381.7	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	19.03	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	4.52	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	118.82	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	11.29	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	18.99	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	8.89	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	2.22	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.38	1
REMAP 2003	NB327	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	5.2	1
REMAP 2003	NB327	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	9.1	1
REMAP 2003	NB327	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	14.25	1
REMAP 2003	NB327	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	88.14	1
REMAP 2003	NB327	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	9.88	1
REMAP 2003	NB327	Dioxins/Furans	OCDD	ng/kg	1489.78	1
REMAP 2003	NB327	Dioxins/Furans	OCDF	ng/kg	640.24	1
REMAP 2003	NB327	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	403.93	1
REMAP 2003	NB327	Dioxins/Furans	Total Hepta-Furans	ng/kg	495.72	1
REMAP 2003	NB327	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	94.19	1
REMAP 2003	NB327	Dioxins/Furans	Total Hexa-Furans	ng/kg	288.01	1
REMAP 2003	NB327	Dioxins/Furans	Total Penta-Dioxins	ng/kg	28.33	1
REMAP 2003	NB327	Dioxins/Furans	Total Penta-Furans	ng/kg	180.73	1
REMAP 2003	NB327	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	106.61	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB327	Dioxins/Furans	Total Tetra-Furans	ng/kg	115.94	1
REMAP 2003	NB327	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	119.61	1
REMAP 2003	NB327	Metals	Aluminum	mg/kg	26000	1
REMAP 2003	NB327	Metals	Antimony	mg/kg	1.2	1
REMAP 2003	NB327	Metals	Arsenic	mg/kg	10.7	1
REMAP 2003	NB327	Metals	Cadmium	mg/kg	2.4	1
REMAP 2003	NB327	Metals	Chromium	mg/kg	120	1
REMAP 2003	NB327	Metals	Copper	mg/kg	89.5	1
REMAP 2003	NB327	Metals	Iron	mg/kg	32100	1
REMAP 2003	NB327	Metals	Lead	mg/kg	118	1
REMAP 2003	NB327	Metals	Manganese	mg/kg	472	1
REMAP 2003	NB327	Metals	Mercury	mg/kg	1.7	1
REMAP 2003	NB327	Metals	Nickel	mg/kg	33.8	1
REMAP 2003	NB327	Metals	Selenium	mg/kg	0.68	1
REMAP 2003	NB327	Metals	Silver	mg/kg	2	1
REMAP 2003	NB327	Metals	Tin	mg/kg	27.8	1
REMAP 2003	NB327	Metals	Zinc	mg/kg	187	1
REMAP 2003	NB327	Pesticides	2,4'-DDD	µg/kg	5.5	1
REMAP 2003	NB327	Pesticides	2,4'-DDE	µg/kg	5.8	1
REMAP 2003	NB327	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	4,4'-DDD	µg/kg	16	1
REMAP 2003	NB327	Pesticides	4,4'-DDE	µg/kg	21	1
REMAP 2003	NB327	Pesticides	4,4'-DDT	µg/kg	38	1
REMAP 2003	NB327	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	alpha-Chlordane	µg/kg	4.5	1
REMAP 2003	NB327	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Hexachlorobenzene	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB327	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	86.3	1
REMAP 2003	NB327	Pesticides	Total DDx (4,4)	µg/kg	75	1
REMAP 2003	NB327	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB327	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB327	PAHs	1-methylnaphthalene	µg/kg	49	1
REMAP 2003	NB327	PAHs	1-methylphenanthrene	µg/kg	10	0
REMAP 2003	NB327	PAHs	2,3,5-trimethylnaphthalene	µg/kg	26	1
REMAP 2003	NB327	PAHs	2,6-dimethylnaphthalene	µg/kg	200	1
REMAP 2003	NB327	PAHs	2-methylnaphthalene	µg/kg	93	1
REMAP 2003	NB327	PAHs	Acenaphthene	µg/kg	170	1
REMAP 2003	NB327	PAHs	Acenaphthylene	µg/kg	340	1
REMAP 2003	NB327	PAHs	Anthracene	µg/kg	580	1
REMAP 2003	NB327	PAHs	Benzo(a)anthracene	µg/kg	1600	1
REMAP 2003	NB327	PAHs	Benzo(a)pyrene	µg/kg	1500	1
REMAP 2003	NB327	PAHs	Benzo(b)fluoranthene	µg/kg	2100	1
REMAP 2003	NB327	PAHs	Benzo(g,h,i)perylene	µg/kg	530	1
REMAP 2003	NB327	PAHs	Benzo(k)fluoranthene	µg/kg	570	1
REMAP 2003	NB327	PAHs	Biphenyl	µg/kg	36	1
REMAP 2003	NB327	PAHs	Chrysene	µg/kg	1300	1
REMAP 2003	NB327	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB327	PAHs	Dibenzothiophene	µg/kg	81	1
REMAP 2003	NB327	PAHs	Fluoranthene	µg/kg	940	1
REMAP 2003	NB327	PAHs	Fluorene	µg/kg	200	1
REMAP 2003	NB327	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	510	1
REMAP 2003	NB327	PAHs	Naphthalene	µg/kg	270	1
REMAP 2003	NB327	PAHs	Phenanthrene	µg/kg	730	1
REMAP 2003	NB327	PAHs	Pyrene	µg/kg	1400	1
REMAP 2003	NB327	PAHs	Total HMW PAHs	µg/kg	10450	1
REMAP 2003	NB327	PAHs	Total LMW PAHs	µg/kg	2383	1
REMAP 2003	NB327	PAHs	Total PAHs	µg/kg	12833	1
REMAP 2003	NB327	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.7	1
REMAP 2003	NB327	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	0.89	1
REMAP 2003	NB327	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	3.3	1
REMAP 2003	NB327	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	1.4	1
REMAP 2003	NB327	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	7.6	1
REMAP 2003	NB327	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	13	1
REMAP 2003	NB327	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	9.2	1
REMAP 2003	NB327	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	25	1
REMAP 2003	NB327	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	4.7	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB327	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB327	PCBs	decachlorobiphenyl	µg/kg	1.8	1
REMAP 2003	NB327	PCBs	PCB 110/77	µg/kg	12	1
REMAP 2003	NB327	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	137.18	1
REMAP 2003	NB329	Butyltins	Dibutyltin	ppb	70.4	1
REMAP 2003	NB329	Butyltins	Monobutyltin	ppb	17.79	1
REMAP 2003	NB329	Butyltins	Tetrabutyltin	ppb	1.14	0
REMAP 2003	NB329	Butyltins	Tributyltin	ppb	99.58	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	151.99	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	73.65	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	9.94	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	3.95	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	22.13	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	11.88	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	8.5	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	10.01	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	2.68	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	2.47	1
REMAP 2003	NB329	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	6.9	1
REMAP 2003	NB329	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	8.75	1
REMAP 2003	NB329	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	7.85	1
REMAP 2003	NB329	Dioxins/Furans	2,3,7,8-TCDD	ng/kg	5.32	1
REMAP 2003	NB329	Dioxins/Furans	2,3,7,8-TCDF	ng/kg	13.04	1
REMAP 2003	NB329	Dioxins/Furans	OCDD	ng/kg	1998.31	1
REMAP 2003	NB329	Dioxins/Furans	OCDF	ng/kg	125.43	1
REMAP 2003	NB329	Dioxins/Furans	Total Hepta-Dioxins	ng/kg	361.11	1
REMAP 2003	NB329	Dioxins/Furans	Total Hepta-Furans	ng/kg	137.39	1
REMAP 2003	NB329	Dioxins/Furans	Total Hexa-Dioxins	ng/kg	121.09	1
REMAP 2003	NB329	Dioxins/Furans	Total Hexa-Furans	ng/kg	108.57	1
REMAP 2003	NB329	Dioxins/Furans	Total Penta-Dioxins	ng/kg	29.4	1
REMAP 2003	NB329	Dioxins/Furans	Total Penta-Furans	ng/kg	106.28	1
REMAP 2003	NB329	Dioxins/Furans	Total Tetra-Dioxins	ng/kg	32.23	1
REMAP 2003	NB329	Dioxins/Furans	Total Tetra-Furans	ng/kg	83.53	1
REMAP 2003	NB329	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	ng/kg	21.44	1
REMAP 2003	NB329	Metals	Aluminum	mg/kg	7560	1
REMAP 2003	NB329	Metals	Antimony	mg/kg	3	1
REMAP 2003	NB329	Metals	Arsenic	mg/kg	21.7	1
REMAP 2003	NB329	Metals	Cadmium	mg/kg	2.1	1
REMAP 2003	NB329	Metals	Chromium	mg/kg	102	1
REMAP 2003	NB329	Metals	Copper	mg/kg	160	1
REMAP 2003	NB329	Metals	Iron	mg/kg	36700	1
REMAP 2003	NB329	Metals	Lead	mg/kg	163	1
REMAP 2003	NB329	Metals	Manganese	mg/kg	395	1
REMAP 2003	NB329	Metals	Mercury	mg/kg	2.1	1
REMAP 2003	NB329	Metals	Nickel	mg/kg	37.5	1
REMAP 2003	NB329	Metals	Selenium	mg/kg	1.9	1
REMAP 2003	NB329	Metals	Silver	mg/kg	3	1
REMAP 2003	NB329	Metals	Tin	mg/kg	32.1	1
REMAP 2003	NB329	Metals	Zinc	mg/kg	296	1
REMAP 2003	NB329	Pesticides	2,4'-DDD	µg/kg	9	1
REMAP 2003	NB329	Pesticides	2,4'-DDE	µg/kg	6.4	1
REMAP 2003	NB329	Pesticides	2,4'-DDT	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	4,4'-DDD	µg/kg	39	1
REMAP 2003	NB329	Pesticides	4,4'-DDE	µg/kg	22	1
REMAP 2003	NB329	Pesticides	4,4'-DDT	µg/kg	44	1
REMAP 2003	NB329	Pesticides	Aldrin	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	alpha-Chlordane	µg/kg	3.8	1
REMAP 2003	NB329	Pesticides	alpha-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	beta-Endosulfan	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Dieldrin	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Endosulfan sulfate	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Endrin	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Heptachlor	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Heptachlor epoxide	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Hexachlorobenzene	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Lindane (gamma-BHC)	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Mirex	µg/kg	0.5	0
REMAP 2003	NB329	Pesticides	Total DDx (2,4 & 4,4)	µg/kg	120.4	1
REMAP 2003	NB329	Pesticides	Total DDx (4,4)	µg/kg	105	1
REMAP 2003	NB329	Pesticides	Toxaphene	µg/kg	50	0
REMAP 2003	NB329	Pesticides	trans-Nonachlor	µg/kg	0.5	0
REMAP 2003	NB329	PAHs	1-methylnaphthalene	µg/kg	23	1
REMAP 2003	NB329	PAHs	1-methylphenanthrene	µg/kg	10	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2003	NB329	PAHs	2,3,5-trimethylnaphthalene	µg/kg	13	1
REMAP 2003	NB329	PAHs	2,6-dimethylnaphthalene	µg/kg	250	1
REMAP 2003	NB329	PAHs	2-methylnaphthalene	µg/kg	44	1
REMAP 2003	NB329	PAHs	Acenaphthene	µg/kg	43	1
REMAP 2003	NB329	PAHs	Acenaphthylene	µg/kg	72	1
REMAP 2003	NB329	PAHs	Anthracene	µg/kg	160	1
REMAP 2003	NB329	PAHs	Benzo(a)anthracene	µg/kg	380	1
REMAP 2003	NB329	PAHs	Benzo(a)pyrene	µg/kg	370	1
REMAP 2003	NB329	PAHs	Benzo(b)fluoranthene	µg/kg	590	1
REMAP 2003	NB329	PAHs	Benzo(g,h,i)perylene	µg/kg	150	1
REMAP 2003	NB329	PAHs	Benzo(k)fluoranthene	µg/kg	220	1
REMAP 2003	NB329	PAHs	Biphenyl	µg/kg	25	1
REMAP 2003	NB329	PAHs	Chrysene	µg/kg	350	1
REMAP 2003	NB329	PAHs	Dibenz(a,h)anthracene	µg/kg	10	0
REMAP 2003	NB329	PAHs	Dibenzothiophene	µg/kg	33	1
REMAP 2003	NB329	PAHs	Fluoranthene	µg/kg	380	1
REMAP 2003	NB329	PAHs	Fluorene	µg/kg	56	1
REMAP 2003	NB329	PAHs	Indeno(1,2,3-c,d)pyrene	µg/kg	150	1
REMAP 2003	NB329	PAHs	Naphthalene	µg/kg	66	1
REMAP 2003	NB329	PAHs	Phenanthrene	µg/kg	270	1
REMAP 2003	NB329	PAHs	Pyrene	µg/kg	540	1
REMAP 2003	NB329	PAHs	Total HMW PAHs	µg/kg	3130	1
REMAP 2003	NB329	PAHs	Total LMW PAHs	µg/kg	711	1
REMAP 2003	NB329	PAHs	Total PAHs	µg/kg	3841	1
REMAP 2003	NB329	PCBs	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	µg/kg	1.5	1
REMAP 2003	NB329	PCBs	2,2',3,3',4,4',5,6-octachlorobiphenyl	µg/kg	0.55	1
REMAP 2003	NB329	PCBs	2,2',3,3',4,4',5-heptachlorobiphenyl	µg/kg	3	1
REMAP 2003	NB329	PCBs	2,2',3,3',4,4'-hexachlorobiphenyl	µg/kg	1.2	1
REMAP 2003	NB329	PCBs	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/kg	6.3	1
REMAP 2003	NB329	PCBs	2,2',3,4,4',5'-hexachlorobiphenyl	µg/kg	31	1
REMAP 2003	NB329	PCBs	2,2',3,4',5,5',6-heptachlorobiphenyl	µg/kg	3.4	1
REMAP 2003	NB329	PCBs	2,2',3,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,2',4,4',5,5'-hexachlorobiphenyl	µg/kg	11	1
REMAP 2003	NB329	PCBs	2,2',4,5,5'-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,2',5,5'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,2',5-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,3,3',4,4'-pentachlorobiphenyl	µg/kg	4	1
REMAP 2003	NB329	PCBs	2,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,4,4'-trichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	2,4'-dichlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	3,3',4,4',5-pentachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	3,3',4,4'-tetrachlorobiphenyl	µg/kg	1	0
REMAP 2003	NB329	PCBs	decachlorobiphenyl	µg/kg	2.2	1
REMAP 2003	NB329	PCBs	PCB 110/77	µg/kg	12	1
REMAP 2003	NB329	PCBs	Total PCBs – Congeners (NOAA[a])	µg/kg	128.3	1
REMAP 2008	NB401	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	55	1
REMAP 2008	NB406	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	67	1
REMAP 2008	NB412	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	67	1
REMAP 2008	NB416	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	80	1
REMAP 2008	NB423	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	58	1
REMAP 2008	NB426	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	78	1
REMAP 2008	NB427	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	48	1
REMAP 2008	NB431	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	75	1
REMAP 2008	NB452	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	49	1
REMAP 2008	NB454	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	72	1
REMAP 2008	NB413	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	57	1
REMAP 2008	NB401	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	24	1
REMAP 2008	NB406	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	20	1
REMAP 2008	NB412	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	14	1
REMAP 2008	NB416	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	12	1
REMAP 2008	NB423	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	9.9	1
REMAP 2008	NB426	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	14	1
REMAP 2008	NB427	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	8.2	1
REMAP 2008	NB431	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	11	1
REMAP 2008	NB452	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	5.2	1
REMAP 2008	NB454	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	13	1
REMAP 2008	NB413	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	22	1
REMAP 2008	NB401	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	22	1
REMAP 2008	NB406	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	13	1
REMAP 2008	NB412	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	19	1
REMAP 2008	NB416	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	8.1	1
REMAP 2008	NB423	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	32	1
REMAP 2008	NB426	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	7.4	1
REMAP 2008	NB427	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	44	1
REMAP 2008	NB431	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	14	1
REMAP 2008	NB452	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	45	1
REMAP 2008	NB454	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	14	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB413	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	21	1
REMAP 2008	NB401	Grain Size	Substrate - silt/clay mix	%	79	1
REMAP 2008	NB406	Grain Size	Substrate - silt/clay mix	%	87	1
REMAP 2008	NB412	Grain Size	Substrate - silt/clay mix	%	81	1
REMAP 2008	NB416	Grain Size	Substrate - silt/clay mix	%	92	1
REMAP 2008	NB423	Grain Size	Substrate - silt/clay mix	%	67.9	1
REMAP 2008	NB426	Grain Size	Substrate - silt/clay mix	%	92	1
REMAP 2008	NB427	Grain Size	Substrate - silt/clay mix	%	56.2	1
REMAP 2008	NB431	Grain Size	Substrate - silt/clay mix	%	86	1
REMAP 2008	NB452	Grain Size	Substrate - silt/clay mix	%	54.2	1
REMAP 2008	NB454	Grain Size	Substrate - silt/clay mix	%	85	1
REMAP 2008	NB413	Grain Size	Substrate - silt/clay mix	%	79	1
REMAP 2008	NB401	Metals	Aluminum	ppm	12000	1
REMAP 2008	NB406	Metals	Aluminum	ppm	11000	1
REMAP 2008	NB412	Metals	Aluminum	ppm	12000	1
REMAP 2008	NB416	Metals	Aluminum	ppm	14000	1
REMAP 2008	NB423	Metals	Aluminum	ppm	7300	1
REMAP 2008	NB426	Metals	Aluminum	ppm	13000	1
REMAP 2008	NB427	Metals	Aluminum	ppm	7600	1
REMAP 2008	NB431	Metals	Aluminum	ppm	12000	1
REMAP 2008	NB452	Metals	Aluminum	ppm	5800	1
REMAP 2008	NB454	Metals	Aluminum	ppm	10000	1
REMAP 2008	NB413	Metals	Aluminum	ppm	11000	1
REMAP 2008	NB401	Metals	Antimony	ppm	2.4	1
REMAP 2008	NB406	Metals	Antimony	ppm	2.5	1
REMAP 2008	NB412	Metals	Antimony	ppm	2.7	1
REMAP 2008	NB416	Metals	Antimony	ppm	3.1	1
REMAP 2008	NB423	Metals	Antimony	ppm	2.2	1
REMAP 2008	NB426	Metals	Antimony	ppm	2.8	1
REMAP 2008	NB427	Metals	Antimony	ppm	2.3	1
REMAP 2008	NB431	Metals	Antimony	ppm	2.9	1
REMAP 2008	NB452	Metals	Antimony	ppm	1.9	0
REMAP 2008	NB454	Metals	Antimony	ppm	2.9	1
REMAP 2008	NB413	Metals	Antimony	ppm	3.5	1
REMAP 2008	NB401	Metals	Arsenic	ppm	9.8	1
REMAP 2008	NB406	Metals	Arsenic	ppm	11	1
REMAP 2008	NB412	Metals	Arsenic	ppm	10	1
REMAP 2008	NB416	Metals	Arsenic	ppm	12	1
REMAP 2008	NB423	Metals	Arsenic	ppm	11	1
REMAP 2008	NB426	Metals	Arsenic	ppm	9.7	1
REMAP 2008	NB427	Metals	Arsenic	ppm	7.4	1
REMAP 2008	NB431	Metals	Arsenic	ppm	9.7	1
REMAP 2008	NB452	Metals	Arsenic	ppm	6	1
REMAP 2008	NB454	Metals	Arsenic	ppm	8.6	1
REMAP 2008	NB413	Metals	Arsenic	ppm	14	1
REMAP 2008	NB401	Metals	Cadmium	ppm	0.83	1
REMAP 2008	NB406	Metals	Cadmium	ppm	0.94	1
REMAP 2008	NB412	Metals	Cadmium	ppm	0.94	1
REMAP 2008	NB416	Metals	Cadmium	ppm	1.5	1
REMAP 2008	NB423	Metals	Cadmium	ppm	0.9	1
REMAP 2008	NB426	Metals	Cadmium	ppm	0.91	1
REMAP 2008	NB427	Metals	Cadmium	ppm	0.84	1
REMAP 2008	NB431	Metals	Cadmium	ppm	0.99	1
REMAP 2008	NB452	Metals	Cadmium	ppm	0.49	1
REMAP 2008	NB454	Metals	Cadmium	ppm	0.93	1
REMAP 2008	NB413	Metals	Cadmium	ppm	2.6	1
REMAP 2008	NB401	Metals	Chromium	ppm	58	1
REMAP 2008	NB406	Metals	Chromium	ppm	67	1
REMAP 2008	NB412	Metals	Chromium	ppm	65	1
REMAP 2008	NB416	Metals	Chromium	ppm	95	1
REMAP 2008	NB423	Metals	Chromium	ppm	51	1
REMAP 2008	NB426	Metals	Chromium	ppm	79	1
REMAP 2008	NB427	Metals	Chromium	ppm	69	1
REMAP 2008	NB431	Metals	Chromium	ppm	90	1
REMAP 2008	NB452	Metals	Chromium	ppm	49	1
REMAP 2008	NB454	Metals	Chromium	ppm	90	1
REMAP 2008	NB413	Metals	Chromium	ppm	110	1
REMAP 2008	NB401	Metals	Copper	ppm	77	1
REMAP 2008	NB406	Metals	Copper	ppm	90	1
REMAP 2008	NB412	Metals	Copper	ppm	84	1
REMAP 2008	NB416	Metals	Copper	ppm	130	1
REMAP 2008	NB423	Metals	Copper	ppm	120	1
REMAP 2008	NB426	Metals	Copper	ppm	94	1
REMAP 2008	NB427	Metals	Copper	ppm	64	1
REMAP 2008	NB431	Metals	Copper	ppm	110	1
REMAP 2008	NB452	Metals	Copper	ppm	45	1
REMAP 2008	NB454	Metals	Copper	ppm	96	1
REMAP 2008	NB413	Metals	Copper	ppm	290	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB401	Metals	Iron	ppm	30000	1
REMAP 2008	NB406	Metals	Iron	ppm	30000	1
REMAP 2008	NB412	Metals	Iron	ppm	30000	1
REMAP 2008	NB416	Metals	Iron	ppm	33000	1
REMAP 2008	NB423	Metals	Iron	ppm	19000	1
REMAP 2008	NB426	Metals	Iron	ppm	32000	1
REMAP 2008	NB427	Metals	Iron	ppm	19000	1
REMAP 2008	NB431	Metals	Iron	ppm	29000	1
REMAP 2008	NB452	Metals	Iron	ppm	14000	1
REMAP 2008	NB454	Metals	Iron	ppm	25000	1
REMAP 2008	NB413	Metals	Iron	ppm	31000	1
REMAP 2008	NB401	Metals	Lead	ppm	76	1
REMAP 2008	NB406	Metals	Lead	ppm	88	1
REMAP 2008	NB412	Metals	Lead	ppm	83	1
REMAP 2008	NB416	Metals	Lead	ppm	120	1
REMAP 2008	NB423	Metals	Lead	ppm	79	1
REMAP 2008	NB426	Metals	Lead	ppm	99	1
REMAP 2008	NB427	Metals	Lead	ppm	75	1
REMAP 2008	NB431	Metals	Lead	ppm	110	1
REMAP 2008	NB452	Metals	Lead	ppm	45	1
REMAP 2008	NB454	Metals	Lead	ppm	91	1
REMAP 2008	NB413	Metals	Lead	ppm	240	1
REMAP 2008	NB401	Metals	Manganese	ppm	520	1
REMAP 2008	NB406	Metals	Manganese	ppm	460	1
REMAP 2008	NB412	Metals	Manganese	ppm	460	1
REMAP 2008	NB416	Metals	Manganese	ppm	470	1
REMAP 2008	NB423	Metals	Manganese	ppm	290	1
REMAP 2008	NB426	Metals	Manganese	ppm	440	1
REMAP 2008	NB427	Metals	Manganese	ppm	270	1
REMAP 2008	NB431	Metals	Manganese	ppm	340	1
REMAP 2008	NB452	Metals	Manganese	ppm	190	1
REMAP 2008	NB454	Metals	Manganese	ppm	320	1
REMAP 2008	NB413	Metals	Manganese	ppm	420	1
REMAP 2008	NB401	Metals	Mercury	ppm	0.81	1
REMAP 2008	NB406	Metals	Mercury	ppm	1.2	1
REMAP 2008	NB412	Metals	Mercury	ppm	0.97	1
REMAP 2008	NB416	Metals	Mercury	ppm	1.5	1
REMAP 2008	NB423	Metals	Mercury	ppm	1.3	1
REMAP 2008	NB426	Metals	Mercury	ppm	1.3	1
REMAP 2008	NB427	Metals	Mercury	ppm	1.1	1
REMAP 2008	NB431	Metals	Mercury	ppm	1.7	1
REMAP 2008	NB452	Metals	Mercury	ppm	0.7	1
REMAP 2008	NB454	Metals	Mercury	ppm	1.5	1
REMAP 2008	NB413	Metals	Mercury	ppm	2.9	1
REMAP 2008	NB401	Metals	Nickel	ppm	29	1
REMAP 2008	NB406	Metals	Nickel	ppm	27	1
REMAP 2008	NB412	Metals	Nickel	ppm	30	1
REMAP 2008	NB416	Metals	Nickel	ppm	32	1
REMAP 2008	NB423	Metals	Nickel	ppm	24	1
REMAP 2008	NB426	Metals	Nickel	ppm	29	1
REMAP 2008	NB427	Metals	Nickel	ppm	19	1
REMAP 2008	NB431	Metals	Nickel	ppm	31	1
REMAP 2008	NB452	Metals	Nickel	ppm	13	1
REMAP 2008	NB454	Metals	Nickel	ppm	25	1
REMAP 2008	NB413	Metals	Nickel	ppm	55	1
REMAP 2008	NB401	Metals	Selenium	ppm	2	0
REMAP 2008	NB406	Metals	Selenium	ppm	2	0
REMAP 2008	NB412	Metals	Selenium	ppm	1.9	0
REMAP 2008	NB416	Metals	Selenium	ppm	2	0
REMAP 2008	NB423	Metals	Selenium	ppm	1.8	0
REMAP 2008	NB426	Metals	Selenium	ppm	2	0
REMAP 2008	NB427	Metals	Selenium	ppm	1.9	0
REMAP 2008	NB431	Metals	Selenium	ppm	1.9	0
REMAP 2008	NB452	Metals	Selenium	ppm	1.9	0
REMAP 2008	NB454	Metals	Selenium	ppm	1.8	0
REMAP 2008	NB413	Metals	Selenium	ppm	2	0
REMAP 2008	NB401	Metals	Silicon	ppm	1300	1
REMAP 2008	NB406	Metals	Silicon	ppm	970	1
REMAP 2008	NB412	Metals	Silicon	ppm	1200	1
REMAP 2008	NB416	Metals	Silicon	ppm	1200	1
REMAP 2008	NB423	Metals	Silicon	ppm	1500	1
REMAP 2008	NB426	Metals	Silicon	ppm	1300	1
REMAP 2008	NB427	Metals	Silicon	ppm	1100	1
REMAP 2008	NB431	Metals	Silicon	ppm	1300	1
REMAP 2008	NB452	Metals	Silicon	ppm	1400	1
REMAP 2008	NB454	Metals	Silicon	ppm	1700	1
REMAP 2008	NB413	Metals	Silicon	ppm	2200	1
REMAP 2008	NB401	Metals	Silver	ppm	3.6	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB406	Metals	Silver	ppm	4.1	1
REMAP 2008	NB412	Metals	Silver	ppm	3.8	1
REMAP 2008	NB416	Metals	Silver	ppm	5.1	1
REMAP 2008	NB423	Metals	Silver	ppm	3.3	1
REMAP 2008	NB426	Metals	Silver	ppm	4	1
REMAP 2008	NB427	Metals	Silver	ppm	3.1	1
REMAP 2008	NB431	Metals	Silver	ppm	4.5	1
REMAP 2008	NB452	Metals	Silver	ppm	2.1	1
REMAP 2008	NB454	Metals	Silver	ppm	4	1
REMAP 2008	NB413	Metals	Silver	ppm	5.8	1
REMAP 2008	NB401	Metals	Tin	ppm	11	1
REMAP 2008	NB406	Metals	Tin	ppm	17	1
REMAP 2008	NB412	Metals	Tin	ppm	14	1
REMAP 2008	NB416	Metals	Tin	ppm	23	1
REMAP 2008	NB423	Metals	Tin	ppm	13	1
REMAP 2008	NB426	Metals	Tin	ppm	18	1
REMAP 2008	NB427	Metals	Tin	ppm	18	1
REMAP 2008	NB431	Metals	Tin	ppm	19	1
REMAP 2008	NB452	Metals	Tin	ppm	10	1
REMAP 2008	NB454	Metals	Tin	ppm	19	1
REMAP 2008	NB413	Metals	Tin	ppm	62	1
REMAP 2008	NB401	Metals	Zinc	ppm	160	1
REMAP 2008	NB406	Metals	Zinc	ppm	170	1
REMAP 2008	NB412	Metals	Zinc	ppm	180	1
REMAP 2008	NB416	Metals	Zinc	ppm	270	1
REMAP 2008	NB423	Metals	Zinc	ppm	140	1
REMAP 2008	NB426	Metals	Zinc	ppm	190	1
REMAP 2008	NB427	Metals	Zinc	ppm	160	1
REMAP 2008	NB431	Metals	Zinc	ppm	200	1
REMAP 2008	NB452	Metals	Zinc	ppm	86	1
REMAP 2008	NB454	Metals	Zinc	ppm	170	1
REMAP 2008	NB413	Metals	Zinc	ppm	870	1
REMAP 2008	NB401	Pesticides	Aldrin	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Aldrin	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Aldrin	ppb	0.95	0
REMAP 2008	NB416	Pesticides	Aldrin	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Aldrin	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Aldrin	ppb	1	0
REMAP 2008	NB427	Pesticides	Aldrin	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Aldrin	ppb	1	0
REMAP 2008	NB452	Pesticides	Aldrin	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Aldrin	ppb	0.9	0
REMAP 2008	NB413	Pesticides	Aldrin	ppb	1	0
REMAP 2008	NB401	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	2	0
REMAP 2008	NB406	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	0.95	0
REMAP 2008	NB412	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1.9	0
REMAP 2008	NB416	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	2.3	0
REMAP 2008	NB423	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1.5	0
REMAP 2008	NB426	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	2.1	0
REMAP 2008	NB427	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1.8	0
REMAP 2008	NB431	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	2.1	0
REMAP 2008	NB452	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1.4	0
REMAP 2008	NB454	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1.8	0
REMAP 2008	NB413	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	2.1	0
REMAP 2008	NB401	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB406	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB412	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB416	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB423	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB426	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB427	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB431	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB452	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB454	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB413	Pesticides	Chlordane	ppb	0	0
REMAP 2008	NB401	Pesticides	Dieldrin	ppb	2	0
REMAP 2008	NB406	Pesticides	Dieldrin	ppb	1.9	0
REMAP 2008	NB412	Pesticides	Dieldrin	ppb	1.9	0
REMAP 2008	NB416	Pesticides	Dieldrin	ppb	2.3	0
REMAP 2008	NB423	Pesticides	Dieldrin	ppb	1.5	0
REMAP 2008	NB426	Pesticides	Dieldrin	ppb	2.1	0
REMAP 2008	NB427	Pesticides	Dieldrin	ppb	1.8	0
REMAP 2008	NB431	Pesticides	Dieldrin	ppb	2.1	0
REMAP 2008	NB452	Pesticides	Dieldrin	ppb	1.4	0
REMAP 2008	NB454	Pesticides	Dieldrin	ppb	1.8	0
REMAP 2008	NB413	Pesticides	Dieldrin	ppb	2.1	0
REMAP 2008	NB401	Pesticides	Endrin	ppb	2	0
REMAP 2008	NB406	Pesticides	Endrin	ppb	1.9	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB412	Pesticides	Endrin	ppb	1.9	0
REMAP 2008	NB416	Pesticides	Endrin	ppb	2.3	0
REMAP 2008	NB423	Pesticides	Endrin	ppb	1.5	0
REMAP 2008	NB426	Pesticides	Endrin	ppb	2.1	0
REMAP 2008	NB427	Pesticides	Endrin	ppb	1.8	0
REMAP 2008	NB431	Pesticides	Endrin	ppb	2.1	0
REMAP 2008	NB452	Pesticides	Endrin	ppb	1.4	0
REMAP 2008	NB454	Pesticides	Endrin	ppb	1.8	0
REMAP 2008	NB413	Pesticides	Endrin	ppb	2.1	0
REMAP 2008	NB401	Pesticides	Heptachlor	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Heptachlor	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Heptachlor	ppb	0.95	0
REMAP 2008	NB416	Pesticides	Heptachlor	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Heptachlor	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Heptachlor	ppb	1	0
REMAP 2008	NB427	Pesticides	Heptachlor	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Heptachlor	ppb	1	0
REMAP 2008	NB452	Pesticides	Heptachlor	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Heptachlor	ppb	0.9	0
REMAP 2008	NB413	Pesticides	Heptachlor	ppb	1	0
REMAP 2008	NB401	Pesticides	Heptachlor epoxide	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Heptachlor epoxide	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Heptachlor epoxide	ppb	0.95	0
REMAP 2008	NB416	Pesticides	Heptachlor epoxide	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Heptachlor epoxide	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2008	NB427	Pesticides	Heptachlor epoxide	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2008	NB452	Pesticides	Heptachlor epoxide	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Heptachlor epoxide	ppb	0.9	0
REMAP 2008	NB413	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2008	NB401	Pesticides	Hexachlorobenzene	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Hexachlorobenzene	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Hexachlorobenzene	ppb	0.95	0
REMAP 2008	NB416	Pesticides	Hexachlorobenzene	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Hexachlorobenzene	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2008	NB427	Pesticides	Hexachlorobenzene	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2008	NB452	Pesticides	Hexachlorobenzene	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Hexachlorobenzene	ppb	0.9	0
REMAP 2008	NB413	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2008	NB401	Pesticides	Methoxychlor	ppb	20	0
REMAP 2008	NB406	Pesticides	Methoxychlor	ppb	9.5	0
REMAP 2008	NB412	Pesticides	Methoxychlor	ppb	19	0
REMAP 2008	NB416	Pesticides	Methoxychlor	ppb	23	0
REMAP 2008	NB423	Pesticides	Methoxychlor	ppb	15	0
REMAP 2008	NB426	Pesticides	Methoxychlor	ppb	21	0
REMAP 2008	NB427	Pesticides	Methoxychlor	ppb	18	0
REMAP 2008	NB431	Pesticides	Methoxychlor	ppb	21	0
REMAP 2008	NB452	Pesticides	Methoxychlor	ppb	14	0
REMAP 2008	NB454	Pesticides	Methoxychlor	ppb	18	0
REMAP 2008	NB413	Pesticides	Methoxychlor	ppb	21	0
REMAP 2008	NB401	Pesticides	Mirex	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Mirex	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Mirex	ppb	0.95	0
REMAP 2008	NB416	Pesticides	Mirex	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Mirex	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Mirex	ppb	1	0
REMAP 2008	NB427	Pesticides	Mirex	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Mirex	ppb	1	0
REMAP 2008	NB452	Pesticides	Mirex	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Mirex	ppb	0.9	0
REMAP 2008	NB413	Pesticides	Mirex	ppb	1	0
REMAP 2008	NB401	Pesticides	Oxychlordane	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Oxychlordane	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Oxychlordane	ppb	0.95	0
REMAP 2008	NB416	Pesticides	Oxychlordane	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Oxychlordane	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Oxychlordane	ppb	1	0
REMAP 2008	NB427	Pesticides	Oxychlordane	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Oxychlordane	ppb	1	0
REMAP 2008	NB452	Pesticides	Oxychlordane	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Oxychlordane	ppb	0.9	0
REMAP 2008	NB413	Pesticides	Oxychlordane	ppb	1	0
REMAP 2008	NB401	Pesticides	Total DDx (2,4 & 4,4)	ppb	2	0
REMAP 2008	NB406	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.9	0
REMAP 2008	NB412	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.9	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB413	Pesticides	Total DDx (2,4 & 4,4)	ppb	2.1	0
REMAP 2008	NB416	Pesticides	Total DDx (2,4 & 4,4)	ppb	2.3	0
REMAP 2008	NB423	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.8	1
REMAP 2008	NB426	Pesticides	Total DDx (2,4 & 4,4)	ppb	2.1	0
REMAP 2008	NB427	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.8	0
REMAP 2008	NB431	Pesticides	Total DDx (2,4 & 4,4)	ppb	6.5	1
REMAP 2008	NB452	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.4	0
REMAP 2008	NB454	Pesticides	Total DDx (2,4 & 4,4)	ppb	1.8	0
REMAP 2008	NB401	Pesticides	Total DDx (4,4)	ppb	2	0
REMAP 2008	NB406	Pesticides	Total DDx (4,4)	ppb	1.9	0
REMAP 2008	NB412	Pesticides	Total DDx (4,4)	ppb	1.9	0
REMAP 2008	NB413	Pesticides	Total DDx (4,4)	ppb	2.1	0
REMAP 2008	NB416	Pesticides	Total DDx (4,4)	ppb	2.3	0
REMAP 2008	NB423	Pesticides	Total DDx (4,4)	ppb	1.8	1
REMAP 2008	NB426	Pesticides	Total DDx (4,4)	ppb	2.1	0
REMAP 2008	NB427	Pesticides	Total DDx (4,4)	ppb	1.8	0
REMAP 2008	NB431	Pesticides	Total DDx (4,4)	ppb	6.5	1
REMAP 2008	NB452	Pesticides	Total DDx (4,4)	ppb	1.4	0
REMAP 2008	NB454	Pesticides	Total DDx (4,4)	ppb	1.8	0
REMAP 2008	NB401	Pesticides	Total alpha + gamma chlordane	ppb	0.98	0
REMAP 2008	NB406	Pesticides	Total alpha + gamma chlordane	ppb	0.95	0
REMAP 2008	NB412	Pesticides	Total alpha + gamma chlordane	ppb	0.95	0
REMAP 2008	NB413	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2008	NB416	Pesticides	Total alpha + gamma chlordane	ppb	1.2	0
REMAP 2008	NB423	Pesticides	Total alpha + gamma chlordane	ppb	0.75	0
REMAP 2008	NB426	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2008	NB427	Pesticides	Total alpha + gamma chlordane	ppb	0.88	0
REMAP 2008	NB431	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2008	NB452	Pesticides	Total alpha + gamma chlordane	ppb	0.71	0
REMAP 2008	NB454	Pesticides	Total alpha + gamma chlordane	ppb	0.9	0
REMAP 2008	NB401	Pesticides	cis-Chlordane	ppb	0.98	0
REMAP 2008	NB406	Pesticides	cis-Chlordane	ppb	0.95	0
REMAP 2008	NB412	Pesticides	cis-Chlordane	ppb	0.95	0
REMAP 2008	NB416	Pesticides	cis-Chlordane	ppb	1.2	0
REMAP 2008	NB423	Pesticides	cis-Chlordane	ppb	0.75	0
REMAP 2008	NB426	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2008	NB427	Pesticides	cis-Chlordane	ppb	0.88	0
REMAP 2008	NB431	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2008	NB452	Pesticides	cis-Chlordane	ppb	0.71	0
REMAP 2008	NB454	Pesticides	cis-Chlordane	ppb	0.9	0
REMAP 2008	NB413	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2008	NB401	Pesticides	cis-Nonachlor	ppb	0.98	0
REMAP 2008	NB406	Pesticides	cis-Nonachlor	ppb	0.95	0
REMAP 2008	NB412	Pesticides	cis-Nonachlor	ppb	0.95	0
REMAP 2008	NB416	Pesticides	cis-Nonachlor	ppb	1.2	0
REMAP 2008	NB423	Pesticides	cis-Nonachlor	ppb	0.75	0
REMAP 2008	NB426	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2008	NB427	Pesticides	cis-Nonachlor	ppb	0.88	0
REMAP 2008	NB431	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2008	NB452	Pesticides	cis-Nonachlor	ppb	0.71	0
REMAP 2008	NB454	Pesticides	cis-Nonachlor	ppb	0.9	0
REMAP 2008	NB413	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2008	NB401	Pesticides	o,p'-DDD	ppb	0.98	0
REMAP 2008	NB406	Pesticides	o,p'-DDD	ppb	0.95	0
REMAP 2008	NB412	Pesticides	o,p'-DDD	ppb	0.95	0
REMAP 2008	NB416	Pesticides	o,p'-DDD	ppb	1.2	0
REMAP 2008	NB423	Pesticides	o,p'-DDD	ppb	0.75	0
REMAP 2008	NB426	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2008	NB427	Pesticides	o,p'-DDD	ppb	0.88	0
REMAP 2008	NB431	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2008	NB452	Pesticides	o,p'-DDD	ppb	0.71	0
REMAP 2008	NB454	Pesticides	o,p'-DDD	ppb	0.9	0
REMAP 2008	NB413	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2008	NB401	Pesticides	o,p'-DDE	ppb	0.98	0
REMAP 2008	NB406	Pesticides	o,p'-DDE	ppb	0.95	0
REMAP 2008	NB412	Pesticides	o,p'-DDE	ppb	0.95	0
REMAP 2008	NB416	Pesticides	o,p'-DDE	ppb	1.2	0
REMAP 2008	NB423	Pesticides	o,p'-DDE	ppb	0.75	0
REMAP 2008	NB426	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2008	NB427	Pesticides	o,p'-DDE	ppb	0.88	0
REMAP 2008	NB431	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2008	NB452	Pesticides	o,p'-DDE	ppb	0.71	0
REMAP 2008	NB454	Pesticides	o,p'-DDE	ppb	0.9	0
REMAP 2008	NB413	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2008	NB401	Pesticides	o,p'-DDT	ppb	0.98	0
REMAP 2008	NB406	Pesticides	o,p'-DDT	ppb	0.95	0
REMAP 2008	NB412	Pesticides	o,p'-DDT	ppb	0.95	0
REMAP 2008	NB416	Pesticides	o,p'-DDT	ppb	1.2	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB423	Pesticides	o,p'-DDT	ppb	0.75	0
REMAP 2008	NB426	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2008	NB427	Pesticides	o,p'-DDT	ppb	0.88	0
REMAP 2008	NB431	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2008	NB452	Pesticides	o,p'-DDT	ppb	0.71	0
REMAP 2008	NB454	Pesticides	o,p'-DDT	ppb	0.9	0
REMAP 2008	NB413	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2008	NB401	Pesticides	p,p'-DDD	ppb	2	0
REMAP 2008	NB406	Pesticides	p,p'-DDD	ppb	1.9	0
REMAP 2008	NB412	Pesticides	p,p'-DDD	ppb	1.9	0
REMAP 2008	NB416	Pesticides	p,p'-DDD	ppb	2.3	0
REMAP 2008	NB423	Pesticides	p,p'-DDD	ppb	1.8	1
REMAP 2008	NB426	Pesticides	p,p'-DDD	ppb	2.1	0
REMAP 2008	NB427	Pesticides	p,p'-DDD	ppb	1.8	0
REMAP 2008	NB431	Pesticides	p,p'-DDD	ppb	2.1	0
REMAP 2008	NB452	Pesticides	p,p'-DDD	ppb	1.4	0
REMAP 2008	NB454	Pesticides	p,p'-DDD	ppb	1.8	0
REMAP 2008	NB413	Pesticides	p,p'-DDD	ppb	2.1	0
REMAP 2008	NB401	Pesticides	p,p'-DDE	ppb	2	0
REMAP 2008	NB406	Pesticides	p,p'-DDE	ppb	1.9	0
REMAP 2008	NB412	Pesticides	p,p'-DDE	ppb	1.9	0
REMAP 2008	NB416	Pesticides	p,p'-DDE	ppb	2.3	0
REMAP 2008	NB423	Pesticides	p,p'-DDE	ppb	1.5	0
REMAP 2008	NB426	Pesticides	p,p'-DDE	ppb	2.1	0
REMAP 2008	NB427	Pesticides	p,p'-DDE	ppb	1.8	0
REMAP 2008	NB431	Pesticides	p,p'-DDE	ppb	2.1	0
REMAP 2008	NB452	Pesticides	p,p'-DDE	ppb	1.4	0
REMAP 2008	NB454	Pesticides	p,p'-DDE	ppb	1.8	0
REMAP 2008	NB413	Pesticides	p,p'-DDE	ppb	2.1	0
REMAP 2008	NB401	Pesticides	p,p'-DDT	ppb	2	0
REMAP 2008	NB406	Pesticides	p,p'-DDT	ppb	1.9	0
REMAP 2008	NB412	Pesticides	p,p'-DDT	ppb	1.9	0
REMAP 2008	NB416	Pesticides	p,p'-DDT	ppb	2.3	0
REMAP 2008	NB423	Pesticides	p,p'-DDT	ppb	1.5	0
REMAP 2008	NB426	Pesticides	p,p'-DDT	ppb	2.1	0
REMAP 2008	NB427	Pesticides	p,p'-DDT	ppb	1.8	0
REMAP 2008	NB431	Pesticides	p,p'-DDT	ppb	6.5	1
REMAP 2008	NB452	Pesticides	p,p'-DDT	ppb	1.4	0
REMAP 2008	NB454	Pesticides	p,p'-DDT	ppb	1.8	0
REMAP 2008	NB413	Pesticides	p,p'-DDT	ppb	2.1	0
REMAP 2008	NB401	Pesticides	trans-Chlordane	ppb	0.98	0
REMAP 2008	NB406	Pesticides	trans-Chlordane	ppb	0.95	0
REMAP 2008	NB412	Pesticides	trans-Chlordane	ppb	0.95	0
REMAP 2008	NB416	Pesticides	trans-Chlordane	ppb	1.2	0
REMAP 2008	NB423	Pesticides	trans-Chlordane	ppb	0.75	0
REMAP 2008	NB426	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2008	NB427	Pesticides	trans-Chlordane	ppb	0.88	0
REMAP 2008	NB431	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2008	NB452	Pesticides	trans-Chlordane	ppb	0.71	0
REMAP 2008	NB454	Pesticides	trans-Chlordane	ppb	0.9	0
REMAP 2008	NB413	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2008	NB401	Pesticides	trans-Nonachlor	ppb	0.98	0
REMAP 2008	NB406	Pesticides	trans-Nonachlor	ppb	0.95	0
REMAP 2008	NB412	Pesticides	trans-Nonachlor	ppb	0.95	0
REMAP 2008	NB416	Pesticides	trans-Nonachlor	ppb	1.2	0
REMAP 2008	NB423	Pesticides	trans-Nonachlor	ppb	0.75	0
REMAP 2008	NB426	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2008	NB427	Pesticides	trans-Nonachlor	ppb	0.88	0
REMAP 2008	NB431	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2008	NB452	Pesticides	trans-Nonachlor	ppb	0.71	0
REMAP 2008	NB454	Pesticides	trans-Nonachlor	ppb	0.9	0
REMAP 2008	NB413	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2008	NB401	PAHs	1-Methylnaphthalene	ppb	22	0
REMAP 2008	NB406	PAHs	1-Methylnaphthalene	ppb	23	0
REMAP 2008	NB412	PAHs	1-Methylnaphthalene	ppb	21	0
REMAP 2008	NB416	PAHs	1-Methylnaphthalene	ppb	28	0
REMAP 2008	NB423	PAHs	1-Methylnaphthalene	ppb	19	0
REMAP 2008	NB426	PAHs	1-Methylnaphthalene	ppb	25	0
REMAP 2008	NB427	PAHs	1-Methylnaphthalene	ppb	42	1
REMAP 2008	NB431	PAHs	1-Methylnaphthalene	ppb	25	0
REMAP 2008	NB452	PAHs	1-Methylnaphthalene	ppb	16	0
REMAP 2008	NB454	PAHs	1-Methylnaphthalene	ppb	21	0
REMAP 2008	NB413	PAHs	1-Methylnaphthalene	ppb	25	0
REMAP 2008	NB401	PAHs	1-Methylphenanthrene	ppb	22	0
REMAP 2008	NB406	PAHs	1-Methylphenanthrene	ppb	23	0
REMAP 2008	NB412	PAHs	1-Methylphenanthrene	ppb	21	0
REMAP 2008	NB416	PAHs	1-Methylphenanthrene	ppb	28	0
REMAP 2008	NB423	PAHs	1-Methylphenanthrene	ppb	19	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB426	PAHs	1-Methylphenanthrene	ppb	25	0
REMAP 2008	NB427	PAHs	1-Methylphenanthrene	ppb	340	1
REMAP 2008	NB431	PAHs	1-Methylphenanthrene	ppb	25	0
REMAP 2008	NB452	PAHs	1-Methylphenanthrene	ppb	21	1
REMAP 2008	NB454	PAHs	1-Methylphenanthrene	ppb	44	1
REMAP 2008	NB413	PAHs	1-Methylphenanthrene	ppb	25	0
REMAP 2008	NB401	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	22	0
REMAP 2008	NB406	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	23	0
REMAP 2008	NB412	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	21	0
REMAP 2008	NB416	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	28	0
REMAP 2008	NB423	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	19	0
REMAP 2008	NB426	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	25	0
REMAP 2008	NB427	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	41	0
REMAP 2008	NB431	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	25	0
REMAP 2008	NB452	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	16	0
REMAP 2008	NB454	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	21	0
REMAP 2008	NB413	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	25	0
REMAP 2008	NB401	PAHs	2,6-Dimethylnaphthalene	ppb	22	0
REMAP 2008	NB406	PAHs	2,6-Dimethylnaphthalene	ppb	23	0
REMAP 2008	NB412	PAHs	2,6-Dimethylnaphthalene	ppb	21	0
REMAP 2008	NB416	PAHs	2,6-Dimethylnaphthalene	ppb	28	0
REMAP 2008	NB423	PAHs	2,6-Dimethylnaphthalene	ppb	19	0
REMAP 2008	NB426	PAHs	2,6-Dimethylnaphthalene	ppb	25	0
REMAP 2008	NB427	PAHs	2,6-Dimethylnaphthalene	ppb	45	1
REMAP 2008	NB431	PAHs	2,6-Dimethylnaphthalene	ppb	25	0
REMAP 2008	NB452	PAHs	2,6-Dimethylnaphthalene	ppb	16	0
REMAP 2008	NB454	PAHs	2,6-Dimethylnaphthalene	ppb	21	0
REMAP 2008	NB413	PAHs	2,6-Dimethylnaphthalene	ppb	25	0
REMAP 2008	NB401	PAHs	2-Methylnaphthalene	ppb	22	0
REMAP 2008	NB406	PAHs	2-Methylnaphthalene	ppb	23	0
REMAP 2008	NB412	PAHs	2-Methylnaphthalene	ppb	21	0
REMAP 2008	NB416	PAHs	2-Methylnaphthalene	ppb	28	0
REMAP 2008	NB423	PAHs	2-Methylnaphthalene	ppb	19	0
REMAP 2008	NB426	PAHs	2-Methylnaphthalene	ppb	25	0
REMAP 2008	NB427	PAHs	2-Methylnaphthalene	ppb	70	1
REMAP 2008	NB431	PAHs	2-Methylnaphthalene	ppb	25	0
REMAP 2008	NB452	PAHs	2-Methylnaphthalene	ppb	16	0
REMAP 2008	NB454	PAHs	2-Methylnaphthalene	ppb	21	0
REMAP 2008	NB413	PAHs	2-Methylnaphthalene	ppb	25	0
REMAP 2008	NB401	PAHs	Acenaphthene	ppb	22	0
REMAP 2008	NB406	PAHs	Acenaphthene	ppb	23	0
REMAP 2008	NB412	PAHs	Acenaphthene	ppb	21	0
REMAP 2008	NB416	PAHs	Acenaphthene	ppb	28	0
REMAP 2008	NB423	PAHs	Acenaphthene	ppb	19	0
REMAP 2008	NB426	PAHs	Acenaphthene	ppb	25	0
REMAP 2008	NB427	PAHs	Acenaphthene	ppb	200	1
REMAP 2008	NB431	PAHs	Acenaphthene	ppb	25	0
REMAP 2008	NB452	PAHs	Acenaphthene	ppb	16	0
REMAP 2008	NB454	PAHs	Acenaphthene	ppb	21	0
REMAP 2008	NB413	PAHs	Acenaphthene	ppb	25	0
REMAP 2008	NB401	PAHs	Acenaphthylene	ppb	22	0
REMAP 2008	NB406	PAHs	Acenaphthylene	ppb	23	0
REMAP 2008	NB412	PAHs	Acenaphthylene	ppb	21	0
REMAP 2008	NB416	PAHs	Acenaphthylene	ppb	28	0
REMAP 2008	NB423	PAHs	Acenaphthylene	ppb	19	0
REMAP 2008	NB426	PAHs	Acenaphthylene	ppb	25	0
REMAP 2008	NB427	PAHs	Acenaphthylene	ppb	530	1
REMAP 2008	NB431	PAHs	Acenaphthylene	ppb	25	0
REMAP 2008	NB452	PAHs	Acenaphthylene	ppb	26	1
REMAP 2008	NB454	PAHs	Acenaphthylene	ppb	67	1
REMAP 2008	NB413	PAHs	Acenaphthylene	ppb	25	0
REMAP 2008	NB401	PAHs	Anthracene	ppb	22	0
REMAP 2008	NB406	PAHs	Anthracene	ppb	23	0
REMAP 2008	NB412	PAHs	Anthracene	ppb	21	0
REMAP 2008	NB416	PAHs	Anthracene	ppb	28	0
REMAP 2008	NB423	PAHs	Anthracene	ppb	19	0
REMAP 2008	NB426	PAHs	Anthracene	ppb	25	0
REMAP 2008	NB427	PAHs	Anthracene	ppb	940	1
REMAP 2008	NB431	PAHs	Anthracene	ppb	25	0
REMAP 2008	NB452	PAHs	Anthracene	ppb	16	0
REMAP 2008	NB454	PAHs	Anthracene	ppb	38	1
REMAP 2008	NB413	PAHs	Anthracene	ppb	25	0
REMAP 2008	NB401	PAHs	Benz[a]anthracene	ppb	24	1
REMAP 2008	NB406	PAHs	Benz[a]anthracene	ppb	24	1
REMAP 2008	NB412	PAHs	Benz[a]anthracene	ppb	42	1
REMAP 2008	NB416	PAHs	Benz[a]anthracene	ppb	44	1
REMAP 2008	NB423	PAHs	Benz[a]anthracene	ppb	27	1
REMAP 2008	NB426	PAHs	Benz[a]anthracene	ppb	48	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB427	PAHs	Benz[a]anthracene	ppb	2400	1
REMAP 2008	NB431	PAHs	Benz[a]anthracene	ppb	55	1
REMAP 2008	NB452	PAHs	Benz[a]anthracene	ppb	68	1
REMAP 2008	NB454	PAHs	Benz[a]anthracene	ppb	180	1
REMAP 2008	NB413	PAHs	Benz[a]anthracene	ppb	41	1
REMAP 2008	NB401	PAHs	Benzo(b)fluoranthene	ppb	25	1
REMAP 2008	NB406	PAHs	Benzo(b)fluoranthene	ppb	32	1
REMAP 2008	NB412	PAHs	Benzo(b)fluoranthene	ppb	54	1
REMAP 2008	NB416	PAHs	Benzo(b)fluoranthene	ppb	48	1
REMAP 2008	NB423	PAHs	Benzo(b)fluoranthene	ppb	26	1
REMAP 2008	NB426	PAHs	Benzo(b)fluoranthene	ppb	65	1
REMAP 2008	NB427	PAHs	Benzo(b)fluoranthene	ppb	2700	1
REMAP 2008	NB431	PAHs	Benzo(b)fluoranthene	ppb	84	1
REMAP 2008	NB452	PAHs	Benzo(b)fluoranthene	ppb	120	1
REMAP 2008	NB454	PAHs	Benzo(b)fluoranthene	ppb	270	1
REMAP 2008	NB413	PAHs	Benzo(b)fluoranthene	ppb	42	1
REMAP 2008	NB401	PAHs	Benzo[a]pyrene	ppb	22	0
REMAP 2008	NB406	PAHs	Benzo[a]pyrene	ppb	30	1
REMAP 2008	NB412	PAHs	Benzo[a]pyrene	ppb	47	1
REMAP 2008	NB416	PAHs	Benzo[a]pyrene	ppb	45	1
REMAP 2008	NB423	PAHs	Benzo[a]pyrene	ppb	28	1
REMAP 2008	NB426	PAHs	Benzo[a]pyrene	ppb	55	1
REMAP 2008	NB427	PAHs	Benzo[a]pyrene	ppb	2400	1
REMAP 2008	NB431	PAHs	Benzo[a]pyrene	ppb	74	1
REMAP 2008	NB452	PAHs	Benzo[a]pyrene	ppb	110	1
REMAP 2008	NB454	PAHs	Benzo[a]pyrene	ppb	290	1
REMAP 2008	NB413	PAHs	Benzo[a]pyrene	ppb	29	1
REMAP 2008	NB401	PAHs	Benzo[b,k]fluoranthene	ppb	25	1
REMAP 2008	NB406	PAHs	Benzo[b,k]fluoranthene	ppb	32	1
REMAP 2008	NB412	PAHs	Benzo[b,k]fluoranthene	ppb	77	1
REMAP 2008	NB416	PAHs	Benzo[b,k]fluoranthene	ppb	48	1
REMAP 2008	NB423	PAHs	Benzo[b,k]fluoranthene	ppb	26	1
REMAP 2008	NB426	PAHs	Benzo[b,k]fluoranthene	ppb	65	1
REMAP 2008	NB427	PAHs	Benzo[b,k]fluoranthene	ppb	3700	1
REMAP 2008	NB431	PAHs	Benzo[b,k]fluoranthene	ppb	112	1
REMAP 2008	NB452	PAHs	Benzo[b,k]fluoranthene	ppb	156	1
REMAP 2008	NB454	PAHs	Benzo[b,k]fluoranthene	ppb	380	1
REMAP 2008	NB413	PAHs	Benzo[b,k]fluoranthene	ppb	42	1
REMAP 2008	NB401	PAHs	Benzo[e]pyrene	ppb	22	0
REMAP 2008	NB406	PAHs	Benzo[e]pyrene	ppb	23	0
REMAP 2008	NB412	PAHs	Benzo[e]pyrene	ppb	21	0
REMAP 2008	NB416	PAHs	Benzo[e]pyrene	ppb	28	0
REMAP 2008	NB423	PAHs	Benzo[e]pyrene	ppb	19	0
REMAP 2008	NB426	PAHs	Benzo[e]pyrene	ppb	25	0
REMAP 2008	NB427	PAHs	Benzo[e]pyrene	ppb	530	1
REMAP 2008	NB431	PAHs	Benzo[e]pyrene	ppb	25	0
REMAP 2008	NB452	PAHs	Benzo[e]pyrene	ppb	26	1
REMAP 2008	NB454	PAHs	Benzo[e]pyrene	ppb	56	1
REMAP 2008	NB413	PAHs	Benzo[e]pyrene	ppb	25	0
REMAP 2008	NB401	PAHs	Benzo[ghi]perylene	ppb	22	0
REMAP 2008	NB406	PAHs	Benzo[ghi]perylene	ppb	23	0
REMAP 2008	NB412	PAHs	Benzo[ghi]perylene	ppb	25	1
REMAP 2008	NB416	PAHs	Benzo[ghi]perylene	ppb	28	0
REMAP 2008	NB423	PAHs	Benzo[ghi]perylene	ppb	19	0
REMAP 2008	NB426	PAHs	Benzo[ghi]perylene	ppb	31	1
REMAP 2008	NB427	PAHs	Benzo[ghi]perylene	ppb	1100	1
REMAP 2008	NB431	PAHs	Benzo[ghi]perylene	ppb	45	1
REMAP 2008	NB452	PAHs	Benzo[ghi]perylene	ppb	57	1
REMAP 2008	NB454	PAHs	Benzo[ghi]perylene	ppb	160	1
REMAP 2008	NB413	PAHs	Benzo[ghi]perylene	ppb	25	0
REMAP 2008	NB401	PAHs	Benzo[k]fluoranthene	ppb	22	0
REMAP 2008	NB406	PAHs	Benzo[k]fluoranthene	ppb	23	0
REMAP 2008	NB412	PAHs	Benzo[k]fluoranthene	ppb	23	1
REMAP 2008	NB416	PAHs	Benzo[k]fluoranthene	ppb	28	0
REMAP 2008	NB423	PAHs	Benzo[k]fluoranthene	ppb	19	0
REMAP 2008	NB426	PAHs	Benzo[k]fluoranthene	ppb	25	0
REMAP 2008	NB427	PAHs	Benzo[k]fluoranthene	ppb	1000	1
REMAP 2008	NB431	PAHs	Benzo[k]fluoranthene	ppb	28	1
REMAP 2008	NB452	PAHs	Benzo[k]fluoranthene	ppb	36	1
REMAP 2008	NB454	PAHs	Benzo[k]fluoranthene	ppb	110	1
REMAP 2008	NB413	PAHs	Benzo[k]fluoranthene	ppb	25	0
REMAP 2008	NB401	PAHs	Biphenyl	ppb	22	0
REMAP 2008	NB406	PAHs	Biphenyl	ppb	23	0
REMAP 2008	NB412	PAHs	Biphenyl	ppb	21	0
REMAP 2008	NB416	PAHs	Biphenyl	ppb	28	0
REMAP 2008	NB423	PAHs	Biphenyl	ppb	19	0
REMAP 2008	NB426	PAHs	Biphenyl	ppb	25	0
REMAP 2008	NB427	PAHs	Biphenyl	ppb	41	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB431	PAHs	Biphenyl	ppb	25	0
REMAP 2008	NB452	PAHs	Biphenyl	ppb	16	0
REMAP 2008	NB454	PAHs	Biphenyl	ppb	21	0
REMAP 2008	NB413	PAHs	Biphenyl	ppb	25	0
REMAP 2008	NB401	PAHs	Chrysene	ppb	22	0
REMAP 2008	NB406	PAHs	Chrysene	ppb	24	1
REMAP 2008	NB412	PAHs	Chrysene	ppb	49	1
REMAP 2008	NB416	PAHs	Chrysene	ppb	39	1
REMAP 2008	NB423	PAHs	Chrysene	ppb	19	1
REMAP 2008	NB426	PAHs	Chrysene	ppb	51	1
REMAP 2008	NB427	PAHs	Chrysene	ppb	2300	1
REMAP 2008	NB431	PAHs	Chrysene	ppb	64	1
REMAP 2008	NB452	PAHs	Chrysene	ppb	67	1
REMAP 2008	NB454	PAHs	Chrysene	ppb	200	1
REMAP 2008	NB413	PAHs	Chrysene	ppb	59	1
REMAP 2008	NB401	PAHs	Dibenz[a,h]anthracene	ppb	22	0
REMAP 2008	NB406	PAHs	Dibenz[a,h]anthracene	ppb	23	0
REMAP 2008	NB412	PAHs	Dibenz[a,h]anthracene	ppb	21	0
REMAP 2008	NB416	PAHs	Dibenz[a,h]anthracene	ppb	28	0
REMAP 2008	NB423	PAHs	Dibenz[a,h]anthracene	ppb	19	0
REMAP 2008	NB426	PAHs	Dibenz[a,h]anthracene	ppb	25	0
REMAP 2008	NB427	PAHs	Dibenz[a,h]anthracene	ppb	350	1
REMAP 2008	NB431	PAHs	Dibenz[a,h]anthracene	ppb	25	0
REMAP 2008	NB452	PAHs	Dibenz[a,h]anthracene	ppb	21	1
REMAP 2008	NB454	PAHs	Dibenz[a,h]anthracene	ppb	45	1
REMAP 2008	NB413	PAHs	Dibenz[a,h]anthracene	ppb	25	0
REMAP 2008	NB401	PAHs	Fluoranthene	ppb	29	1
REMAP 2008	NB406	PAHs	Fluoranthene	ppb	32	1
REMAP 2008	NB412	PAHs	Fluoranthene	ppb	54	1
REMAP 2008	NB416	PAHs	Fluoranthene	ppb	53	1
REMAP 2008	NB423	PAHs	Fluoranthene	ppb	32	1
REMAP 2008	NB426	PAHs	Fluoranthene	ppb	65	1
REMAP 2008	NB427	PAHs	Fluoranthene	ppb	4200	1
REMAP 2008	NB431	PAHs	Fluoranthene	ppb	79	1
REMAP 2008	NB452	PAHs	Fluoranthene	ppb	78	1
REMAP 2008	NB454	PAHs	Fluoranthene	ppb	210	1
REMAP 2008	NB413	PAHs	Fluoranthene	ppb	25	0
REMAP 2008	NB401	PAHs	Fluorene	ppb	22	0
REMAP 2008	NB406	PAHs	Fluorene	ppb	23	0
REMAP 2008	NB412	PAHs	Fluorene	ppb	21	0
REMAP 2008	NB416	PAHs	Fluorene	ppb	28	0
REMAP 2008	NB423	PAHs	Fluorene	ppb	19	0
REMAP 2008	NB426	PAHs	Fluorene	ppb	25	0
REMAP 2008	NB427	PAHs	Fluorene	ppb	210	1
REMAP 2008	NB431	PAHs	Fluorene	ppb	25	0
REMAP 2008	NB452	PAHs	Fluorene	ppb	16	0
REMAP 2008	NB454	PAHs	Fluorene	ppb	21	0
REMAP 2008	NB413	PAHs	Fluorene	ppb	25	0
REMAP 2008	NB401	PAHs	Indeno[1,2,3-cd]pyrene	ppb	22	0
REMAP 2008	NB406	PAHs	Indeno[1,2,3-cd]pyrene	ppb	23	0
REMAP 2008	NB412	PAHs	Indeno[1,2,3-cd]pyrene	ppb	29	1
REMAP 2008	NB416	PAHs	Indeno[1,2,3-cd]pyrene	ppb	28	0
REMAP 2008	NB423	PAHs	Indeno[1,2,3-cd]pyrene	ppb	19	0
REMAP 2008	NB426	PAHs	Indeno[1,2,3-cd]pyrene	ppb	27	1
REMAP 2008	NB427	PAHs	Indeno[1,2,3-cd]pyrene	ppb	1300	1
REMAP 2008	NB431	PAHs	Indeno[1,2,3-cd]pyrene	ppb	48	1
REMAP 2008	NB452	PAHs	Indeno[1,2,3-cd]pyrene	ppb	56	1
REMAP 2008	NB454	PAHs	Indeno[1,2,3-cd]pyrene	ppb	140	1
REMAP 2008	NB413	PAHs	Indeno[1,2,3-cd]pyrene	ppb	25	0
REMAP 2008	NB401	PAHs	Naphthalene	ppb	22	0
REMAP 2008	NB406	PAHs	Naphthalene	ppb	23	0
REMAP 2008	NB412	PAHs	Naphthalene	ppb	21	0
REMAP 2008	NB416	PAHs	Naphthalene	ppb	28	0
REMAP 2008	NB423	PAHs	Naphthalene	ppb	19	0
REMAP 2008	NB426	PAHs	Naphthalene	ppb	25	0
REMAP 2008	NB427	PAHs	Naphthalene	ppb	570	1
REMAP 2008	NB431	PAHs	Naphthalene	ppb	25	0
REMAP 2008	NB452	PAHs	Naphthalene	ppb	16	0
REMAP 2008	NB454	PAHs	Naphthalene	ppb	29	1
REMAP 2008	NB413	PAHs	Naphthalene	ppb	25	0
REMAP 2008	NB401	PAHs	Perylene	ppb	22	0
REMAP 2008	NB406	PAHs	Perylene	ppb	23	0
REMAP 2008	NB412	PAHs	Perylene	ppb	32	1
REMAP 2008	NB416	PAHs	Perylene	ppb	34	1
REMAP 2008	NB423	PAHs	Perylene	ppb	21	1
REMAP 2008	NB426	PAHs	Perylene	ppb	40	1
REMAP 2008	NB427	PAHs	Perylene	ppb	1400	1
REMAP 2008	NB431	PAHs	Perylene	ppb	54	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB452	PAHs	Perylene	ppb	70	1
REMAP 2008	NB454	PAHs	Perylene	ppb	170	1
REMAP 2008	NB413	PAHs	Perylene	ppb	25	0
REMAP 2008	NB401	PAHs	Phenanthrene	ppb	22	0
REMAP 2008	NB406	PAHs	Phenanthrene	ppb	23	0
REMAP 2008	NB412	PAHs	Phenanthrene	ppb	23	1
REMAP 2008	NB416	PAHs	Phenanthrene	ppb	28	0
REMAP 2008	NB423	PAHs	Phenanthrene	ppb	19	0
REMAP 2008	NB426	PAHs	Phenanthrene	ppb	26	1
REMAP 2008	NB427	PAHs	Phenanthrene	ppb	1400	1
REMAP 2008	NB431	PAHs	Phenanthrene	ppb	32	1
REMAP 2008	NB452	PAHs	Phenanthrene	ppb	27	1
REMAP 2008	NB454	PAHs	Phenanthrene	ppb	70	1
REMAP 2008	NB413	PAHs	Phenanthrene	ppb	25	0
REMAP 2008	NB401	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	108	1
REMAP 2008	NB406	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	180	1
REMAP 2008	NB412	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	411	1
REMAP 2008	NB416	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	322	1
REMAP 2008	NB423	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	189	1
REMAP 2008	NB426	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	452	1
REMAP 2008	NB427	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	23280	1
REMAP 2008	NB431	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	615	1
REMAP 2008	NB452	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	802	1
REMAP 2008	NB454	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	2101	1
REMAP 2008	NB413	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	171	1
REMAP 2008	NB401	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	0	0
REMAP 2008	NB406	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	0	0
REMAP 2008	NB412	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	23	1
REMAP 2008	NB416	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	0	0
REMAP 2008	NB423	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	0	0
REMAP 2008	NB426	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	26	1
REMAP 2008	NB427	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	4347	1
REMAP 2008	NB431	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	32	1
REMAP 2008	NB452	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	74	1
REMAP 2008	NB454	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	248	1
REMAP 2008	NB413	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	0	0
REMAP 2008	NB401	PAHs	Pyrene	ppb	30	1
REMAP 2008	NB406	PAHs	Pyrene	ppb	38	1
REMAP 2008	NB412	PAHs	Pyrene	ppb	56	1
REMAP 2008	NB416	PAHs	Pyrene	ppb	59	1
REMAP 2008	NB423	PAHs	Pyrene	ppb	36	1
REMAP 2008	NB426	PAHs	Pyrene	ppb	70	1
REMAP 2008	NB427	PAHs	Pyrene	ppb	3600	1
REMAP 2008	NB431	PAHs	Pyrene	ppb	84	1
REMAP 2008	NB452	PAHs	Pyrene	ppb	93	1
REMAP 2008	NB454	PAHs	Pyrene	ppb	270	1
REMAP 2008	NB413	PAHs	Pyrene	ppb	25	0
REMAP 2008	NB401	PAHs	Total HMW PAHs	ppb	108	1
REMAP 2008	NB406	PAHs	Total HMW PAHs	ppb	180	1
REMAP 2008	NB412	PAHs	Total HMW PAHs	ppb	379	1
REMAP 2008	NB413	PAHs	Total HMW PAHs	ppb	171	1
REMAP 2008	NB416	PAHs	Total HMW PAHs	ppb	288	1
REMAP 2008	NB423	PAHs	Total HMW PAHs	ppb	168	1
REMAP 2008	NB426	PAHs	Total HMW PAHs	ppb	412	1
REMAP 2008	NB427	PAHs	Total HMW PAHs	ppb	21350	1
REMAP 2008	NB431	PAHs	Total HMW PAHs	ppb	561	1
REMAP 2008	NB452	PAHs	Total HMW PAHs	ppb	706	1
REMAP 2008	NB454	PAHs	Total HMW PAHs	ppb	1875	1
REMAP 2008	NB401	PAHs	Total LMW PAHs	ppb	22	0
REMAP 2008	NB406	PAHs	Total LMW PAHs	ppb	23	0
REMAP 2008	NB412	PAHs	Total LMW PAHs	ppb	23	1
REMAP 2008	NB413	PAHs	Total LMW PAHs	ppb	25	0
REMAP 2008	NB416	PAHs	Total LMW PAHs	ppb	28	0
REMAP 2008	NB423	PAHs	Total LMW PAHs	ppb	19	0
REMAP 2008	NB426	PAHs	Total LMW PAHs	ppb	26	1
REMAP 2008	NB427	PAHs	Total LMW PAHs	ppb	3920	1
REMAP 2008	NB431	PAHs	Total LMW PAHs	ppb	32	1
REMAP 2008	NB452	PAHs	Total LMW PAHs	ppb	53	1
REMAP 2008	NB454	PAHs	Total LMW PAHs	ppb	204	1
REMAP 2008	NB401	PAHs	Total PAHs	ppb	108	1
REMAP 2008	NB406	PAHs	Total PAHs	ppb	180	1
REMAP 2008	NB412	PAHs	Total PAHs	ppb	402	1
REMAP 2008	NB413	PAHs	Total PAHs	ppb	171	1
REMAP 2008	NB416	PAHs	Total PAHs	ppb	288	1
REMAP 2008	NB423	PAHs	Total PAHs	ppb	168	1
REMAP 2008	NB426	PAHs	Total PAHs	ppb	438	1
REMAP 2008	NB427	PAHs	Total PAHs	ppb	25270	1
REMAP 2008	NB431	PAHs	Total PAHs	ppb	593	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2008	NB452	PAHs	Total PAHs	ppb	759	1
REMAP 2008	NB454	PAHs	Total PAHs	ppb	2079	1
REMAP 2008	NB401	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB406	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB412	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB416	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB423	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB426	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB427	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB431	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB452	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB454	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB413	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2008	NB401	TOC	Organic carbon	ppm	24000	1
REMAP 2008	NB406	TOC	Organic carbon	ppm	25000	1
REMAP 2008	NB412	TOC	Organic carbon	ppm	26000	1
REMAP 2008	NB416	TOC	Organic carbon	ppm	32000	1
REMAP 2008	NB423	TOC	Organic carbon	ppm	19000	1
REMAP 2008	NB426	TOC	Organic carbon	ppm	29000	1
REMAP 2008	NB427	TOC	Organic carbon	ppm	31000	1
REMAP 2008	NB431	TOC	Organic carbon	ppm	27000	1
REMAP 2008	NB452	TOC	Organic carbon	ppm	15000	1
REMAP 2008	NB454	TOC	Organic carbon	ppm	27000	1
REMAP 2008	NB413	TOC	Organic carbon	ppm	29000	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	2400	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	240	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	2500	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	3200	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	1200	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	3000	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	2200	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	2800	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	910	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	1900	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/g	3100	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	180	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	69	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	280	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	390	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	91	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	750	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	920	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	360	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	150	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	640	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/g	320	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	210	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	25	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	240	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	310	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	110	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	290	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	220	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	250	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	67	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	170	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	310	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	120	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	41	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	170	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	280	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	64	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	470	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	580	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	230	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	98	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	430	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	210	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	5.7	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	6.7	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	12	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	3.8	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	18	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	24	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	9.4	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	3.6	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	15	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	10	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3.2	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	4.8	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	2.8	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	4.3	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3.2	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3.3	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	2.9	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3.2	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	4.2	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	24	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	11	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	37	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	62	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	12	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	100	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	150	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	51	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	27	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	110	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	44	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	11	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	12	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	16	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	6.2	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	15	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	12	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	13	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	4	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	11	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	16	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	7.7	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	9.9	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	15	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	5.4	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	23	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	28	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	14	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	6	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	21	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	13	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	9.6	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	9.9	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	15	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	4.9	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	15	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	9.9	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	11	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	3.9	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	8.8	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	15	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3.2	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	2.8	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	2.9	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	3.1	1
REMAP 2013	NB401	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3.2	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	2.8	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	4.2	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3.1	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	2.9	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	3.3	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB401	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	5.2	1
REMAP 2013	NB406	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	5.5	1
REMAP 2013	NB416	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	7.1	1
REMAP 2013	NB423	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	3.1	1
REMAP 2013	NB426	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	7.4	1
REMAP 2013	NB427	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	7.4	1
REMAP 2013	NB431	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	6.5	1
REMAP 2013	NB452	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	2.9	1
REMAP 2013	NB454	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	5.6	1
REMAP 2013	NB413	Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran	pg/g	7.4	1
REMAP 2013	NB401	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	4.5	1
REMAP 2013	NB406	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	4.8	1
REMAP 2013	NB416	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	7.9	1
REMAP 2013	NB423	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	3.3	1
REMAP 2013	NB426	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	9.5	1
REMAP 2013	NB427	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	10	1
REMAP 2013	NB431	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	6.6	1
REMAP 2013	NB452	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	2.9	1
REMAP 2013	NB454	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	8.5	1
REMAP 2013	NB413	Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	7.4	1
REMAP 2013	NB401	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	7.6	1
REMAP 2013	NB406	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	3	1
REMAP 2013	NB412	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	8.3	1
REMAP 2013	NB416	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	12	1
REMAP 2013	NB423	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	4.4	1
REMAP 2013	NB426	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	14	1
REMAP 2013	NB427	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	18	1
REMAP 2013	NB431	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	11	1
REMAP 2013	NB452	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	4.5	1
REMAP 2013	NB454	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	12	1
REMAP 2013	NB413	Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran	pg/g	11	1
REMAP 2013	NB401	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	23	1
REMAP 2013	NB406	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	4.3	1
REMAP 2013	NB412	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	29	1
REMAP 2013	NB416	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	110	1
REMAP 2013	NB423	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	13	1
REMAP 2013	NB426	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	94	1
REMAP 2013	NB427	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	61	1
REMAP 2013	NB431	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	50	1
REMAP 2013	NB452	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	27	1
REMAP 2013	NB454	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	56	1
REMAP 2013	NB413	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	32	1
REMAP 2013	NB401	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	13	1
REMAP 2013	NB406	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	1.4	1
REMAP 2013	NB412	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	13	1
REMAP 2013	NB416	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	16	1
REMAP 2013	NB423	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	7	1
REMAP 2013	NB426	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	16	1
REMAP 2013	NB427	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	13	1
REMAP 2013	NB431	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	17	1
REMAP 2013	NB452	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	5.6	1
REMAP 2013	NB454	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	10	1
REMAP 2013	NB413	Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran	pg/g	17	1
REMAP 2013	NB401	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	40.147	1
REMAP 2013	NB406	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	12.1127	1
REMAP 2013	NB412	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	49.156	1
REMAP 2013	NB413	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	57.118	1
REMAP 2013	NB416	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	137.88	1
REMAP 2013	NB423	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	23.8183	1
REMAP 2013	NB426	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	130.107	1
REMAP 2013	NB427	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	101.808	1
REMAP 2013	NB431	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	74.227	1
REMAP 2013	NB452	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	38.861	1
REMAP 2013	NB454	Dioxins/Furans	Total WHO Dioxin TEQ(Human/Mammal)(ND=0)	pg/g	87.23	1
REMAP 2013	NB401	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	54	1
REMAP 2013	NB406	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	1.8	1
REMAP 2013	NB412	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	61	1
REMAP 2013	NB416	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	66	1
REMAP 2013	NB423	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	20	1
REMAP 2013	NB426	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	95	1
REMAP 2013	NB427	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	49	1
REMAP 2013	NB431	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	66	1
REMAP 2013	NB452	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	24	1
REMAP 2013	NB454	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	49	1
REMAP 2013	NB413	Grain Size	RBP2, Substrate, Inorganic, Silt, 0.004-0.06 mm	%	60	1
REMAP 2013	NB401	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	31	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB406	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	4.1	1
REMAP 2013	NB412	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	29	1
REMAP 2013	NB416	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	31	1
REMAP 2013	NB423	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	19	1
REMAP 2013	NB426	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	4.2	1
REMAP 2013	NB427	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	13	1
REMAP 2013	NB431	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	28	1
REMAP 2013	NB452	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	12	1
REMAP 2013	NB454	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	9.9	1
REMAP 2013	NB413	Grain Size	RBP2, Substrate, inorganic, clay, <0.004 mm	%	28	1
REMAP 2013	NB401	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	14	1
REMAP 2013	NB406	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	94	1
REMAP 2013	NB412	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	10	1
REMAP 2013	NB416	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	2.8	1
REMAP 2013	NB423	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	60	1
REMAP 2013	NB426	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	1.1	1
REMAP 2013	NB427	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	38	1
REMAP 2013	NB431	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	6.5	1
REMAP 2013	NB452	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	64	1
REMAP 2013	NB454	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	41	1
REMAP 2013	NB413	Grain Size	RBP2, Substrate, inorganic, sand, 0.06-2.0 mm	%	13	1
REMAP 2013	NB401	Grain Size	Substrate - silt/clay mix	%	85	1
REMAP 2013	NB406	Grain Size	Substrate - silt/clay mix	%	5.9	1
REMAP 2013	NB412	Grain Size	Substrate - silt/clay mix	%	90	1
REMAP 2013	NB416	Grain Size	Substrate - silt/clay mix	%	97	1
REMAP 2013	NB423	Grain Size	Substrate - silt/clay mix	%	39	1
REMAP 2013	NB426	Grain Size	Substrate - silt/clay mix	%	99.2	1
REMAP 2013	NB427	Grain Size	Substrate - silt/clay mix	%	62	1
REMAP 2013	NB431	Grain Size	Substrate - silt/clay mix	%	94	1
REMAP 2013	NB452	Grain Size	Substrate - silt/clay mix	%	36	1
REMAP 2013	NB454	Grain Size	Substrate - silt/clay mix	%	58.9	1
REMAP 2013	NB413	Grain Size	Substrate - silt/clay mix	%	88	1
REMAP 2013	NB401	Metals	Aluminum	ppm	54301	1
REMAP 2013	NB406	Metals	Aluminum	ppm	26376	1
REMAP 2013	NB412	Metals	Aluminum	ppm	66131	1
REMAP 2013	NB416	Metals	Aluminum	ppm	66130	1
REMAP 2013	NB423	Metals	Aluminum	ppm	58714	1
REMAP 2013	NB426	Metals	Aluminum	ppm	70432	1
REMAP 2013	NB427	Metals	Aluminum	ppm	55022	1
REMAP 2013	NB431	Metals	Aluminum	ppm	59583	1
REMAP 2013	NB452	Metals	Aluminum	ppm	40498	1
REMAP 2013	NB454	Metals	Aluminum	ppm	54538	1
REMAP 2013	NB413	Metals	Aluminum	ppm	71908	1
REMAP 2013	NB401	Metals	Antimony	ppm	0.9	1
REMAP 2013	NB406	Metals	Antimony	ppm	0.3	1
REMAP 2013	NB412	Metals	Antimony	ppm	1	1
REMAP 2013	NB416	Metals	Antimony	ppm	1.2	1
REMAP 2013	NB423	Metals	Antimony	ppm	1	1
REMAP 2013	NB426	Metals	Antimony	ppm	1.3	1
REMAP 2013	NB427	Metals	Antimony	ppm	0.8	1
REMAP 2013	NB431	Metals	Antimony	ppm	1.1	1
REMAP 2013	NB452	Metals	Antimony	ppm	0.5	1
REMAP 2013	NB454	Metals	Antimony	ppm	0.8	1
REMAP 2013	NB413	Metals	Antimony	ppm	1.9	1
REMAP 2013	NB401	Metals	Arsenic	ppm	12.4	1
REMAP 2013	NB406	Metals	Arsenic	ppm	4.4	1
REMAP 2013	NB412	Metals	Arsenic	ppm	14	1
REMAP 2013	NB416	Metals	Arsenic	ppm	15.4	1
REMAP 2013	NB423	Metals	Arsenic	ppm	14.3	1
REMAP 2013	NB426	Metals	Arsenic	ppm	16.5	1
REMAP 2013	NB427	Metals	Arsenic	ppm	9.1	1
REMAP 2013	NB431	Metals	Arsenic	ppm	12.2	1
REMAP 2013	NB452	Metals	Arsenic	ppm	6.2	1
REMAP 2013	NB454	Metals	Arsenic	ppm	9.1	1
REMAP 2013	NB413	Metals	Arsenic	ppm	19.4	1
REMAP 2013	NB401	Metals	Cadmium	ppm	1	1
REMAP 2013	NB406	Metals	Cadmium	ppm	0.2	1
REMAP 2013	NB412	Metals	Cadmium	ppm	1.1	1
REMAP 2013	NB416	Metals	Cadmium	ppm	1.7	1
REMAP 2013	NB423	Metals	Cadmium	ppm	1.1	1
REMAP 2013	NB426	Metals	Cadmium	ppm	1.3	1
REMAP 2013	NB427	Metals	Cadmium	ppm	1	1
REMAP 2013	NB431	Metals	Cadmium	ppm	1	1
REMAP 2013	NB452	Metals	Cadmium	ppm	0.8	1
REMAP 2013	NB454	Metals	Cadmium	ppm	1.2	1
REMAP 2013	NB413	Metals	Cadmium	ppm	1.9	1
REMAP 2013	NB401	Metals	Chromium	ppm	95.8	1
REMAP 2013	NB406	Metals	Chromium	ppm	35.2	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB412	Metals	Chromium	ppm	121.5	1
REMAP 2013	NB416	Metals	Chromium	ppm	155.3	1
REMAP 2013	NB423	Metals	Chromium	ppm	108.9	1
REMAP 2013	NB426	Metals	Chromium	ppm	157.7	1
REMAP 2013	NB427	Metals	Chromium	ppm	109.2	1
REMAP 2013	NB431	Metals	Chromium	ppm	137.3	1
REMAP 2013	NB452	Metals	Chromium	ppm	71.6	1
REMAP 2013	NB454	Metals	Chromium	ppm	100.1	1
REMAP 2013	NB413	Metals	Chromium	ppm	179.8	1
REMAP 2013	NB401	Metals	Copper	ppm	67.9	1
REMAP 2013	NB406	Metals	Copper	ppm	17.1	1
REMAP 2013	NB412	Metals	Copper	ppm	83.3	1
REMAP 2013	NB416	Metals	Copper	ppm	115.3	1
REMAP 2013	NB423	Metals	Copper	ppm	119.4	1
REMAP 2013	NB426	Metals	Copper	ppm	100.9	1
REMAP 2013	NB427	Metals	Copper	ppm	61.3	1
REMAP 2013	NB431	Metals	Copper	ppm	92.5	1
REMAP 2013	NB452	Metals	Copper	ppm	42	1
REMAP 2013	NB454	Metals	Copper	ppm	56.3	1
REMAP 2013	NB413	Metals	Copper	ppm	169.1	1
REMAP 2013	NB401	Metals	Iron	ppm	36458	1
REMAP 2013	NB406	Metals	Iron	ppm	9026	1
REMAP 2013	NB412	Metals	Iron	ppm	42621	1
REMAP 2013	NB416	Metals	Iron	ppm	50080	1
REMAP 2013	NB423	Metals	Iron	ppm	31653	1
REMAP 2013	NB426	Metals	Iron	ppm	46907	1
REMAP 2013	NB427	Metals	Iron	ppm	34180	1
REMAP 2013	NB431	Metals	Iron	ppm	41230	1
REMAP 2013	NB452	Metals	Iron	ppm	20744	1
REMAP 2013	NB454	Metals	Iron	ppm	28925	1
REMAP 2013	NB413	Metals	Iron	ppm	47217	1
REMAP 2013	NB401	Metals	Lead	ppm	69.3	1
REMAP 2013	NB406	Metals	Lead	ppm	24.6	1
REMAP 2013	NB412	Metals	Lead	ppm	96.1	1
REMAP 2013	NB416	Metals	Lead	ppm	128.3	1
REMAP 2013	NB423	Metals	Lead	ppm	89.7	1
REMAP 2013	NB426	Metals	Lead	ppm	122.3	1
REMAP 2013	NB427	Metals	Lead	ppm	80.2	1
REMAP 2013	NB431	Metals	Lead	ppm	104.9	1
REMAP 2013	NB452	Metals	Lead	ppm	62.4	1
REMAP 2013	NB454	Metals	Lead	ppm	65.7	1
REMAP 2013	NB413	Metals	Lead	ppm	180.6	1
REMAP 2013	NB401	Metals	Manganese	ppm	679.2	1
REMAP 2013	NB406	Metals	Manganese	ppm	191.6	1
REMAP 2013	NB412	Metals	Manganese	ppm	821.1	1
REMAP 2013	NB416	Metals	Manganese	ppm	725.6	1
REMAP 2013	NB423	Metals	Manganese	ppm	523.3	1
REMAP 2013	NB426	Metals	Manganese	ppm	799.7	1
REMAP 2013	NB427	Metals	Manganese	ppm	557.6	1
REMAP 2013	NB431	Metals	Manganese	ppm	575.4	1
REMAP 2013	NB452	Metals	Manganese	ppm	344.4	1
REMAP 2013	NB454	Metals	Manganese	ppm	441.4	1
REMAP 2013	NB413	Metals	Manganese	ppm	710.8	1
REMAP 2013	NB401	Metals	Mercury	ppm	1.4	1
REMAP 2013	NB406	Metals	Mercury	ppm	0.22	1
REMAP 2013	NB412	Metals	Mercury	ppm	1.48	1
REMAP 2013	NB416	Metals	Mercury	ppm	1.91	1
REMAP 2013	NB423	Metals	Mercury	ppm	1.22	1
REMAP 2013	NB426	Metals	Mercury	ppm	1.68	1
REMAP 2013	NB427	Metals	Mercury	ppm	1.88	1
REMAP 2013	NB431	Metals	Mercury	ppm	1.75	1
REMAP 2013	NB452	Metals	Mercury	ppm	0.78	1
REMAP 2013	NB454	Metals	Mercury	ppm	1.69	1
REMAP 2013	NB413	Metals	Mercury	ppm	2.14	1
REMAP 2013	NB401	Metals	Nickel	ppm	43.3	1
REMAP 2013	NB406	Metals	Nickel	ppm	13.6	1
REMAP 2013	NB412	Metals	Nickel	ppm	50.3	1
REMAP 2013	NB416	Metals	Nickel	ppm	54.1	1
REMAP 2013	NB423	Metals	Nickel	ppm	72.9	1
REMAP 2013	NB426	Metals	Nickel	ppm	58.1	1
REMAP 2013	NB427	Metals	Nickel	ppm	30.3	1
REMAP 2013	NB431	Metals	Nickel	ppm	68.7	1
REMAP 2013	NB452	Metals	Nickel	ppm	27	1
REMAP 2013	NB454	Metals	Nickel	ppm	29.6	1
REMAP 2013	NB413	Metals	Nickel	ppm	75.9	1
REMAP 2013	NB401	Metals	Selenium	ppm	0.5	1
REMAP 2013	NB406	Metals	Selenium	ppm	0.1	1
REMAP 2013	NB412	Metals	Selenium	ppm	0.8	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB416	Metals	Selenium	ppm	1	1
REMAP 2013	NB423	Metals	Selenium	ppm	0.7	1
REMAP 2013	NB426	Metals	Selenium	ppm	0.9	1
REMAP 2013	NB427	Metals	Selenium	ppm	0.5	1
REMAP 2013	NB431	Metals	Selenium	ppm	0.7	1
REMAP 2013	NB452	Metals	Selenium	ppm	0.3	1
REMAP 2013	NB454	Metals	Selenium	ppm	0.3	1
REMAP 2013	NB413	Metals	Selenium	ppm	1.3	1
REMAP 2013	NB401	Metals	Silver	ppm	1.2	1
REMAP 2013	NB406	Metals	Silver	ppm	0.2	1
REMAP 2013	NB412	Metals	Silver	ppm	1.4	1
REMAP 2013	NB416	Metals	Silver	ppm	1.7	1
REMAP 2013	NB423	Metals	Silver	ppm	1.2	1
REMAP 2013	NB426	Metals	Silver	ppm	1.7	1
REMAP 2013	NB427	Metals	Silver	ppm	0.9	1
REMAP 2013	NB431	Metals	Silver	ppm	1.6	1
REMAP 2013	NB452	Metals	Silver	ppm	0.6	1
REMAP 2013	NB454	Metals	Silver	ppm	1.4	1
REMAP 2013	NB413	Metals	Silver	ppm	2.3	1
REMAP 2013	NB401	Metals	Tin	ppm	19.9	1
REMAP 2013	NB406	Metals	Tin	ppm	5.2	1
REMAP 2013	NB412	Metals	Tin	ppm	22.1	1
REMAP 2013	NB416	Metals	Tin	ppm	36.7	1
REMAP 2013	NB423	Metals	Tin	ppm	19.6	1
REMAP 2013	NB426	Metals	Tin	ppm	27.9	1
REMAP 2013	NB427	Metals	Tin	ppm	20.2	1
REMAP 2013	NB431	Metals	Tin	ppm	24	1
REMAP 2013	NB452	Metals	Tin	ppm	30.1	1
REMAP 2013	NB454	Metals	Tin	ppm	26.9	1
REMAP 2013	NB413	Metals	Tin	ppm	30.4	1
REMAP 2013	NB401	Metals	Zinc	ppm	160.4	1
REMAP 2013	NB406	Metals	Zinc	ppm	45.9	1
REMAP 2013	NB412	Metals	Zinc	ppm	205.7	1
REMAP 2013	NB416	Metals	Zinc	ppm	202.3	1
REMAP 2013	NB423	Metals	Zinc	ppm	184.1	1
REMAP 2013	NB426	Metals	Zinc	ppm	249.4	1
REMAP 2013	NB427	Metals	Zinc	ppm	154.8	1
REMAP 2013	NB431	Metals	Zinc	ppm	205.4	1
REMAP 2013	NB452	Metals	Zinc	ppm	91.5	1
REMAP 2013	NB454	Metals	Zinc	ppm	115.8	1
REMAP 2013	NB413	Metals	Zinc	ppm	362.1	1
REMAP 2013	NB401	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB406	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB412	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB416	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB423	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB426	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB427	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB431	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB452	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB454	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB413	Pesticides	Aldrin	ppb	1	0
REMAP 2013	NB401	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB406	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB412	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB416	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB423	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB426	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB427	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB431	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB452	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB454	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB413	Pesticides	BHC, .beta.-BHC & .gamma.-BHC mix, unspecified	ppb	1	0
REMAP 2013	NB401	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB406	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB412	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB416	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB423	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB426	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB427	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB431	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB452	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB454	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB413	Pesticides	Chlordane	ppb	0	0
REMAP 2013	NB401	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB406	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB412	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB416	Pesticides	Dieldrin	ppb	1	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB423	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB426	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB427	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB431	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB452	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB454	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB413	Pesticides	Dieldrin	ppb	1	0
REMAP 2013	NB401	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB406	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB412	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB416	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB423	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB426	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB427	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB431	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB452	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB454	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB413	Pesticides	Endrin	ppb	1	0
REMAP 2013	NB401	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB406	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB412	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB416	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB423	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB426	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB427	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB431	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB452	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB454	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB413	Pesticides	Heptachlor	ppb	1	0
REMAP 2013	NB401	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB406	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB412	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB416	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB423	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB426	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB427	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB431	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB452	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB454	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB413	Pesticides	Heptachlor epoxide	ppb	1	0
REMAP 2013	NB401	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB406	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB412	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB416	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB423	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB426	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB427	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB431	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB452	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB454	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB413	Pesticides	Hexachlorobenzene	ppb	1	0
REMAP 2013	NB401	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB406	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB412	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB416	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB423	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB426	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB427	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB431	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB452	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB454	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB413	Pesticides	Methoxychlor	ppb	1	0
REMAP 2013	NB401	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB406	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB412	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB416	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB423	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB426	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB427	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB431	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB452	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB454	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB413	Pesticides	Mirex	ppb	1	0
REMAP 2013	NB401	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB406	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB412	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB416	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB423	Pesticides	Oxychlordane	ppb	1	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB426	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB427	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB431	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB452	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB454	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB413	Pesticides	Oxychlordane	ppb	1	0
REMAP 2013	NB401	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	0
REMAP 2013	NB406	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	0
REMAP 2013	NB412	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	0
REMAP 2013	NB413	Pesticides	Total DDx (2,4 & 4,4)	ppb	3.8	1
REMAP 2013	NB416	Pesticides	Total DDx (2,4 & 4,4)	ppb	2.2	1
REMAP 2013	NB423	Pesticides	Total DDx (2,4 & 4,4)	ppb	7.3	1
REMAP 2013	NB426	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	0
REMAP 2013	NB427	Pesticides	Total DDx (2,4 & 4,4)	ppb	13.1	1
REMAP 2013	NB431	Pesticides	Total DDx (2,4 & 4,4)	ppb	1	0
REMAP 2013	NB452	Pesticides	Total DDx (2,4 & 4,4)	ppb	3.1	1
REMAP 2013	NB454	Pesticides	Total DDx (2,4 & 4,4)	ppb	13.7	1
REMAP 2013	NB401	Pesticides	Total DDx (4,4)	ppb	1	0
REMAP 2013	NB406	Pesticides	Total DDx (4,4)	ppb	1	0
REMAP 2013	NB412	Pesticides	Total DDx (4,4)	ppb	1	0
REMAP 2013	NB413	Pesticides	Total DDx (4,4)	ppb	3.8	1
REMAP 2013	NB416	Pesticides	Total DDx (4,4)	ppb	2.2	1
REMAP 2013	NB423	Pesticides	Total DDx (4,4)	ppb	6	1
REMAP 2013	NB426	Pesticides	Total DDx (4,4)	ppb	1	0
REMAP 2013	NB427	Pesticides	Total DDx (4,4)	ppb	8.3	1
REMAP 2013	NB431	Pesticides	Total DDx (4,4)	ppb	1	0
REMAP 2013	NB452	Pesticides	Total DDx (4,4)	ppb	3.1	1
REMAP 2013	NB454	Pesticides	Total DDx (4,4)	ppb	7.9	1
REMAP 2013	NB401	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB406	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB412	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB413	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB416	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB423	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB426	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB427	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB431	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB452	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB454	Pesticides	Total alpha + gamma chlordane	ppb	1	0
REMAP 2013	NB401	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB406	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB412	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB416	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB423	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB426	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB427	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB431	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB452	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB454	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB413	Pesticides	cis-Chlordane	ppb	1	0
REMAP 2013	NB401	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB406	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB412	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB416	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB423	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB426	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB427	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB431	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB452	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB454	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB413	Pesticides	cis-Nonachlor	ppb	1	0
REMAP 2013	NB401	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB406	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB412	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB416	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB423	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB426	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB427	Pesticides	o,p'-DDD	ppb	1.9	1
REMAP 2013	NB431	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB452	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB454	Pesticides	o,p'-DDD	ppb	1.4	1
REMAP 2013	NB413	Pesticides	o,p'-DDD	ppb	1	0
REMAP 2013	NB401	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB406	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB412	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB416	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB423	Pesticides	o,p'-DDE	ppb	1.3	1
REMAP 2013	NB426	Pesticides	o,p'-DDE	ppb	1	0

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB427	Pesticides	o,p'-DDE	ppb	2.9	1
REMAP 2013	NB431	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB452	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB454	Pesticides	o,p'-DDE	ppb	1.1	1
REMAP 2013	NB413	Pesticides	o,p'-DDE	ppb	1	0
REMAP 2013	NB401	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB406	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB412	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB416	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB423	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB426	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB427	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB431	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB452	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB454	Pesticides	o,p'-DDT	ppb	3.3	1
REMAP 2013	NB413	Pesticides	o,p'-DDT	ppb	1	0
REMAP 2013	NB401	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB406	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB412	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB416	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB423	Pesticides	p,p'-DDD	ppb	2.3	1
REMAP 2013	NB426	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB427	Pesticides	p,p'-DDD	ppb	2.9	1
REMAP 2013	NB431	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB452	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB454	Pesticides	p,p'-DDD	ppb	3.2	1
REMAP 2013	NB413	Pesticides	p,p'-DDD	ppb	1	0
REMAP 2013	NB401	Pesticides	p,p'-DDE	ppb	1	0
REMAP 2013	NB406	Pesticides	p,p'-DDE	ppb	1	0
REMAP 2013	NB412	Pesticides	p,p'-DDE	ppb	1	0
REMAP 2013	NB416	Pesticides	p,p'-DDE	ppb	2.2	1
REMAP 2013	NB423	Pesticides	p,p'-DDE	ppb	3.7	1
REMAP 2013	NB426	Pesticides	p,p'-DDE	ppb	1	0
REMAP 2013	NB427	Pesticides	p,p'-DDE	ppb	5.4	1
REMAP 2013	NB431	Pesticides	p,p'-DDE	ppb	1	0
REMAP 2013	NB452	Pesticides	p,p'-DDE	ppb	3.1	1
REMAP 2013	NB454	Pesticides	p,p'-DDE	ppb	4.7	1
REMAP 2013	NB413	Pesticides	p,p'-DDE	ppb	3.8	1
REMAP 2013	NB401	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB406	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB412	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB416	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB423	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB426	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB427	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB431	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB452	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB454	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB413	Pesticides	p,p'-DDT	ppb	1	0
REMAP 2013	NB401	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB406	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB412	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB416	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB423	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB426	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB427	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB431	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB452	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB454	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB413	Pesticides	trans-Chlordane	ppb	1	0
REMAP 2013	NB401	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB406	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB412	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB416	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB423	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB426	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB427	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB431	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB452	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB454	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB413	Pesticides	trans-Nonachlor	ppb	1	0
REMAP 2013	NB401	PAHs	1-Methylnaphthalene	ppb	2.7	1
REMAP 2013	NB406	PAHs	1-Methylnaphthalene	ppb	17.4	1
REMAP 2013	NB412	PAHs	1-Methylnaphthalene	ppb	5.1	1
REMAP 2013	NB416	PAHs	1-Methylnaphthalene	ppb	8.4	1
REMAP 2013	NB423	PAHs	1-Methylnaphthalene	ppb	19.8	1
REMAP 2013	NB426	PAHs	1-Methylnaphthalene	ppb	3.6	1
REMAP 2013	NB427	PAHs	1-Methylnaphthalene	ppb	19	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB431	PAHs	1-Methylnaphthalene	ppb	4.8	1
REMAP 2013	NB452	PAHs	1-Methylnaphthalene	ppb	6.8	1
REMAP 2013	NB454	PAHs	1-Methylnaphthalene	ppb	5.4	1
REMAP 2013	NB413	PAHs	1-Methylnaphthalene	ppb	5	1
REMAP 2013	NB401	PAHs	1-Methylphenanthrene	ppb	4.5	1
REMAP 2013	NB406	PAHs	1-Methylphenanthrene	ppb	32.9	1
REMAP 2013	NB412	PAHs	1-Methylphenanthrene	ppb	10.9	1
REMAP 2013	NB416	PAHs	1-Methylphenanthrene	ppb	13.7	1
REMAP 2013	NB423	PAHs	1-Methylphenanthrene	ppb	21	1
REMAP 2013	NB426	PAHs	1-Methylphenanthrene	ppb	11.4	1
REMAP 2013	NB427	PAHs	1-Methylphenanthrene	ppb	114.4	1
REMAP 2013	NB431	PAHs	1-Methylphenanthrene	ppb	7.1	1
REMAP 2013	NB452	PAHs	1-Methylphenanthrene	ppb	33.2	1
REMAP 2013	NB454	PAHs	1-Methylphenanthrene	ppb	21.2	1
REMAP 2013	NB413	PAHs	1-Methylphenanthrene	ppb	14.4	1
REMAP 2013	NB401	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	1.1	1
REMAP 2013	NB406	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	7	1
REMAP 2013	NB412	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	3.6	1
REMAP 2013	NB416	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	3.1	1
REMAP 2013	NB423	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	5.8	1
REMAP 2013	NB426	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	2.8	1
REMAP 2013	NB427	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	18.8	1
REMAP 2013	NB431	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	2.3	1
REMAP 2013	NB452	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	6.1	1
REMAP 2013	NB454	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	3.7	1
REMAP 2013	NB413	PAHs	-Trimethylnaphthalene***retired***use 1,6,7-Trimethylnaphth	ppb	5.7	1
REMAP 2013	NB401	PAHs	2,6-Dimethylnaphthalene	ppb	1	0
REMAP 2013	NB406	PAHs	2,6-Dimethylnaphthalene	ppb	15.5	1
REMAP 2013	NB412	PAHs	2,6-Dimethylnaphthalene	ppb	4.8	1
REMAP 2013	NB416	PAHs	2,6-Dimethylnaphthalene	ppb	6.5	1
REMAP 2013	NB423	PAHs	2,6-Dimethylnaphthalene	ppb	17.3	1
REMAP 2013	NB426	PAHs	2,6-Dimethylnaphthalene	ppb	4	1
REMAP 2013	NB427	PAHs	2,6-Dimethylnaphthalene	ppb	19.1	1
REMAP 2013	NB431	PAHs	2,6-Dimethylnaphthalene	ppb	3.4	1
REMAP 2013	NB452	PAHs	2,6-Dimethylnaphthalene	ppb	6.8	1
REMAP 2013	NB454	PAHs	2,6-Dimethylnaphthalene	ppb	5.9	1
REMAP 2013	NB413	PAHs	2,6-Dimethylnaphthalene	ppb	5.7	1
REMAP 2013	NB401	PAHs	2-Methylnaphthalene	ppb	1.6	1
REMAP 2013	NB406	PAHs	2-Methylnaphthalene	ppb	22.9	1
REMAP 2013	NB412	PAHs	2-Methylnaphthalene	ppb	9.4	1
REMAP 2013	NB416	PAHs	2-Methylnaphthalene	ppb	14	1
REMAP 2013	NB423	PAHs	2-Methylnaphthalene	ppb	34.1	1
REMAP 2013	NB426	PAHs	2-Methylnaphthalene	ppb	8.2	1
REMAP 2013	NB427	PAHs	2-Methylnaphthalene	ppb	27.6	1
REMAP 2013	NB431	PAHs	2-Methylnaphthalene	ppb	8	1
REMAP 2013	NB452	PAHs	2-Methylnaphthalene	ppb	8.8	1
REMAP 2013	NB454	PAHs	2-Methylnaphthalene	ppb	10.6	1
REMAP 2013	NB413	PAHs	2-Methylnaphthalene	ppb	10.1	1
REMAP 2013	NB401	PAHs	Acenaphthene	ppb	4	1
REMAP 2013	NB406	PAHs	Acenaphthene	ppb	38.3	1
REMAP 2013	NB412	PAHs	Acenaphthene	ppb	8.3	1
REMAP 2013	NB416	PAHs	Acenaphthene	ppb	9.1	1
REMAP 2013	NB423	PAHs	Acenaphthene	ppb	15.4	1
REMAP 2013	NB426	PAHs	Acenaphthene	ppb	5	1
REMAP 2013	NB427	PAHs	Acenaphthene	ppb	86.8	1
REMAP 2013	NB431	PAHs	Acenaphthene	ppb	4	1
REMAP 2013	NB452	PAHs	Acenaphthene	ppb	15.9	1
REMAP 2013	NB454	PAHs	Acenaphthene	ppb	6	1
REMAP 2013	NB413	PAHs	Acenaphthene	ppb	6.6	1
REMAP 2013	NB401	PAHs	Acenaphthylene	ppb	7.9	1
REMAP 2013	NB406	PAHs	Acenaphthylene	ppb	36.7	1
REMAP 2013	NB412	PAHs	Acenaphthylene	ppb	24.2	1
REMAP 2013	NB416	PAHs	Acenaphthylene	ppb	17.7	1
REMAP 2013	NB423	PAHs	Acenaphthylene	ppb	18.1	1
REMAP 2013	NB426	PAHs	Acenaphthylene	ppb	14	1
REMAP 2013	NB427	PAHs	Acenaphthylene	ppb	204	1
REMAP 2013	NB431	PAHs	Acenaphthylene	ppb	9.6	1
REMAP 2013	NB452	PAHs	Acenaphthylene	ppb	26.3	1
REMAP 2013	NB454	PAHs	Acenaphthylene	ppb	96.7	1
REMAP 2013	NB413	PAHs	Acenaphthylene	ppb	16.1	1
REMAP 2013	NB401	PAHs	Anthracene	ppb	17.4	1
REMAP 2013	NB406	PAHs	Anthracene	ppb	92	1
REMAP 2013	NB412	PAHs	Anthracene	ppb	137.2	1
REMAP 2013	NB416	PAHs	Anthracene	ppb	28.2	1
REMAP 2013	NB423	PAHs	Anthracene	ppb	46.8	1
REMAP 2013	NB426	PAHs	Anthracene	ppb	123.2	1
REMAP 2013	NB427	PAHs	Anthracene	ppb	369	1
REMAP 2013	NB431	PAHs	Anthracene	ppb	19.3	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB452	PAHs	Anthracene	ppb	76.1	1
REMAP 2013	NB454	PAHs	Anthracene	ppb	47.9	1
REMAP 2013	NB413	PAHs	Anthracene	ppb	25.5	1
REMAP 2013	NB401	PAHs	Benz[a]anthracene	ppb	82.8	1
REMAP 2013	NB406	PAHs	Benz[a]anthracene	ppb	169.1	1
REMAP 2013	NB412	PAHs	Benz[a]anthracene	ppb	113.6	1
REMAP 2013	NB416	PAHs	Benz[a]anthracene	ppb	98.7	1
REMAP 2013	NB423	PAHs	Benz[a]anthracene	ppb	118.4	1
REMAP 2013	NB426	PAHs	Benz[a]anthracene	ppb	85.6	1
REMAP 2013	NB427	PAHs	Benz[a]anthracene	ppb	1542.3	1
REMAP 2013	NB431	PAHs	Benz[a]anthracene	ppb	58.4	1
REMAP 2013	NB452	PAHs	Benz[a]anthracene	ppb	339.6	1
REMAP 2013	NB454	PAHs	Benz[a]anthracene	ppb	430.2	1
REMAP 2013	NB413	PAHs	Benz[a]anthracene	ppb	102.1	1
REMAP 2013	NB401	PAHs	Benzo(b)fluoranthene	ppb	92.4	1
REMAP 2013	NB406	PAHs	Benzo(b)fluoranthene	ppb	124.4	1
REMAP 2013	NB412	PAHs	Benzo(b)fluoranthene	ppb	89.4	1
REMAP 2013	NB416	PAHs	Benzo(b)fluoranthene	ppb	96.3	1
REMAP 2013	NB423	PAHs	Benzo(b)fluoranthene	ppb	99.7	1
REMAP 2013	NB426	PAHs	Benzo(b)fluoranthene	ppb	78.6	1
REMAP 2013	NB427	PAHs	Benzo(b)fluoranthene	ppb	1070.9	1
REMAP 2013	NB431	PAHs	Benzo(b)fluoranthene	ppb	51.8	1
REMAP 2013	NB452	PAHs	Benzo(b)fluoranthene	ppb	234	1
REMAP 2013	NB454	PAHs	Benzo(b)fluoranthene	ppb	592.5	1
REMAP 2013	NB413	PAHs	Benzo(b)fluoranthene	ppb	95.3	1
REMAP 2013	NB401	PAHs	Benzo[a]pyrene	ppb	105.4	1
REMAP 2013	NB406	PAHs	Benzo[a]pyrene	ppb	194.3	1
REMAP 2013	NB412	PAHs	Benzo[a]pyrene	ppb	124.4	1
REMAP 2013	NB416	PAHs	Benzo[a]pyrene	ppb	102.4	1
REMAP 2013	NB423	PAHs	Benzo[a]pyrene	ppb	144.1	1
REMAP 2013	NB426	PAHs	Benzo[a]pyrene	ppb	88.5	1
REMAP 2013	NB427	PAHs	Benzo[a]pyrene	ppb	1406	1
REMAP 2013	NB431	PAHs	Benzo[a]pyrene	ppb	64.5	1
REMAP 2013	NB452	PAHs	Benzo[a]pyrene	ppb	323.7	1
REMAP 2013	NB454	PAHs	Benzo[a]pyrene	ppb	985.4	1
REMAP 2013	NB413	PAHs	Benzo[a]pyrene	ppb	101.8	1
REMAP 2013	NB401	PAHs	Benzo[b,k]fluoranthene	ppb	134.6	1
REMAP 2013	NB406	PAHs	Benzo[b,k]fluoranthene	ppb	262.3	1
REMAP 2013	NB412	PAHs	Benzo[b,k]fluoranthene	ppb	144	1
REMAP 2013	NB416	PAHs	Benzo[b,k]fluoranthene	ppb	151.4	1
REMAP 2013	NB423	PAHs	Benzo[b,k]fluoranthene	ppb	211.5	1
REMAP 2013	NB426	PAHs	Benzo[b,k]fluoranthene	ppb	160.6	1
REMAP 2013	NB427	PAHs	Benzo[b,k]fluoranthene	ppb	2260.9	1
REMAP 2013	NB431	PAHs	Benzo[b,k]fluoranthene	ppb	114.3	1
REMAP 2013	NB452	PAHs	Benzo[b,k]fluoranthene	ppb	479.7	1
REMAP 2013	NB454	PAHs	Benzo[b,k]fluoranthene	ppb	897.5	1
REMAP 2013	NB413	PAHs	Benzo[b,k]fluoranthene	ppb	194.9	1
REMAP 2013	NB401	PAHs	Benzo[e]pyrene	ppb	64.7	1
REMAP 2013	NB406	PAHs	Benzo[e]pyrene	ppb	129.9	1
REMAP 2013	NB412	PAHs	Benzo[e]pyrene	ppb	82.1	1
REMAP 2013	NB416	PAHs	Benzo[e]pyrene	ppb	85.7	1
REMAP 2013	NB423	PAHs	Benzo[e]pyrene	ppb	98.4	1
REMAP 2013	NB426	PAHs	Benzo[e]pyrene	ppb	68.4	1
REMAP 2013	NB427	PAHs	Benzo[e]pyrene	ppb	843.5	1
REMAP 2013	NB431	PAHs	Benzo[e]pyrene	ppb	48.2	1
REMAP 2013	NB452	PAHs	Benzo[e]pyrene	ppb	202.3	1
REMAP 2013	NB454	PAHs	Benzo[e]pyrene	ppb	498.4	1
REMAP 2013	NB413	PAHs	Benzo[e]pyrene	ppb	82.2	1
REMAP 2013	NB401	PAHs	Benzo[ghi]perylene	ppb	53.9	1
REMAP 2013	NB406	PAHs	Benzo[ghi]perylene	ppb	149.9	1
REMAP 2013	NB412	PAHs	Benzo[ghi]perylene	ppb	74	1
REMAP 2013	NB416	PAHs	Benzo[ghi]perylene	ppb	84.3	1
REMAP 2013	NB423	PAHs	Benzo[ghi]perylene	ppb	93.1	1
REMAP 2013	NB426	PAHs	Benzo[ghi]perylene	ppb	61.9	1
REMAP 2013	NB427	PAHs	Benzo[ghi]perylene	ppb	761.1	1
REMAP 2013	NB431	PAHs	Benzo[ghi]perylene	ppb	51.4	1
REMAP 2013	NB452	PAHs	Benzo[ghi]perylene	ppb	181	1
REMAP 2013	NB454	PAHs	Benzo[ghi]perylene	ppb	305.8	1
REMAP 2013	NB413	PAHs	Benzo[ghi]perylene	ppb	77.7	1
REMAP 2013	NB401	PAHs	Benzo[k]fluoranthene	ppb	42.2	1
REMAP 2013	NB406	PAHs	Benzo[k]fluoranthene	ppb	137.9	1
REMAP 2013	NB412	PAHs	Benzo[k]fluoranthene	ppb	54.6	1
REMAP 2013	NB416	PAHs	Benzo[k]fluoranthene	ppb	55.1	1
REMAP 2013	NB423	PAHs	Benzo[k]fluoranthene	ppb	111.8	1
REMAP 2013	NB426	PAHs	Benzo[k]fluoranthene	ppb	82	1
REMAP 2013	NB427	PAHs	Benzo[k]fluoranthene	ppb	1190	1
REMAP 2013	NB431	PAHs	Benzo[k]fluoranthene	ppb	62.5	1
REMAP 2013	NB452	PAHs	Benzo[k]fluoranthene	ppb	245.7	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB454	PAHs	Benzo[k]fluoranthene	ppb	305	1
REMAP 2013	NB413	PAHs	Benzo[k]fluoranthene	ppb	99.6	1
REMAP 2013	NB401	PAHs	Biphenyl	ppb	1.3	1
REMAP 2013	NB406	PAHs	Biphenyl	ppb	7.8	1
REMAP 2013	NB412	PAHs	Biphenyl	ppb	3.3	1
REMAP 2013	NB416	PAHs	Biphenyl	ppb	3.5	1
REMAP 2013	NB423	PAHs	Biphenyl	ppb	6.7	1
REMAP 2013	NB426	PAHs	Biphenyl	ppb	2.3	1
REMAP 2013	NB427	PAHs	Biphenyl	ppb	8.6	1
REMAP 2013	NB431	PAHs	Biphenyl	ppb	1.9	1
REMAP 2013	NB452	PAHs	Biphenyl	ppb	3.3	1
REMAP 2013	NB454	PAHs	Biphenyl	ppb	3	1
REMAP 2013	NB413	PAHs	Biphenyl	ppb	3.5	1
REMAP 2013	NB401	PAHs	Chrysene	ppb	78.2	1
REMAP 2013	NB406	PAHs	Chrysene	ppb	181.4	1
REMAP 2013	NB412	PAHs	Chrysene	ppb	130	1
REMAP 2013	NB416	PAHs	Chrysene	ppb	125.4	1
REMAP 2013	NB423	PAHs	Chrysene	ppb	143.1	1
REMAP 2013	NB426	PAHs	Chrysene	ppb	102.3	1
REMAP 2013	NB427	PAHs	Chrysene	ppb	1418.8	1
REMAP 2013	NB431	PAHs	Chrysene	ppb	67.5	1
REMAP 2013	NB452	PAHs	Chrysene	ppb	358.1	1
REMAP 2013	NB454	PAHs	Chrysene	ppb	424.6	1
REMAP 2013	NB413	PAHs	Chrysene	ppb	126.5	1
REMAP 2013	NB401	PAHs	Dibenz[a,h]anthracene	ppb	24.3	1
REMAP 2013	NB406	PAHs	Dibenz[a,h]anthracene	ppb	40.3	1
REMAP 2013	NB412	PAHs	Dibenz[a,h]anthracene	ppb	19.1	1
REMAP 2013	NB416	PAHs	Dibenz[a,h]anthracene	ppb	17.5	1
REMAP 2013	NB423	PAHs	Dibenz[a,h]anthracene	ppb	26.8	1
REMAP 2013	NB426	PAHs	Dibenz[a,h]anthracene	ppb	18.1	1
REMAP 2013	NB427	PAHs	Dibenz[a,h]anthracene	ppb	265	1
REMAP 2013	NB431	PAHs	Dibenz[a,h]anthracene	ppb	12.4	1
REMAP 2013	NB452	PAHs	Dibenz[a,h]anthracene	ppb	61	1
REMAP 2013	NB454	PAHs	Dibenz[a,h]anthracene	ppb	158.7	1
REMAP 2013	NB413	PAHs	Dibenz[a,h]anthracene	ppb	22.9	1
REMAP 2013	NB401	PAHs	Fluoranthene	ppb	109.2	1
REMAP 2013	NB406	PAHs	Fluoranthene	ppb	312.8	1
REMAP 2013	NB412	PAHs	Fluoranthene	ppb	141.3	1
REMAP 2013	NB416	PAHs	Fluoranthene	ppb	212.2	1
REMAP 2013	NB423	PAHs	Fluoranthene	ppb	180.2	1
REMAP 2013	NB426	PAHs	Fluoranthene	ppb	141.1	1
REMAP 2013	NB427	PAHs	Fluoranthene	ppb	2267.1	1
REMAP 2013	NB431	PAHs	Fluoranthene	ppb	105.2	1
REMAP 2013	NB452	PAHs	Fluoranthene	ppb	523.9	1
REMAP 2013	NB454	PAHs	Fluoranthene	ppb	261.8	1
REMAP 2013	NB413	PAHs	Fluoranthene	ppb	232.3	1
REMAP 2013	NB401	PAHs	Fluorene	ppb	1.2	1
REMAP 2013	NB406	PAHs	Fluorene	ppb	38.7	1
REMAP 2013	NB412	PAHs	Fluorene	ppb	19.1	1
REMAP 2013	NB416	PAHs	Fluorene	ppb	9.6	1
REMAP 2013	NB423	PAHs	Fluorene	ppb	14.3	1
REMAP 2013	NB426	PAHs	Fluorene	ppb	12.6	1
REMAP 2013	NB427	PAHs	Fluorene	ppb	59	1
REMAP 2013	NB431	PAHs	Fluorene	ppb	3.8	1
REMAP 2013	NB452	PAHs	Fluorene	ppb	16.3	1
REMAP 2013	NB454	PAHs	Fluorene	ppb	7.2	1
REMAP 2013	NB413	PAHs	Fluorene	ppb	8.2	1
REMAP 2013	NB401	PAHs	Indeno[1,2,3-cd]pyrene	ppb	73.7	1
REMAP 2013	NB406	PAHs	Indeno[1,2,3-cd]pyrene	ppb	146.7	1
REMAP 2013	NB412	PAHs	Indeno[1,2,3-cd]pyrene	ppb	73	1
REMAP 2013	NB416	PAHs	Indeno[1,2,3-cd]pyrene	ppb	78.5	1
REMAP 2013	NB423	PAHs	Indeno[1,2,3-cd]pyrene	ppb	96.4	1
REMAP 2013	NB426	PAHs	Indeno[1,2,3-cd]pyrene	ppb	64.3	1
REMAP 2013	NB427	PAHs	Indeno[1,2,3-cd]pyrene	ppb	915.2	1
REMAP 2013	NB431	PAHs	Indeno[1,2,3-cd]pyrene	ppb	51.1	1
REMAP 2013	NB452	PAHs	Indeno[1,2,3-cd]pyrene	ppb	203	1
REMAP 2013	NB454	PAHs	Indeno[1,2,3-cd]pyrene	ppb	430.9	1
REMAP 2013	NB413	PAHs	Indeno[1,2,3-cd]pyrene	ppb	80	1
REMAP 2013	NB401	PAHs	Naphthalene	ppb	7.6	1
REMAP 2013	NB406	PAHs	Naphthalene	ppb	36.8	1
REMAP 2013	NB412	PAHs	Naphthalene	ppb	28.5	1
REMAP 2013	NB416	PAHs	Naphthalene	ppb	53.1	1
REMAP 2013	NB423	PAHs	Naphthalene	ppb	84.3	1
REMAP 2013	NB426	PAHs	Naphthalene	ppb	22.9	1
REMAP 2013	NB427	PAHs	Naphthalene	ppb	141.7	1
REMAP 2013	NB431	PAHs	Naphthalene	ppb	25.3	1
REMAP 2013	NB452	PAHs	Naphthalene	ppb	30.8	1
REMAP 2013	NB454	PAHs	Naphthalene	ppb	31.1	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB413	PAHs	Naphthalene	ppb	28.7	1
REMAP 2013	NB401	PAHs	Perylene	ppb	18.2	1
REMAP 2013	NB406	PAHs	Perylene	ppb	51.6	1
REMAP 2013	NB412	PAHs	Perylene	ppb	27	1
REMAP 2013	NB416	PAHs	Perylene	ppb	25.3	1
REMAP 2013	NB423	PAHs	Perylene	ppb	33.5	1
REMAP 2013	NB426	PAHs	Perylene	ppb	25	1
REMAP 2013	NB427	PAHs	Perylene	ppb	357.5	1
REMAP 2013	NB431	PAHs	Perylene	ppb	19.2	1
REMAP 2013	NB452	PAHs	Perylene	ppb	78.1	1
REMAP 2013	NB454	PAHs	Perylene	ppb	93	1
REMAP 2013	NB413	PAHs	Perylene	ppb	30.5	1
REMAP 2013	NB401	PAHs	Phenanthrene	ppb	28	1
REMAP 2013	NB406	PAHs	Phenanthrene	ppb	250	1
REMAP 2013	NB412	PAHs	Phenanthrene	ppb	73.2	1
REMAP 2013	NB416	PAHs	Phenanthrene	ppb	74	1
REMAP 2013	NB423	PAHs	Phenanthrene	ppb	97.9	1
REMAP 2013	NB426	PAHs	Phenanthrene	ppb	56.8	1
REMAP 2013	NB427	PAHs	Phenanthrene	ppb	529.6	1
REMAP 2013	NB431	PAHs	Phenanthrene	ppb	37.6	1
REMAP 2013	NB452	PAHs	Phenanthrene	ppb	202.6	1
REMAP 2013	NB454	PAHs	Phenanthrene	ppb	54.1	1
REMAP 2013	NB413	PAHs	Phenanthrene	ppb	84	1
REMAP 2013	NB401	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	849.7	1
REMAP 2013	NB406	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	1962.9	1
REMAP 2013	NB412	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	1072.2	1
REMAP 2013	NB416	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	1172.2	1
REMAP 2013	NB423	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	1359	1
REMAP 2013	NB426	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	954.4	1
REMAP 2013	NB427	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	14038.3	1
REMAP 2013	NB431	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	693.3	1
REMAP 2013	NB452	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	3261.4	1
REMAP 2013	NB454	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	4877.2	1
REMAP 2013	NB413	PAHs	Polycyclic aromatic hydrocarbons, high molecular weight	ppb	1263.1	1
REMAP 2013	NB401	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	77.3	1
REMAP 2013	NB406	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	596	1
REMAP 2013	NB412	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	327.6	1
REMAP 2013	NB416	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	240.9	1
REMAP 2013	NB423	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	381.5	1
REMAP 2013	NB426	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	266.8	1
REMAP 2013	NB427	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	1597.6	1
REMAP 2013	NB431	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	127.1	1
REMAP 2013	NB452	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	433	1
REMAP 2013	NB454	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	292.8	1
REMAP 2013	NB413	PAHs	Polycyclic aromatic hydrocarbons, low molecular weight	ppb	213.5	1
REMAP 2013	NB401	PAHs	Pyrene	ppb	104.7	1
REMAP 2013	NB406	PAHs	Pyrene	ppb	324.6	1
REMAP 2013	NB412	PAHs	Pyrene	ppb	143.7	1
REMAP 2013	NB416	PAHs	Pyrene	ppb	190.8	1
REMAP 2013	NB423	PAHs	Pyrene	ppb	213.5	1
REMAP 2013	NB426	PAHs	Pyrene	ppb	138.6	1
REMAP 2013	NB427	PAHs	Pyrene	ppb	2000.9	1
REMAP 2013	NB431	PAHs	Pyrene	ppb	101.1	1
REMAP 2013	NB452	PAHs	Pyrene	ppb	511	1
REMAP 2013	NB454	PAHs	Pyrene	ppb	390.9	1
REMAP 2013	NB413	PAHs	Pyrene	ppb	212.2	1
REMAP 2013	NB401	PAHs	Total HMW PAHs	ppb	766.8	1
REMAP 2013	NB406	PAHs	Total HMW PAHs	ppb	1781.4	1
REMAP 2013	NB412	PAHs	Total HMW PAHs	ppb	963.1	1
REMAP 2013	NB413	PAHs	Total HMW PAHs	ppb	1150.4	1
REMAP 2013	NB416	PAHs	Total HMW PAHs	ppb	1061.2	1
REMAP 2013	NB423	PAHs	Total HMW PAHs	ppb	1227.1	1
REMAP 2013	NB426	PAHs	Total HMW PAHs	ppb	861	1
REMAP 2013	NB427	PAHs	Total HMW PAHs	ppb	12837.3	1
REMAP 2013	NB431	PAHs	Total HMW PAHs	ppb	625.9	1
REMAP 2013	NB452	PAHs	Total HMW PAHs	ppb	2981	1
REMAP 2013	NB454	PAHs	Total HMW PAHs	ppb	4285.8	1
REMAP 2013	NB401	PAHs	Total LMW PAHs	ppb	67.7	1
REMAP 2013	NB406	PAHs	Total LMW PAHs	ppb	515.4	1
REMAP 2013	NB412	PAHs	Total LMW PAHs	ppb	299.9	1
REMAP 2013	NB413	PAHs	Total LMW PAHs	ppb	179.2	1
REMAP 2013	NB416	PAHs	Total LMW PAHs	ppb	205.7	1
REMAP 2013	NB423	PAHs	Total LMW PAHs	ppb	310.9	1
REMAP 2013	NB426	PAHs	Total LMW PAHs	ppb	242.7	1

Table A-5-1
Sediment Chemistry Data from the REMAP Sampling in the NBSA

Study	Station	Parameter Group	Chemical Name	Units	Result	Detect (1 = yes, 0=no)
REMAP 2013	NB427	PAHs	Total LMW PAHs	ppb	1417.7	1
REMAP 2013	NB431	PAHs	Total LMW PAHs	ppb	107.6	1
REMAP 2013	NB452	PAHs	Total LMW PAHs	ppb	376.8	1
REMAP 2013	NB454	PAHs	Total LMW PAHs	ppb	253.6	1
REMAP 2013	NB401	PAHs	Total PAHs	ppb	834.5	1
REMAP 2013	NB406	PAHs	Total PAHs	ppb	2296.8	1
REMAP 2013	NB412	PAHs	Total PAHs	ppb	1263	1
REMAP 2013	NB413	PAHs	Total PAHs	ppb	1329.6	1
REMAP 2013	NB416	PAHs	Total PAHs	ppb	1266.9	1
REMAP 2013	NB423	PAHs	Total PAHs	ppb	1538	1
REMAP 2013	NB426	PAHs	Total PAHs	ppb	1103.7	1
REMAP 2013	NB427	PAHs	Total PAHs	ppb	14255	1
REMAP 2013	NB431	PAHs	Total PAHs	ppb	733.5	1
REMAP 2013	NB452	PAHs	Total PAHs	ppb	3357.8	1
REMAP 2013	NB454	PAHs	Total PAHs	ppb	4539.4	1
REMAP 2013	NB401	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2013	NB406	PCBs (Aroclors)	Total PCBs	ppb	2.3	1
REMAP 2013	NB412	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2013	NB416	PCBs (Aroclors)	Total PCBs	ppb	3.5	1
REMAP 2013	NB423	PCBs (Aroclors)	Total PCBs	ppb	2.8	1
REMAP 2013	NB426	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2013	NB427	PCBs (Aroclors)	Total PCBs	ppb	4.7	1
REMAP 2013	NB431	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2013	NB452	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2013	NB454	PCBs (Aroclors)	Total PCBs	ppb	0	0
REMAP 2013	NB413	PCBs (Aroclors)	Total PCBs	ppb	6.5	1
REMAP 2013	NB401	TOC	Organic carbon	ppm	21000	1
REMAP 2013	NB406	TOC	Organic carbon	ppm	2900	1
REMAP 2013	NB412	TOC	Organic carbon	ppm	22000	1
REMAP 2013	NB416	TOC	Organic carbon	ppm	29000	1
REMAP 2013	NB423	TOC	Organic carbon	ppm	13000	1
REMAP 2013	NB426	TOC	Organic carbon	ppm	27000	1
REMAP 2013	NB427	TOC	Organic carbon	ppm	24000	1
REMAP 2013	NB431	TOC	Organic carbon	ppm	21000	1
REMAP 2013	NB452	TOC	Organic carbon	ppm	14000	1
REMAP 2013	NB454	TOC	Organic carbon	ppm	17000	1
REMAP 2013	NB413	TOC	Organic carbon	ppm	29000	1

Notes:
Includes only samples collected within the NBSA boundary.
[a]An estimate of total PCBs used in the NOAA Status and Trends Program. It is calculated as the sum of 20 PCB congeners (PCB numbers 8, 18, 28, 44, 52, 66,
REMAP Data were obtained from the following sources:
REMAP 1993 through 2003: https://archive.epa.gov/emap/archive-emap
REMAP 2008 AND 2013: https://www.waterqualitydata.us

Acronyms and Abbreviations:
AVS = acid volatile sulfide
BHC = benzene hexachloride
ERL = effect range-low
ERM = effect range-medium
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
mmol = micromoles per gram
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picograms per gram
ppb = parts per billion
ppm = parts per million
REMAP = Regional Environmental Monitoring and Assessment Program
SEM = simultaneous extractable metals
TOC = total organic carbon
Total DDx (2,4 and 4,4) = sum of six isomers of DDE, DDD, and DDT
% = percent
µg/kg = micrograms per kilogram

Table A-5-2
Ampelisca abdita Survival (10-day) from the REMAP Sampling in the NBSA

Study	Station	Survival as a Percent of Control	Statistically Significantly Different from Control (alpha = 0.05)
REMAP 1993/94	NB025	91	--
REMAP 1993/94	NB027	90	--
REMAP 1993/94	NB036	86	--
REMAP 1993/94	NB039	101	--
REMAP 1993/94	NB044	87	--
REMAP 1993/94	NB045	86	--
REMAP 1993/94	NB047	77	--
REMAP 1993/94	NB052	92	--
REMAP 1993/94	NB053	85	--
REMAP 1993/94	NB065	87	--
REMAP 1993/94	NB102	8	--
REMAP 1993/94	NB103	93	--
REMAP 1993/94	NB104	98	--
REMAP 1993/94	NB105	86	--
REMAP 1993/94	NB106	62	--
REMAP 1993/94	NB110	103	--
REMAP 1993/94	NB112	86	--
REMAP 1993/94	NB113	18	--
REMAP 1998	NB201	83	Yes
REMAP 1998	NB202	42	Yes
REMAP 1998	NB206	92	Yes
REMAP 1998	NB211	2	Yes
REMAP 1998	NB212	79	Yes
REMAP 1998	NB213	83	Yes
REMAP 1998	NB216	99	No
REMAP 1998	NB217	92	No
REMAP 1998	NB222	71	Yes
REMAP 1998	NB223	21	Yes
REMAP 1998	NB226	88	Yes
REMAP 1998	NB227	34	Yes
REMAP 1998	NB231	65	Yes
REMAP 2003	NB301	94	No
REMAP 2003	NB305	85	Yes
REMAP 2003	NB306	94	No
REMAP 2003	NB307	3	Yes
REMAP 2003	NB309	91	No
REMAP 2003	NB310	94	No
REMAP 2003	NB312	96	No
REMAP 2003	NB325	97	No

Table A-5-2
Ampelisca abdita Survival (10-day) from the REMAP Sampling in the NBSA

Study	Station	Survival as a Percent of Control	Statistically Significantly Different from Control (alpha = 0.05)
REMAP 2003	NB326	95	No
REMAP 2003	NB327	95	No
REMAP 2003	NB329	97	No
REMAP 2008	NB401	84	No
REMAP 2008	NB406	102	No
REMAP 2008	NB412	90	No
REMAP 2008	NB413	59	Yes
REMAP 2008	NB416	83	No
REMAP 2008	NB423	101	No
REMAP 2008	NB426	98	No
REMAP 2008	NB427	93	No
REMAP 2008	NB431	90	No
REMAP 2008	NB452	86	No
REMAP 2008	NB454	92	No
REMAP 2013	NB401	97	No
REMAP 2013	NB406	98	No
REMAP 2013	NB412	100	No
REMAP 2013	NB413	98	No
REMAP 2013	NB416	96.9	No
REMAP 2013	NB423	100	No
REMAP 2013	NB426	111.8	No
REMAP 2013	NB427	93.9	No
REMAP 2013	NB431	95.9	No
REMAP 2013	NB452	114.1	No
REMAP 2013	NB454	108.2	No

Notes:
Includes only samples collected within the NBSA boundary.
REMAP Data were obtained from the following sources:
REMAP 1993 through 2003: https://archive.epa.gov/emap/archive-emap
REMAP 2008 and 2013: https://www.waterqualitydata.us
-- Not reported in data source.

Acronyms and Abbreviations:
NBSA = Newark Bay Study Area
REMAP = Regional Environmental Monitoring and Assessment Program

Table A-5-3
BIC Metrics from the REMAP Sampling in the NBSA

Study	Station	Total Taxa	Density (no./m^2)	Shannon Weiner Diversity Index	Swartz's Dominance Index	Pielou's Evenness	Proportion of Tolerant Taxa	Proportion of Sensitive Taxa
REMAP 1993/94	NB025	14	469	1.40	3	0.53	66%	0%
REMAP 1993/94	NB027	17	665	1.40	2	0.49	57%	0%
REMAP 1993/94	NB036	15	422	1.62	3	0.60	24%	0%
REMAP 1993/94	NB039	16	452	1.20	2	0.43	60%	0%
REMAP 1993/94	NB044	16	479	1.52	2	0.55	56%	0%
REMAP 1993/94	NB045	21	545	1.80	3	0.59	39%	0.37%
REMAP 1993/94	NB047	10	122	1.53	3	0.66	63%	0%
REMAP 1993/94	NB052	32	1448	1.66	3	0.48	67%	0.97%
REMAP 1993/94	NB053	18	326	1.94	4	0.67	63%	0%
REMAP 1993/94	NB065	22	319	1.58	2	0.51	82%	0%
REMAP 1993/94	NB102	11	303	0.61	1	0.25	91%	4.29%
REMAP 1993/94	NB103	11	204	1.44	3	0.60	15%	0%
REMAP 1993/94	NB104	23	753	1.95	4	0.62	48%	0%
REMAP 1993/94	NB105	16	606	1.30	2	0.47	70%	2.81%
REMAP 1993/94	NB106	22	385	1.67	3	0.54	53%	0%
REMAP 1993/94	NB110	23	721	2.09	5	0.67	46%	0.14%
REMAP 1993/94	NB112	21	1268	1.39	2	0.46	67%	0%
REMAP 1993/94	NB113	29	1699	1.64	4	0.49	59%	0.12%
REMAP 1998	NB201	13	23	2.36	8	0.92	9%	8.70%
REMAP 1998	NB202	18	126	1.73	4	0.60	74%	0%
REMAP 1998	NB206	11	33	2.08	5	0.87	18%	0%
REMAP 1998	NB211	25	492	1.14	2	0.35	90%	0%
REMAP 1998	NB212	12	63	2.00	5	0.81	25%	11.11%
REMAP 1998	NB213	9	188	1.29	2	0.59	74%	0%
REMAP 1998	NB216	11	123	1.76	4	0.73	44%	0%
REMAP 1998	NB217	18	103	2.27	7	0.79	29%	0%
REMAP 1998	NB222	10	29	2.09	5	0.91	21%	0%
REMAP 1998	NB223	13	272	1.02	2	0.40	79%	0%
REMAP 1998	NB226	12	84	2.00	5	0.80	45%	0%
REMAP 1998	NB227	19	240	1.82	3	0.62	53%	2.08%
REMAP 1998	NB231	9	40	1.46	2	0.67	55%	0%
REMAP 2003	NB301	12	56	1.84	4	0.74	41%	7.14%
REMAP 2003	NB305	12	301	1.20	2	0.48	52%	0%
REMAP 2003	NB306	30	980	1.78	3	0.52	27%	5.10%
REMAP 2003	NB307	28	405	2.12	5	0.64	55%	12.35%
REMAP 2003	NB309	22	2202	1.60	2	0.52	76%	0.32%
REMAP 2003	NB310	27	511	2.33	6	0.71	27%	0%
REMAP 2003	NB312	9	39	1.81	4	0.82	36%	0%
REMAP 2003	NB325	31	2265	1.96	4	0.57	47%	0.35%
REMAP 2003	NB326	15	428	1.32	2	0.49	49%	0%
REMAP 2003	NB327	23	1248	2.21	5	0.70	33%	0.32%
REMAP 2003	NB329	34	4079	1.55	3	0.44	23%	0.44%

Notes:
Includes only samples collected within the NBSA boundary.
REMAP Data were obtained from the following sources:
REMAP 1993 through 2003: https://archive.epa.gov/emap/archive-emap
REMAP 2008 AND 2013: https://www.waterqualitydata.us

Acronyms and Abbreviations:
NBSA = Newark Bay Study Area
no./m^2 = number per square meter
REMAP = Regional Environmental Monitoring and Assessment Program

ATTACHMENT A-6

SQT Scoring Uncertainty Evaluations



Table A-6-1
Sediment Quality Triad Scoring Uncertainty Evaluation 1

Geographic Area	Station	SQT Category Scores (Maximum = 1)			Total SQT Score (Maximum = 3)	Degree of Impact[b]
		Total BIC Score	Total Sediment Toxicity Score	Total Sediment Chemistry Score[a]		
North	136	0	0	0	0.00	No Impact
	137	0	**0.38**	0	0.38	No Impact
	138	0	**0.50**	**0.5**	1.00	Low Impact
	139	0	**0.25**	**0.5**	0.75	No Impact
	140	0	0	**0.5**	0.50	No Impact
	158	0	**0.75**	0	0.75	No Impact
	159	0	0	**1**	1.00	Low Impact
	160	0	**0.75**	**0.5**	1.25	Low Impact
	161	**0.08**	0	0	0.08	No Impact
	162	**0.08**	0	0	0.08	No Impact
	163	0	0	**0.5**	0.50	No Impact
	164	**0.08**	**0.25**	0	0.33	No Impact
	165	0	**0.38**	0	0.38	No Impact
Central	141	0	0	**1**	1.00	Low Impact
	142	0	0	0	0.00	No Impact
	143	0	**0.75**	**0.5**	1.25	Low Impact
	144	**0.08**	**0.25**	**0.5**	0.83	Low Impact
	145	0	0	**0.5**	0.50	No Impact
	156	0	0	0	0.00	No Impact
	157	0	**0.13**	0	0.13	No Impact
South	146	0	**0.38**	**0.5**	0.88	Low Impact
	147	**0.08**	**0.25**	**1**	1.33	Low Impact
	148	**0.33**	0	**0.5**	0.83	Low Impact
	149	0	**0.25**	**0.5**	0.75	No Impact
	150	0	**0.25**	**1**	1.25	Low Impact
	151	**0.08**	**1**	**1**	2.08	**Medium Impact**
	152	0	**0.38**	**0.5**	0.88	Low Impact
	153	0	0	0	0.00	No Impact
	154	**0.08**	**1**	**0.5**	1.58	**Medium Impact**
	155	**0.08**	0	**0.5**	0.58	No Impact

Notes:
[a]In this uncertainty evaluation, the porewater chemistry score is given 100% weight.
Non-zero cells shaded and bolded.
[b] Impact categories are defined by total scores as follows: no impact (blue shading) = ≤0.75; low impact (green shading) = >0.75 and ≤1.5; medium impact (yellow shading and bold font) = >1.5 and <2.25; and high impact (none present) = >2.25.

Acronyms and Abbreviations:
BIC = Benthic Invertebrate Community
SQT = sediment quality triad
> = greater than
< = less than

Table A-6-2
Sediment Quality Triad Scoring Uncertainty Evaluation 2

Geographic Area	Station	SQT Category Scores (Maximum = 1)			Total SQT Score (Maximum = 3)	Degree of Impact[b]
		Total BIC Score	Total Sediment Toxicity Score[a]	Total Sediment Chemistry Score		
North	136	0	**0.25**	**0.5**	0.75	No Impact
	137	0	**0.38**	**0.5**	0.88	Low Impact
	138	0	**0.75**	**0.75**	1.50	Low Impact
	139	0	**0.25**	**0.75**	1.00	Low Impact
	140	0	0	**0.75**	0.75	No Impact
	158	0	**0.75**	**0.5**	1.25	Low Impact
	159	0	**0.25**	**1**	1.25	Low Impact
	160	0	**0.75**	**0.75**	1.50	Low Impact
	161	**0.08**	0	**0.5**	0.58	No Impact
	162	**0.08**	0	**0.5**	0.58	No Impact
	163	0	0	**0.75**	0.75	No Impact
	164	**0.08**	**0.25**	**0.5**	0.83	Low Impact
	165	0	**0.38**	**0.5**	0.88	Low Impact
Central	141	0	0.00	**1**	1.00	Low Impact
	142	0	**0.25**	**0.5**	0.75	No Impact
	143	0	**0.75**	**0.75**	1.50	Low Impact
	144	**0.08**	**0.25**	**0.75**	1.08	Low Impact
	145	0	**0.25**	**0.75**	1.00	Low Impact
	156	0	0	**0.5**	0.50	No Impact
	157	0	**0.13**	**0.5**	0.63	No Impact
South	146	0	**0.38**	**0.75**	1.13	Low Impact
	147	**0.08**	**0.25**	**1**	1.33	Low Impact
	148	**0.33**	0	**0.75**	1.08	Low Impact
	149	0	**0.50**	**0.75**	1.25	Low Impact
	150	0	**0.25**	**1**	1.25	Low Impact
	151	**0.08**	**1**	**1**	2.08	**Medium Impact**
	152	0	**0.38**	**0.75**	1.13	Low Impact
	153	0	0	**0.5**	0.50	No Impact
	154	**0.08**	**1**	**0.75**	1.83	**Medium Impact**
	155	**0.08**	0	**0.75**	0.83	Low Impact

Notes:
[a]In this uncertainty evaluation, any survival < 80% of control is given a score of 1.
Non-zero cells shaded and bolded.
[b] Impact categories are defined by total scores as follows: no impact (blue shading) = ≤0.75; low impact (green shading) = >0.75 and ≤1.5; medium impact (yellow shading and bold font) = >1.5 and <2.25; and high impact (none present) = >2.25.

Acronyms and Abbreviations:
BIC = Benthic Invertebrate Community
SQT = sediment quality triad
> = greater than
< = less than

ATTACHMENT A-7

Multivariate Analyses Conducted by USEPA

Attachment 7

Multivariate Analyses Conducted by USEPA

DETAILS ON COMMENT 103: In practice, there are several approaches to consider when conducting a principal components analysis (PCA), and selection of an approach depends on how the data matrix is standardized prior to analysis. The approach conducted by GSH was based on extracting principal components from the correlation matrix of the raw data, with no sample-based standardization. Concentrations for the individual contaminants were solely standardized to the mean of the contaminant across all samples (referred to as "column" standardization). This approach is the most common approach for estimating independent variables for multiple regression model development. As part of the BERA review, EPA also considered other approaches for standardizing the data to verify the GSH findings. Specifically, we considered approaches based on standardizing concentrations within samples (referred to as "row" standardization), so that each variable represented the mass fraction of the contaminant in the sample mixture. For this evaluation, the "on Correlations" and "on Unscaled" methods were utilized. It is important to note that the PCA was insensitive to these variations but did show some patterns in the Principal Component 1 (PC1) and Principal Component 2 (PC2); however, please consider these approaches to verify findings.

In this evaluation, EPA performed the PCA using the same chemicals as GSH, with four additional chemicals (Total Alpha+Beta+Delta BHC, gamma-BHC (or lindane), Total Heptachlors, and Total Nonachlors)[1]. PCA was conducted using JMP® software on the contaminant concentrations in the sediment using both "row" and "column" standardizations. In JMP®, the principal components are derived from an eigenvalue decomposition of one of the following:

- Correlation matrix ("on Correlations" option in JMP): Using the correlation matrix is equivalent to standardizing each of the variables (to mean 0 and standard deviation 1). For the on Correlations option, the eigenvalues are scaled to sum to the number of variables.
- Covariance matrix ("on Covariances" option in JMP): For the on Covariances options, the eigenvalues are not scaled.
- Sum of squares and cross products matrix for the unscaled and uncentered data (on Unscaled option in JMP): For the on Unscaled option, the eigenvalues are divided by the total number of observations.

PCA Mass Fraction "on Correlations" Method Results

Figure 1 shows a scatter plot of PC1 versus PC2 of the PCA results for "on Correlations" principal component method. Figure 2 shows the associated loadings of the principal components 1, 2, and 3 for "on Correlations". In this analysis, EPA evaluated several combinations of the 2016 Phase III data and the 2015 SQT data. The results are almost identical (regardless of the combination of data examined) except for the 2015 SQT sediment data only (panel D of Figures 1 and 2). The first principal component explained about 16 to 20 percent of the variance in the dataset. The second principal component explained an additional 13 to 15 percent. Figure 3 shows the first three principal components scores against 10-day and 28-day survival rates for the four dataset combinations. A solid black line in Figure 3 represents a cubic spline with lambda of 0.05 and standardized X values. When the PCA was performed for the 2015 SQT data only, the PCA results showed three different groups based on the locations/zones (i.e., North, Central, and South). PCA "on Correlation" method separates the zones, but did not give a meaningful correlation between the PC scores and survival rates (Figure 3). In conclusion, the PCA on mass fraction using the "on Correlations" method is useful to identify sources or to fingerprint and seems to reveal some structure in the data and relationships among variables, but not to identify risks associated with exposures to contaminants.

[1] Analytes were not considered in the GSH PCA models because they were detected in less than 25 percent of samples; however, these pesticides are relatively toxic and could be significant contributors, at least locally.

PCA Mass Fraction "on Unscaled" Method Results

Figures 4 to 6 show the results of PCA mass fraction by using "on Unscaled" method. Again, in this analysis, EPA evaluated several combinations of the 2016 Phase III data and the 2015 SQT data. The "on Unscaled" method explained a larger percentage of the variances compared to the "on Correlations" method. For the "on Unscaled" method, the first principal component explained about 70 to 80 percent of the variance. The first two principal components explained about 80 to 90 percent of the dataset variance. Although the PC1 was able to explain about 70 to 80 percent of the variance, the first principal component did not differentiate chemicals that cause mortality. This observation can be seen in Figure 5 where for PC1 loadings for all chemicals are positive. Although there are some differences in magnitude of the PC1 loadings, all the 27 chemicals affect the 10-day and 28-day survival equally in the positive direction. The PCA mass fraction "on Unscaled" method showed good correlation between PC1 and the 28-day survival rate, but not the 10-day survival rate (Figure 6). The PC2 loadings separate some chemicals into separate independent scores relative to PC1; however, plotting PC2 scores against the 10-day and 28-day survival did not explain survival rates, except for the dataset without the composite sediment sample for the 28-day survival rates (Panel C of Figure 6). The four combinations of dataset did not seem to change the results, and the PCA is insensitive to the dataset combinations.

DETAILS ON COMMENT 104: The BERA states that entire Phase III surface sediment dataset was used in the principal component analysis. As part of the BERA review, EPA considered other historical data, as well as combinations of the 2016 Phase III samples and the 2015 SQT samples. The following combinations of data were tested to examine the sensitivity of the data used in the GSH's models:

- All of the 2016 Phase III samples
- All of the 2015 SQT samples
- 2015 SQT and 2016 Phase III data without the channel samples. (Note that the 2015 SQT samples were collected outside the channel; therefore, the Phase III samples from the channel were eliminated to determine if the channel samples could influence the PCA results.)
- 2015 SQT and 2016 Phase III data without the composite samples. (Note that the Phase III composite samples were eliminated to determine if the variance in the composite samples could influence the PCA results.)
- Historical REMAP data from 2003, 2015, and 2016 (extracted from the Water Quality Exchange website https://www.exchangenetwork.net/data-exchange/wqx/)

When examining the 2015 SQT samples only, EPA was able to correlate both the 10-day and 28-day survival rates to PC1 (refer to Comment 103). Since there are additional historical data with 10-day survival rates, EPA added the historical dataset to the PCA. Please note that the chemicals analyzed in the historical dataset were not exactly the same as the 2015 SQT dataset (refer to table below).

Table: Chemicals for the Historical and 2015 SQT Data PCA

Chemical Group	Chemical
Dioxins/Furans	2,3,7,8-TCDD
Metals	Arsenic
Metals	Cadmium
Metals	Chromium
Metals	Copper
Metals	Mercury
Metals	Nickel
Metals	Lead
Metals	Zinc
PAHs	HMW PAHs
PAHs	LMW PAHs
PCB	Total PCB
Pesticides	Dieldrin
Pesticides	Hexachlorobenzene
Pesticides	Sum 4,4'-DDx
Pesticides	Total Chlordane
Pesticides	Total Heptachlors
TOC	Total Organic Carbon

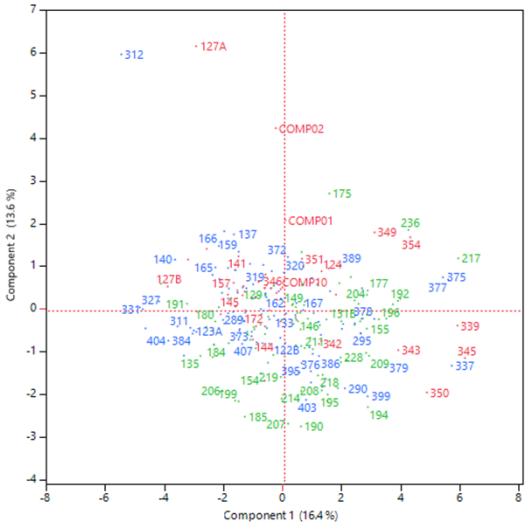
It should be noted that it appears that the PC scores differentiate data by collection year (refer to panel A of Figure 9). The most recent data (2015, purple symbol) formed a group on the upper right hand corner, while the older data (2013, blue symbol) formed a group on the lower left hand corner with the

oldest data (2003, green symbol) in the middle (Panel A of Figure 9). (EPA recognizes that the different datasets have different analytical methods and different detection limits, which may be the reason for the temporal groups.) Figure 9 and Figure 10 show the results of the PCA on the historical data and 2015 SQT data. The results are similar to the PCA analysis using the 2015 SQT data only; however, it seems that PC1 scores are predictive of both 10-day and 28-day survival tests. Please consider incorporating this approach into the BERA multivariate analysis to verify findings.

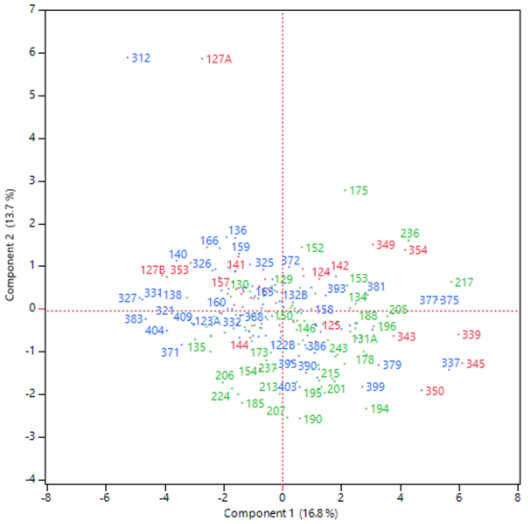
DETAILS ON COMMENT 106: Because loadings on PC1 were positive and relatively evenly distributed across all chemicals, PC1 essentially represents a nearly equal average of the standardized chemicals. As part of the BERA review, EPA evaluated an alternative approach to modeling the toxicity data. We summed the standardized concentrations and then plotted the sum against the 10-day and 28-day survival rates, which assumes that all chemicals are contributing to the observed toxicity (giving essentially the same results as plotting the PC 1 scores; refer to Comment 107, Figure 8). In this evaluation, the historical samples (discussed in Comment 104) and the 2015 SQT samples were used. Figure 11 shows a scatter plot of the sum of the 18 standardized concentrations versus the 10-day and 28-day survival. The sum of the standardized concentrations shows a similar curve to those of the PCA on log-transformed concentrations (refer to Comment 107, Figure 8) and seems to be able to explain the survival rates in terms of the combined chemicals. Figure 12 shows the results of the sum of standardized concentrations for the rest of the datasets (left panel), along with GSH model prediction of the 10-day and 28-day survival rates (middle and right panel, respectively). Based on Figure 11 (showing the sum of standardized concentrations versus survival rates), a value of 5 was chosen to represent the division between low and high survival rates. The data presentation in Figure 12 shows that in general the "sum of standardized concentrations" showed similar results to those of GSH model predictions, with some additional areas identified. For example, the "sum of standardized concentrations" method identified more mortality in the southeast part of the subtidal flat area. Please consider incorporating this approach into the BERA multivariate analysis as another possible model.

DETAILS ON COMMENT 107: The BERA states that the entire Phase III surface sediment dataset was used in the principal component analysis, and PC1 accounts for 66.7 percent of the variation. As part of the BERA review, EPA evaluated the principal component analysis using only the 2015 SQT samples to determine if a better correlation between survival rates and chemical concentrations can be achieved. To be consistent with GSH's analysis (and for the purpose of direct comparison to GSH's PCA results), the concentrations were log transformed before calculating the principal components via the "on Correlations" method in JMP (refer to Figure 7 and Figure 8). Although the principal component scores and loadings presented in Figure 7 are similar to GSH's PCA results, the correlation between PC1 and the 10-day and 28-day survival rates is better (refer to Figure 8). Figure 8 shows that both the 10-day and 28-day survival rates are associated with PC1, unlike GSH's analysis where PC1 is only associated with the 10-day survival rate. Please consider incorporating this approach into the BERA multivariate analysis.

A. All 2015 SQT and 2016 Sediment Data



B. Navigational channel sediment samples excluded



Legend

Zone

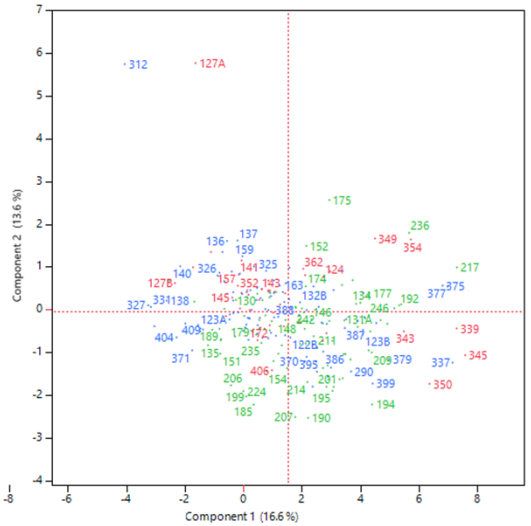
North

Central

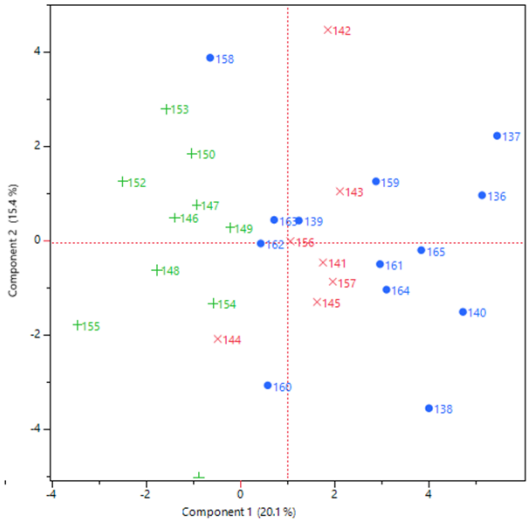
South

127A – Location ID

C. Composite sediment samples excluded



D. 2015 SQT sediment samples only



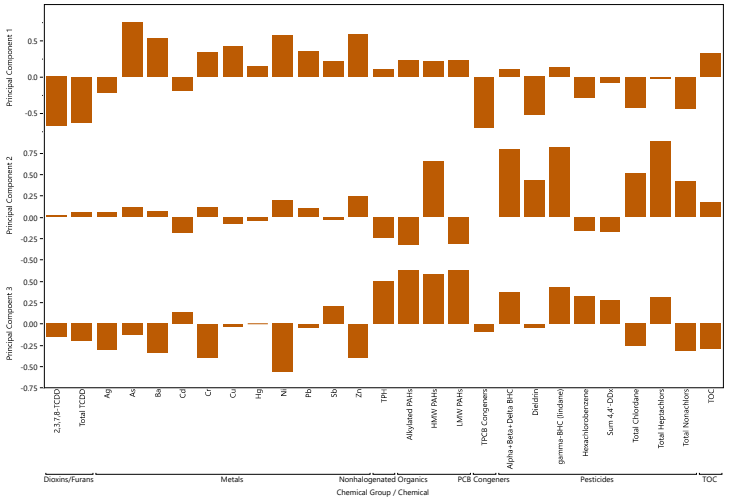
Louis Berger

PCA on Mass Fraction "On Correlation" Method Results
Component 1 vs. Component 2

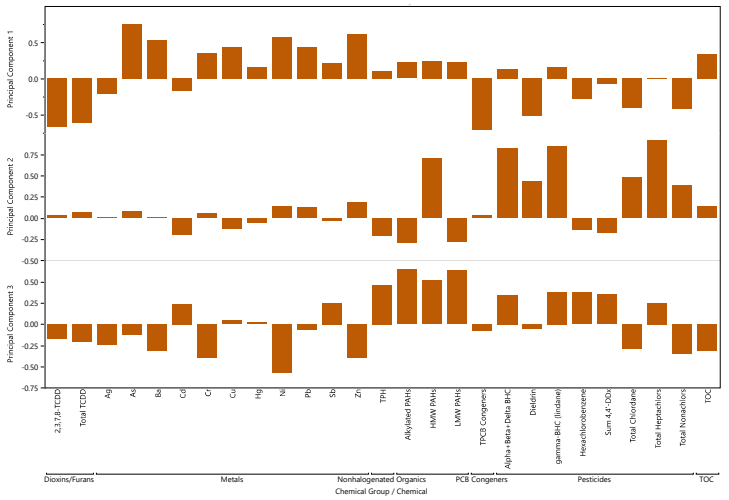
Figure 1

2019

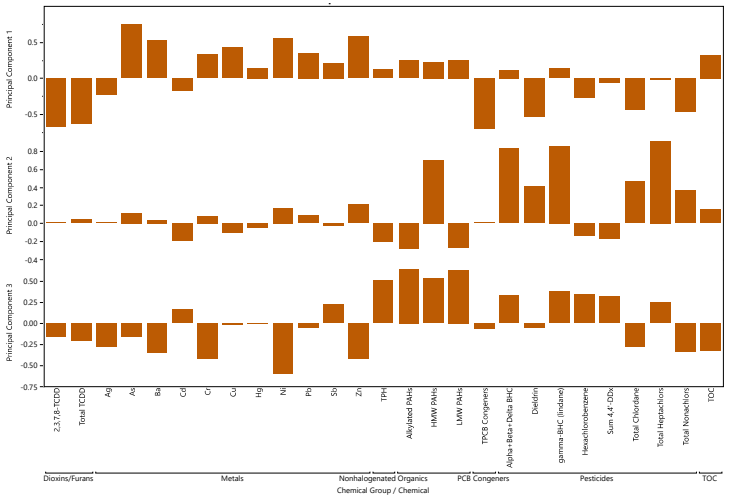
A. All 2015 SQT and 2016 Sediment Data



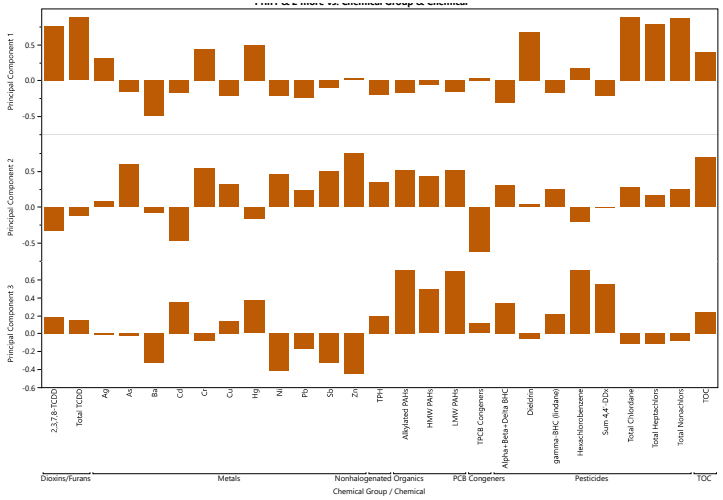
B. Navigational channel sediment samples excluded



C. Composite sediment samples excluded



D. 2015 SQT sediment samples only



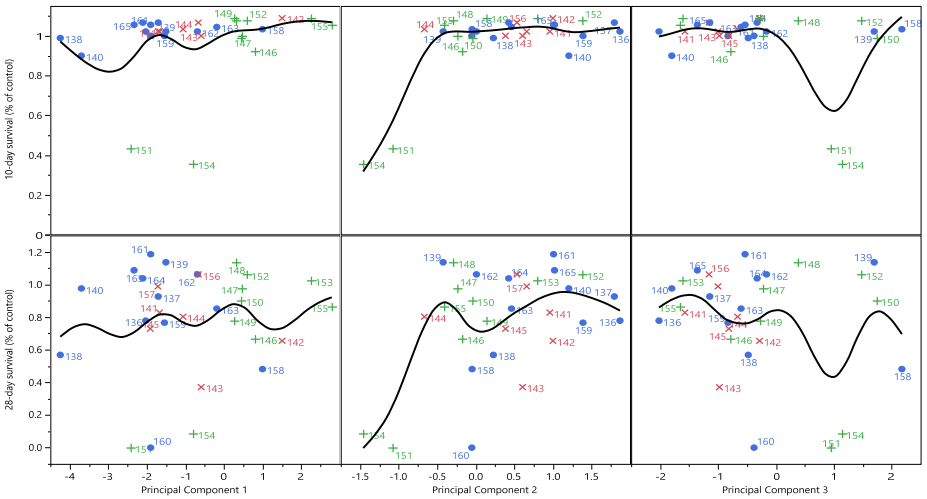
Louis Berger

PCA on Mass Fraction "On Correlation" Method Results
Components 1, 2, and 3 Loading

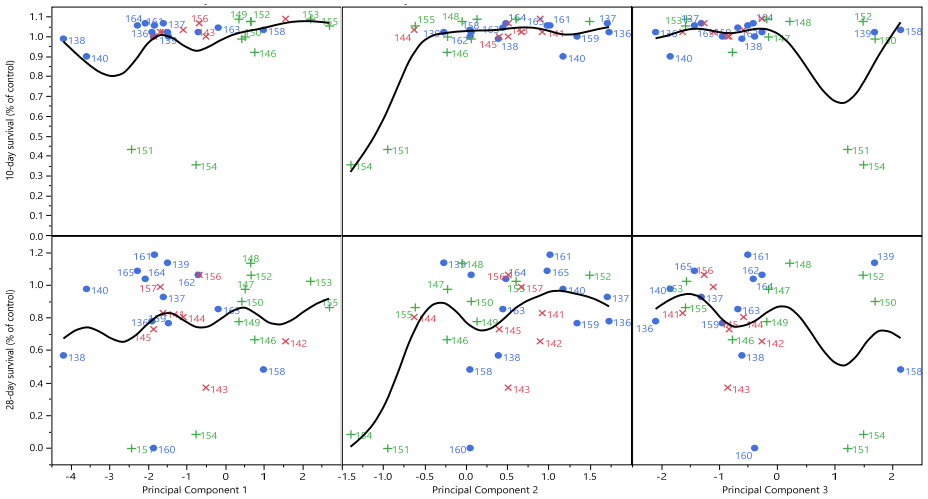
Figure 2

2019

A. All 2015 SQT and 2016 Sediment Data



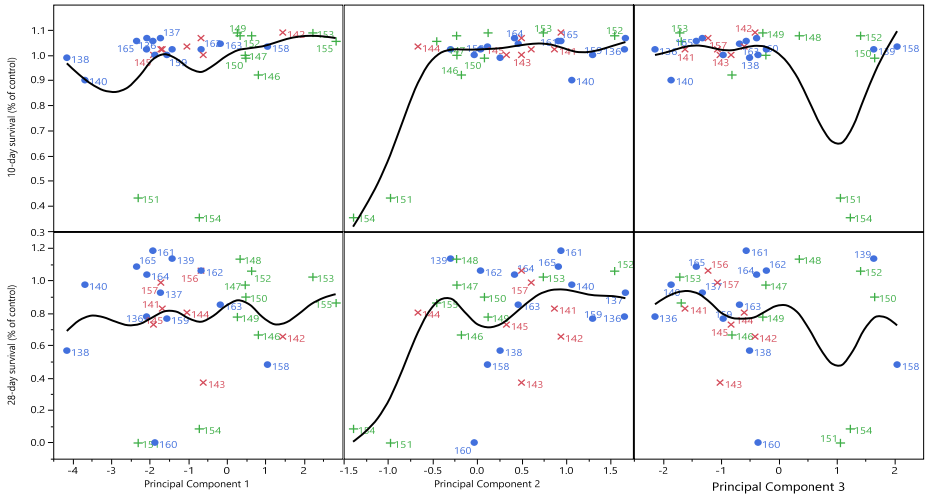
B. Navigational channel sediment samples excluded



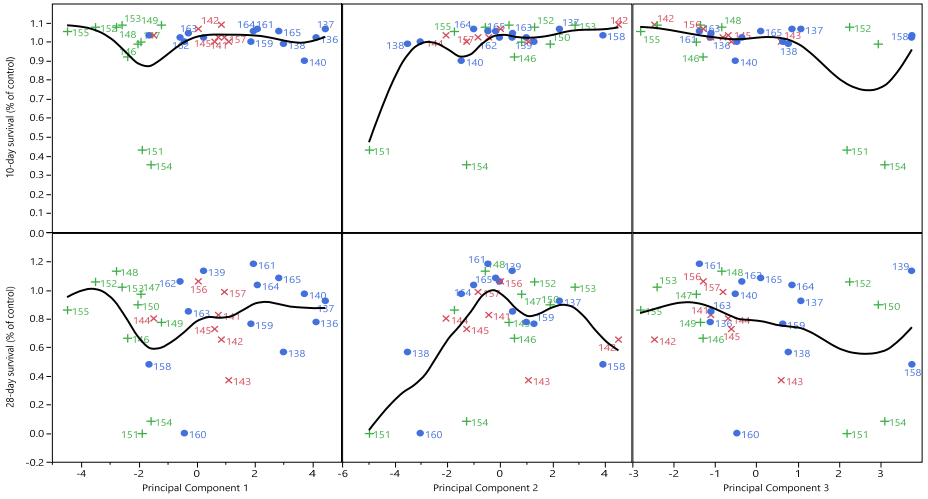
Legend
Zone
North
Central
South
127A – Location ID

Cubic spline (λ=0.05) and standardized X values

C. Composite sediment samples excluded



D. 2015 SQT sediment samples only



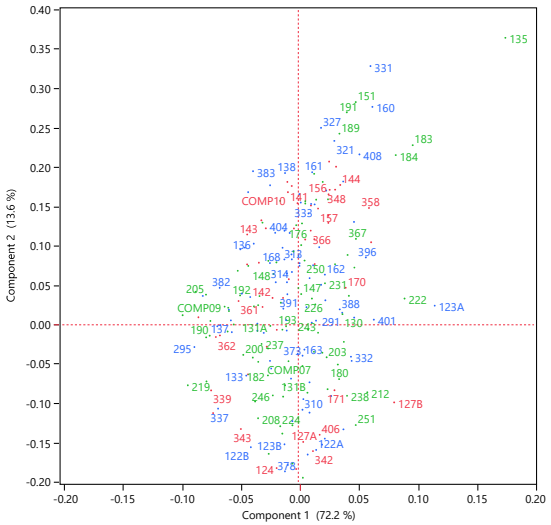
Louis Berger

PCA on Mass Fraction "On Correlation" Method Results
10-day and 28-day Survival Rate vs. Principal Components 1, 2 & 3

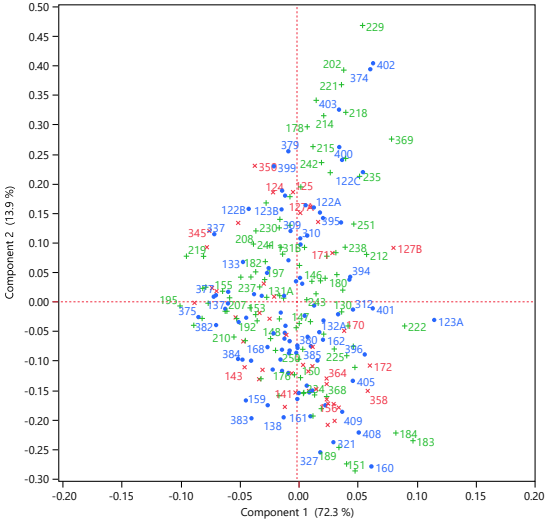
Figure 3

2019

A. All 2015 SQT and 2016 Sediment Data



B. Navigational channel sediment samples excluded



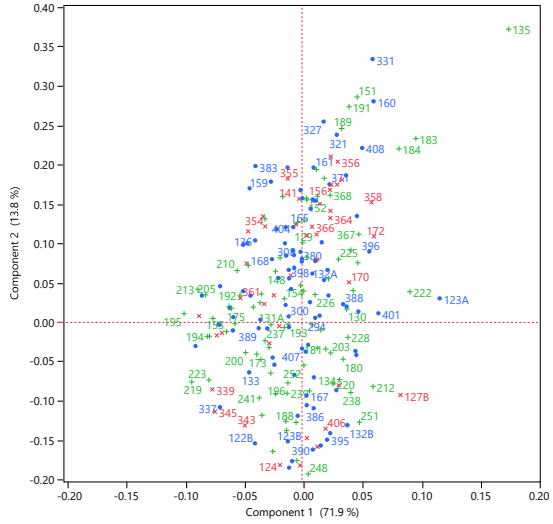
Legend

Zone

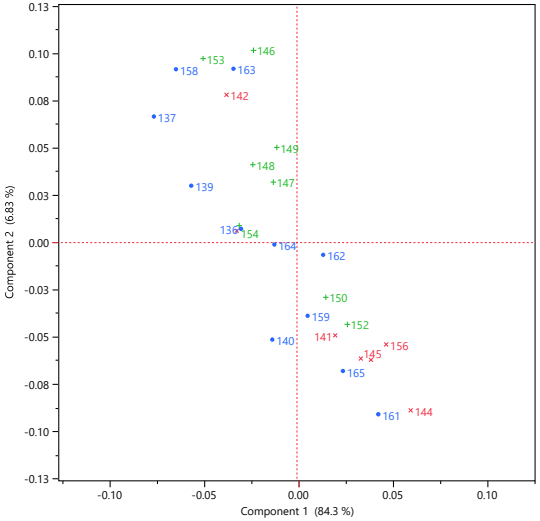
- North
- Central
- South

127A – Location ID

C. Composite sediment samples excluded



D. 2015 SQT sediment samples only



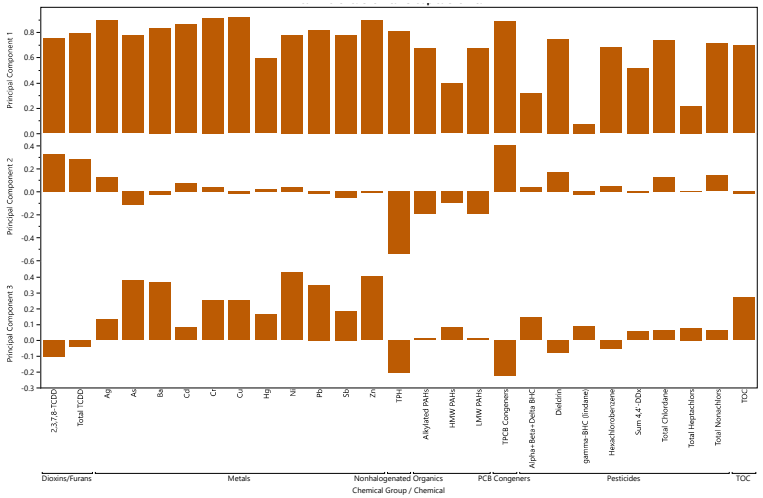
Louis Berger

PCA on Mass Fraction "Unscaled" Method Results
Composite 1 vs. Composite 2

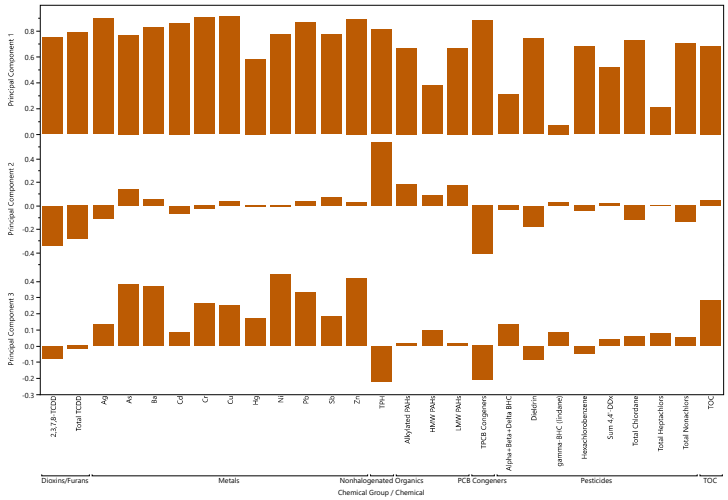
Figure 4

2019

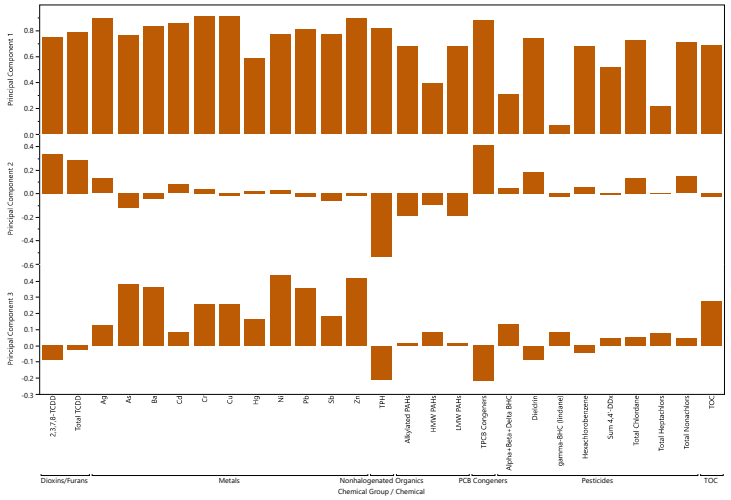
A. All 2015 SQT and 2016 Sediment Data



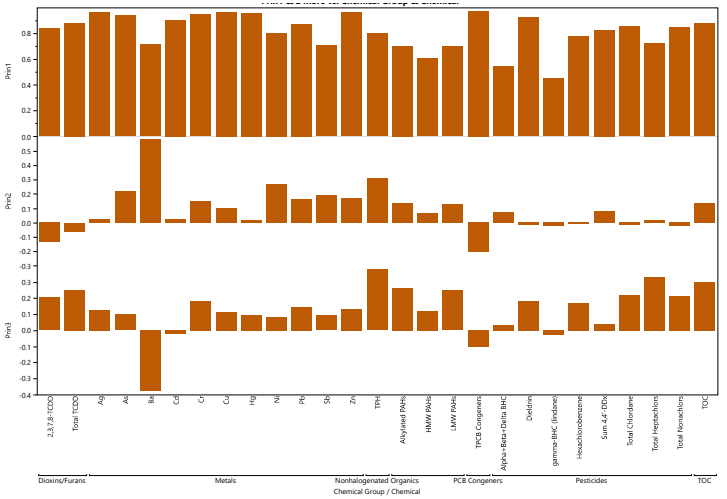
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C. Composite sediment samples excluded



D. 2015 SQT sediment samples only



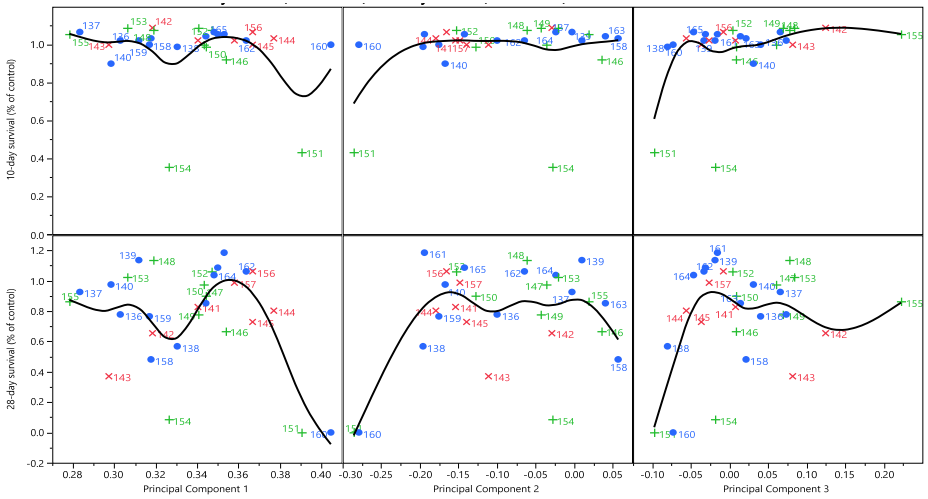
Louis Berger

PCA on Mass Fraction "Unscaled" Method Results
Components 1, 2, and 3 Loading

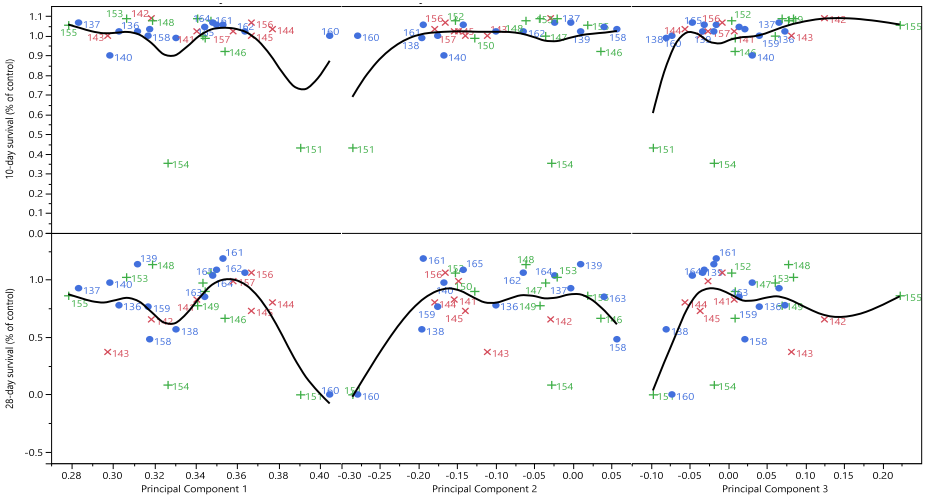
Figure 5

2019

A. All 2015 SQT and 2016 Sediment Data

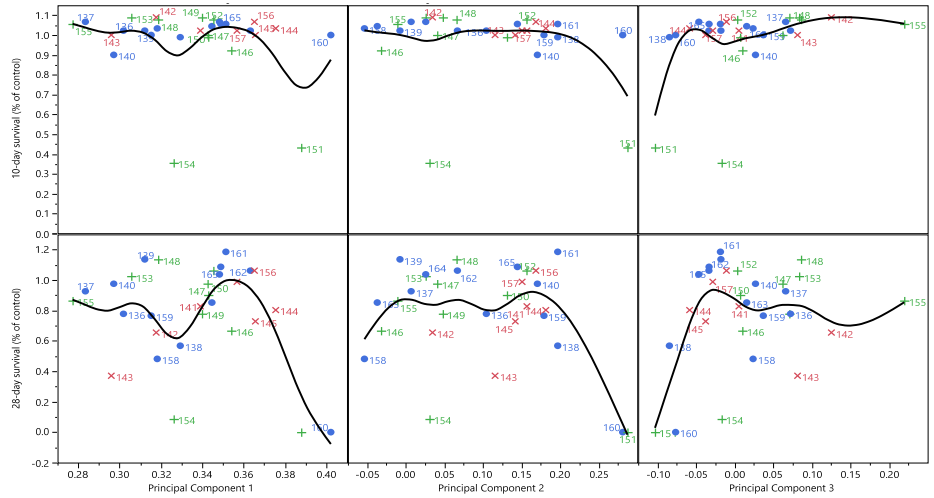


B. Navigational channel sediment samples excluded

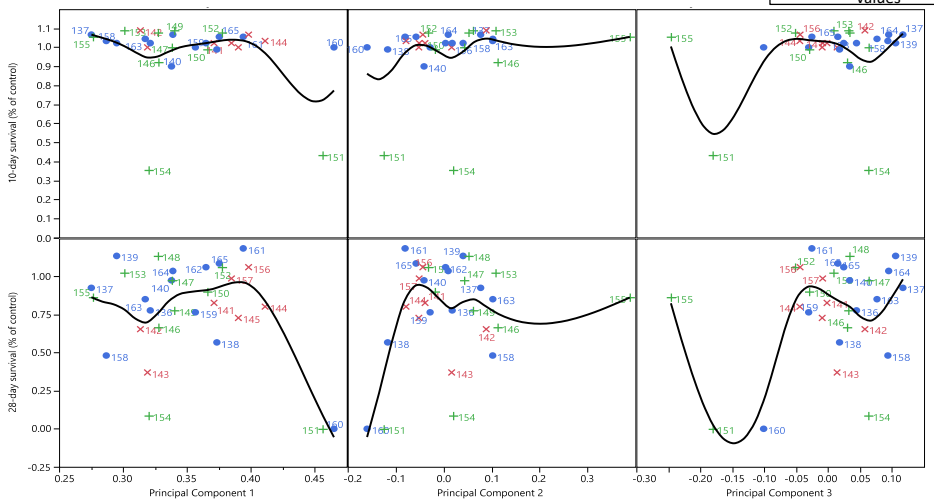


Legend
Zone
North
Central
South
127A – Location ID

C. Composite sediment samples excluded



D. 2015 SQT sediment samples only



Cubic spline (λ=0.05) and standardized X values

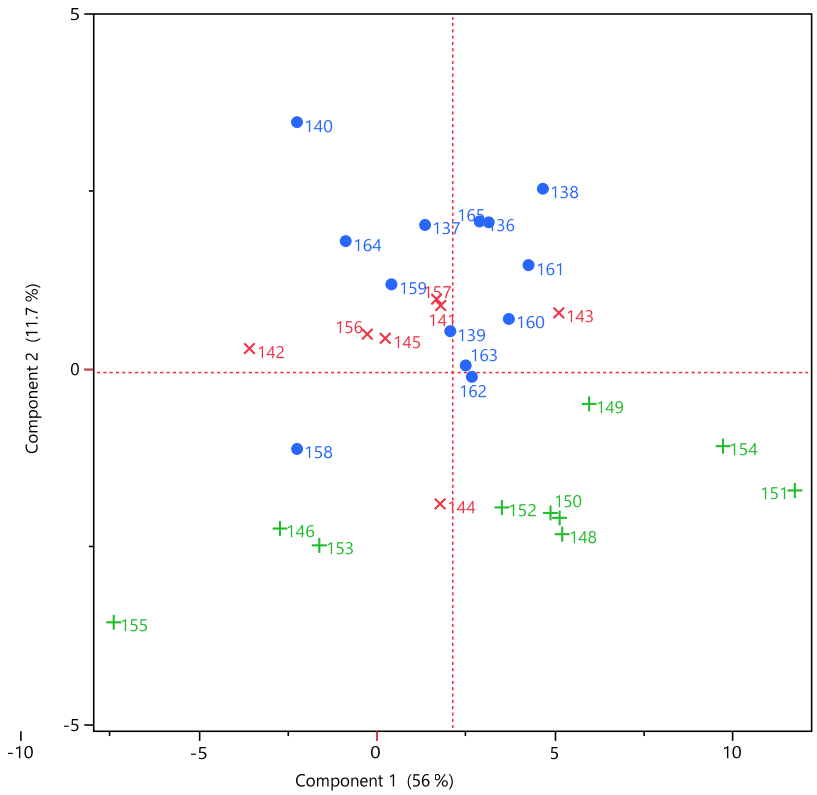
Louis Berger

PCA on Mass Fraction "Unscaled" Method Results
10-day and 28-day Survival Rate vs. Principal Components 1, 2 & 3

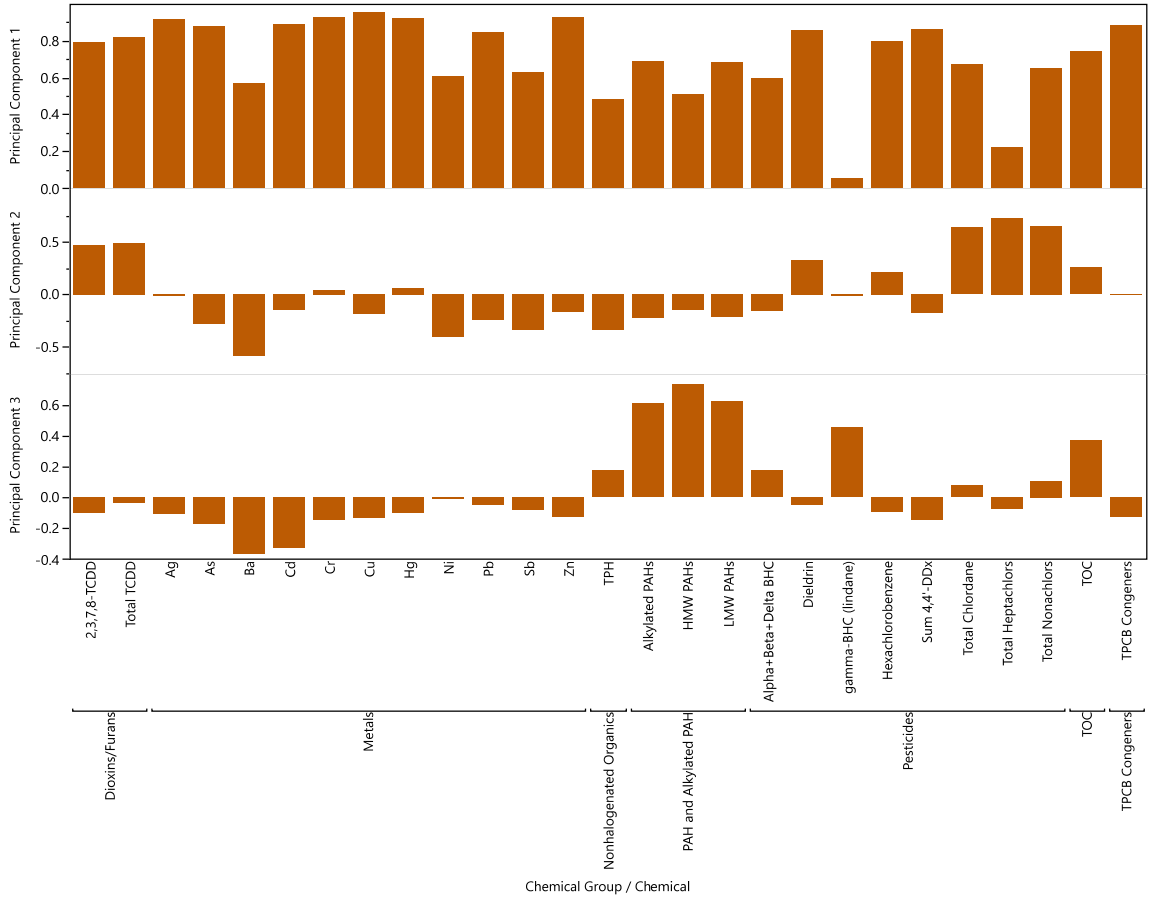
Figure 6

2019

A. Principal Components Scores



B. Principal Component Loadings



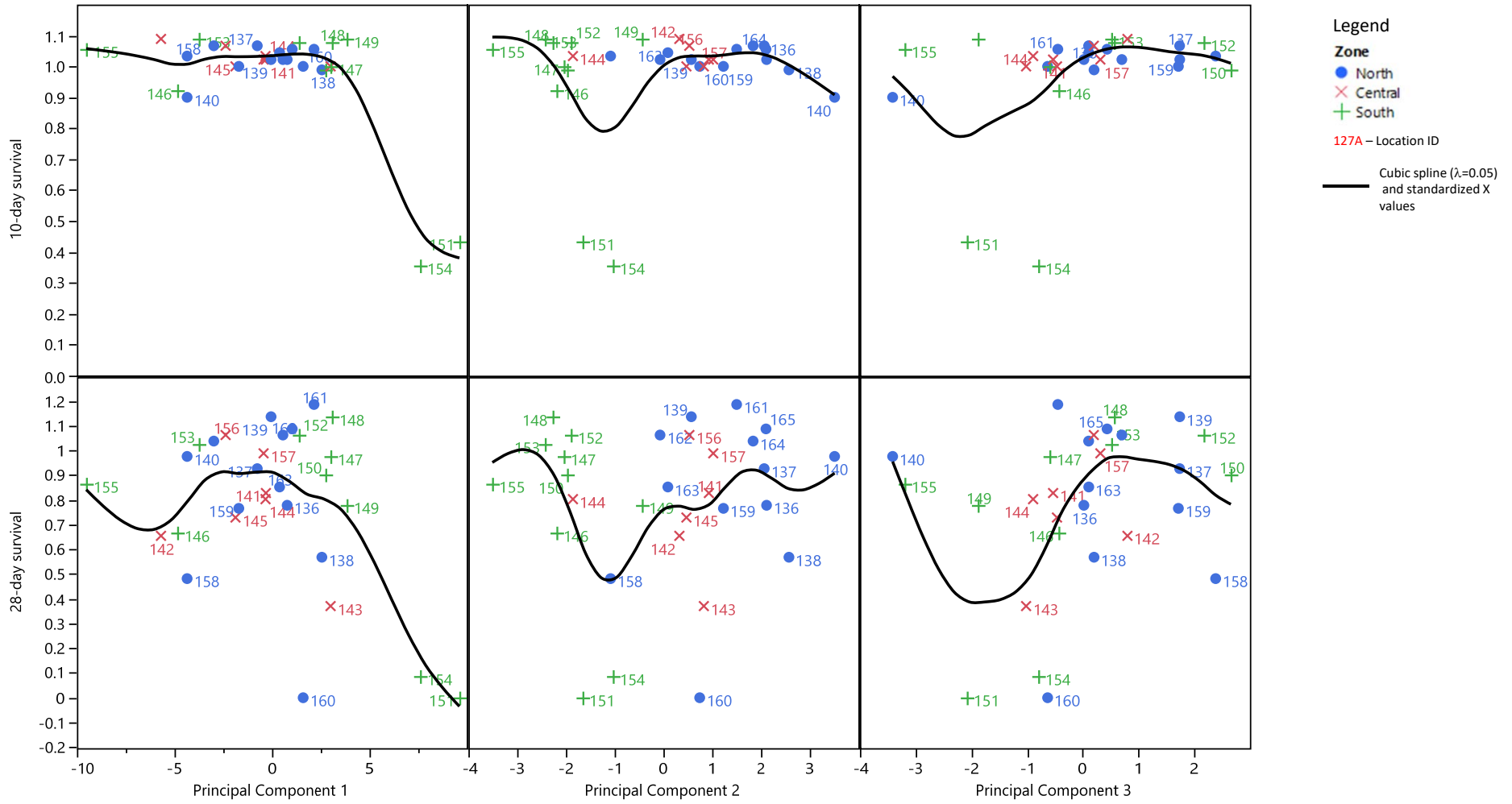
Legend

Zone

- North
- Central
- South

127A – Location ID

Louis Berger	**2015 SQT Data on Log Concentrations PCA Results**	Figure 7
		2019



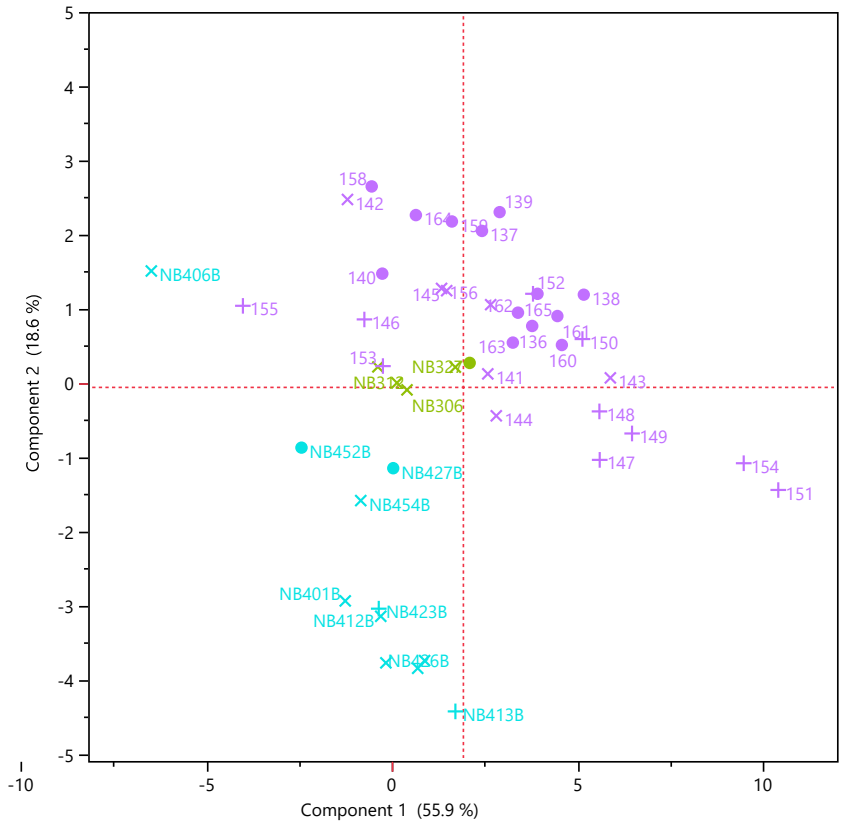
Louis Berger

2015 SQT Data on Log Concentrations
10-day and 28-day Survival Rate vs. Principal Components 1, 2 & 3

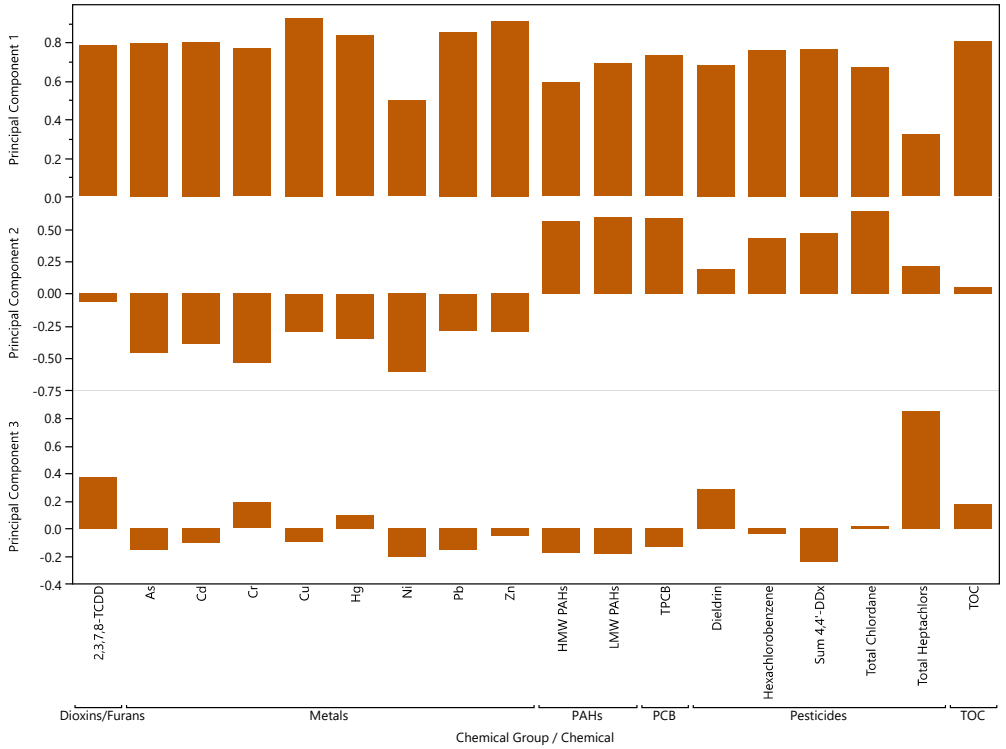
Figure 8

2019

A. Principal Components Scores



B. Principal Component Loadings

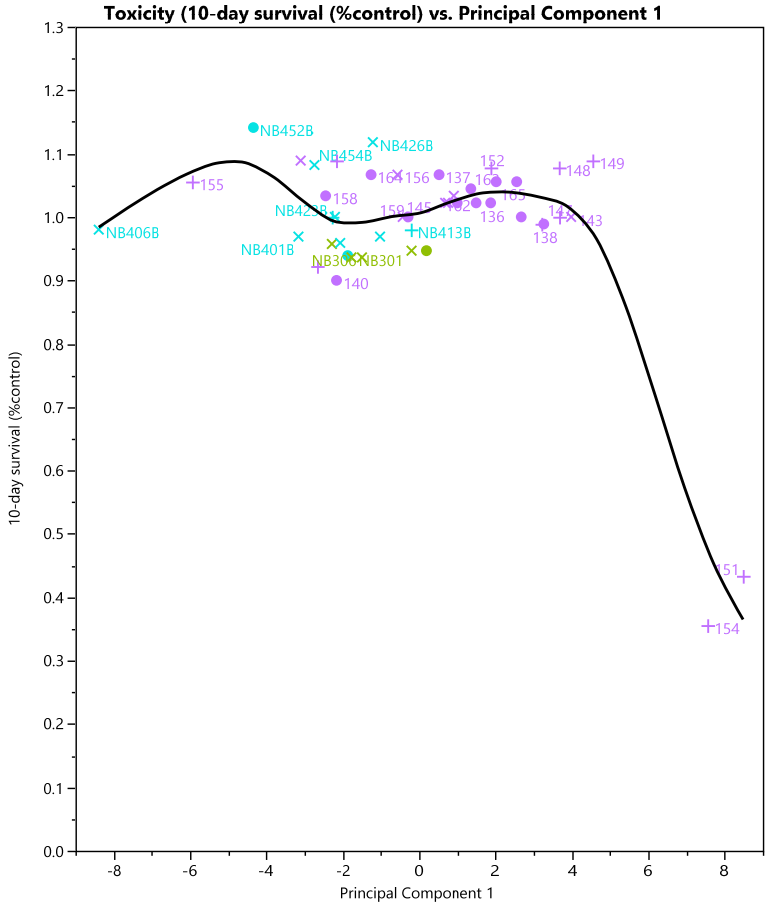


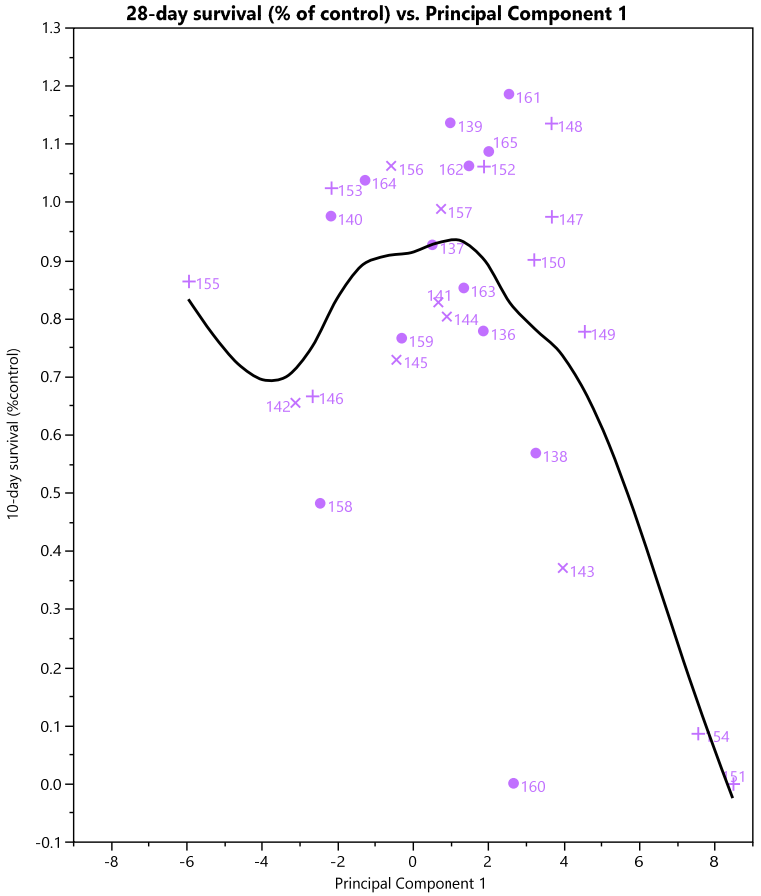
Legend

Sample Year
- 2003
- 2013
- 2015

Zone
- North
- Central
- South

Louis Berger	**Historical and 2015 SQT Data with Toxicity PCA on Log Concentrations Results**	Figure 9
		2019





Legend

Sample Year

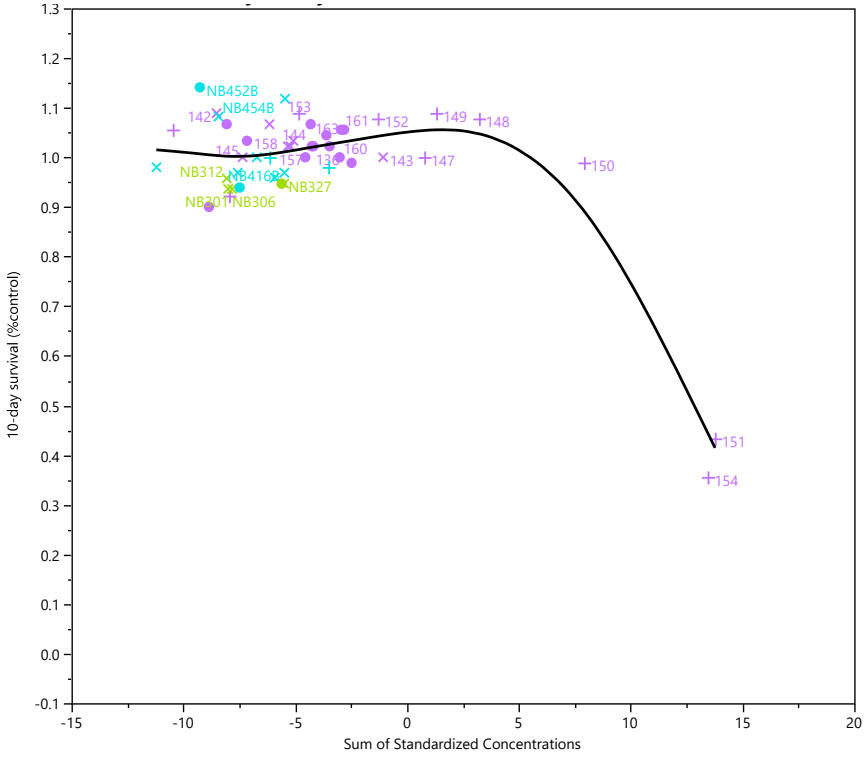
- 2003
- 2013
- 2015

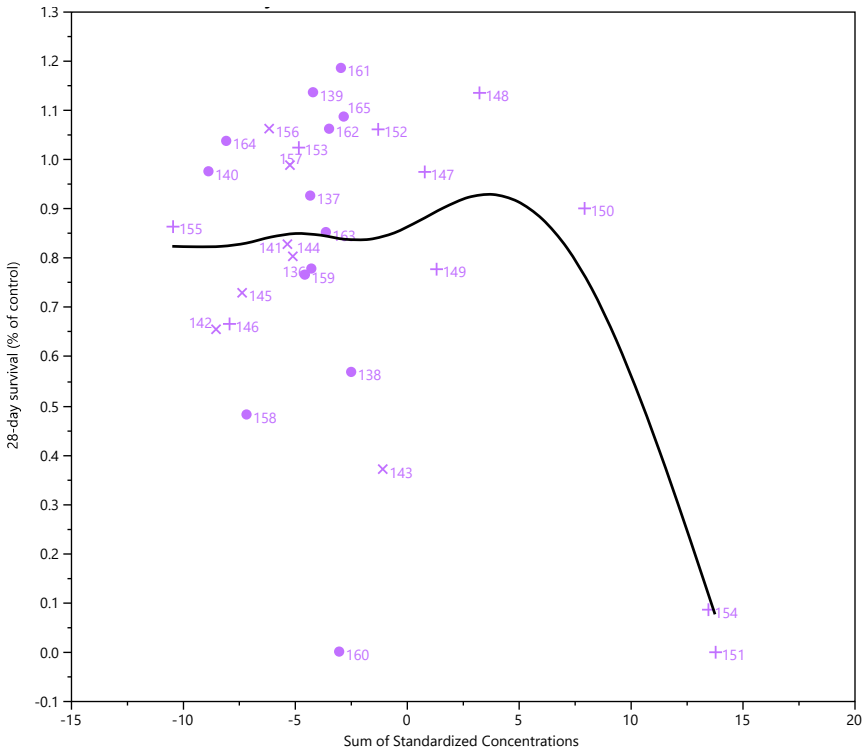
Zone

- North
- Central
- South

Cubic spline (λ=0.05) and standardized X values

Louis Berger	**Historical and 2015 SQT Data with Toxicity PCA on Log Concentrations** **10-day Survival vs. PC Scores**	Figure 10 2019





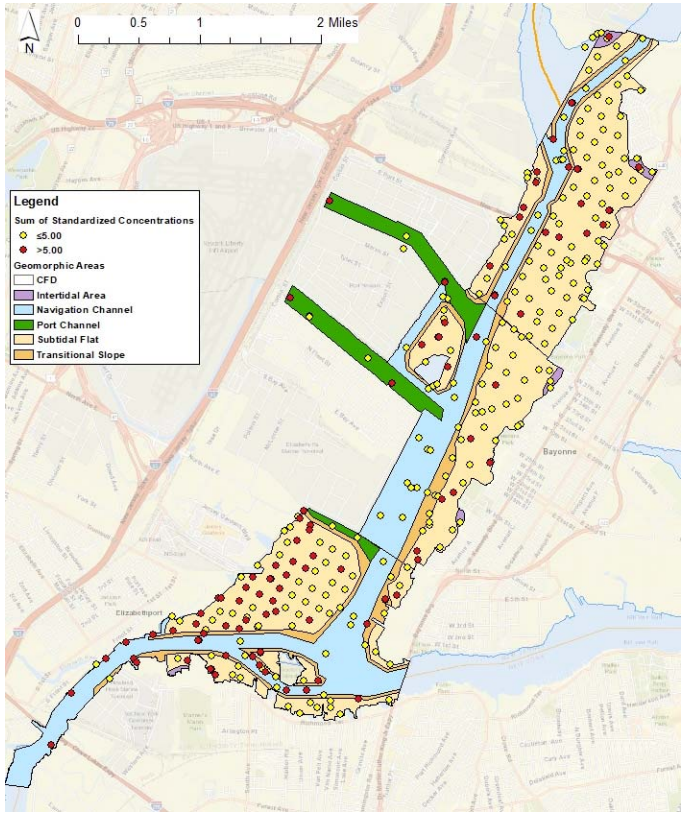
Legend

Sample Year
- 2003
- 2013
- 2015

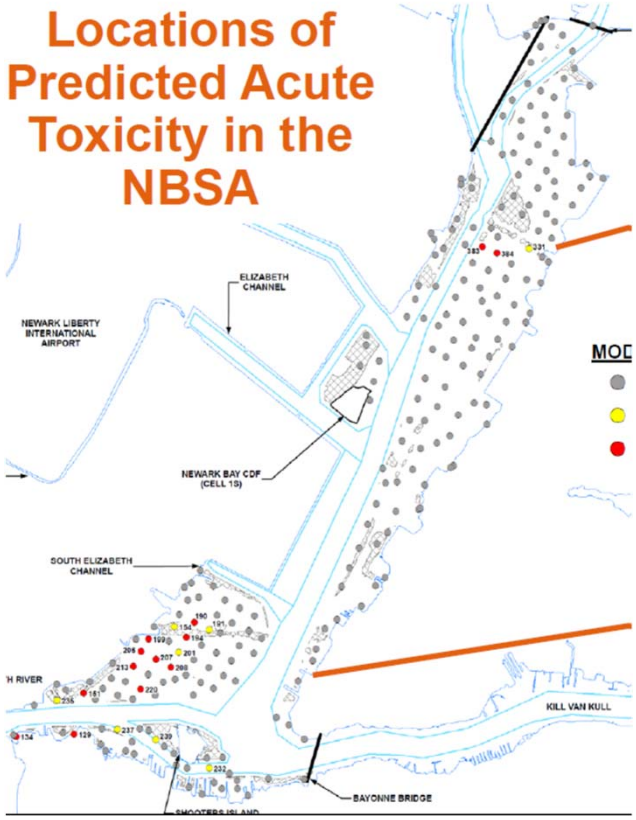
Zone
- North
- Central
- South

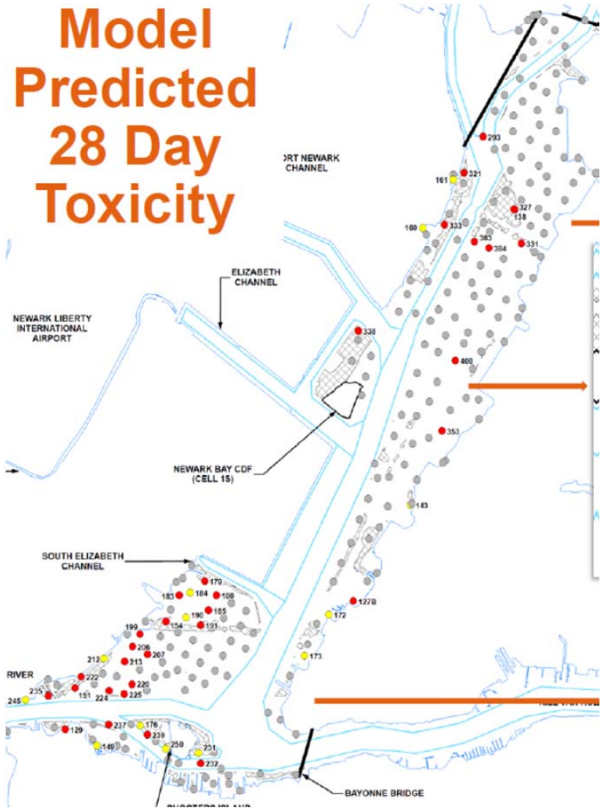
Cubic spline (λ=0.05) and standardized X values

Louis Berger	**Historical and 2015 SQT Data with Toxicity: Sum of Standardized Concentrations vs. 10-day and 28-day Survival**	Figure 11
		2019



Sum of Standardized Concentrations





Louis Berger	**Comparison between Sum of Standardized Log Concentrations and GSH Model Prediction for the 10-day and 28-day Toxicity in Newark Bay**	Figure 12 2019

APPENDIX B

Species Life History Profiles and Exposure Factors

ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

BASELINE ECOLOGICAL RISK ASSESSMENT

APPENDIX B – SPECIES LIFE HISTORY PROFILES

Newark Bay Study Area

Newark Bay, New Jersey

July 2020

CONTENTS

Acronyms and Abbreviations iv

1 INTRODUCTION 1

2 SOFTSHELL CLAM 1

2.1 Habitat 1

2.2 Reproduction 1

2.3 Diet 1

2.4 Predators 2

2.5 Newark Bay 2

3 BLUE CRAB 2

3.1 Habitat and Reproduction 2

3.2 Diet 2

3.3 Predators 3

3.4 Newark Bay 3

4 MUMMICHOG 3

4.1 Habitat 3

4.2 Reproduction 4

4.3 Diet 4

4.4 Predators 4

4.5 Newark Bay 4

5 SUMMER/WINTER FLOUNDER 5

5.1 Summer Flounder 5

5.1.1 Habitat 5

5.1.2 Reproduction 5

5.1.3 Diet 5

5.1.4 Predators 6

5.1.5 Newark Bay 6

5.2 Winter Flounder 6

5.2.1 Habitat 6

5.2.2 Reproduction 7

5.2.3 Diet 7
5.2.4 Predators 7
5.2.5 Newark Bay 7
6 WHITE PERCH 8
6.1 Habitat 8
6.2 Reproduction 8
6.3 Diet 9
6.4 Predators 9
6.5 Newark Bay 9
7 AMERICAN EEL 9
7.1 Habitat and Reproduction 9
7.2 Diet 10
7.3 Predators 11
7.4 Newark Bay 11
8 SPOTTED SANDPIPER 11
8.1 Habitat 11
8.2 Reproduction 11
8.3 Diet 12
8.4 Newark Bay 12
9 GREAT BLUE HERON 12
9.1 Habitat 12
9.2 Reproduction 13
9.3 Diet 13
9.4 Newark Bay 13
10 DOUBLE-CRESTER CORMORANT 14
10.1 Habitat 14
10.2 Reproduction 14
10.3 Diet 14
10.4 Newark Bay 15
11 LESSER SCAUP 15
11.1 Habitat 15

11.2 Reproduction 15
11.3 Diet 15
11.4 Newark Bay 16
12 RIVER OTTER 16
12.1 Habitat 16
12.2 Reproduction 16
12.3 Diet 16
12.4 Newark Bay 17
13 MUSKRAT 17
13.1 Habitat 17
13.2 Reproduction 18
13.3 Diet 18
13.4 Newark Bay 18
14 HARBOR SEAL 18
14.1 Habitat 18
14.2 Reproduction 19
14.3 Diet 19
14.4 Newark Bay 19
15 REFERENCES 20

ACRONYMS AND ABBREVIATIONS

ABS	Aquatic Biological Survey
ASMFC	Atlantic States Marine Fisheries Commission
BERA	baseline ecological risk assessment
cm	centimeter
CPUE	catch per unit effort
ha	hectares
km	kilometers
m	meter
mm	millimeter
NBSA	Newark Bay Study Area
NYSDEC	New York State Department of Environmental Conservation
USACE	United States Army Corp of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
Tierra	Tierra Solutions, Inc.

1 INTRODUCTION

This appendix provides additional details on the life histories of the representative ecological receptors evaluated in the Newark Bay Study Area (NBSA) Baseline Ecological Risk Assessment (BERA). For each selected receptor, the habitat used, geographic range, reproduction and breeding, diet, and relevance to Newark Bay are discussed.

2 SOFTSHELL CLAM

2.1 Habitat

The softshell clam (*Mya arenaria*) is a marine/estuarine bivalve species found along the Atlantic coast from the Subarctic to Cape Hatteras, and along the west coast from Alaska to San Francisco (Pfitzenmeyer 1972, Lucy 1976; cited in Abraham and Dillon 1986). Although found in all types of habitat, softshell clams appear to thrive in areas with sandy, sand-mud, or sandy-clay bottoms. Growth of softshell clams is impacted by seasonal availability of phytoplankton, water currents, clam density, mudflat topography, sediment type, tidal level, water temperature, and spawning activity (Anonymous 1983; cited in Abraham and Dillon 1986). Softshell clams grow most rapidly in sediments that are easily penetrated (not coarse gravel or hard clay). Growth slows as clams get larger (Abraham and Dillon 1986).

Density is usually six to eight clams per square foot and is highest at depths of 3 to 4 meters (m), temperatures less than 28 degrees Celsius, and at salinities not less than 4 to 5 parts per trillion (Pfitzenmeyer and Drobeck 1963, Lucy 1976; cited in Abraham and Dillon 1986). Adult clams burrow as far as 30 centimeter (cm) into the sediment, and siphon to the sediment surface (Kennedy and Mihursky 1971; cited in Abraham and Dillon 1986).

2.2 Reproduction

Softshell clams achieve maturity after about 5 years and typically have a life span of 10 to 12 years; although, there are data indicating that this species can live 28 years (Perkins 1974, Brousseau 1978, MacDonald and Thomas 1980; cited in Abraham and Dillon 1986). Softshell clams typically have two spawning periods during a calendar year, one in the spring and another during the fall (Lucy 1976, Pfitzenmeyer 1965; cited in Abraham and Dillon 1986). Spawning is triggered by temperatures in the 10 to 20 degrees Celsius range (Lucy 1976; cited in Abraham and Dillon 1986).

2.3 Diet

Adult softshell clams feed by filtering and absorbing microscopic particles of organic material (e.g., detritus and plankton) suspended in seawater (Abraham and Dillon 1986). They depend on abundant plankton before and during spawning to produce adequate gametes (Coe and Turner 1938; cited in Abraham and Dillon 1986).

2.4 Predators

Softshell clams, particularly larvae and juveniles, are prey for a number of marine organisms including jellyfish, cyprinodont fishes, oyster drill snails, several kinds of crabs (including the blue crab), flatworms, and bottom-dwelling fishes (Holland et al. 1980, Andrews 1970, Lucy 1976, Holland et al. 1980, Blundon and Kennedy 1982; cited in Abraham and Dillon 1986). Birds, including diving ducks and gulls, as well as mammals like raccoon, also consume softshell clams (MacGinitie and MacGinitie 1968, Gosner 1978, Holland et al. 1980; cited in Abraham and Dillon 1986).

2.5 Newark Bay

Softshell clam were found throughout intertidal areas of Newark Bay the 2013 Reconnaissance Survey (Tierra 2015) and during targeted crab, clam, and fish sampling in 2014. Softshell clam are expected to be present year-round in Newark Bay.

3 BLUE CRAB

3.1 Habitat and Reproduction

The blue crab (*Callinectes sapidus*) can be found in coastal waters from Massachusetts Bay to the eastern coast of South America. It is primarily found in bays and brackish estuaries (Hill et al. 1989). Blue crabs mate from May to October, primarily in low-salinity waters in the upper areas of estuaries and lower portions of rivers (Pyle and Cronin 1950, Darnell 1959, Williams 1965, Tagatz 1968; cited in Hill et al. 1989). Females migrate to high-salinity waters in lower estuaries, sounds, and nearshore spawning areas after mating (Churchill 1919, Darnell 1959, Fischler and Walburg 1962; cited in Hill et al. 1989) where they overwinter before spawning by burrowing in the mud at the mouths of bays (Cook 1981, Schmidt 1985; cited in Hill et al. 1989). Females will remain in spawning areas for the rest of their lives or travel only short distances out to sea (Williams 1965; cited in Hill et al. 1989). In warmer months, mature males tend to remain dispersed in the upper estuary, creeks, and rivers with low salinity (Churchill 1919, Van Engel 1958, Dudley and Judy 1971, Music 1979; cited in Hill et al. 1989).

Females lay eggs from May to August and incubate eggs (generally 1 to 2 weeks) until planktonic larvae are released. These larvae feed and undergo a series of molts offshore (Cook 1981, Finchham 1981, Sulkin et al. 1982; cited in Hill et al. 1989). The larvae then migrate inshore to lower estuaries, staying near the bottom in high-salinity areas (Tagatz 1968; cited in Hill et al. 1989). Juveniles typically migrate into shallow, less saline water in upper estuaries to mature (Fischler and Walburg 1962; cited in Hill et al. 1989), typically reaching maturity in the spring or summer the year following hatching (Hill et al. 1989). Few blue crabs live longer than three years (Churchill 1919, Williams 1965; cited in Hill et al. 1989).

3.2 Diet

Depending on the life stage, blue crabs are phytoplanktivores, omnivores, detritivores, and scavengers (Darnell 1959, Van Engel 1958, Tagatz 1968; cited in Hill et al. 1989). The omnivorous megalopa stage eats fish larvae, small shellfish, and aquatic plants (Van Engel 1958, Darnell 1959, Tagatz 1968; cited in Hill et al. 1989); and cannibalism is common among all blue crab life stages (Hay 1905, Churchill 1919, Darnell 1959, and Tagatz 1968; cited in Hill et al. 1989). Diet studies have shown that the predominant

prey consumed by blue crab vary, and some common items include dead and live fish, crabs (including juvenile or molting blue crabs), organic debris, shrimp, mollusks (including mussels, clams, oysters, and snails), and aquatic plants (Newcombe 1945, Darnell 1959, Williams 1965, Tagatz 1968, Seed 1980, Arnold 1984, Warren 1985; cited in Hill et al. 1989). Roots, shoots, and leaves of eel grass (*Zostera* spp.), ditch grass (*Ruppia* spp.), sea lettuce, and salt marsh grass (*Spartina* spp.) were commonly eaten by crabs in saltwater marshes, tidal creeks, and other shallow estuarine areas (Truitt 1939; cited in Hill et al. 1989). Mollusks were the dominant prey of crabs wider than 120 millimeter (mm) (Darnell 1958, cited in Hill et al. 1989).

3.3 Predators

Blue crab are preyed upon by a variety of species. Egg masses are attacked by fish (Adkins 1972; cited in Hill et al. 1989). Larval stages are eaten by fish, shellfish, jellyfish, comb jellies, and other planktivores (Van Engel 1958, cited in Hill et al. 1989). Juveniles are eaten by a variety of fish, wading birds, and seabirds (Fontenot and Rogillio 1970, Adkins 1972, Barrass and Kitting 1986; cited in Hill et al. 1989). Juvenile and adult blue crabs are consumed by mammals, a variety of birds, and several fishes (Manooch 1973, Wenner and Musick 1975, Medved and Marshall 1981; cited in Hill et al. 1989).

3.4 Newark Bay

Blue crab were found throughout intertidal and shallow subtidal areas of Newark Bay during the 2013 Reconnaissance Survey (Tierra Solutions, Inc. [Tierra] 2015) and at a variety of depths throughout the Bay during the crab, clam, and fish sampling in 2014 and 2015. During these sampling efforts, blue crabs were collected from 12 intertidal locations and an additional 25 locations throughout the three geographic zones of the Bay. Blue crab are expected to be present year-round in Newark Bay. As in most estuaries, it is expected that adults move to deeper waters of the Bay during the late fall and winter months, and into the subtidal flats and intertidal areas during the rest of the year.

4 MUMMICHOG

4.1 Habitat

The mummichog (*Fundulus heteroclitus*) is found along muddy marshes, tidal creeks and the sheltered shores of the Atlantic coast from the Gulf of St. Lawrence south to northeastern Florida (Abraham 1985). Mummichog tend to inhabit bays and tidally influenced rivers and creeks or estuaries, prefer shallow water near the shoreline, and typically do not go deeper than approximately 12 feet (Bigelow and Schroeder 1953). They are usually found within 110 m of shorelines along intertidal marshes and mudflats (Armstrong and Child 1965; cited in Abraham 1985).

Mummichogs do not migrate for breeding (Rosen 1973; cited in Abraham 1985). Fish greater than 60 mm long maintain a summer home range of 36 to 38 m along one bank of tidal creeks, but some may move as much as 375 m (Lotrich 1975; cited in Abraham 1985). In winter, mummichogs can burrow 150 to 200 mm into the mud of pools, while others migrate to the mouth of the tidal channel where they have been living. In the subsequent spring, mummichogs usually return up the same channel (Butner and Brattstrom 1960; cited in Abraham 1985). During the growing season, young mummichogs remain in the intertidal

zone for 6 to 8 weeks, and inhabit shallow pools on the marsh surface at low tide (Taylor et al. 1979; cited in Abraham 1985).

4.2 Reproduction

The spawning season of mummichogs vary depending on latitude. From New Jersey northward, the spawning season lasts from spring (March to May) through late summer or early fall (July to September) (Hardy 1978; cited in Abraham 1985). The timing and duration of spawning seasons differ, but the water temperature range over which spawning occurs is similar (Abraham 1985). Mummichogs may spawn eight or more times in a season in fresh, brackish, and saltwater; each lasting five or more days (Taylor and DiMichele 1980, Hardy 1978; cited in Abraham 1985). Females lay sticky eggs in empty mollusk shells or on dead vegetation when the tide is highest during the new or full moon (Taylor and DiMichele 1983; cited in Abraham 1985). When the tide recedes, eggs are exposed to air and normally incubate during this time (Taylor and DiMichele 1980; cited in Abraham 1985). Eggs will not begin to hatch until once again covered with water during the next month's highest tide (Taylor and DiMichele 1980; cited in Abraham 1985). When hatched, larvae measure about five millimeters long (Hardy 1978). Most adults reach sexual maturity during their second year and generally live for three years (Kneib and Stiven 1978; cited in Abraham 1985).

4.3 Diet

Mummichog are opportunistic and will feed on almost any organism in the water column, and subtidal and intertidal benthos (Weisberg and Lotrich 1982). Several studies conducted in varied habitats have found that the mummichog diet consists of crustaceans (i.e., amphipods, tanaids, copepods, and ostracods), polychaetes, insects (adult and larvae), algae, fish and fish eggs, shrimp, and hymenopterans (Fritz 1974, Kneib and Stiven 1978, Kneib et al. 1980; cited in Abraham 1985). The size of mummichog prey is limited by the size of the fish’s mouth (Vince et al. 1976, as cited in Abraham 1985). Mummichog often consume detritus incidentally while feeding on the water’s surface or bottom substrate; however, detritus is not a significant source of energy (Prinslow et al. 1974; cited in Abraham 1985).

4.4 Predators

Mummichog are the major prey for wading birds, aerial searching birds, piscivorous ducks, and many predatory fishes, including herons, egrets, terns, gulls, striped bass, and bluefish (Peterson and Peterson 1979, Valiela et al. 1977; cited in Abraham 1985). The diet of nesting herons and egrets may contain up to 30% mummichog (Jenni 1969; cited in Abraham 1985). Least and common terns eat mummichog from pools when the tide goes out (Butner and Brattstrom 1960; cited in Abraham 1985). American eel, white perch, summer flounder, red drum and blue crabs also prey on mummichog (Lotrich 1975, Miller 1963, Meredith and Lotrich 1979, Peterson and Peterson 1979; cited in Abraham 1985).

4.5 Newark Bay

Mummichog were collected throughout the NBSA during 2014 - 2016 BERA sampling programs (Normandeau 2017) and are expected to be present year-round in Newark Bay.

5 SUMMER/WINTER FLOUNDER

5.1 Summer Flounder

5.1.1 Habitat

Summer flounder (*Paralichthys dentatus*) can generally be found from Nova Scotia to Florida in shallow estuarine waters and the outer continental shelf (Ginsburg 1952, Bigelow and Schroeder 1953, Anderson and Gehringer 1965, Leim and Scott 1966, Gutherz 1967, Gilbert 1986, Grimes et al. 1989; cited in Packer et al. 1999); although, they may be found as far south as the northern Gulf of Mexico (Briggs 1958; cited in Packer et al. 1999). They stay inshore during the spring and summer months and migrate offshore during the fall and winter months, found at depths down to 150 m (Bigelow and Schroeder 1953, Grosslein and Azarovitz 1982; cited in Packer et al. 1999). However, older adults may remain offshore all year (Festa 1977; cited in Packer et al. 1999).

Summer flounder occur on all bottom types, but appear to prefer hard sandy substrates (Vouglitois 1983). Abundance varies by depth and area (Packer et al. 1999).

5.1.2 Reproduction

As stated above, summer flounder exhibit strong seasonal inshore-offshore movements. Spawning occurs in the fall and winter over the open ocean areas of the shelf while the fish are moving offshore to their wintering grounds. Spawning migration is linked to sexual maturity, with the oldest and largest fish migrating first (Smith 1973; cited in Packer et al. 1999). As in their seasonal migrations, spawning summer flounder in the northern portion of the geographic range spawn and move offshore earlier than those in the southern part of the range (Rogers and Van Den Avyle 1983; cited in Packer et al. 1999).

Eggs are pelagic and buoyant and have been collected at depths 10 to 30 m in the spring, 30 to 70 m in the fall, and as deep as 110 m in the winter (Packer et al. 1999). Planktonic larvae (ranging from 2 to 13 mm) are found 19 to 83 m from shore ranging from depth of 10 to 70 m. They are found in the northern part of the Middle Atlantic Bight from September to February (Smith 1973, Able et al. 1990; cited in Packer et al. 1999). Larvae and postlarvae migrate inshore with the currents from October to May, entering coastal and estuarine nursery areas to develop into juveniles (Merriman and Sclar 1952, Olney 1983, Olney and Boehlert 1988, Able et al. 1990, Szedlmayer et al. 1992; cited in Packer et al. 1999). The larvae leave the water column and settle on the bottom where they bury in the sediment to develop into juveniles (Keefe and Able 1994; cited in Packer et al. 1999). Juveniles remain inshore in estuaries through spring, summer and fall (Deubler 1958, Pearcy and Richards 1962, Poole 1966, Miller and Jorgenson 1969, Powell and Schwartz 1977, Fogarty 1981, Rountree and Able 1992a, 1992b, 1997, Able and Kaiser 1994, Walsh et al. 1999; cited in Packer et al. 1999); although, they may travel to deeper waters in the winter (Smith and Daiber 1977, Wilk et al. 1977, Able and Kaiser 1994; cited in Packer et al. 1999).

5.1.3 Diet

Adults are opportunistic feeders, eating whatever food is convenient at the time. Adults feed mostly on fish and crustaceans as well as squid, polychaetes, and shrimp; larval and post-larval flounder feed on

zooplankton and small crustaceans; and juveniles eat polychaetes, crustaceans, and fish (Packer et al. 1999).

Adult summer flounder feeding in estuaries and shelf waters are more active during daylight hours (Olla et al. 1972; cited in Packer et al. 1999). Summer flounder can feed equally well in the water column or on the bottom. To capture prey, they "lie-in-wait" on the ocean floor concealed, partly by sand and partly by their coloration, and wait for their prey to swim by. When suitable prey appears, flounder ambush them (Lascara 1981; cited in Packer et al. 1999).

5.1.4 Predators

Larval and juvenile summer flounder are preyed upon until they grow large enough to fend for themselves, with a variety of predators including spiny dogfish, monkfish, cod, hakes, sea raven, longhorn sculpin, fourspot flounder, blue crab, and sea robins. Large sharks, rays, and monkfish prey on adult summer flounder (Bowman et al. 1976, Reichert and van der Veer 1991; cited in Packer et al. 1999).

5.1.5 Newark Bay

The New York and New Jersey Harbor Deepening Project Aquatic Biological Survey (ABS) program fish sampling (USACE 2015a; 2015b) indicates that summer flounder are not present in Newark Bay during the winter months from November through March. In addition, 1992-1997 Hudson-Raritan surveys show the adults to be present in moderate numbers throughout the estuary in all seasons except winter (Packer et al. 1999). This species has been collected in Newark Bay from April-October (Packer et al. 1999). The NBSA BERA fish surveys (Normandeau 2017) indicate that summer flounder are present in NBSA from March through October; however, no sampling was conducted from November to February.

5.2 Winter Flounder

5.2.1 Habitat

Winter flounder (*Pseudopleuronectes americanus*) is found along the northwest Atlantic coast, from Labrador to North Carolina and Georgia; they are common in shelf waters to the south in Chesapeake Bay as well as inshore areas from Massachusetts to New Jersey (Kendall 1909, Backus 1957, Hildebrand and Schroeder 1928; cited in Pereira et al. 1999).

Winter flounder has annual spawning migrations into nearshore waters in fall and early winter (McCracken 1963, Howe and Coates 1975; cited in Pereira et al. 1999). Adults migrate in two phases: an autumn estuarine immigration prior to spawning, and a late spring/summer movement to either deeper, cooler portions of estuaries or to offshore areas after spawning. This pattern of seasonal distribution may change in colder waters at the northern extent of their range where winter flounder migrate to shallow waters in the summer and deeper waters in the winter (Weber 1984; cited in Pereira et al. 1999). In waters off southern Massachusetts, winter flounder moved offshore to deeper water in the spring and summer, but usually remained within the 55 m depth contour (Howe and Coates 1975; cited in Grimes et al. 1989). This seaward movement may have been an avoidance of the temperature rise in the nearshore waters (Grimes et al. 1989). For young-of-year winter flounder, sandy coves in estuaries and bays appear to be preferred habitats for the first summer (Hildebrand and Schroeder 1928; cited in Grimes et al. 1989). Nursery habitat for winter flounder larvae and juveniles is typically close to spawning grounds, and includes shallow bays and estuaries (Pereira et al. 1999).

5.2.2 Reproduction

Adult winter flounder migrate inshore in the fall and early winter and spawn in late winter and early spring, with peak spawning occurring during February and March, throughout most of their range; but may occur earlier in their southern range (Bigelow and Schroeder 1953, Klein-MacPhee, in prep; cited in Pereira et al. 1999). During spawning, females release demersal eggs that remain on the spawning grounds. The most common substrate seems to be sand, but may also include muddy sand and mud and gravel (Pereira et al. 1999). Larvae are predominantly found in the upper reaches of estuaries in early spring, moving into the lower estuary later in the season. For the first summer, young-of-year winter flounder remain in shallow waters of bays and estuaries where they were spawned. Larvae are initially planktonic, but become more bottom-oriented as metamorphosis occurs (i.e., the left eye migrates to the right side and larvae become “flounder-like”). Metamorphosis begins around 5 to 6 weeks after hatching and is completed by the time the larvae are 8 to 9 mm in length at about 8 weeks after hatching (Bigelow and Schroeder 1953; cited in Pereira et al. 1999). Although most juveniles overwinter in the estuaries, large numbers are also found on the shelf and outside the estuaries (Bigelow and Schroeder 1953, Phelan 1992, Able and Hagan 1995; cited in Pereira et al. 1999). Temperature, salinity, dissolved oxygen, and food availability influence larval and juvenile growth and survival.

5.2.3 Diet

Winter flounder are omnivorous or opportunistic feeders and consume a wide variety of prey. The majority of their diet is made up of polychaetes and crustaceans (mostly amphipods) (Hacunda 1981, Macdonald 1983, Steimle et al. 1993, Martell and McClelland 1994, Carlson et al. 1997; cited in Pereira et al. 1999). Food items change with increasing larval size. Smaller larvae (3 to 6 mm) ate more invertebrate eggs and nauplii while larger larvae (6 to 8 mm) ate polychaetes and copepods. Young-of-the-year and yearling flounder eat more amphipods and polychaetes (Pearcy 1962; cited in Pereira et al. 1999). Juvenile diets consist of Mysid shrimp and small fish. Adults have a varied diet from polychaetes, Mysids, crustaceans, small fish and fish eggs (Hildebrand and Schroeder 1928, Smith and Daiber 1977, Powell and Schwartz 1977; cited in Grimes et al. 1989). Their diet is related to size: the larger the individual, the greater the size of the food item to be consumed. Winter flounder feed by sight, lying on the sediment bottom just before lunging at prey; they feed throughout the day and are inactive at night (Olla et al. 1969; cited in Grimes et al. 1989).

5.2.4 Predators

Larval winter flounder are preyed upon by predatory amphipods, anemone, and mackerel and potentially other fish. The juveniles are preyed upon by snapper bluefish, gulls, and cormorants (Howe et al. 1976; cited in Pereira et al. 1999). Larger juveniles and adults are preyed upon by summer flounder, striped bass, bluefish, sea robins and other species of fish of larger size. Cormorants, herons, osprey, gulls, and harbor seals are also predators (Poole 1964, Richards et al. 1979, Manderson et al. 1999; cited in Pereira et al. 1999).

5.2.5 Newark Bay

The New York and New Jersey Harbor Deepening Project ABS program fish sampling (USACE 2015a; 2015b) indicates that winter flounder are potentially present in Newark Bay year-round, although are less common in the summer months. The 1992-1997 Hudson-Raritan surveys show the adults to be present in

moderate numbers throughout the estuary in all seasons except winter (Packer et al. 1999). Fish surveys conducted in the NBSA as part of the 2014-15 BERA sampling (Normandeau 2017) found winter flounder to be present from the spring through fall months, but most abundant in the late spring/early summer.

6 WHITE PERCH

6.1 Habitat

White perch (*Morone americana*) are found in coastal areas from New Brunswick, Nova Scotia, and Prince Edward Island south to South Carolina, but have also been introduced to lakes and ponds in New England, Nebraska, and the Great Lakes (Hardy 1978, Hergenrader and Bliss 1980, Busch et al. 1977, Scott and Christie 1963; cited in Stanley and Danie 1983). White perch are native to shallow turbid areas in the few coastal rivers in New York and New Jersey. They prefer areas with compact silt and a fairly level bottom, as well as mud, sand, and clay as substrates (Stanley and Danie 1983). They do not rely on vegetation, rocks or debris for shelter because they are normally found in open water, in varying water depths depending on the time of day, night, and for overwintering (AuClair 1956, Sheri and Power 1969; cited in Stanley and Danie 1983).

When temperatures increase in spring, white perch begin their spawning migration. They move shoreward and generally upstream, sometimes in large schools to shallow areas in tidal creeks and freshwater areas. After spawning, they may seek deeper water. Overwintering occurs in deeper brackish or estuarine waters throughout bays with soft substrates (Stanley and Danie 1983).

6.2 Reproduction

White perch are euryhaline, residing in estuaries and rivers throughout their life cycle (Klauda et al. 1988). They spawn in estuaries, rivers, lakes, and marshes, usually in freshwater, but sometimes brackish water up to 4.2 parts per trillion salinity (Hardy 1978; cited in Stanley and Danie 1983). White perch migrate upstream from the saltier bays and coastal areas into tidal, more freshwater portions of streams and rivers to spawn in spring. Northern populations begin spawning in late March to early April; southern populations may spawn later (Hardy 1978; cited in Stanley and Danie 1983).

Eggs are demersal and usually attach singly to detritus (Stanley and Danie 1983). Newly hatched prolarvae have limited mobility and remain in the general spawning area during the first 4 to 13 days (Mansueti 1964, Hardy 1978; cited in Stanley and Danie 1983). Once larvae grow larger, they swim vertically or sink, resulting in downstream drift in rivers or planktonic drift in estuaries or lakes (Hardy 1978; cited in Stanley and Danie 1983). Inshore zones of estuaries and creeks are nurseries and juveniles stay in these areas up to one year, inhabiting waters with silt, mud, and plant substrate (Wang and Kernehan 1979, Hardy 1978; cited in Stanley and Danie 1983). Juveniles occasionally venture to offshore waters during daylight, but return to protected beach areas at night and during rough water (Hardy 1978; cited in Stanley and Danie 1983). Once temperatures decrease in August, juveniles return to brackish waters to overwinter either in deep pools of tidal creeks and tributaries or deep waters of rivers and bays (Wang and Kernehan 1979; cited in Stanley and Danie 1983).

6.3 Diet

White perch are invertivorous benthic-feeding fish; common dietary components include amphipods, shrimp, and copepods, based on regional studies for the Hudson and Hackensack Rivers (Bath and O'Connor 1985, Weis 2005). The diet varies depending on the time of year and the maturity of the individual fish. In late summer and fall, a greater proportion of the white perch's diet is fish, while in winter and spring, a greater proportion is invertebrates (Bath and O'Connor 1985; Weis 2005). A study by Schaeffer and Margraf (1986) of white perch stomach contents from fish caught in Lake Erie found high variability in white perch diets, which ranged from 0 to 96% cladocerans, 0 to 30% copepods, 0 to 14% chironomids, 0 to 77% gizzard shad, and 1 to 15% unidentified fish, depending on the season. In the Hudson River, New York, Bath and O'Connor (1985) identified amphipods as the most common food item in mature and immature white perch gut contents. The average frequency of occurrence of the various prey items in white perch gut contents was as follows: 37.3% amphipods, 6.5% isopods, 5.2% insects, 4.4% annelids, 3.1% shrimp, 2.1% fish eggs, 1.8% fish, 1.2% cladocerans, 0.5% fish larvae, 8.5% plant matter, and 29.7% unidentified material. In the Hackensack River, New Jersey, Weis (2005) identified amphipods as the predominant prey items of white perch, while fish and shrimp were less important items. While prey contents varied by season, the yearly average dry weight percentages were as follows: 23% amphipods, 17% shrimp, 17% fish, < 1% plant matter, and 43% unidentified material (Weis 2005).

6.4 Predators

White perch are consumed by larger predatory fish, (e.g., Atlantic salmon, brook trout, chain pickerel, smallmouth and largemouth bass), as well as by terrestrial vertebrates (wading birds and cormorants) (Smith and Kernehan 1981; cited in Stanley and Danie 1983). In addition, white perch fry may be eaten by copepods (Stanley and Danie 1983).

6.5 Newark Bay

The New York and New Jersey Harbor Deepening Project ABS program fish sampling (USACE 2015a; 2015b) indicates that white perch are seasonally abundant in Newark Bay in late fall and winter and are not present in Newark Bay in late spring, summer, and early fall. The 2014-16 NBSA BERA fish surveys (Normandeau 2017) indicate that white perch were mainly present in March and April; no white perch were caught between May and August. This confirms the literature life history information that white perch migrate into tributaries from Newark Bay in spring to begin spawning and remain there until fall when they return to winter in the deeper waters of Newark Bay.

7 AMERICAN EEL

7.1 Habitat and Reproduction

American eel (*Anguilla rostrata*) can be found throughout most of the east coasts of North America, Central America, and northern South America (Atlantic States Marine Fisheries Commission [ASMFC] 2000). They are found in most types of habitat, including offshore, mid-water, and bottom of lakes, estuaries, and streams, more commonly found in nearshore shallow embayments and tributaries that have relatively warm water (Adams and Hankinson 1928, Facey and LaBar 1981, GLFC 1996, Helfman et al. 1983, New York State Department of Environmental Conservation [NYSDEC] 1997a, 1997b; cited in

ASMFC 2000). Spawning and larval development occurs in the open ocean and feeding and growth occurs in estuaries and fresh waters (Facey and Van Den Avyle 1987; cited in ASMFC 2000). They have one spawning population in the Sargasso Sea (an oval area located in the middle of the Atlantic Ocean between the West Indies and the Azores), which provides all juvenile eel to be dispersed throughout its entire range each year (Facey and Van Den Avyle 1987; cited in ASMFC 2000). Individuals live for many years in freshwater and estuarine environments, before returning to the ocean as adults to reproduce once and die (ASMFC 2000).

ASMFC (2000) states that spawning may take place from February to April (McCleave et al. 1987). Eggs hatch after approximately two days (Yamamoto and Yamauchi 1974), releasing leptocephali that are transported to the eastern seaboard of North America to grow for several months (e.g., 8 to 12 months) (Facey and Van Den Avyle 1987). Shortly after metamorphosis, glass eels enter estuaries, eventually migrate to freshwater, and ascend rivers during the late winter and early spring (Helfman et al. 1984, McCleave and Kleckner 1982; cited in ASMFC 2000). While migrating upstream, glass eels metamorphose into elvers (also called yellow eels) (ASMFC 2000). In addition to the upriver migration, fall and spring migrations have been documented. Some yellow-phase American eel continue migrating upstream until they reach maturity, while others remain in the lower portions of coastal estuaries and rivers. Morrison et al. (2003b) studied the migration histories of yellow eels using otolith microchemistry. Yellow eels in the Hudson River, New York, showed three modes of habitat use: 1) the freshwater mode, in which yellow eels and elvers utilized only freshwater habitats; 2) the mixed mode, where American eel resided in freshwater for at least 2 years before migrating back to brackish water; and 3) the brackish mode, where American eel remained entirely in brackish habitats, without ever utilizing freshwater environments (Morrison et al. 2003a). American eel migrations upstream occur from March through October, and peak in May and July depending on location. Once yellow eel metamorphose into silver eel, they migrate offshore to their spawning grounds (ASMFC 2000).

Home ranges for eel have been reported at 3.4 hectares (ha) in small streams and rivers, and 2.4 to 65.4 ha in large lakes (Gunning and Shoop 1962, Bianchini et al. 1982, Bozeman et al. 1985, LaBar and Facey 1983; cited in ASMFC 2000).

7.2 Diet

American eel are opportunistic carnivores and have a diverse diet that includes benthic invertebrates (e.g., insects, crayfish, snails, worms), gastropods, and fish (Ogden 1970; Scott and Crossman 1973; Facey and LaBar 1981; cited in ASMFC 2000). As eel grow, a clear shift occurs in the percent composition of prey in their diet; larger eel have a diet of mainly fish and crustaceans, while smaller eel mainly prey on insects (Ogden 1970; cited in ASMFC 2000).

Ogden (1970) studied American eel gut contents from New Jersey streams and found that eel < 50 cm in length consumed primarily insects (72–100%) and secondarily fish (0–22%) and crustaceans (0–19%), whereas American eel ≥ 50 cm in length consumed more fish (20–60%) and crustaceans (20–40%) and fewer insects (0–40%). Similarly, a study of prey items in the diet of American eel from the James River (a tributary to Chesapeake Bay) found that for eel < 25 cm in length, invertebrates comprised 95% of the diet, while crayfish comprised 5% (Lookabaugh and Angermeier 1992). The same study found that American eel ≥ 37 cm in length consumed < 5% invertebrates and > 95% crayfish and vertebrates.

7.3 Predators

Glass eels, elvers, and small yellow eels are eaten by a variety of predatory fishes including largemouth bass and striped bass (Hornberger et al. 1978). Adult and juvenile eels are eaten by fish, aquatic mammals, and fish-eating birds including gulls and eagles (Sinha and Jones 1967, Seymour 1974; cited in ASMFC 2000).

7.4 Newark Bay

Fish surveys conducted as part of the New York and New Jersey Harbor Deepening Project ABS program (USACE 2015a; 2015b) show that American eel was collected in all months when surveys took place except February and March. Fish surveys conducted in the NBSA as part of the 2014-15 BERA sampling (Normandeau 2017) also collected American eel in all months when surveys were conducted except March and May. Although these survey data suggest that American eel is not present in Newark Bay in the spring, other research in the region shows that American eel may be present year-round.

8 SPOTTED SANDPIPER

8.1 Habitat

The spotted sandpiper (*Actitis macularius*) breeds throughout much of North America, including northern New Jersey, typically from May through August (Reed et al. 2013). Spotted sandpipers breed along bodies of water, usually in open habitats, from the northern border of the boreal forest across North America, to the central United States (Oring and Lank 1986; cited in USEPA 1993). Spotted sandpipers require open water for bathing and drinking, semi-open habitat for nesting, and dense vegetation for breeding (Bent 1929, Oring et al. 1983; cited in USEPA 1993). They typically prefer freshwater habitats (e.g., lakes, rivers, and marshes) over estuaries and beaches (Howell and Webb 1995; cited in Reed et al. 2013). During the winter, spotted sandpipers migrate to Central America (Reed et al. 2013). They generally migrate in small flocks or solitarily (National Geographic Society 1987; cited in USEPA 1993).

In coastal or shoreline areas, spotted sandpipers search beaches and muddy edges of inlets and creeks, wading less frequently than most sandpipers. Inland, they feed along the shores of sandy ponds and all types of streams, and may sometimes stray into meadows, fields, and gardens in agricultural areas (Bent 1929; cited in U.S. Environmental Protection Agency [USEPA] 1993). Spotted sandpiper wade into the water's edge and probe or peck at prey in or near the sediment (Reed et al. 2013).

8.2 Reproduction

Nests usually are placed in semi-open vegetation near the edge of a lake, river, or ocean (Oring et al., 1983; cited in USEPA 1993). Egg laying begins between late May and early June (Lank et al. 1985; cited in USEPA 1993), and females may lay several clutches in a year (Maxson and Oring 1980; cited in USEPA 1993). An average of 21 days has been reported for the incubation period (Mousley 1937, Mousley 1939, Nelson 1939, Cialdini and Orians 1944, Miller and Miller 1948; cited in Reed et al. 2013).

8.3 Diet

Sandpipers typically feed in open areas, foraging on the ground, ranging from shoreline to dense forest, typically within 200 m of shoreline, and prefer sandy or firm substrate (Rubbelke 1976; cited in Reed et al. 2013). The diet of the spotted sandpiper consists primarily of terrestrial and aquatic invertebrates. Examples of prey consumed include flies, grasshoppers, crickets, beetles, caterpillars, worms, spiders, fish, crustaceans, and mollusks (Bent 1929, Nelson 1939, Cramp and Simmons 1983; cited in Reed et al. 2013). They may also pick insects off aquatic vegetation, plants, dead fish, and debris (Rubbelke 1976; cited in Reed et al. 2013). During insect outbreaks, sandpipers will forage in wooded areas near water, and they have been observed eating eggs and fish (USEPA 1993).

8.4 Newark Bay

Spotted sandpipers require exposed areas (e.g., mudflats or sandbars) with firm, fine grained (e.g., silt or sand) sediment for feeding (Reed et al. 2013). These habitats are found in the NBSA mudflats. Based on this information, the exposure area selected for the risk calculations for spotted sandpiper includes a scenario with exposure only to sediment in mudflat areas throughout the Bay.

A study by Walsh et al. (1999; as cited in Ludwig et al. 2010) found evidence of spotted sandpiper breeding in the survey block including Kearny Marsh (near the southern end of the Hackensack Meadowlands) during a breeding bird survey. The Harbor Herons Project 2016 breeding wading bird survey (Winston 2016) identified spotted sandpiper on Shooters Island. The 2013 Newark Bay Study Area Reconnaissance Survey (Tierra 2015) identified a common sandpiper, which is a European species and not found in North America. However, this may have been a mis-identification of a spotted sandpiper.

9 GREAT BLUE HERON

9.1 Habitat

Great blue heron (*Ardea herodias*) are abundant throughout most of North America, and includes both migratory and non-migratory populations. In the winter, great blue herons move south from their breeding areas in North America (Henny 1972; cited in Vennesland and Butler 2011).

Great blue herons inhabit freshwater and marine areas, including freshwater lakes, rivers, brackish marshes, lagoons, mangroves, and coastal wetlands, especially where small fish are plentiful in shallow areas (Spendelow and Patton 1988, Short and Cooper 1985; cited in USEPA 1993). They can be seen on tidal flats and sandbars and occasionally forage in wet meadows, pastures, and other terrestrial habitats (Palmer 1962; cited in USEPA 1993). They sometimes forage in wet meadows and pastures in pursuit of lizards, small mammals, and large insects (Palmer 1962, Peifer 1979; cited in USEPA 1993). Great blue herons have a higher preference for emergent vegetation/natural shoreline features, and a lower preference for developed habitat areas with limited vegetation (e.g., riprap) (Short and Cooper 1985; Granholm 2008).

Herons defend feeding territories in some areas, but in other areas they appear to be opportunistic foragers, not partial to particular feeding sites (Dowd and Flake 1985; cited in USEPA 1993). Several studies on great blue heron home ranges (i.e., distance from breeding grounds to foraging areas) in various locations throughout North America have reported that foraging grounds are generally within 0 to

8 kilometers (km) of breeding colonies, and that 15 to 20 km is generally the farthest that great blue herons will travel from the colony to foraging areas (USEPA 1993). A North Dakota study found that herons often returned to the same general areas, but different individuals often used the same areas at different times (Dowd and Flake 1985; cited in USEPA 1993).

9.2 Reproduction

Great blue herons tend to nest in dense colonies, but it depends on the availability of nesting and foraging habitat (USEPA 1993). Breeding colonies are generally close to foraging grounds (Bent 1926, Palmer 1962, Gibbs et al. 1987; cited in USEPA 1993). Each breeding pair defends a small territory around the nest, in which the size depends on local habitat and the birds' stage of reproduction (Hancock and Kushlan 1984; cited in USEPA 1993).

The first brood of eggs per season are laid between late February to late April, depending on the region (Vennesland and Butler 2011). Nests are found mostly in trees, up to 30 m or more above the ground, comprised primarily of sticks (Vennesland and Butler 2011). Tall trees are preferred over shorter trees or bushes for nest sites (USEPA 1993). The average incubation period is 27 days (Vermeer 1969, Pratt 1970, Mcaloney 1973; cited in Vennesland and Butler 2011).

9.3 Diet

Great blue herons prefer fish, but they also consume amphibians, reptiles, crustaceans, insects, birds, and mammals (Alexander 1977, Bent 1926, Hoffman 1978, Kirkpatrick 1940, Peifer 1979; cited in USEPA 1993). Stomach contents of great blue heron from a Michigan lake and river included fish (primarily trout), which made up 94 to 98% of the species' diet; crustaceans and amphibians made up < 2 to 5%, and birds and mammals made up 0 to 1% (percentages calculated on a wet weight basis) (Alexander 1977; cited in USEPA 1993). Based on an average beak length of 13.5 cm (Vennesland and Butler 2011), Krebs (1974) determined that more than 92% of great blue heron fish prey are small or medium sized (up to about 6.8 cm in length), and the remaining fish prey are greater than or equal to the length of the beak (13.5 cm). Fish up to about 20 cm in length were dominant in the diet of herons foraging in southwestern Lake Erie and 95% of fish consumed in a Wisconsin population were less than 25 cm in length (USEPA 1993). Based on the information from Krebs (1974), fish ≤ 15 cm were included as 80% of the diet for the NBSA. Because great blue heron are opportunistic foragers and will feed on prey other than fish, the remaining 20% of the diet was assumed to be 10% crab and 10% clam. To fish, they generally use two techniques: standing still and waiting for fish to swim close enough to strike, or slow wading. They require shallow waters to fish (up to 0.5 m) with a firm substrate (Short and Cooper 1985; cited in USEPA 1993). Adults generally feed solitarily, but may feed in single or mixed species flocks where there are large concentrations of prey (Bayer 1978, Krebs 1974, Kushlan 1978, Willard 1977; cited in USEPA 1993).

9.4 Newark Bay

In general, great blue herons move south for the winter from their breeding areas in North America. However, some New Jersey populations are year-round, non-migratory residents that both overwinter and nest in the state (Vennesland and Butler 2011; Antonucci et al. 2008). Great blue heron are expected to be present year-round in Newark Bay. It has been reported that in the summer, Kearny Marsh becomes a roost for large numbers of herons and egrets, including great blue herons (Boyle 2002). Great blue herons were observed during the 2013 NBSA Reconnaissance Survey (Tierra 2015). No great blue

herons were observed at Shooters Island, Isle of Meadows, or Pralls Island during the Harbor Herons Project 2016 breeding wading bird survey (Winston 2016).

10 DOUBLE-CRESTER CORMORANT

10.1 Habitat

The double-crested cormorant (*Phalacrocorax auritus*) is widely distributed in North America and occupies a range of diverse aquatic habitats in all seasons. Non-breeding birds are distributed more widely. Most inland breeders winter in coastal areas (Glahn et al. 2000, King et al. 2012, Dorr et al. 2012; cited in Dorr et al. 2014). In all seasons, they require appropriate foraging habitats and suitable places for daytime resting or loafing and nighttime roosts (Dorr et al. 2014). When they are not fishing, cormorants spend their time perching on exposed sites such as rocks or sandbars, pilings, ship wrecks, high-tension wires, or trees near favored fishing sites (Dorr et al. 2014).

Most individuals forage in open water (less than 10 m deep), typically less than 30 km from the colony or roost and within 2.5 km of shore. They are usually within sight of land and are rarely seen offshore (Dorr et al. 2014). They often feed along the bottom, but also in midwater. The number of cormorants increases rapidly when prey is readily accessible, and predictable seasonal patterns may result (Dorr et al. 2014).

The proximity of preferred roosts and nesting colonies to foraging areas greatly influences daily flight distances; some birds that are nesting or roosting on coastal islands fly inland to feed at freshwater sites (Dorr et al. 2014). Custer and Bunck (1992) reported that cormorants in Wisconsin flew an average of less than 3 km from the breeding colony to first foraging site. Winter home ranges varied from an average of 81 km^2 to 17,490 km^2 (Scherr et al. 2012, King et al. 2012; cited in Dorr et al. 2014).

10.2 Reproduction

Breeding generally occurs in five main areas: 1) Alaska, 2) the Pacific coast from British Columbia to Mexico, 3) Canadian and United States interior, 4) Atlantic coast from Newfoundland to New York, and 5) Florida and the Caribbean (Carter et al. 1995; cited in Dorr et al. 2014). Breeding in northeastern United States occurs from May to August with one brood per breeding season (Dorr et al. 2014). Cormorants nest on breeding colonies. Breeding habitat includes ponds, lakes, artificial impoundments, slow-moving rivers, lagoons, estuaries, and open coastlines; and may use small rocky islands, bridges, shipwrecks, docks, or towers (Dorr et al. 2014).

The first young appear approximately 30 days after first eggs are laid. The young leave nests after 3 to 4 weeks. Young that are in tree or cliff nests may remain in nest until they are able to fly (6 to 7 weeks old; Mendall 1936; cited in Dorr et al. 2014), or may be dislodged earlier by disturbance (Dorr et al. 2014).

10.3 Diet

Double-crested cormorants eat almost entirely fish, usually slow-moving or schooling species (Dorr et al. 2014). Prey size ranges from 3 to 40 cm, but most commonly less than 15 cm. Therefore, for the NBSA, a diet of 100% fish (≤ 15 cm) was evaluated. Cormorants also consume other aquatic animals (less frequently than fish), including insects, crustaceans, eels, and amphibians (Palmer 1962; cited in Dorr et

al. 2014). Foraging is opportunistic and flexible, and more than 250 species of fish from 60 families have been reported as prey (Dorr et al. 2014).

10.4 Newark Bay

A total of nine double-crested cormorant nests were observed on dry docks and other wreckage west of Shooters Island in 2016, consistent with a count of eight nests in 2015. This cormorant colony has exhibited a continuous decline over the past 20 years. The structures upon which the birds nest continue to collapse, offering fewer nesting sites than in the past.

The 2013 NBSA Shoreline Reconnaissance Survey (Tierra 2015) also noted double-crested cormorant nests in the Bay located on water features like buoys, markers, and other structures. In coastal New Jersey, the double-crested cormorant is expected to be a year-round resident.

11 LESSER SCAUP

11.1 Habitat

Lesser scaup (*Aythya affinis*) are one of the most abundant and wide-spread North American ducks and breed principally throughout western Canada and Alaska (Allen 1986; cited in USEPA 1993). Lesser scaup spend winter in the United States in the Mississippi flyway and the Atlantic flyway (Bellrose 1976; cited in USEPA 1993).

During the fall and winter, lesser scaup are found mainly at large lakes, reservoirs, and fresh to brackish coastal bays and estuaries of the south Atlantic Coast, Gulf Coast, and Pacific Coast (Chabreck et al. 1989, Johnson and Montalbano III 1989; cited in Anteau et al. 2014).

The home range for pairs tends to be a few small lakes or wetlands (Hammell 1973; cited in Anteau et al. 2014). Pairs on large lakes appear to be associated with a particular portion of shoreline (Gehrman 1951; cited in cited in Anteau et al. 2014).

11.2 Reproduction

Lesser scaup breed in the prairie potholes region of Canada and North and South Dakota, generally on wetlands that are permanent or semi-permanent (USEPA 1993). Because they do not breed in the NBSA, additional reproductive information is not applicable to this report.

11.3 Diet

Lesser scaup consume primarily aquatic invertebrates (e.g., insects, crustaceans, and mollusks) (Anteau et al. 2014). They primarily feed by foot-propelled diving in water less than 5 feet deep (Siegfried 1974, Custer et al. 1996; cited in Anteau et al. 2014) and consume prey underwater (Tome and Wrubleski 1988, Richman and Lovvorn 2004; cited in Anteau et al. 2014), but may also handle prey at the surface before swallowing (e.g., fish, bivalves, snails, polychaetes), or pursue prey in the water column or from the surfaces of aquatic vegetation and other substrates (Tome and Wrubleski 1988, Richman and Lovvorn 2004; cited in Anteau et al. 2014).

Specific components of the diet in winter vary geographically and often reflect local abundance (Anteau et al. 2014). In the winter in the Gulf of Mexico, scaup feed nearly exclusively on surf clams (*Mulinia lateralis*) and other mollusks (Harmon 1962); when wintering in coastal bays and marshes, they feed mainly on midges (46% of total dry weight) and bulrush seeds (36%) (Afton et al. 1991); along the Columbia River in the Pacific Northwest, most of the diet is vegetation (Thompson et al. 1988); and in the Midwest, Jones and Drobney (1986) have reported that scaup consume oligochaete worms in the Detroit River. During the winter, there are no significant differences in diet between juveniles and adults or between males and females (Anteau et al. 2014).

11.4 Newark Bay

Lesser scaup are found in Newark Bay during winter only and do not breed in the area. Wintering groups of lesser scaup are regularly observed in Newark Bay and the Arthur Kill complex (U.S. Fish and Wildlife Service [USFWS] 1997). The nearby Hackensack Meadowlands is an important overwintering area for lesser scaup (Tiner et al. 2002). Therefore, lesser scaup are only expected to be present in the NBSA during migration and winter.

12 RIVER OTTER

12.1 Habitat

The river otter (*Lontra canadensis*) is almost exclusively aquatic and is found in freshwater, estuarine, and some marine environments including lakes, marshes, streams, and seashores throughout much of the North American continent (USEPA 1993). They are found primarily in food-rich coastal areas, including the lower portions of streams and rivers, estuaries, nonpolluted waterways, lakes and tributaries, and areas showing little human impact (USEPA 1993).

The home range of an individual river otter is approximately 3-30 square miles (Helon et al. 2004; Wilson 2012), but varies by habitat type and encompasses the area needed for foraging and reproduction. Near rivers or coastal areas, it may be a long strip along the shoreline, but in marshes or areas with many small streams, the home range may resemble a polygon (Melquist and Dronkert 1987; cited in USEPA 1993). Habitat use depends greatly on food, but adequate shelter in the form of temporary dens and resting sites also plays a role (Anderson and Woolf 1987, Melquist and Hornocker 1983; cited in USEPA 1993). River otters use dens dug by other animals or other shelters including hollow logs, logjams, or drift piles (Toweill and Tabor 1982, Melquist and Dronkert 1987; cited in USEPA 1993), and appear to prefer flowing water habitats over stationary water (Melquist and Hornocker 1983; cited in USEPA 1993).

12.2 Reproduction

River otters breed in late winter or early spring over a period of 3 months or more, with active gestation lasting 2 months. Newborns are dependent until they reach the age of 3 to 5 months (USEPA 1993).

12.3 Diet

River otters have a diet primarily of fish; however, they are opportunistic and will feed on a variety of prey depending on availability. River otters take different fish species according to their availability (Loranger

1981; cited in USEPA 1993). Other diet items include crustaceans (e.g., crayfish), aquatic insects (e.g., stonefly nymphs and aquatic beetles), amphibians, insects, birds (e.g., ducks), mammals (e.g., young beavers), and turtles (Burt and Grossenheider 1980, Lagler and Ostenson 1942, Liers 1951, Melquist and Hornocker 1983, Palmer and Fowler 1975, Toweill and Tabor 1982; cited in USEPA 1993). River otters do not appear to be selective when fishing and generally take the most available fish (usually slower species such as suckers, common carp, and catfish) (Boyle 2006). When river otters probe the bottoms of ponds or streams for invertebrates, they may ingest mud or other debris in the process (Liers, 1951; cited in USEPA 1993).

River otters generally prey on fish that are 2 to 50 cm in length, with an average prey length of approximately 30 cm (USEPA 1993; Melquist and Hornocker 1983). For the NBSA, river otter diet was limited to fish ≤ 30 cm (comprising 80% of the diet evaluated). However, river otter from some locations have been observed to consume fish up to 50 cm in length (Tumlison et al. 1986; Wise et al. 1981; Melquist and Hornocker 1983) and may infrequently consume fish up to 70 cm in length.

12.4 Newark Bay

There is no record of sightings of river otters in Newark Bay; however, they are considered a furbearer species in the state of New Jersey and are permitted to be trapped. River otter are generally limited to natural shorelines (preferably with riparian vegetation) with access to water. River otters inhabit “some” marine environments and are found in “non-polluted waterways” and areas showing “little human impact” (USEPA 1993). Only 20% of Newark Bay shoreline is classified as vegetated, with the rest as industrial/commercial or bulkhead /riprap; therefore, Newark Bay is not expected to support resident river otter populations and they may only use the NBSA intermittently.

13 MUSKRAT

13.1 Habitat

The muskrat (*Ondatra zibethicus*) is common throughout most of the United States and is the most aquatic of the rodent family (Burt and Grossenheider 1980; cited in USEPA 1993). They inhabit marshes (freshwater, saltwater, and brackish), and freshwater lakes, streams, and ponds (Dozier 1953, Johnson 1925, Kiviat 1978, O'Neil 1949; cited in USEPA 1993). Muskrats build lodges in or near water, using marsh vegetation, or will excavate dens in the banks (Johnson 1925, Perry 1982; cited in USEPA 1993). Muskrats need emergent vegetation and a firm substrate for building lodges (Willner et al. 1980; cited in Allen and Hoffman 1984); submergent vegetation is generally not suitable for lodge material (Errington 1963; cited in Allen and Hoffman 1984). Optimum sites for bank burrows are on slopes of 30 degrees or more, with a minimum height of 1.6 feet (0.5 m).

Muskrat populations have higher densities in areas with dense aquatic emergent vegetation surrounded by terrestrial herbaceous vegetation (Errington 1963; cited in USEPA 1993. Brooks and Dodge (1981) found that forested riverbanks resulted in low muskrat populations.

Maximum breeding density for common muskrats is 5 pairs per hectare (Perry 1982). Muskrats build two types of houses including a main dwelling and a feeder house, which is smaller than the main dwelling (Dozier 1953, Johnson 1925, Sather 1958; cited in USEPA 1993). They will usually stay close to their

lodges while foraging (i.e., they usually forage within 5 to 10 m of a house; Willner et al. 1980; cited in USEPA 1993), and rarely forage further than 150 m (MacArthur 1978; cited in USEPA 1993).

13.2 Reproduction

Muskrats breed from spring (i.e., April to May) to fall and have large litters (i.e., 4 to 8 young); with a potential to have up to three litters in a year. The gestation period is 25 to 30 days. After two weeks, young will venture out of the den for their first swim (NYSDEC 2018).

During breeding, muskrats are solitary or form breeding pairs, with a home range exclusive of other individuals. Muskrat are territorial during breeding and houses are spaced at least 8 m apart from other pairs (Johnson 1925, Sather 1958, Trippensee 1953; cited in USEPA 1993).

13.3 Diet

Muskrats are herbivorous and eat the basal parts, rhizomes, and leaves of aquatic emergent vegetation (Dozier 1953, Errington 1939; cited in USEPA 1993). Although they consume mostly plant material, they will also eat some fish, crustaceans, dead birds, and frogs (Errington 1939, Johnson 1925, Willner et al. 1980; cited in USEPA 1993). Plant food species eaten will vary with muskrat distribution and habitat, but some of the major foods are cattail, bulrush, and sedges (Takos 1947; cited in Allen and Hoffman 1984).

13.4 Newark Bay

The 2013 NBSA Shoreline Reconnaissance Survey (Tierra 2015) noted muskrat tracks and muskrat observations along shoreline areas in the NBSA. Muskrat are expected to be found in NBSA year-round.

14 HARBOR SEAL

14.1 Habitat

Harbor seals (*Phoca vitulina*) are one of the most common pinniped species (i.e., comprised of seals, sea lions, and walruses). In North America, harbor seals range can be found on the Pacific coast from Alaska to Baja California, Mexico, and on the Atlantic coast from Newfoundland to eastern Long Island (Hoover 1988, Payne and Selzer 1989; cited in USEPA 1993). They inhabit a variety of environments, temperatures, and water salinities (Boulva and McLaren 1979, Hoover 1988; cited in USEPA 1993). Along the Atlantic coast, harbor seal inhabit inlets, islets, reefs, and sandbars, but will winter offshore if coastal ice has formed (Boulva and McLaren 1979; cited in USEPA 1993). They generally use highly productive coastal areas for foraging and require adequate habitat for haulouts (e.g., cobble and sand beaches, offshore rocks, reefs, and man-made structures) (Hoover 1988; cited in USEPA 1993). Seals are generally sedentary, and show year-round site fidelity, staying near particular haul-out sites with only local movements. However, some seasonal movement associated with pupping and long-distance movements have been recorded (Brown and Mate 1983, Pitcher and Calkins 1979, Slater and Markowitz 1983; cited in USEPA 1993).

14.2 Reproduction

Breeding varies with location, initiated earlier in the year in more southern locations (Hoover 1988, Slater and Markowitz 1983; cited in USEPA 1993). Females produce one pup per year (Hoover 1988; cited in USEPA 1993). Harbor seals may form large groups to breed on land in areas with adequate food resources, but may also occur outside of large breeding aggregations (Slater and Markowitz 1983, Pitcher and Calkins 1979; cited in USEPA 1993).

14.3 Diet

The diet of harbor seals varies seasonally and includes bottom-dwelling fishes (e.g., flounder), invertebrates (e.g., octopus), and species that can be caught in periodic spawning aggregations (e.g., herring) (Everitt et al. 1981, Lowry and Frost 1981, Pitcher and Calkins 1979, Roffe and Mate 1984; cited in USEPA 1993). They are opportunistic and will consume different prey based on availability and ease of capture (Pitcher and Calkins 1979, Pitcher 1980, Shaffer 1989; cited in USEPA 1993). Recently weaned pups tend to feed on prey such as shrimp or other crustaceans that are more easily captured than fish (Hoover 1988, Pitcher and Calkins 1979; cited in USEPA 1993). Fish species between 4 and 28 cm are consumed, with an average of 6 to 18 cm (Brown and Mate 1983; cited in USEPA 1993). Therefore, fish ≤ 30 cm were included as 90% of the harbor seal diet evaluated in the NBSA. The remaining prey items evaluated as part of the harbor seal diet included 5% blue crab, and 5% softshell clam.

14.4 Newark Bay

The harbor seal is the most commonly observed marine mammal in the New York Bight. It winters in New York Harbor and hauls out onto islands in Jamaica Bay, Sandy Hook, Staten Island, and the Westchester and Connecticut shorelines of Long Island Sound. Harbor seal have been sighted in the Arthur Kill in recent years but are reported as uncommon visitors to Newark Bay (USACE 1997) and very rarely observed in the Hackensack Meadowlands (Kiviat and MacDonald 2002).

Harbor seals are found as far south as eastern Long Island, but generally winter offshore. In addition, harbor seals require adequate places to haul out, which are not found in the NBSA. Harbor seals usually stay within a 50 m radius of their haul out site. Closer proximity to land during foraging allows for an easier escape from predators, so most of their activity occurs within a 10 m radius from haul out sites. (Grigg et al., 2009; Nowak 2003). Therefore, the harbor seal is not expected in Newark Bay year-round and likely only uses this waterbody for a portion of its annual cycle and for some portion of its entire home range.

15 REFERENCES

Able, K.W. and S.M. Hagan. 1995. Fishes in the vicinity of Beach Haven Ridge: annual and seasonal patterns of abundance during the early 1970s. *Rutgers Univ. Inst. Mar. Coastal Sci. Tech. Rep*. 95-24.

Able, K.W. and S.C. Kaiser. 1994. Synthesis of Summer Flounder Habitat Parameters. NOAA Coastal Ocean Prog., Decision Analysis Ser. 1. NOAA Coastal Ocean Office, Silver Spring, MD. 68p.

Able, K.W., R.E. Matheson, W.W. Morse, M.P. Fahay, and G. Shepherd. 1990. Patterns of summer flounder *Paralichthys dentatus* early life history in the Mid- Atlantic Bight and New Jersey estuaries. *Fish Bull* 88:1-12.

Abraham, B.J. 1985. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Mummichog and Striped Killifish. Biological Report 82-4 (11.40). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Abraham, B.J. and P.L. Dillon. 1986. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Softshell Clam. Biological Report 82-4 (11.68). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Adams, C.C. and T. L. Hankinson. 1928. The ecology and economics of Oneida Lake fish. *Trans Am Fish Soc* 45(3):155-169.

Adkins, G. 1972. A Study of the Blue Crab Fishery in Louisiana. *LA. Wildl. Fish. Comm., Oyster, Water Bottoms and Seafood Div. Tech. Bull. No. 3*. Baton Rouge, LA. 57 pp.

Afton, A.D., R.H. Hier and S.L. Paulus. 1991. Lesser Scaup diets during migration and winter in the Mississippi Flyway. *Can J Zool* 69:328-333.

Alexander, G. 1977. Food of vertebrate predators on trout waters in north central lower Michigan. *Michigan Academ* 10:181-195.

Allen, A.W. 1986. Habitat Suitability Index Models: Lesser Scaup. U.S. Fish and Wildlife Service Biological Report FWS/OBS-82/10.117.

Allen, A.W. and R.D. Hoffman. 1984. Habitat Suitability Index Models: Muskrat. U.S. Fish and Wildlife Service FWS/OBS-82/10.46.

Anderson, W.W. and J.W. Gehringer. 1965. Biological Statistical Census of the Species Entering Fisheries in the Cape Canaveral Area. U.S. Fish and Wildlife Service Spec. Sci. Rep. Fish. 514. 79p.

Anderson, E.A. and A. Woolf. 1987. River otter habitat use in northwestern Illinois. *Trans Illinois Acad Sci* 80:107-114.

Andrews, J.D. 1970. The mollusc fisheries of Chesapeake Bay (USA). *Mar Biol Assoc India Proc Symp Mollusca* 3:847-856.

Anonymous. 1983. Increasing Clam Harvests in Maine: A Practical Guide. Maine/New Hampshire Sea Grant College Program, University of Maine, Orono, and Maine Department of Marine Resources. 61 pp.

Anteau, M.J., J. DeVink, D.N. Koons, J.E. Austin, C.M. Custer, and A.D. Afton. 2014. Lesser Scaup (*Aythya affinis*), Version 2.0. In: Poole, A.F., Ed., The Birds of North America. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.338.

Antonucci, C., R. Higgins, and C. Yuhas. 2008. Harbor Herons: Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Black-crowned Night Heron (*Nycticorax nycticorax*), Glossy Ibis (*Plegadis falcinellus)* [online]. New Jersey Sea Grant Consortium, Fort Hancock, NJ. Available at: http://www.njmsc.org/education/Lesson_Plans/Key/Herons.pdf.

Armstrong, P.B. and J.S. Child. 1965. Stages in the normal development of *Fundulus heteroclitus*. *Biol Bull Woods Hole* 128:143-168.

Arnold, W.S. 1984. The effects of prey size, predator size, and sediment composition on the rate of predation of the blue crab, *Callinectes sapidus* Rathbun, on the hard clam, *Mercenaria* (Linne). *J Mar Biol Ecol* 80:207-219.

ASMFC. 2000. Interstate Fishery Management Plan for the American Eel. Fishery Management Report No. 36. April 2000.

AuClair, R.P. 1956. The White Perch *Morone americana* (Gmelin), Sebasticook Lake, Maine. M.S. Thesis. University of Maine, Orono. 84p.

Backus, R.H. 1957. The fishes of Labrador. *Bull Am Mus Nat Hist* 113:275-337.

Barrass, A.N. and C.L. Kitting. 1986. Responses of *Callinectes* blue crabs to recorded group feeding vocalizations of *Sterna* terns and *Larus artricilla* gulls. *Am Zool* 22(4):853.

Bath, D.W. and J.M. O'Connor. 1985. Food preferences of white perch in the Hudson River estuary. NY *Fish Game J* 32(1):63-70.

Bayer, R.D. 1978. Aspects of an Oregon estuarine great blue heron population. In: Sprunt, A., J. Ogden, and S. Winckler, Eds., Wading birds. *Nat Audubon Soc Res Rep* 7:213-217.

Bellrose, F.C. 1976. Ducks, Geese, and Swans of North America. Harrisburg, PA: The Stackpole Co.

Bent, A.C. 1926. Life Histories of North American Marsh Birds. Washington, DC. U.S. Government Printing Office; Smithsonian Inst. U.S. Nat. Mus. Bull. 135.

Bent, A.C. 1929. Life Histories of North American Shore Birds. Part 2. Washington, DC. U.S. Government Printing Office; Smithsonian Inst. U.S. Nat. Mus. Bull. 146.

Bianchini, M., P.W. Sorenson, and H.E. Winn. 1982. Stima dell'abbondanza e schemi di movimento a breve raggio della anuilla Americana, *Anguilla rostrata*, nel Narrow River, Rhode Island, USA. *Naturalista Siciliano, S. IV, VI (Suppl.)* 2:269-277. (Translation provided by P.W. Sorenson).

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish and Wildlife Service Fish. Bull. 53. 575p.

Blundon, J.A. and V.S. Kennedy. 1982. Refuges for infaunal bivalves from blue crab, *Callinectes sapidus* (Rathbun), predation in Chesapeake Bay. *J Exp Mar Biol Ecol* 65:76-81.

Boulva, J. and I.A. McLaren. 1979. Biology of the Harbor Seal, *Phoca vitulina*, in Eastern Canada. Quebec, Canada. Fish. Res. Board Can. Bull. 200.

Bowman, R.E., R.O. Maurer, Jr., and J.A. Murphy. 1976. Stomach Contents of Twenty-nine Fish Species from Five Regions in the Northwest Atlantic - Data Report. U.S. Natl. Mar. Fish. Serv. Northeast Fish. Cent. Woods Hole Lab. Ref. Doc. No. 76-10. 37p.

Boyle, W.J., Jr. 2002. A Guide to Bird Finding in New Jersey. Revised and Expanded, 2nd Edition. Rutgers University Press, New Brunswick, NJ.

Boyle, S. 2006. North American River Otter (*Lontra canadensis*): A Technical Conservation Assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/northamericanriverotter.pdf

Bozeman, E.L., G.S. Helfman, and T. Richardson. 1985. Population size and home range of American eel in a Georgia tidal creek. *Trans Am Fish Soc* 114:821-825.

Briggs, J.C. 1958. A list of Florida fishes and their distribution. *Bull Fla State Mus Biol Sci* 2:223-318.

Brooks, R.P. and W.E. Dodge. 1981. Identification of muskrat habitat in riverine environments. *Proc Worldwide Furbearer Conf* 1:113-127.

Brousseau, D.J. 1978. Spawning cycle, fecundity, and recruitment in a population of soft-shell clam, *Mya arenaria*, from Cape Ann, Massachusetts. *U.S. Nat Mar Fish Serv Fish Bull* 76(1):155-166.

Brown, R.F. and B.R. Mate. 1983. Abundance, movements, and feeding habits of harbor seals, *Phoca vitulina*, at Nearts and Tillamook Bays, Oregon. *U.S. Nat Mar Fish Serv Fish Bull* 81:291-301.

Burt, W.H. and R.P. Grossenheider. 1980. A Field Guide to the Mammals of North America North of Mexico. Boston, MA: Houghton Mifflin Co.

Busch, W.D.N., D.H. Davies, and S.J. Nepszy. 1977. Establishment of white perch, *Morone americana*, in Lake Erie. *J Fish Res Board Can* 34(7):1039-1041.

Butner, A. and B.H. Brattstrom. 1960. Local movement in *Menidia* and *Fundulus*. *Copeia* 1960(2):139-141.

Carlson, J.K., T.A. Randall, and M.E. Mroczka. 1997. Feeding habits of winter flounder, *Pleuronectes americanus*, in a habitat exposed to anthropogenic disturbance. *J Northwest Atl Fish Sci* 21:65-73.

Carter, H.R., A.L. Sowls, M.S. Rodway, U.W. Wilson, and R.W. Lowe. 1995. Population size, trends, and conservation problems of the Double-crested Cormorant on the Pacific Coast of North America. *Colon Waterbirds* 18:189-215.

Chabreck, R.H., R. Joanen, and S.L. Paulus. 1989. Southern Coastal Marshes and Lakes. In: Habitat Management for Migrating and Wintering Waterfowl in North America., Ed. by L. M. Smith, R. L. Pederson and R. M. Kaminski, 249-277. Lubbock: Texas Tech Univ. Press.

Churchill, E.P., Jr. 1919. Life history of the blue crab. *Bull Bur Fish* 36:95-128.

Cialdini, R. and G. Orians. 1944. Nesting studies of the Spotted Sandpiper. *Passenger Pigeon* 6:79-81.

Coe, W.R. and H.J. Turner, Jr. 1938. Development of the gonads and gametes in the soft-shell clam (*Mya arenaria*). *J Morphol* 62:91-111.

Cook, D. 1981. In search of the blue crab. *Mar Resour Bull* 13(1):2-3.

Cramp, S. and K.E.L. Simmons. 1983. The Birds of the Western Palearctic, V3: Waders to Gulls. Oxford: Oxford Univ. Press

Custer, C.M., T.W. Custer, and D.W. Sparks. 1996. Radio telemetry documents 24-hour feeding activity of wintering Lesser Scaup. *Wilson Bull* 108:556-566.

Custer, T. W. and C. Bunck. 1992. Feeding flights of breeding Double-crested Cormorants at two Wisconsin colonies. *J Field Ornithol* 63:203-211.

Darnell, R.M. 1958. Food habits of fishes and larger invertebrates of Lake Pontchartrain, Louisiana, an estuarine community, *Publ Inst Mar Sci Univ Tex* 5:353-416.

Darnell, R.M. 1959. Studies of the life history of the blue crab (*Callinectes sapidus* Rathbun) in Louisiana waters. *Trans Am Fish Soc* 88:294-304.

Deubler, E.E., Jr. 1958. A comparative study of postlarvae of three flounders (*Paralichthys*) in North Carolina. *Copeia* 1958(2):112-116.

Dorr, B.S., J.J. Hatch, and D.V. Weseloh. 2014. Double-crested Cormorant (*Phalacrocorax auritus*), Version 2.0. In The Birds of North America (A.F. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.441

Dorr, B.S., L.W. Burger, S.C. Barras, and K.C. Godwin. 2012. Double-crested Cormorant distribution on catfish aquaculture in the Yazoo River Basin of Mississippi. *Wildl Soc Bull* 36(1):70-77.

Dowd, E. and L.D. Flake. 1985. Foraging habitats and movements of nesting great blue herons in a prairie river ecosystem, South Dakota. *J Field Ornithol* 56:379-387.

Dozier, H.L. 1953. Muskrat Production and Management. U.S. Fish and Wildlife Service Circ. 18. 42p.

Dudley, D.L. and M.H. Judy. 1971. Occurrence of Larval, Juvenile, and Mature Crabs in the Vicinity of Beaufort Inlet, North Carolina. U.S. Natl. Mar. Fish. Serv. Spec. Sci. Rep. Fish. 637. 10p.

Errington, P.L. 1963. Muskrat Populations. Ames, IA: Iowa State University Press.

Everitt, R.D., P.J. Gearin, and J.S. Skidmore. 1981. Prey items of harbor seals and California sea lions in Puget Sound, Washington. *Murrelet* 62:83-86.

Facey, D.E. and G.W. LaBar. 1981. Biology of American eel in Lake Champlain, Vermont. *Trans Am Fish Soc*. 110:396-402.

Facey, D.E. and M.J. Van Den Avyle. 1987. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic). American Eel. Biological Report 82(11.74). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Festa, P.J. 1977. Observations on the Summer Flounder (*Paralichthys dentatus*) Sport Fishery in Great Bay, N.J. During Summer of 1976 in Reference to Anoxic Water Conditions. Appendix VII. In: Oxygen Depletion and Associated Environmental Disturbances in the Middle Atlantic Bight in 1976. pp. 463-471. U.S. Natl. Mar. Fish. Serv. Northeast Fish. Cent. Sandy Hook Lab. Tech. Ser. Rep. 3.

Finchham, M.W. 1981. The offshore odyssey of the Atlantic blue crab. *MD Sea Grant Prog Newsl* 4(4):2-5.

Fischler, K.J. and C.H. Walburg. 1962. Blue crab movement in coastal South Carolina, 1958-59. *Trans Am Fish Soc* 91:275-278.

Fogarty, M.J. 1981. Review and Assessment of the Summer Flounder (*Paralichthys dentatus*) Fishery in the Northwest Atlantic. U.S. Natl. Mar. Fish. Serv. Northeast Fish. Cent. Woods Hole Lab Ref. Doc. No. 81-25. 54p.

Fontenot, B.J. and H.E. Rogillio. 1970. A Study of Estuarine Sports-fishes in the Biloxi Marsh Complex. Compl. Rep., Dingell-Johnson Project F-8, LA Wildl. Fish. Comm., Baton Rouge. 172 pp.

Fritz, E.S. 1974. Total diet comparison in fishes by Spearman rank correlation coefficients. *Copeia* 1974(1): 210-214.

Gehrman, K.H. 1951. An Ecological Study of the Lesser Scaup Duck (*Aythya affinis* Eyton) at West Medical Lake, Spokane County Washington. Master's Thesis, State Coll. Washington, Pullman.

Gibbs, J.P., S. Woodward, and M.L. Hunter. 1987. Determinants of great blue heron colony distribution in coastal Maine. *Auk* 104:38-47.

Gilbert, C.R. 1986. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Florida). Southern, Gulf, and Summer Flounders. Biological Report 82(11.54). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Ginsburg, I. 1952. Flounders of the genus *Paralichthys* and related genera in American waters. *U.S. Fish Wildl Serv Fish Bull* 52:267-351.

Glahn, J.F., D.S. Reinhold, and C.A. Sloan. 2000. Recent population trends of Double-crested Cormorants wintering in the delta region of Mississippi: Responses to roost dispersal and removal under a recent depredation order. *Waterbirds* 23(1):38-44.

GLFC. 1996. Conceptual Model of the Lake Ontario Fish Community: Effects of Management Actions. ESSA Technologies Ltd. Final Report.

Gosner, K.L. 1978. A Field Guide to the Atlantic Seashore. Houghton Mifflin Co., Boston. 309 pp.

Granholm, S. 2008. Great Blue Heron, *Ardea herodias*. California Wildlife Habitat Relationships System, Sacramento, CA. Available from: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=17745

Grigg, E., A. Klimley, S. Allen, D. Green, D. Elliott-Fisk, and H. Markowitz. 2009. Spatial and seasonal relationships between Pacific harbor seals (*Phoca vitulina richardii*) and their prey, at multiple scales. *Fish Bull* 107(3):359-372.

Grimes, B.H., M.T. Huish, J.H. Kerby, and D. Morgan. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Summer and Winter Flounder. Biological Report 88(11.112). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Grosslein, M.D. and T.R. Azarovitz. 1982. Fish Distribution. MESA New York Bight Atlas Monograph 15, N.Y. Sea Grant Inst., Albany, N.Y. 182p.

Gunning, G.E. and C.R. Shoop. 1962. Restricted movements of the American eel, *Anguilla rostrata* (LeSueur), in freshwater streams, with comments on growth rate. *Tulane Stud Zool* 9(5):265-272.

Gutherz, E.J. 1967. Field Guide to the Flatfishes of the Family Bothidae in the Western North Atlantic. U.S. Fish Wildl. Serv. Circ. 263. 47p.

Hacunda, J.S. 1981. Trophic relationships among demersal fishes in a coastal area of the Gulf of Maine. *Fish Bull* 79:775-788.

Hammell, G.S. 1973. The Ecology of the Lesser Scaup (*Aythya affinis* Eyton) in Southwestern Manitoba. Master's Thesis, Univ. of Guelph, Ontario.

Hancock, J. and J. Kushlan. 1984. The Herons Handbook. New York, NY. Harper & Row.

Hardy, J.D., Jr. 1978. Development of fishes of the Mid-Atlantic Bight: an atlas of egg, larval and juvenile stages. Vol. 2: Anguillidae through Syngnathidae. U.S. Fish Wildl. Serv. Biol. Serv. Program FWS/OBS-78/12. 458p.

Harmon, B.G. 1962. Mollusks as food of Lesser Scaup along the Louisiana coast. *Trans N Am Wildl Nat Res Conf* 27:132-138.

Hay, W.P. 1905. The life history of the blue crab (*Callinectes sapidus*). *Rep U.S. Bur Fish* 1904:395-413.

Helfman, G.S., D.L. Stoneburner, E.L. Bozeman, P.A. Christian, and R. Whalen. 1983. Ultrasonic telemetry of American eel movements in a tidal creek. *Trans Am Fish Soc* 112:105-110.

Helfman, G.S., E.L. Bozeman, and E.B. Brothers. 1984. Size, age, and sex of American eel in a Georgia River. *Trans Am Fish Soc* 113:132-141.

Helon, D.A., J.T. Anderson, C.P. Dwyer, et al. 2004. Summer Home Range Size and Habitat Use by River Otters in Ohio. Proceedings IXth International Otter Colloquium Volume 21A.

Henny, C.J. 1972. An Analysis of the Population Dynamics of Selected Avian Species with Special Reference to Changes During the Modern Pesticide Era. Washington, DC Bur. Sport. Fish. Wildl. Res. Rep. 1.

Hergenrader, G.L. and Q. Bliss. 1980. Current distribution and potential for dispersal of white perch in Nebraska and adjacent water. *Am Midl Nat* 103(2):404-406.

Hildebrand, S.F. and W.C. Schroeder. 1928. Fishes of the Chesapeake Bay. *Bull U.S. Bur Fish* 43(1):1-366.

Hill J., D.L. Fowler, and M.J. Van den Avyle. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic). Blue crab. Biological Report 82(11.100). U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Hoffman, R.D. 1978. The diets of herons and egrets in southwestern Lake Erie. In: Sprunt, A.; Ogden, J.; Winckler, S., eds. Wading birds. *Natl Audubon Soc Res Rep* 7:365-369.

Holland, A.F., N.K. Mountford, M.H. Hiegel, K.R. Kaumeyer, and J.A. Mihursky. 1980. Influence of predation on infaunal abundance in upper Chesapeake Bay, USA. *Mar Biol* 57:221-235.

Hoover, A.A. 1988. Harbor Seal, *Phoca vitulina*. In: Lentfer, J. W., Ed. Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations. Washington, DC. Marine Mammal Commission. pp.125-157.

Hornberger, M.L., J.S. Tuten, A. Eversole, J. Crane, R. Hansen, and M. Hinton. 1978. American Eel Investigations. Completion Report for March 1977-July 1978. South Carolina Wildlife and Marine Research Department, Charleston, and Clemson University, Clemson. 311p.

Howe, A.B. and P.G. Coates. 1975. Winter flounder movements, growth, and mortality off Massachusetts. *Trans Am Fish Soc* 104:13-29.

Howe, A.B., P.G. Coates, and D.E. Pierce. 1976. Winter flounder estuarine year-class abundance, mortality, and recruitment. *Trans Am Fish Soc* 105:647-657.

Howell, S.N.G. and S. Webb. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford University Press, New York, USA.

Jenni, D.A. 1969. A study of the ecology of four species of herons during the breeding season at Lake Alice, Alachua County, Florida. *Ecol Monogr* 39(3):245-270.

Johnson, C.E. 1925. The muskrat in New York: its natural history and economics. *Roosevelt Wildl Bull* 3:205-321.

Johnson, F.A. and F. Montalbano III. 1989. Southern reservoirs and lakes. In: Habitat management for migrating and wintering waterfowl in North America., edited by L. M. Smith, R. L. Penderson and R. M. Kaminski, 93-116. Lubbock: Texas Tech Univ. Press.

Jones, J.J. and R.D. Drobney. 1986. Winter feeding ecology of scaup and Common Goldeneye in Michigan. *J Wildl Mang* 50:446-452.

Keefe, M. and K.W. Able. 1994. Contributions of biotic factors to settlement in summer flounder, *Paralichthys dentatus*. *Copeia* 1994(2):458-465.

Kendall, W. 1909. The fishes of Labrador. *Proc Portland Soc Nat Hist* 2:207-243.

Kennedy, V.S. and J.A. Mihursky. 1971. Upper temperature tolerances of some estuarine bivalves. *Chesapeake Sci*.12(4):193-204.

King, D.T., B.K. Strickland, and A. Radomski. 2012. Migration patterns of Double-crested Cormorants wintering in the southeastern United States. *Waterbirds* 35(1):132-137.

Kirkpatrick, C.M. 1940. Some foods of young great blue herons. *Am Midl Nat* 24:594-601.

Kiviat, E. and K. MacDonald. 2002. Hackensack Meadowlands, New Jersey, Biodiversity: A Review and Synthesis. Hudsonia Ltd., Annandale, NY.

Kiviat, E. 1978. The muskrat's role in the marsh ecosystem: a qualitative synthesis (abstract). *Bull Ecol Soc Am* 59:124.

Klauda R.J., J.B. McClaren, R.E. Schmidt, and W.P. Dey. 1988. Life history of white perch in the Hudson River estuary. *Am Fish Soc Monogr* 4:69-88.

Klein-MacPhee, G. 2002. Winter flounder, *Pseudopleuronectes americanus*, (Walbaum 1792). In B.B. Collette and G. Klein-MacPhee eds. Bigelow and Schroeder's Fishes of the Gulf of Maine. Smithsonian Institution Press, Washington, DC.

Kneib, R.T. and A.E. Stiven. 1978. Growth, reproduction, and feeding of *Fundulus heteroclitus* on a North Carolina saltmarsh. *J Exp Mar Bio. Eco*. 31(2):121-140.

Kneib, R.T., A.E. Stiven, and E.B. Haines. 1980. Stable carbon isotope ratios in *Fundulus heteroclitus* muscle tissue and gut contents from a North Carolina Spartina alterniflora marsh. *J Exp Mar Biol Ecol* 46(1):89-98.

Krebs, J.R. 1974. Colonial nesting and social feeding as strategies for exploiting food resources in the great blue heron (*Ardea herodias*). *Behaviour* 51:93-134.

Kushlan, J. A. 1978. Feeding Ecology of Wading birds. In: Wading birds., Ed. by A. Sprunt Iv, J.C. Ogden and S. Winkler, 249-298. New York. Natl. Audubon Soc. Res. Rep. No. 7.

LaBar, D.E. and D.E. Facey. 1983. Local movement and inshore population sizes of American eel in Lake Champlain, Vermont. *Trans Am Fish Soc* 112:111-116.

Lagler, K.F. and B.T. Ostenson. 1942. Early spring food of the otter in Michigan. *J Wildl Manag* 6:244-254.

Lank, D.B., L.W. Oring, and S.J. Maxson. 1985. Mate and nutrient limitation of egg-laying in a polyandrous shorebird. *Ecology* 66:1513-1524.

Lascara, J. 1981. Fish predator-prey interactions in areas of eelgrass (*Zostera marina*). M.S. thesis, Coll. William and Mary, Williamsburg, VA. 81p.

Leim, A.H. and W.B. Scott. 1966. Fishes of the Atlantic Coast of Canada. Bull. Fish. Res. Board Can. 155. 485p.

Liers, E.E. 1951. Notes on the river otter (*Lutra canadensis*). *J Mammal* 32:1-9.

Lookabaugh, P.S. and P.L. Angermeier. 1992. Diet patterns of American eel, *Anguilla rostrata*, in the James River drainage, Virginia. *J Fresh Ecol* 7:425-431.

Loranger, A.J. 1981. Late Fall and Early Winter Foods of the River Otter (*Lutra canadensis*) in Massachusetts, 1976-1978. In: Chapman, J. A. and D. Pursley, Eds. Worldwide Furbearer Conference Proceedings, V1; August 3-11, 1980; Frostburg, MD; pp. 599-605.

Lotrich, V.A. 1975. Summer home range and movements of *Fundulus heteroclitus* (Pisces: Cyprinodonitae) in a tidal creek. *Ecology* 56(1):191-198.

Lowry, L.F. and K.J. Frost. 1981. Feeding and Trophic Relationships of Phocid Seals and Walruses in the Eastern Bering Sea. In: Hood, D.W. and J.A., Calder, Eds. The Eastern Bering Sea Shelf: Oceanography and Resources: V2. Washington, DC. Department of Commerce; pp. 813-824.

Lucy, J.A. 1976. The Reproductive Cycle of *Mya arenaria* L. and Distribution of Juvenile Clams in the Upper Portion of the Nearshore Zone of the York River, Virginia. Master's Thesis. The College of William and Mary, Virginia Institute of Marine Science, Gloucester Point. 131p.

Ludwig, D.F., J. Iannuzzi, T.J. Iannuzzi, and J.K. Shisler. 2010. Spatial and temporal habitat use patterns by water birds in an urban estuarine ecosystem: implications for ecosystem management and restoration. *Human Ecol Risk Assess* 16:163-184.

MacArthur, R.A. 1978. Winter movements and home range of the muskrat. *Can Field Nat* 92:345-349.

Macdonald, J.S. 1983. Laboratory observations of feeding behavior of the ocean pout, *Macrozoarces americanus*, and winter flounder, *Pseudopleuronectes americanus*, with reference to niche overlap of the populations. *Can J Zool* 61:539-546.

MacDonald, B.A. and M.L.H. Thomas. 1980. Age determination of the soft-shell clam *Mya arenaria* using shell internal growth lines. *Mar Biol* 58:105-109.

MacGinitie, G.E. and M. MacGinitie. 1968. Natural History of Marine Animals, 2nd Ed. McGraw-Hill Book Co., New York. 523p.

Manderson, J.P., B.A. Phelan, A.J. Bejda, L.L. Stehlik, and A.W. Stoner. 1999. Predation by striped searobin (*Prionotus evolans*, Triglidae) on young-of-the-year winter flounder (*Pseudopleuronectes americanus*, Walbaum): examining prey size selection and prey choice using field observations and laboratory experiments. *J Exp Mar Biol Ecol* 242:211-231.

Manooch, C.S., Il1. 1973. Food habits of yearling and adult striped bass, *Morone saxatilis* (Walbaum), from Albemarle Sound, North Carolina. *Chesapeake Sci* 14:73-86.

Mansueti, R.J. 1964. Eggs, larvae, and young of the white perch, *Roccus americanus*, with comments on its ecology in the estuary. *Chesapeake Sci* 5:3-45.

Martell, D.J. and G. McClelland. 1994. Diets of sympatric flatfishes, *Hippoglossoides platessoides*, *Pleuronectes ferrugineus*, *Pleuronectes americanus*, from Sable Island Bank, Canada. *J Fish Biol* 44:821-848.

Maxson, S.J. and L.W. Oring. 1980. Breeding season time and energy budgets of the polyandrous spotted sandpiper. *Behaviour* 74:200-263.

McAloney, K. 1973. The breeding biology of the great blue heron on Tobacco Island, Nova Scotia. *Can Field Nat* 87:137-140.

McCleave, J.D. and R.C. Kleckner. 1982. Selective tidal stream transport in the estuarine migration of glass eel of the American eel (*Anguilla rostrata*). *J Cons Int Explor Mer* 10:262-271.

McCleave, J.D., R.C. Kleckner, and M. Castonguay. 1987. Reproductive sympatry of American and European eel and implications for migration and taxonomy. *Am Fish Soc Symp* 1:268-297.

McCracken, F.D. 1963. Seasonal movements of the winter flounder, *Pseudopleuronectes americanus*, (Walbaum) on the Atlantic coast. *J Fish Res Board Can* 20:551-586.

Medved, R.J. and J.A. Marshall. 1981. Feeding behavior and biology of young sandbar sharks, *Carcharhinus plumbeus* (Pisces, Carcharhinidae) in Chincoteague Bay, Virginia. *U.S. Natl Mar Fish Serv Fish Bull* 79(3):441-447.

Melquist, W.E. and A.E. Dronkert. 1987. River Otter. In: Novak, M., J.A. Baker, and M.E. Obbarel, Eds. Wild Furbearer Management and Conservation. Pittsburgh, PA: University of Pittsburgh Press; pp. 627-641.

Melquist, W.E. and M.G. Hornocker. 1983. Ecology of river otters in west central Idaho. In: Kirkpatrick, R. L., ed. Wildlife monographs: v. 83. Bethesda, MD: The Wildlife Society; 60p.

Mendall, H.L. 1936. The Home-life and Economic Status of the Double-crested Cormorant, *Phalacrocorax auritus* (Lesson), Univ. Maine Stud., Second Ser. no. 38. Orono: Maine Bull. 39.3. Univ. Press.

Meredith, W.H. and V.A. Lotrich. 1979. Production dynamics of a tidal creek population of *Fundulus heteroclitus* (Linnaeus). *Est Coastal Mar Sci* 8(2):99-118.

Merriman, D. and R.C. Sclar. 1952. The Pelagic Fish Eggs and Larvae of Block Island Sound. In: G.A. Riley et al. Eds. Hydrographic and Biological Studies of Block Island Sound. pp 165-219. Bull. Bingham Oceanography Collection 13.

Miller, L.W. 1963. Growth, Reproduction and Food Habits of the White Perch, *Roccus americanus* (Gmelin) in the Delaware River Estuary. M.S. Thesis. University of Delaware, Newark. 62p.

Miller, G.L. and S.C. Jorgenson. 1969. Seasonal Abundance and Length Frequency Distributions of Some Marine Fishes in Coastal Georgia. U.S. Fish and Wildlife Service Data Rep. 35. Washington, DC. 102p.

Miller, J.R. and J.T. Miller. 1948. Nesting of the Spotted Sandpiper at Detroit, Michigan. *Auk* 65:558-567.

Morrison, W.E. and D.H. Secor. 2003a. Demographic attributes of yellow-phase American eels (*Anguilla rostrata*) in the Hudson River estuary. *Can J Fish Aq Sci* 60:1487-1501.

Morrison, W.E., D.H. Secor, and P.M. Piccoli. 2003b. Estuarine Habitat Use by Hudson River American Eels as Determined by Otolith Strontium:Calcium Ratios. Pages 87-99 In: D.A. Dixon, Ed. Biology, Management, and Protection of Catadromous Eels. American Fisheries Society, Symposium 33. Bethesda, Maryland.

Mousley, H. 1937. Nesting habits of the Spotted Sandpiper. *Auk* 54:445-451.

Mousley, H. 1939. Nesting behavior of Wilson's Snipe and Spotted Sandpiper. *Auk* 56:129-133.

National Geographic Society. 1987. Field Guide to the Birds of North America. Washington, DC.

Nelson, T. 1939. The Biology of the Spotted Sandpiper (*Actitis macularia*, Linn.). Ph.D. thesis, Univ. of Michigan, Ann Arbor.

Newcombe, C.L. 1945. The Biology and Conservation of the Blue Crab, *Callinectes sapidus,* Rathbun. VA. Fish. Lab. Ed. Ser. No. 4, Gloucester Point. 39 pp.

Normandeau. 2017. Final Newark Bay Study Area Environmental Sample Collection Report. June.

Nowak, R. 2003. Walker's Marine Mammals of the World. Baltimore, MD. The John Hopkins University Press.

NYSDEC. 1997a. Unpublished Data from T. Eckert. New York State Department of Environmental Conservation. Cape Vincent, New York

NYSDEC. 1997b. American Eel Distribution - NYS Bureau of Fisheries Database, Unpublished Data. New York State Department of Environmental Conservation. Ray Brook, NY.

NYSDEC. 2018. Muskrat. http://www.dec.ny.gov/animals/57561.html. Accessed on: November 2, 2019.

Ogden, J.C. 1970. Relative abundance, food habits, and age of the American eel, *Anguilla rostrata* (LeSueur), in certain New Jersey streams. *Trans Am Fish Soc* 99:54-59.

Olla, B.L., R. Wicklund, and S. Wilk. 1969. Behavior of winter flounder in a natural habitat. *Trans Am Fish Soc* 98:717-720.

Olla, B.L., C.E. Samet, and A.L. Studholme. 1972. Activity and feeding behavior of the summer flounder (*Paralichthys dentatus*) under controlled laboratory conditions. *Fish Bull* 70:1127-1136.

Olney, J.E. 1983. Eggs and early larvae of the bay anchovy *Anchoa mitchilli* and the weakfish *Cynoscion regalis,* in lower Chesapeake Bay with notes on associated ichthyoplankton. *Estuaries* 6:20-35.

Olney, J.E. and G.W. Boehlert. 1988. Nearshore ichthyoplankton associated with seagrass beds in the lower Chesapeake Bay. *Mar Ecol Prog Ser* 45:33- 43.

O'Neil, T. 1949. The Muskrat in the Louisiana Coastal Marshes (A Study of the Ecological, Geological, Biological, Tidal, and Climatic Factors Governing the Production and Management of the Muskrat Industry in Louisiana). New Orleans, LA. Louis. Dept Wildl. Fish., Fed. Aid Sect., Fish and Game Div. 152p.

Oring, L.W. and D.B. Lank. 1986. Polyandry in Spotted Sandpipers: The Impact of Environment and Experience. In: Rubenstein, D.I. and R.W. Wrangham, Eds. Ecological Aspects of Social Evolution - Birds and Mammals. pp. 21-42.

Oring, L.W., D.B. Lank, and S.J. Maxson. 1983. Population studies of the polyandrous spotted sandpiper. *Auk* 100:272-285.

Oring, L.W., E.M. Gray, and J.M. Reed. 1997. Spotted Sandpiper (*Actitis macularius*). In: Poole A, Ed, The Birds of North America Online. Cornell Laboratory of Ornithology, Ithaca, NY. Available from: http://bna.birds.cornell.edu/bna/species/289.

Packer, D.B., S.J. Greisbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-151. September 1999.

Palmer, R.S. 1962. Handbook of North American Birds: Vol. 1. New Haven, CT. Yale University Press

Palmer, E.L. and H.S. Fowler. 1975. Field Book of Natural History. New York, NY. McGraw-Hill Book Co.

Payne, P.M. and L.A. Selzer. 1989. The distribution, abundance and selected prey of the harbor seal, *Phoca vitulina concolor*, in southern New England. *Mar Mammal Sci* 5:173-192.

Pearcy, W.G. 1962. Ecology of an estuarine population of winter flounder, *Pseudopleuronectes americanus* (Walbaum). Parts I-IV. *Bull Bingham Oceanogr Collect* 18(1):5-78.

Pearcy, W.G. and S.W. Richards. 1962. Distribution and ecology of fishes in the Mystic River, Connecticut. *Ecology* 43:248-259.

Peifer, R.W. 1979. Great blue herons foraging for small mammals. *Wilson Bull* 91:630-631.

Pereira, J.J., R. Pereira, J.J. Goldberg, P.L. Ziskowski, W.W. Berrien, Morse, and D.L. Johnson. Essential Fish Habitat Source Document: Winter Flounder, *Pseudopleuronectes americanus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-138. September 1999.

Perkins, E.J. 1974. The Biology of Estuaries and Coastal Waters. Academic Press, New York. 678p.

Perry, H.R., Jr. 1982. Muskrats. In: Chapman, J. A. and G.A. Feldhamer, Eds. Wild mammals of North America: Biology, Management and Economics. Baltimore, MD. Johns Hopkins University Press. pp. 282-325.

Peterson, C.H. and N.M. Peterson. 1979. The Ecology of Intertidal Flats of North Carolina: A Community Profile. U.S. Fish Wildl. Serv. Biol. Serv. Program FWS/OBS-79/39. 73p.

Pfitzenmeyer, H.T. 1965. Annual cycle of gametogenesis of the soft-shelled clam, *Mya arenaria*, at Solomons, Maryland. *Chesapeake Sci* 6:52-59.

Pfitzenmeyer, H.T. 1972. Tentative outline for inventory of molluscs: *Mya arenaria* (soft-shell clam). *Chesapeake Sci* 13:182-184.

Pfitzenmeyer, H.T., and K.G. Drobeck. 1963. Benthic survey for populations of soft-shell clams, *Mya arenar*ia. *Chesapeake Sci* 4(2):67-74.

Phelan, B.A. 1992. Winter flounder movements in the inner New York Bight. *Trans Am Fish Soc* 121:777-784.

Pitcher, K.W. 1980. Food of the harbor seal, *Phoca vitulina richardsi*, in the Gulf of Alaska. *U.S. Natl Mar Fish Serv Fish Bull* 78:544-549.

Pitcher, K.W. and D.G. Calkins. 1979. Biology of the Harbor Seal, *Phoca vitulina richardsi*, in the Gulf of Alaska. Final report. Outer Continental Shelf Environmental Assessment Program Research Unit 229. Contract No. 03-5-002-69.

Poole, J.C. 1964. Feeding habits of the summer flounder in Great South Bay. *N.Y. Fish Game J* 11:28-34.

Poole, J.C. 1966. A review of research concerning summer flounder and needs for further study. *N.Y. Fish Game J* 13:226-231.

Powell, A.B. and F.J. Schwartz. 1977. Distribution of *Paralichthid* flounders (Bothidae: Paralichthys) in North Carolina estuaries. *Chesapeake Sci* 18:334-339.

Pratt, H.M. 1970. Breeding biology of great blue herons and common egrets in central California. *Condor* 72:407-416.

Prinslow, T.E., I. Valiela, and J.M. Teal. 1974. The effect of detritus and ration size on the growth of *Fundulus heteroclitus*. *J Exp Mar Biol Ecol* 16(1):1-10.

Pyle, R.W. and L.E. Cronin. 1950. The general anatomy of the blue crab *Callinectes sapidus* Rathbun. Chesapeake Biol. Lab. Publ. No. 87, Solomons, MD. 40p.

Reed, J.M., L.W. Oring, and E.M. Gray. 2013. Spotted Sandpiper (*Actitis macularius*), Ver. 2.0. In: The Birds of North America (A.F. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.289

Reichert, M.J.M. and H.W. van der Veer. 1991. Settlement, abundance, growth and mortality of juvenile flatfish in a subtropical tidal estuary (Georgia, U.S.A.). *Neth J Sea Res* 27:375-391.

Richards, S.W., J.M. Mann, and J.A. Walker. 1979. Comparison of spawning seasons, age, growth rates, and food of two sympatric species of searobins, *Prionotus carolinus* and *Prionotus evolans*, from Long Island Sound. *Estuaries* 2(4):255-268.

Richman, S.E. and J.R. Lovvorn. 2004. Relative foraging value to Lesser Scaup ducks of native and exotic clams from San Francisco Bay. *Ecol App* 14(4):1217-1231.

Roffe, T.J. and B.R. Mate. 1984. Abundances and feeding habits of pinnipeds in the Rogue River, Oregon. *J Wildl Manag* 48:1262-1274

Rogers, S.G. and M.J. Van Den Avyle. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Atlantic): Summer Flounder. FWS/OBS-82/11.15. U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Rosen, D.E. 1973. Suborder Cyprinodontoidei. Pages 229-262 In: Cohen, D.M., N.B. Marshall, A.W. Ebeling, D.E. Rosen, T. Iwamoto, P. Sonoda, S.B. McDowell, W.H. Weed III, and L.P. Woods. Fishes of the Western North Atlantic. Sears Found. Mar. Res. Mem. 1, Pt. 6, Yale University.

Rountree, R.A. and K.W. Able. 1992a. Fauna of polyhaline marsh creeks in southern New Jersey: composition, abundance and biomass. *Estuaries* 15:171-186.

Rountree, R.A. and K.W. Able. 1992b. Foraging habits, growth, and temporal patterns of salt-marsh creek habitat use by young-of-year summer flounder in New Jersey. *Trans Am Fish Soc* 121:765-776.

Rountree, R.A. and K.W. Able. 1997. Nocturnal fish use of New Jersey marsh creek and adjacent bay shoal habitats. *Est Coast Shelf Sci* 44:703-711.

Rubbelke, D.L. 1976. Distribution and Relative Abundance of Potential Prey of Spotted Sandpipers (*Actitis macularia* L.) on Little Pelican Island, Leech Lake, Cass Co., Minnesota. Master's Thesis, Univ. of North Dakota, Grand Forks.

Sather, J.H. 1958. Biology of the Great Plains Muskrat in Nebraska. Wildl. Monogr. 2. 35p.

Schaeffer, J.S. and F.J. Margraf. 1986. Food of white perch (*Morone americana*) and potential for competition with yellow perch (*Parca flavescens*) in Lake Erie. *Ohio J Sci* 86(1):26-29.

Scherr, H., J. Bowman and K.F. Abraham. 2010. Migration and winter movements of Double-crested Cormorants breeding in Georgian Bay, Ontario. *Waterbirds* 33(4):451-460.

Schmidt, S. 1985. Dredging for blue crabs: Virginia's winter fishery. *Mar Res Bull* 17(1):2-3.

Scott, W.B. and W.J. Christie. 1963. The invasion of the lower Great Lakes by the white perch, *Roccus americanus*. *J Fish Res Board Can* 20:1189-1195.

Scott, W.B. and E.J. Crossman. 1973. Freshwater Fishes of Canada. Fish. Res. Bd. Can. Bull. 184. 966p.

Seed, R. 1980. Predator-prey relationships between the mud crab *Panopeus herbstii*, the blue crab *Callinectes sapidus* and the Atlantic ribbed mussel *Geukensia demissa*. *Est Coast Mar Sci* 11:445-458.

Seymour, N.R. 1974. Great black-backed gulls feeding on live eel. *Can Field Nat* 8:352-353.

Shaffer, K.E. 1989. Seasonal and Size Variations in Diets of Harbor Seals, *Phoca vitulina* (abstract). Page 62 In: 8th Biennial Conference on the Biology of Marine Mammals; December 7-11, 1989. Pacific Grove, CA.

Sheri, A.N. and G. Power. 1969. Vertical distribution of white perch, *Roccus americanus*, modified by light. *Can Field Nat* 83(2):160-161.

Short, H.L. and R.J. Cooper. 1985. Habitat Suitability Index Models: Great Blue Heron. U.S. Fish and Wildlife Service Biol. Rep. No. 82(10.99). 23p.

Siegfried, W.R. 1974. Time budget of behavior among Lesser Scaups on Delta Marsh. *J Wildl Manag* 38:708-713.

Sinha, V.R.P. and J.W. Jones. 1967. On the food of the freshwater eel and their feeding relationship with salmonids. *J Zool* 153:119-137.

Slater, L.M. and H. Markowitz. 1983. Spring population trends in *Phoca vitulina richardi* in two central California coastal areas. *Calif Fish Game* 69:217-226.

Smith, W.G. 1973. The distribution of summer flounder, *Paralichthys dentatus*, eggs and larvae on the continental shelf between Cape Cod and Cape Lookout, 1965-66. *Fish Bull* 71:527-548.

Smith, R.W. and F.C. Daiber. 1977. Biology of the summer flounder, *Paralichthys dentatus*, in Delaware Bay. *U.S. Natl Mar Fish Serv Fish Bull* 75:823-830.

Smith, R.E. and R.J. Kernehan. 1981. Predation by the free-living copepod, *Cyclops bicuspidatus* (Thomasi), on larvae of the striped bass, *Morone saxatilis*, and white perch, *Morone americana*. *Estuaries* 4(1):81-83.

Spendelow, J.A. and S.R. Patton. 1988. National Atlas of Coastal Waterbird Colonies: 1976-1982. U.S. Fish Wildl. Serv. Biol. Rep. No. 88(5).

Stanley, J.G. and D.S. Danie. 1983. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic). White Perch. FWS/OBS-82/11.7. U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Steimle, F.W., D. Jeffress, S.A. Fromm, R.N. Reid, J.J. Vitaliano, and A. Frame. 1993. Predator-prey relationships of winter flounder, *Pleuronectes americanus*, in the New York Bight apex. *Fish Bull* 92:608-619.

Sulkin, S.D., C.E. Epifanio, and A.J. Provenzano, Jr. 1982. The Blue Crab in the Mid-Atlantic Bight Estuaries: A Proposed Recruitment Model. Maryland Sea Grant Program.

Szedlmayer, S.T. and K.W. Able. 1992. Validation studies of daily increment formation for larval and juvenile summer flounder, *Paralichthys dentatus*. *Can J Fish Aquat Sci* 49:1856-1862.

Tagatz, M.E. 1968. Biology of the blue crab, *Callinectes sapidus* (Rathbun), in the St. Johns River Florida. *U.S. Fish Wildl Serv Fish Bull* 67:17-33.

Takos, M. 1947. A semi-quantitative study of muskrat food habits. *J Wildl Manag* 11(4):331-339.

Taylor, M.H. and L. DiMichele. 1980. Ovarian changes during the lunar spawning cycle of *Fundulus heteroclitus*. *Copeia* 1980(1):118-125.

Taylor, M.H. and L. DiMichele. 1983. Spawning site utilization in a Delaware population of *Fundulus heteroclitus* (Pisces: Cyprinodontidae). *Copeia* 1983(3):719-725.

Taylor, M.H., G.J. Leach, L. DiMichele, W.H. Levitan, and W.F. Jacob. 1979. Lunar spawning cycle in the mummichog, *Fundulus heteroclitus* (Pisces: Cyprinodontidae). *Copeia* 1979(2):291-297.

Thompson, B.C., J.E. Tabor, and C.L. Turner. 1988. Diurnal Behavior Patterns of Waterfowl Wintering on the Columbia River, Oregon and Washington. In: Weller, M.W., Ed., Waterfowl in Winter, pp 153-167. University of Minnesota Press. Minneapolis, MN.

Tierra. 2015. Newark Bay Study Area Reconnaissance Survey Report. Baseline Human Health and Ecological Risk Assessment. East Brunswick, New Jersey. April.

Tiner, R.W. J.Q. Swords, and B.J. McClain. 2002. Wetland Status and Trends for the Hackensack Meadowlands. U.S. Fish and Wildlife Service.

Tome, M.W. and D.A. Wrubleski. 1988. Underwater foraging behavior of Canvasbacks, Lesser Scaups, and Ruddy Ducks. *Condor* 90:168-172.

Toweill, D.E. and J.E. Tabor. 1982. River Otter. In: Chapman, J.A. and G.A. Feldhammer, Eds. Wild Mammals of North America. Baltimore, MD. Johns Hopkins University Press. pp. 688-703.

Trippensee, R.E. 1953. Muskrats. In: Wildlife Management: Fur Bearers, Waterfowl, and Fish: V.2. New York, NY. McGraw-Hill. pp.126-139.

Truitt, P.V. 1939. Our Water Resources and Their Conservation. Chesapeake Biol. Lab. Contrib. No. 17. Solomons, Md. 103p.

USACE. 1997. Kill Van Kull-Newark Bay Channels Phase II Deepening Project Final Environmental Impact Statement. U.S. Army Corps of Engineers, New York District.

USACE. 2015a. Migratory Finfish Summary Report. New York and New Jersey Harbor Deepening Project. U.S. Army Corps of Engineers, New York District. New York, New York.

USACE. 2015b. Demersal Fish Assemblages of New York / New Jersey Harbor and Near-Shore Fish Communities of New York Bight. U.S. Army Corps of Engineers, New York District. New York, New York.

USEPA. 1993. Wildlife Exposure Factors Handbook. EPA/600/R-93/187a. Office of Research and Development. U.S. Environmental Protection Agency. Washington, DC.

USFWS. 1997. Significant Habitats and Habitat Complexes of the New York Bight Watershed. Southern New England-New York Bight Coastal Ecosystems Program, U.S. Fish and Wildlife Service, Charlestown, RI. Available from: http://library.fws.gov/pubs5/web_link/text/toc.htm

Valiela, I., J.E. Wright, J.M. Teal, and S.B. Volkman. 1977. Growth, production and energy transformations in the saltmarsh killifish, *Fundulus heteroclitus*. *Mar Biol* 40(2):135-144.

Van Enqel, W.A. 1958. The blue crab and its fishery in Chesapeake Bay. Part 1. Reproduction, early development, growth, and migration. *Com Fish Rev* 20(6):6-17.

Vennesland, R.G. and R.W. Butler. 2011. Great Blue Heron (*Ardea herodias*), V 2.0. In: Poole, A.F. Ed., The Birds of North America. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.25

Vermeer, K. 1969. Great blue heron colonies in Alberta. *Can Field Nat* 83:237-242.

Vince, S., I. Valiela, N. Backus, and J.M. Teal. 1976. Predation by the saltmarsh killifish *Fundulus heteroclitus* (L.) in relation to prey size and habitat structure: consequences for prey distribution and abundance. *J Exp Mar Biol Ecol* 23(3):255-266.

Vouglitois, J.J. 1983. The Ichthyofauna of Barnegat Bay, New Jersey: Relationships Between Long Term Temperature Fluctuations and the Population Dynamics and Life History of Temperate Estuarine Fishes During a Five Year Period, 1976-1980. M.S. Thesis, Rutgers Univ., New Brunswick, NJ. 304p.

Walsh, H.J., D.S. Peters, and D.P. Cyrus. 1999. Habitat utilization by small flatfishes in a North Carolina estuary. *Estuaries* 22: 803-813.

Wang, J.C.S. and R.J. Kernehan. 1979. Fishes of the Delaware Estuaries: A Guide to Early Life Histories. Copyright by the authors. Towson, MD. 410p.

Warren, J.H. 1985. Climbina as an avoidance behavior in the salt marsh periwinkle, *Littorina irrorata* (Say). *J Exp Mar Biol Ecol* 89:11-28.

Weber, A.M. 1984. Winter Flounder in Western Long Island Sound: Preliminary Results of the 1981-1983 Tagging Projects. New York State Dept. Environ. Conserv. Div. Mar. Resour. Stony Brook, NY. 33p.

Weis, J.S. 2005. Diet and food web support of the white perch, *Morone americana*, in the Hackensack Meadowlands of New Jersey. *Environ Biol Fish* 74:109-113.

Weisberg, S.B. and V.A. Lotrich. 1982. The importance of an infrequently flooded intertidal marsh surface as an energy source for the mummichog *Fundulus heteroclitus*: an experimental approach. *Mar Biol* 66(3):307-310.

Wenner, C.A. and J.A. Musick. 1975. Food habits and seasonal abundance of the American eel, *Anquilla rostrata*, from the lower Chesapeake Bay. *Chesapeake Sci* 16:62-66.

Wilk, S.J., W.W. Morse, D.E. Ralph, and T.R. Azarovitz. 1977. Fishes and Associated Environmental Data Collected in New York Bight, June 1974-June 1975. NOAA Tech. Rep. NMFS-SSRF-716. 53p.

Willard, D.E. 1977. The feeding ecology and behavior of five species of herons in southeastern New Jersey. *Condor* 79: 462-470.

Williams, A.B. 1965. Marine decapod crustaceans of the Carolinas. *U.S. Fish Wildl Serv Fish Bull* 65:1-298.

Willner, G.R., G.A. Feldhamer, and E.E. Zucker. 1980. *Ondatra zibethicus*. Mammalian species. No. 141. Amer. Soc. Mammal. 8p.

Wilson, S.P. 2012. River Otter (*Lontra canadensis*) Home Range, Habitat Use, Overnight Movement, and Survival in the Platte River of Nebraska. University of Nebraska Lincoln, School of Natural Resources.

Winston, T. 2016. New York City Audubon's Harbor Herons Project: 2016 Nesting Survey Report.

Yamamoto, K. and K. Yamauchi. 1974. Sexual maturation of Japanese eel and production of eel larvae in the aquarium. *Nature* 251:220-221.

APPENDIX C

Food Web/Exposure Point Concentration Calculations

ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

BASELINE ECOLOGICAL RISK ASSESSMENT

APPENDIX C – FOOD WEB/ EXPOSURE POINT CONCENTRATION CALCULATIONS

Newark Bay Study Area

Newark Bay, New Jersey

July 2020

TABLES

Table C-1	Sediment (0-0.5 feet bss) EPCs for Risk Assessments
Table C-2	Fish < 15 cm in Length Dietary EPCs for Risk Assessments
Table C-3	Fish < 30 cm in Length Dietary EPCs for Risk Assessments
Table C-4	All Fish Dietary EPCs for Risk Assessments
Table C-5	Fish > 30 cm in Length Dietary EPCs for Risk Assessments
Table C-6	Polychaete Worm Tissue EPCs for Risk Assessments
Table C-7	Softshell Clam Tissue EPCs for Risk Assessments
Table C-8	Blue Crab Tissue EPCs for Risk Assessments
Table C-9	*Fundulus* sp Tissue EPCs for Risk Assessments
Table C-10	White Perch Tissue EPCs for Risk Assessments
Table C-11	Combined Summer/Winter Flounder Tissue EPCs for Risk Assessments
Table C-12	American Eel Tissue EPCs for Risk Assessments
Table C-13	Atlantic Menhaden Tissue EPCs for Risk Assessments
Table C-14	Atlantic Silverside Tissue EPCs for Risk Assessments
Table C-15	*Fundulus* sp. Fish Egg Tissue EPCs for Risk Assessments
Table C-16	*Fundulus* sp. Egg Mercury EPCs Using Adult Tissue and Conversion Factors from the Literature
Table C-17	*Fundulus* sp. Egg PCB and TEQ EPCs Using Adult Tissue and Conversion Factors from the Literature
Table C-18	Bird Egg Tissue EPCs for Risk Assessments

ACRONYMS AND ABBREVIATIONS

-- = data not available
% = percent
bss = below sediment surface
cm = centimeters
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
HMW = high molecular weight
LMW = low molecular weight
mg/kg = milligrams per kilogram
N = sample size
N/A = not applicable
NBSA = Newark Bay Study Area
ND = nondetect
ng/kg = nanograms per kilogram
ng/g = nanograms per gram
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
pg/g = picograms per gram
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent

Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)

UCL = upper confidence limit

µg/kg = micrograms per kilogram

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	254	254	100	0.12	1710	87.13	182.2	N/A	N/A	137	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	254	254	100	0.322	1870	131.1	210.5	N/A	N/A	188.7	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	254	254	100	0.347	1870	131.3	210.5	N/A	N/A	188.8	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	254	254	100	0.372	1870	131.4	210.4	N/A	N/A	189	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	254	254	100	0.223	1810	113.7	200.2	N/A	N/A	168.4	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	254	254	100	0.247	1810	113.8	200.2	N/A	N/A	168.6	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	254	254	100	0.272	1810	114	200.2	N/A	N/A	168.7	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	254	254	100	0.223	1810	114.8	201	N/A	N/A	169.8	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	254	254	100	0.248	1810	114.9	201	N/A	N/A	169.9	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	254	254	100	0.273	1810	115.1	201	N/A	N/A	170	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCBs (ND=0)	ng/kg	254	254	100	2480	5030000	479555	691031	N/A	N/A	668553	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCBs (ND=1)	ng/kg	254	254	100	20500	5040000	486006	690373	N/A	N/A	674824	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	254	254	100	11500	5040000	482785	690832	N/A	N/A	671729	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	254	253	100	0.000668	2440	147	237.1	10.2	10.2	175.2	95% KM Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	254	253	100	20.6	2440	161	234.4	10.2	10.2	225.3	95% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	254	253	100	11.1	2440	154	235.7	10.2	10.2	177.5	KM H-UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	254	253	100	0.000334	11.7	0.67	1.084	0.51	0.51	0.967	95% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	254	253	100	0.356	11.7	1.056	1.049	0.51	0.51	1.343	95% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	254	253	100	0.269	11.7	0.863	1.048	0.51	0.51	1.15	95% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	254	253	100	0.002	121	5.992	10.97	10.2	10.2	9	95% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	254	253	100	6.34	125	16.38	11.37	10.2	10.2	16.78	KM H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	254	253	100	4.91	123	11.19	10.3	10.2	10.2	14.02	95% KM (Chebyshev) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	254	254	100	0.322	2760	278.2	398.1	N/A	N/A	387.1	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	254	254	100	13	2770	285.4	396.8	N/A	N/A	393.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	254	254	100	22.5	2770	292.5	395.4	N/A	N/A	400.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	254	254	100	0.223	1810	114.3	200.4	N/A	N/A	169.1	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	254	254	100	0.538	1810	114.6	200.4	N/A	N/A	169.4	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	254	254	100	0.853	1820	115	200.7	N/A	N/A	169.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	254	254	100	0.223	1820	120.8	205.4	N/A	N/A	177	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	254	254	100	6.91	1820	126.1	205.2	N/A	N/A	182.3	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	254	254	100	13.6	1830	131.5	205.4	N/A	N/A	187.7	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	254	254	100	120	2600000	130946	300836	N/A	N/A	213225	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	254	254	100	130	2600000	131018	300809	N/A	N/A	213290	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	254	254	100	130	2600000	130982	300822	N/A	N/A	213258	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	253	244	96	38.8	39598	7340	6908	39.7	335	9237	95% KM (Chebyshev) UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	253	244	96	279.4	41012	7751	6993	39.7	335	8535	95% KM Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	253	244	96	159.1	40226	7546	6944	39.7	335	9452	95% KM (Chebyshev) UCL
	Pesticides	Dieldrin	pg/g	253	240	95	39.4	37400	1741	3501	39.7	1560	2703	95% KM (Chebyshev) UCL
	Pesticides	Hexachlorobenzene	pg/g	253	252	100	13.2	46200	2871	6237	221	221	4583	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	254	252	99	37	100000	10877	12405	41	45	14276	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	254	252	99	45	100000	10923	12383	41	45	14317	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	254	252	99	41	100000	10901	12390	41	45	14297	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	254	245	96	5.2	17000	1354	2122	35	1400	1936	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	254	245	96	5.2	17000	1398	2127	35	1400	1981	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	254	245	96	5.2	17000	1374	2114	35	1400	2096	KM H-UCL
	PAHs	Total PAH (ND=0)	µg/kg	254	252	99	37	110000	12229	14200	41	45	16121	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1)	µg/kg	254	252	99	50	110000	12372	14173	41	45	16256	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	254	252	99	46	110000	12302	14179	41	45	16187	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	254	254	100	1.18	115	18.27	16.79	N/A	N/A	22.86	95% Chebyshev (Mean, Sd) UCL
	Metals	Cadmium	mg/kg	254	252	99	0.0592	24.6	2.064	3.273	0.0867	0.103	2.961	95% KM (Chebyshev) UCL
	Metals	Chromium	mg/kg	254	254	100	3.95	777	122.7	116.9	N/A	N/A	139.3	95% H-UCL
	Metals	Copper	mg/kg	254	254	100	1.5	924	149	151.7	N/A	N/A	190.5	95% Chebyshev (Mean, Sd) UCL
	Metals	Lead	mg/kg	254	254	100	2.18	2190	165.9	219.7	N/A	N/A	193	95% H-UCL
	Metals	Mercury	ng/g	254	254	100	5.11	22100	2350	2847	N/A	N/A	3129	95% Chebyshev (Mean, Sd) UCL
	Metals	Methylmercury	ng/g	254	253	100	0.027	11.9	1.101	1.143	0.058	0.058	1.205	95% GROS Approximate Gamma UCL
	Metals	Nickel	mg/kg	254	254	100	3.83	282	40.88	28.9	N/A	N/A	48.78	95% Chebyshev (Mean, Sd) UCL
	Metals	Selenium	mg/kg	253	250	99	0.0939	7.58	1.021	1.106	0.347	0.484	1.324	95% KM (Chebyshev) UCL
	Metals	Silver	mg/kg	254	253	100	0.0448	12	1.813	1.639	0.103	0.103	2.263	95% KM (Chebyshev) UCL
	Metals	Zinc	mg/kg	254	254	100	8.18	6810	299.6	485.9	N/A	N/A	319.5	95% H-UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide Mudflat Only	Dioxins/Furans	2378-TCDD	ng/kg	21	21	100	2.18	271	60.11	64.43	N/A	N/A	84.36	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	21	21	100	4.18	417	102.3	100.7	N/A	N/A	140.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	21	21	100	4.57	417	102.4	100.7	N/A	N/A	140.3	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	21	21	100	4.97	418	102.6	100.8	N/A	N/A	140.5	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	21	21	100	3.2	346	85.25	85.29	N/A	N/A	117.3	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	21	21	100	4.71	346	85.38	85.16	N/A	N/A	117.4	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	21	21	100	6.23	347	85.66	85.25	N/A	N/A	117.7	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	21	21	100	3.25	353	85.79	86.02	N/A	N/A	118.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	21	21	100	3.77	353	85.93	85.99	N/A	N/A	118.3	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	21	21	100	4.3	354	86.11	86.08	N/A	N/A	118.5	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	21	21	100	23400	2380000	424486	556665	N/A	N/A	700542	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	21	21	100	33900	2380000	432033	554740	N/A	N/A	698992	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	21	21	100	28700	2380000	428448	556041	N/A	N/A	699843	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	21	21	100	3.6	597	104.6	140.9	N/A	N/A	178.1	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	21	21	100	25.1	597	123	134.2	N/A	N/A	180.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	14.4	597	113.8	137.5	N/A	N/A	176.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	21	21	100	0.0121	3.73	0.593	0.87	N/A	N/A	1.1	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	21	21	100	0.502	3.74	1.072	0.735	N/A	N/A	1.771	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	0.272	3.74	0.833	0.785	N/A	N/A	1.146	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	0.0373	41.4	6.183	10.46	N/A	N/A	20.43	97.5% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	10.3	46.9	18.81	8.958	N/A	N/A	22.18	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	5.53	44.1	12.49	8.984	N/A	N/A	21.03	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	21	21	100	7.77	1010	206.7	224.9	N/A	N/A	331	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	18.9	1010	216	221.5	N/A	N/A	299.4	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	21	21	100	30.1	1010	225.3	218.3	N/A	N/A	307.5	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	21	21	100	3.21	350	85.83	85.96	N/A	N/A	118.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	5.02	350	86.2	85.74	N/A	N/A	118.5	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	21	21	100	6.84	350	86.69	85.63	N/A	N/A	118.9	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	3.29	395	92.02	94.45	N/A	N/A	148.8	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	10.8	398	98.41	92.87	N/A	N/A	133.4	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	18.3	401	104.9	91.45	N/A	N/A	139.3	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	21	21	100	1600	540000	102948	149085	N/A	N/A	184854	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	21	21	100	1700	540000	102967	149072	N/A	N/A	184634	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	21	21	100	1600	540000	102957	149078	N/A	N/A	184803	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	21	21	100	633.8	31330	10250	7816	N/A	N/A	13192	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	21	21	100	835.8	35229	10763	8202	N/A	N/A	13850	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	21	21	100	734.8	33279	10507	7999	N/A	N/A	13517	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	21	19	90	119	20900	2786	5137	1020	1560	7808	95% KM (Chebyshev) UCL
	Pesticides	Hexachlorobenzene	pg/g	21	21	100	42.1	24800	2612	5310	N/A	N/A	7663	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	21	20	95	870	70000	9085	14713	45	45	23444	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	21	20	95	870	70000	9085	14713	45	45	23444	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	21	20	95	870	70000	9085	14713	45	45	23444	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	21	20	95	69	17000	1818	3822	45	45	5548	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	21	20	95	200	17000	1868	3802	45	45	5578	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	21	20	95	140	17000	1843	3812	45	45	5563	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	21	20	95	990	87000	10911	18537	45	45	29001	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1)	µg/kg	21	20	95	1200	87000	10964	18516	45	45	29033	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	21	20	95	1100	87000	10940	18526	45	45	29020	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	21	21	100	1.18	115	18.46	26.15	N/A	N/A	29.04	95% H-UCL
	Metals	Cadmium	mg/kg	21	21	100	0.0858	13.7	1.777	2.881	N/A	N/A	2.869	95% Adjusted Gamma UCL
	Metals	Chromium	mg/kg	21	21	100	9.1	276	92.43	59.96	N/A	N/A	115	95% Student's-t UCL
	Metals	Copper	mg/kg	21	21	100	9.14	443	135.1	124.6	N/A	N/A	196.4	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	21	21	100	10.6	2190	262.2	503.8	N/A	N/A	741.4	95% Chebyshev (Mean, Sd) UCL
	Metals	Mercury	ng/g	21	21	100	54.6	7390	1680	1646	N/A	N/A	2299	95% Student's-t UCL
	Metals	Methylmercury	ng/g	21	21	100	0.065	11.9	1.696	2.706	N/A	N/A	2.993	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	21	21	100	5.89	124	37.74	29.85	N/A	N/A	48.97	95% Student's-t UCL
	Metals	Selenium	mg/kg	21	20	95	0.175	3	0.792	0.72	0.484	0.484	1.116	95% GROS Adjusted Gamma UCL
	Metals	Silver	mg/kg	21	21	100	0.0759	5.8	1.365	1.27	N/A	N/A	1.843	95% Student's-t UCL
	Metals	Zinc	mg/kg	21	21	100	35.2	6810	642.9	1499	N/A	N/A	2069	95% Chebyshev (Mean, Sd) UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide All Shorelines Only	Dioxins/Furans	2378-TCDD	ng/kg	51	51	100	1.76	271	49.96	57.43	N/A	N/A	66.08	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	51	51	100	4.18	417	86.74	85.11	N/A	N/A	110.9	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	51	51	100	4.57	417	86.85	85.08	N/A	N/A	111	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	51	51	100	4.97	418	86.96	85.15	N/A	N/A	111.1	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	51	51	100	3.2	346	70.96	73.38	N/A	N/A	91.8	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	51	51	100	3.45	346	71.08	73.35	N/A	N/A	91.77	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	51	51	100	3.45	347	71.26	73.48	N/A	N/A	91.87	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	51	51	100	3.25	353	71.61	73.76	N/A	N/A	92.52	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	51	51	100	3.56	353	71.75	73.83	N/A	N/A	92.6	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	51	51	100	3.56	354	71.89	73.89	N/A	N/A	92.69	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	51	51	100	23400	4000000	469716	699559	N/A	N/A	622522	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	51	51	100	33900	4000000	476721	697943	N/A	N/A	625073	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	51	51	100	28700	4000000	473195	698615	N/A	N/A	623599	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	51	51	100	3.6	2440	150.7	357.4	N/A	N/A	245.1	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	51	51	100	25.1	2440	168.4	353.1	N/A	N/A	191.5	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	51	51	100	14.4	2440	159.6	355.2	N/A	N/A	196.5	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	51	51	100	0.0121	11.7	0.767	1.743	N/A	N/A	1.095	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	51	51	100	0.357	11.7	1.261	1.632	N/A	N/A	2.257	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	51	51	100	0.272	11.7	1.014	1.679	N/A	N/A	2.039	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	51	51	100	0.0373	121	7.557	18.46	N/A	N/A	18.83	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	51	51	100	8.28	125	20.42	16.73	N/A	N/A	22.31	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	51	51	100	5.53	123	13.99	17.23	N/A	N/A	24.51	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	51	51	100	7.77	2490	237.5	382.3	N/A	N/A	315.5	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	51	51	100	18.9	2490	246.4	379.9	N/A	N/A	319.4	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	51	51	100	30.1	2490	255.3	377.7	N/A	N/A	325.3	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	51	51	100	3.21	350	71.74	73.81	N/A	N/A	92.73	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	51	51	100	3.81	350	72.07	73.68	N/A	N/A	92.74	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	51	51	100	4.14	350	72.47	73.66	N/A	N/A	92.93	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	51	51	100	3.29	395	79.21	80.22	N/A	N/A	102.5	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	51	51	100	10.5	398	85.72	79.28	N/A	N/A	106.6	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	51	51	100	16.4	401	92.34	78.6	N/A	N/A	112.1	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	51	51	100	1600	540000	89596	127193	N/A	N/A	164602	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	51	51	100	1700	540000	89655	127160	N/A	N/A	163036	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	51	51	100	1600	540000	89625	127177	N/A	N/A	164012	95% H-UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	51	50	98	591.5	31330	9374	7121	50.3	50.3	11062	95% KM (t) UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	51	50	98	835.8	35229	9749	7249	50.3	50.3	11467	95% KM (t) UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	51	50	98	734.8	33279	9562	7179	50.3	50.3	11263	95% KM (t) UCL
	Pesticides	Dieldrin	pg/g	51	48	94	106	20900	1846	3449	50.3	1560	2665	KM H-UCL
	Pesticides	Hexachlorobenzene	pg/g	51	51	100	42.1	24800	1774	3508	N/A	N/A	2323	95% Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	51	50	98	660	70000	8634	11416	45	45	14841	KM H-UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	51	50	98	660	70000	8634	11416	45	45	14841	KM H-UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	51	50	98	660	70000	8634	11416	45	45	14841	KM H-UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	51	50	98	41	17000	1501	2832	45	45	2316	KM H-UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	51	50	98	160	17000	1543	2813	45	45	3277	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	51	50	98	130	17000	1522	2822	45	45	3262	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	51	50	98	780	87000	10135	14220	45	45	17782	KM H-UCL
	PAHs	Total PAH (ND=1)	µg/kg	51	50	98	1000	87000	10180	14196	45	45	17242	KM H-UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	51	50	98	900	87000	10163	14205	45	45	17428	KM H-UCL
	Metals	Arsenic	mg/kg	51	51	100	1.18	115	14.71	18.61	N/A	N/A	17.49	95% H-UCL
	Metals	Chromium	mg/kg	51	51	100	9.1	280	88.82	59.51	N/A	N/A	104.3	95% Approximate Gamma UCL
	Metals	Cadmium	mg/kg	51	51	100	0.0858	13.7	1.376	1.982	N/A	N/A	1.836	95% H-UCL
	Metals	Copper	mg/kg	51	51	100	9.14	619	139.9	129.7	N/A	N/A	172.7	95% Approximate Gamma UCL
	Metals	Lead	mg/kg	51	51	100	10.6	2190	197.8	342.5	N/A	N/A	237.1	95% H-UCL
	Metals	Methylmercury	ng/g	51	51	100	0.065	11.9	1.548	1.861	N/A	N/A	1.967	95% Approximate Gamma UCL
	Metals	Mercury	ng/g	51	51	100	54.6	7390	1527	1359	N/A	N/A	1883	95% Approximate Gamma UCL
	Metals	Selenium	mg/kg	50	49	98	0.141	3.74	0.804	0.708	0.484	0.484	0.969	95% GROS Approximate Gamma UCL
	Metals	Silver	mg/kg	51	51	100	0.0759	5.8	1.373	1.168	N/A	N/A	1.702	95% Approximate Gamma UCL
	Metals	Nickel	mg/kg	51	51	100	5.89	282	44.29	48.32	N/A	N/A	53.28	95% H-UCL
	Metals	Zinc	mg/kg	51	51	100	35.2	6810	451.5	1003	N/A	N/A	1064	95% Chebyshev (Mean, Sd) UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North	Dioxins/Furans	2378-TCDD	ng/kg	104	104	100	1.19	1710	118.1	251.6	N/A	N/A	225.7	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	104	104	100	3.3	1870	167.3	282.1	N/A	N/A	287.9	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	104	104	100	3.3	1870	167.4	282.1	N/A	N/A	288	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	104	104	100	3.3	1870	167.5	282.1	N/A	N/A	288	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	104	104	100	2.72	1810	151.3	271.6	N/A	N/A	267.4	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	104	104	100	2.72	1810	151.4	271.6	N/A	N/A	267.5	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	104	104	100	2.72	1810	151.5	271.5	N/A	N/A	230.7	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	104	104	100	2.72	1810	150.8	271.3	N/A	N/A	266.7	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	104	104	100	2.72	1810	150.9	271.3	N/A	N/A	266.8	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	104	104	100	2.72	1810	150.9	271.3	N/A	N/A	266.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCBs (ND=0)	ng/kg	104	104	100	9070	5030000	435865	707916	N/A	N/A	653839	95% H-UCL
	PCBs	Total PCBs (ND=1)	ng/kg	104	104	100	25000	5040000	442043	707552	N/A	N/A	572360	95% H-UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	104	104	100	17100	5040000	439031	708089	N/A	N/A	600159	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	104	104	100	0.000918	1280	118	194.3	N/A	N/A	201.1	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	104	104	100	21.3	1280	131.2	190	N/A	N/A	144.4	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	104	104	100	11.7	1280	124.6	192.1	N/A	N/A	148.2	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	104	104	100	0.000459	6.37	0.562	0.898	N/A	N/A	0.946	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	104	104	100	0.356	6.38	0.905	0.799	N/A	N/A	1.247	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	104	104	100	0.269	6.37	0.734	0.836	N/A	N/A	1.091	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	104	104	100	0.00275	60.6	5.325	8.812	N/A	N/A	9.092	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	104	104	100	6.34	63.6	14.67	7.476	N/A	N/A	15.88	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	104	104	100	4.91	62.1	9.998	7.603	N/A	N/A	11.24	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	104	104	100	3.35	2760	285.5	461.5	N/A	N/A	452	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	104	104	100	15.1	2770	292.1	459.7	N/A	N/A	488.5	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	104	104	100	24.6	2770	298.7	457.5	N/A	N/A	494.3	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	104	104	100	2.73	1810	151.7	271.7	N/A	N/A	267.8	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	104	104	100	3.25	1820	152.3	272.1	N/A	N/A	268.1	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	104	104	100	3.25	1820	152.3	272.1	N/A	N/A	224.9	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	104	104	100	2.73	1820	156.2	277.6	N/A	N/A	274.8	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	104	104	100	8.89	1820	160.9	276.6	N/A	N/A	279.1	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	104	104	100	15.1	1830	165.6	276	N/A	N/A	191.5	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	104	104	100	400	390000	39240	49957	N/A	N/A	46752	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	104	104	100	830	390000	39367	49912	N/A	N/A	46788	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	104	104	100	750	390000	39305	49931	N/A	N/A	46764	95% Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	104	100	96	205.6	39598	7029	7137	221	335	8365	95% KM Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	104	100	96	483.2	39866	7454	7106	221	335	8773	95% KM Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	104	100	96	355.3	39732	7242	7113	221	335	8567	95% KM Approximate Gamma UCL
	Pesticides	Dieldrin	pg/g	104	99	95	53.7	19300	1530	2730	221	1560	1924	KM H-UCL
	Pesticides	Hexachlorobenzene	pg/g	104	103	99	27.3	14100	1705	2230	221	221	2663	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	104	103	99	71	53000	11827	10819	45	45	13824	95% KM Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	104	103	99	340	53000	11839	10806	45	45	13833	95% KM Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	104	103	99	300	53000	11833	10813	45	45	13829	95% KM Approximate Gamma UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	104	100	96	14	7500	1147	1113	42	65	1354	95% KM Approximate Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	104	100	96	160	7500	1192	1096	42	65	1591	KM H-UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	104	100	96	130	7500	1170	1103	42	65	1375	95% KM Approximate Gamma UCL
	PAHs	Total PAH (ND=0)	µg/kg	104	103	99	71	56000	12994	11793	45	45	15169	95% KM Approximate Gamma UCL
	PAHs	Total PAH (ND=1)	µg/kg	104	103	99	640	56000	13074	11777	45	45	15244	95% KM Approximate Gamma UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	104	103	99	470	56000	13044	11803	45	45	15220	95% KM Approximate Gamma UCL
	Metals	Arsenic	mg/kg	104	104	100	1.18	59.3	12.58	7.492	N/A	N/A	15.79	95% Chebyshev (Mean, Sd) UCL
	Metals	Cadmium	mg/kg	104	104	100	0.0858	7.18	1.215	1.492	N/A	N/A	1.471	95% H-UCL
	Metals	Chromium	mg/kg	104	104	100	9.1	691	116.6	116.6	N/A	N/A	137.3	95% H-UCL
	Metals	Copper	mg/kg	104	104	100	8.85	466	96.43	79.53	N/A	N/A	109.9	95% Approximate Gamma UCL
	Metals	Lead	mg/kg	104	104	100	9.17	1410	116.2	162.5	N/A	N/A	137.2	95% H-UCL
	Metals	Mercury	ng/g	104	104	100	54.6	10400	1605	1663	N/A	N/A	1873	95% Approximate Gamma UCL
	Metals	Methylmercury	ng/g	104	104	100	0.065	4.43	0.928	0.782	N/A	N/A	1.054	95% Approximate Gamma UCL
	Metals	Nickel	mg/kg	104	104	100	5.45	171	32.65	23.75	N/A	N/A	36.11	95% Approximate Gamma UCL
	Metals	Selenium	mg/kg	104	103	99	0.121	1.49	0.658	0.344	0.484	0.484	0.717	95% GROS Approximate Gamma UCL
	Metals	Silver	mg/kg	104	104	100	0.0687	5.58	1.374	1.172	N/A	N/A	1.593	95% Approximate Gamma UCL
	Metals	Zinc	mg/kg	104	104	100	25.1	976	205	158.4	N/A	N/A	229.5	95% Approximate Gamma UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	50	50	100	0.12	261	53.81	49.63	N/A	N/A	84.4	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	50	50	100	0.322	321	90.42	65.88	N/A	N/A	106	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	50	50	100	0.347	321	90.5	65.86	N/A	N/A	106.1	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	50	50	100	0.372	321	90.59	65.84	N/A	N/A	106.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	50	50	100	0.223	295	74.16	59.01	N/A	N/A	88.15	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	50	50	100	0.247	295	74.23	58.98	N/A	N/A	88.21	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	50	50	100	0.272	296	74.31	59.03	N/A	N/A	88.3	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	50	50	100	0.223	296	75.29	59.47	N/A	N/A	89.4	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	50	50	100	0.248	297	75.39	59.53	N/A	N/A	89.51	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	50	50	100	0.273	297	75.48	59.52	N/A	N/A	89.59	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	50	50	100	2480	1400000	352668	296414	N/A	N/A	422948	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	50	50	100	20500	1400000	359065	293411	N/A	N/A	428633	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	50	50	100	11500	1400000	355809	294901	N/A	N/A	425730	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	50	49	98	0.000668	775	124.1	132.9	10.2	10.2	242.7	97.5% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	50	49	98	21.4	776	136.5	128.4	10.2	10.2	173.4	95% KM Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	50	49	98	11.5	776	130.4	130.5	10.2	10.2	168.4	95% KM Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	50	49	98	0.000334	2.71	0.615	0.577	0.51	0.51	0.781	95% KM Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	50	49	98	0.357	2.72	0.921	0.465	0.51	0.51	1.033	95% KM (t) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	50	49	98	0.276	2.72	0.769	0.495	0.51	0.51	0.893	95% GROS Approximate Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	50	49	98	0.002	23.2	6.272	6.715	10.2	10.2	12.28	97.5% KM (Chebyshev) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	50	49	98	7.32	30.9	15.07	5.821	10.2	10.2	16.23	KM Student's t
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	50	50	100	0.322	874	214.4	171.9	N/A	N/A	255.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	50	50	100	13.2	874	221	169.1	N/A	N/A	261	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	50	50	100	24.3	874	227.4	166.4	N/A	N/A	266.8	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	50	50	100	0.223	297	74.78	59.41	N/A	N/A	88.86	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	50	50	100	0.538	297	75.02	59.32	N/A	N/A	89.08	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	50	50	100	0.853	297	75.28	59.25	N/A	N/A	89.33	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	50	50	100	0.223	315	81.52	63.53	N/A	N/A	96.58	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	50	50	100	6.91	317	86.1	62.25	N/A	N/A	100.9	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	50	50	100	13.6	320	90.64	61.09	N/A	N/A	105.1	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	50	49	98	5.77	24.6	10.7	5.281	10.2	10.2	11.92	KM H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	50	50	100	120	470000	45251	73959	N/A	N/A	90843	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	50	50	100	130	470000	45312	73936	N/A	N/A	90889	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	50	50	100	130	470000	45287	73948	N/A	N/A	90871	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	49	46	94	38.8	18833	7471	4800	39.7	50.3	8633	95% KM (t) UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	49	46	94	279.4	18912	7626	4809	39.7	50.3	8791	95% KM (t) UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	49	46	94	159.1	18873	7548	4804	39.7	50.3	8712	95% KM (t) UCL
	Pesticides	Dieldrin	pg/g	49	47	96	44.5	15400	1343	2176	39.7	50.3	2712	95% KM (Chebyshev) UCL
	Pesticides	Hexachlorobenzene	pg/g	49	49	100	13.2	6650	1001	1143	N/A	N/A	1712	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	50	49	98	37	46000	7952	8423	41	41	13198	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	50	49	98	45	46000	7958	8418	41	41	13201	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	50	49	98	41	46000	7955	8420	41	41	13200	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	50	48	96	5.2	12000	1156	1876	40	41	2325	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	50	48	96	5.2	12000	1178	1868	40	41	2342	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	50	48	96	5.2	12000	1167	1872	40	41	2333	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	50	49	98	37	51000	9082	10081	41	41	15361	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1)	µg/kg	50	49	98	50	51000	9120	10058	41	41	15384	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	50	49	98	46	51000	9102	10069	41	41	15373	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	50	50	100	1.8	85.4	17.3	15.94	N/A	N/A	27.12	95% Chebyshev (Mean, Sd) UCL
	Metals	Cadmium	mg/kg	50	48	96	0.234	3.65	1.046	0.737	0.0867	0.103	1.362	KM H-UCL
	Metals	Chromium	mg/kg	50	50	100	3.95	280	104	53.78	N/A	N/A	137.2	95% Chebyshev (Mean, Sd) UCL
	Metals	Copper	mg/kg	50	50	100	1.5	319	112.3	71.33	N/A	N/A	156.3	95% Chebyshev (Mean, Sd) UCL
	Metals	Lead	mg/kg	50	50	100	2.18	441	125.8	72.42	N/A	N/A	170.4	95% Chebyshev (Mean, Sd) UCL
	Metals	Mercury	ng/g	50	50	100	5.11	9440	1805	1600	N/A	N/A	2791	95% Chebyshev (Mean, Sd) UCL
	Metals	Methylmercury	ng/g	50	49	98	0.027	4.8	1.021	0.809	0.058	0.058	1.247	95% KM Approximate Gamma UCL
	Metals	Nickel	mg/kg	50	50	100	3.83	182	44.66	27.87	N/A	N/A	61.84	95% Chebyshev (Mean, Sd) UCL
	Metals	Selenium	mg/kg	50	48	96	0.192	3.74	0.769	0.53	0.347	0.412	1.099	95% KM (Chebyshev) UCL
	Metals	Silver	mg/kg	50	49	98	0.0448	4.32	1.756	0.978	0.103	0.103	1.99	95% KM (t) UCL
	Metals	Zinc	mg/kg	50	50	100	8.18	551	223.3	97.77	N/A	N/A	283.5	95% Chebyshev (Mean, Sd) UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	90	90	100	0.434	833	76.69	132	N/A	N/A	99.11	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	90	90	100	1.61	1020	120.4	167.7	N/A	N/A	150	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	90	90	100	1.9	1020	120.6	167.7	N/A	N/A	149.8	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	90	90	100	1.9	1020	120.9	167.6	N/A	N/A	149.8	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	90	90	100	0.995	948	100.3	152.6	N/A	N/A	126.4	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	90	90	100	1.5	949	100.5	152.6	N/A	N/A	126.3	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	90	90	100	1.5	949	100.8	152.5	N/A	N/A	126.3	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	90	90	100	1.05	972	103.3	156.7	N/A	N/A	130	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	90	90	100	1.9	972	103.5	156.6	N/A	N/A	129.8	95% Approximate Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	90	90	100	1.9	972	103.7	156.6	N/A	N/A	129.9	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	90	90	100	5320	4370000	630059	828308	N/A	N/A	787424	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	90	90	100	20500	4380000	637036	827529	N/A	N/A	787587	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	90	90	100	12900	4380000	633504	827884	N/A	N/A	786920	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	90	90	100	1.46	2440	201.3	319.1	N/A	N/A	254.9	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	90	90	100	20.6	2440	217	316.9	N/A	N/A	279	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	90	90	100	11.1	2440	209.1	317.9	N/A	N/A	304.3	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	90	90	100	0.00391	11.7	0.87	1.468	N/A	N/A	1.122	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	90	90	100	0.404	11.7	1.342	1.464	N/A	N/A	2.015	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	90	90	100	0.27	11.7	1.106	1.443	N/A	N/A	1.769	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	90	90	100	0.0089	121	7.085	14.95	N/A	N/A	13.96	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	90	90	100	7.12	125	19.45	16.41	N/A	N/A	26.99	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	90	90	100	5.64	123	13.27	14.56	N/A	N/A	19.96	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	90	90	100	3.36	2490	321.7	424.9	N/A	N/A	401.7	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	90	90	100	13	2490	329.8	424.2	N/A	N/A	404.3	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	90	90	100	22.5	2490	337.9	423.6	N/A	N/A	409.1	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	90	90	100	1	951	101.2	153.1	N/A	N/A	127.5	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	90	90	100	1.77	952	101.6	153.1	N/A	N/A	127.3	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	90	90	100	2.04	954	102.1	153.1	N/A	N/A	127.4	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	90	90	100	1.07	979	110.3	159.3	N/A	N/A	138.7	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	90	90	100	8.13	1010	116.7	160.8	N/A	N/A	142.2	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	90	90	100	14.3	1050	123.2	163	N/A	N/A	154.2	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	90	90	100	1000	2600000	291876	458337	N/A	N/A	845456	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	90	90	100	1100	2600000	291899	458322	N/A	N/A	829483	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	90	90	100	1100	2600000	291883	458332	N/A	N/A	835637	95% H-UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	90	88	98	104.9	39440	7607	7705	53.1	55.8	9176	95% KM Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	90	88	98	407.3	41012	8114	7932	53.1	55.8	9722	95% KM Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	90	88	98	256.1	40226	7860	7813	53.1	55.8	9448	95% KM Approximate Gamma UCL
	Pesticides	Dieldrin	pg/g	90	84	93	39.4	37400	2278	4770	47.7	85.4	4202	KM H-UCL
	Pesticides	Hexachlorobenzene	pg/g	90	90	100	38.4	46200	5482	9648	N/A	N/A	15324	95% H-UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	90	90	100	67	100000	12008	15830	N/A	N/A	14753	95% Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	90	90	100	240	100000	12123	15783	N/A	N/A	14759	95% Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	90	90	100	150	100000	12068	15798	N/A	N/A	14734	95% Approximate Gamma UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	90	87	97	7.4	17000	1774	3000	35	1400	3161	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	90	87	97	200	17000	1831	3018	35	1400	3226	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	90	87	97	110	17000	1797	2989	35	1400	3179	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	90	90	100	67	110000	13770	18470	N/A	N/A	16965	95% Approximate Gamma UCL
	PAHs	Total PAH (ND=1)	µg/kg	90	90	100	490	110000	14053	18407	N/A	N/A	17037	95% Approximate Gamma UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	90	90	100	280	110000	13903	18409	N/A	N/A	16935	95% Approximate Gamma UCL
	Metals	Arsenic	mg/kg	90	90	100	2.26	115	25.83	22.31	N/A	N/A	29.75	95% Approximate Gamma UCL
	Metals	Cadmium	mg/kg	90	90	100	0.0592	24.6	3.743	4.82	N/A	N/A	4.642	95% Approximate Gamma UCL
	Metals	Chromium	mg/kg	90	90	100	10.6	777	145.1	143	N/A	N/A	170.1	95% Approximate Gamma UCL
	Metals	Copper	mg/kg	90	90	100	8.9	924	236.8	207.3	N/A	N/A	282.3	95% Approximate Gamma UCL
	Metals	Lead	mg/kg	90	90	100	12.8	2190	253.2	302.6	N/A	N/A	303.2	95% Approximate Gamma UCL
	Metals	Mercury	ng/g	90	90	100	34.2	22100	3629	3973	N/A	N/A	4436	95% Approximate Gamma UCL
	Metals	Methylmercury	ng/g	90	90	100	0.056	11.9	1.297	1.547	N/A	N/A	1.537	95% Approximate Gamma UCL
	Metals	Nickel	mg/kg	90	90	100	8.31	282	47.83	33.97	N/A	N/A	54.53	95% H-UCL
	Metals	Selenium	mg/kg	89	89	100	0.0939	7.58	1.626	1.623	N/A	N/A	1.927	95% Approximate Gamma UCL
	Metals	Silver	mg/kg	90	90	100	0.0645	12	2.394	2.22	N/A	N/A	2.869	95% Approximate Gamma UCL
	Metals	Zinc	mg/kg	90	90	100	30.1	6810	462.1	771.3	N/A	N/A	554.2	95% H-UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North Mudflat Only	Dioxins/Furans	2378-TCDD	ng/kg	13	13	100	2.18	137	57.24	46.46	N/A	N/A	80.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	13	13	100	4.18	242	95.48	78.68	N/A	N/A	134.4	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	13	13	100	4.57	242	95.68	78.7	N/A	N/A	134.6	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	13	13	100	4.97	242	95.74	78.64	N/A	N/A	134.6	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	13	13	100	3.2	208	82.05	68.45	N/A	N/A	115.9	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	13	13	100	4.71	208	82.19	68.29	N/A	N/A	115.9	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	13	13	100	6.23	208	82.48	68.24	N/A	N/A	116.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	13	13	100	3.25	200	81.64	67.91	N/A	N/A	115.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	13	13	100	3.77	200	81.78	67.93	N/A	N/A	115.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	13	13	100	4.3	200	81.92	67.89	N/A	N/A	115.5	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	13	13	100	23400	1200000	327131	346346	N/A	N/A	623875	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	13	13	100	33900	1210000	334162	346445	N/A	N/A	618877	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	13	13	100	28700	1210000	330915	347418	N/A	N/A	621682	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	13	13	100	3.6	275	79.93	80.52	N/A	N/A	119.7	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	13	13	100	25.1	275	97.21	76.24	N/A	N/A	134.9	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	13	13	100	14.4	275	88.61	78.35	N/A	N/A	127.3	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	13	13	100	0.0121	1.4	0.463	0.499	N/A	N/A	1.033	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	13	13	100	0.502	1.77	0.867	0.413	N/A	N/A	1.071	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	13	13	100	0.272	1.46	0.666	0.435	N/A	N/A	0.961	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	13	13	100	0.0373	21	4.982	6.747	N/A	N/A	14.76	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	13	13	100	10.3	27.4	15.83	5.328	N/A	N/A	19.03	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	13	13	100	5.53	24.2	10.4	5.34	N/A	N/A	13.04	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	13	13	100	7.77	361	175.6	125.5	N/A	N/A	237.6	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	13	13	100	18.9	371	184.2	124.1	N/A	N/A	245.5	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	13	13	100	30.1	382	192.9	122.9	N/A	N/A	253.7	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	13	13	100	3.21	208	82.48	68.57	N/A	N/A	116.4	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	13	13	100	5.02	208	82.81	68.33	N/A	N/A	116.6	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	13	13	100	6.84	209	83.3	68.34	N/A	N/A	117.1	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	13	13	100	3.29	207	86.61	71.63	N/A	N/A	122	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	13	13	100	10.8	209	92.14	70.72	N/A	N/A	127.1	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	13	13	100	18.3	211	97.68	69.97	N/A	N/A	132.3	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	13	13	100	1600	390000	57069	101829	N/A	N/A	126922	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	13	13	100	1700	390000	57100	101812	N/A	N/A	126550	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	13	13	100	1600	390000	57085	101821	N/A	N/A	126842	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	13	13	100	633.8	20565	7565	6568	N/A	N/A	10812	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	13	13	100	835.8	20781	7967	6367	N/A	N/A	11114	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	13	13	100	734.8	20673	7766	6462	N/A	N/A	10961	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	13	11	85	119	1850	868.8	524.1	1020	1560	1150	95% KM (t) UCL
	Pesticides	Hexachlorobenzene	pg/g	13	13	100	42.1	2250	1120	769.9	N/A	N/A	1501	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	13	12	92	2300	12000	4996	3025	45	45	6557	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	13	12	92	2300	12000	4996	3025	45	45	6557	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	13	12	92	2300	12000	4996	3025	45	45	6557	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	13	12	92	210	1900	611.9	529.4	45	45	1090	95% KM Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	13	12	92	320	1900	650.4	508.9	45	45	1091	95% KM Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	13	12	92	270	1900	631.2	518.7	45	45	1089	95% KM Adjusted Gamma UCL
	PAHs	Total PAH (ND=0)	µg/kg	13	12	92	2600	13000	5565	3370	45	45	7305	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	13	12	92	2600	13000	5603	3360	45	45	7338	95% KM (t) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	13	12	92	2600	13000	5580	3370	45	45	7320	95% KM (t) UCL
	Metals	Arsenic	mg/kg	13	13	100	1.18	15.4	9.012	3.886	N/A	N/A	10.93	95% Student's-t UCL
	Metals	Cadmium	mg/kg	13	13	100	0.0858	2.52	0.93	0.673	N/A	N/A	1.263	95% Student's-t UCL
	Metals	Chromium	mg/kg	13	13	100	9.1	121	70.58	33.98	N/A	N/A	87.37	95% Student's-t UCL
	Metals	Copper	mg/kg	13	13	100	9.14	163	91.14	48.48	N/A	N/A	115.1	95% Student's-t UCL
	Metals	Lead	mg/kg	13	13	100	10.6	254	101.9	69.54	N/A	N/A	136.3	95% Student's-t UCL
	Metals	Mercury	ng/g	13	13	100	54.6	3700	1279	1100	N/A	N/A	1823	95% Student's-t UCL
	Metals	Methylmercury	ng/g	13	13	100	0.065	4.43	1.073	1.266	N/A	N/A	2.27	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	13	13	100	5.89	55.4	27.61	16.24	N/A	N/A	35.64	95% Student's-t UCL
	Metals	Selenium	mg/kg	13	12	92	0.175	1.14	0.529	0.265	0.484	0.484	0.667	95% KM (t) UCL
	Metals	Silver	mg/kg	13	13	100	0.0759	2.12	1.123	0.701	N/A	N/A	1.47	95% Student's-t UCL
	Metals	Zinc	mg/kg	13	13	100	35.2	346	197.2	81.59	N/A	N/A	237.6	95% Student's-t UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast Mudflat Only	Dioxins/Furans	2378-TCDD	ng/kg	3	3	100	3.79	90.7	32.81	50.14	N/A	N/A	90.7	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	3	3	100	8.53	128	49.54	67.97	N/A	N/A	128	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	3	3	100	8.78	128	49.73	67.81	N/A	N/A	128	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	3	3	100	9.03	128	49.88	67.68	N/A	N/A	128	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	3	3	100	6.5	113	42.14	61.37	N/A	N/A	113	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	3	3	100	6.75	113	42.31	61.22	N/A	N/A	113	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	3	3	100	7	113	42.47	61.08	N/A	N/A	113	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	3	3	100	6.96	114	42.66	61.78	N/A	N/A	114	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	3	3	100	7.21	114	42.83	61.64	N/A	N/A	114	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	3	3	100	7.46	114	42.99	61.49	N/A	N/A	114	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	6.28	10.6	8.18	2.206	N/A	N/A	10.6	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	3	3	100	42400	968000	353500	532187	N/A	N/A	968000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	3	3	100	50500	972000	360867	529279	N/A	N/A	972000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	3	3	100	46400	970000	357167	530747	N/A	N/A	970000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	3	3	100	7.45	282	99.34	158.2	N/A	N/A	282	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	3	3	100	26.6	294	117.5	152.9	N/A	N/A	294	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	17	288	108.4	155.5	N/A	N/A	288	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	3	3	100	0.0216	0.92	0.324	0.516	N/A	N/A	0.92	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	3	3	100	0.553	1.55	0.926	0.544	N/A	N/A	1.55	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	0.287	1.24	0.627	0.532	N/A	N/A	1.24	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	0.0557	2.52	0.892	1.41	N/A	N/A	2.52	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	12.5	18.8	15.5	3.161	N/A	N/A	18.8	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	3	3	100	17.1	410	148.9	226.1	N/A	N/A	410	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	29	416	158.1	223.3	N/A	N/A	416	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	3	3	100	39.3	423	167.7	221.1	N/A	N/A	423	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	3	3	100	6.53	114	42.49	61.93	N/A	N/A	114	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	7.1	114	42.85	61.62	N/A	N/A	114	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	3	3	100	7.67	115	43.55	61.88	N/A	N/A	115	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	7.06	117	43.71	63.47	N/A	N/A	117	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	13.5	125	51.13	63.97	N/A	N/A	125	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	20	133	58.57	64.48	N/A	N/A	133	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	3	3	100	7000	150000	55667	81709	N/A	N/A	150000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	3	3	100	7000	150000	55667	81709	N/A	N/A	150000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	3	3	100	7000	150000	55667	81709	N/A	N/A	150000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	3	3	100	9242	18450	14830	4909	N/A	N/A	18450	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	3	3	100	9456	18751	15002	4901	N/A	N/A	18751	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	3	3	100	9349	18601	14916	4905	N/A	N/A	18601	Maximum detected value
	Pesticides	Dieldrin	pg/g	3	3	100	413	15400	5604	8488	N/A	N/A	15400	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	3	3	100	201	6650	2383	3696	N/A	N/A	6650	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	3	3	100	870	10000	3950	5240	N/A	N/A	10000	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	3	3	100	870	10000	3950	5240	N/A	N/A	10000	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	3	3	100	870	10000	3950	5240	N/A	N/A	10000	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	3	3	100	69	2900	1030	1620	N/A	N/A	2900	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	3	3	100	200	2900	1133	1531	N/A	N/A	2900	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	3	3	100	140	2900	1083	1574	N/A	N/A	2900	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	3	3	100	990	13000	4997	6931	N/A	N/A	13000	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	3	3	100	1200	13000	5133	6813	N/A	N/A	13000	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	3	3	100	1100	13000	5067	6870	N/A	N/A	13000	Maximum detected value
	Metals	Arsenic	mg/kg	3	3	100	6.4	13.3	9.24	3.608	N/A	N/A	13.3	Maximum detected value
	Metals	Cadmium	mg/kg	3	3	100	0.234	2.19	0.98	1.058	N/A	N/A	2.19	Maximum detected value
	Metals	Chromium	mg/kg	3	3	100	27.1	165	102.7	69.91	N/A	N/A	165	Maximum detected value
	Metals	Copper	mg/kg	3	3	100	25.8	102	54.87	41.19	N/A	N/A	102	Maximum detected value
	Metals	Lead	mg/kg	3	3	100	41.7	110	72.13	34.75	N/A	N/A	110	Maximum detected value
	Metals	Mercury	ng/g	3	3	100	401	1980	1390	862	N/A	N/A	1980	Maximum detected value
	Metals	Methylmercury	ng/g	3	3	100	0.204	0.503	0.324	0.158	N/A	N/A	0.503	Maximum detected value
	Metals	Nickel	mg/kg	3	3	100	13.2	33.9	20.93	11.3	N/A	N/A	33.9	Maximum detected value
	Metals	Selenium	mg/kg	3	3	100	0.192	0.641	0.351	0.252	N/A	N/A	0.641	Maximum detected value
	Metals	Silver	mg/kg	3	3	100	0.206	1.57	0.672	0.778	N/A	N/A	1.57	Maximum detected value
	Metals	Zinc	mg/kg	3	3	100	70.3	231	137.1	83.71	N/A	N/A	231	Maximum detected value

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest Mudflat Only	Dioxins/Furans	2378-TCDD	ng/kg	5	5	100	6.12	271	83.96	108.3	N/A	N/A	271	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	5	5	100	17.1	417	151.5	156.9	N/A	N/A	417	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	5	5	100	17.4	417	151.6	156.8	N/A	N/A	417	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	5	5	100	17.6	418	151.9	157.1	N/A	N/A	418	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	5	5	100	12.3	346	119.4	132.4	N/A	N/A	346	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	5	5	100	12.6	346	119.5	132.3	N/A	N/A	346	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	5	5	100	12.8	347	119.8	132.7	N/A	N/A	347	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	5	5	100	12.9	353	122.5	134.6	N/A	N/A	353	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	5	5	100	13.2	353	122.6	134.5	N/A	N/A	353	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	5	5	100	13.4	354	122.9	134.9	N/A	N/A	354	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	5	5	100	100000	2380000	720200	950793	N/A	N/A	2380000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	5	5	100	122000	2380000	729200	945106	N/A	N/A	2380000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	5	5	100	111000	2380000	724800	947870	N/A	N/A	2380000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	5	5	100	17.4	597	171.8	244.4	N/A	N/A	597	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	5	5	100	67.2	597	193.4	229.2	N/A	N/A	597	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	5	5	100	42.7	597	182.6	236.6	N/A	N/A	597	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	5	5	100	0.061	3.73	1.092	1.577	N/A	N/A	3.73	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	5	5	100	0.675	3.74	1.691	1.187	N/A	N/A	3.74	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	5	5	100	0.404	3.74	1.394	1.363	N/A	N/A	3.74	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	5	5	100	0.195	41.4	12.48	18.27	N/A	N/A	41.4	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	5	5	100	13.1	46.9	28.54	12.48	N/A	N/A	46.9	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	5	5	100	6.69	44.1	20.5	14.4	N/A	N/A	44.1	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	5	5	100	34.5	1010	322.4	397	N/A	N/A	1010	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	5	5	100	60.1	1010	333.6	388.7	N/A	N/A	1010	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	5	5	100	85.7	1010	344.1	380.9	N/A	N/A	1010	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	5	5	100	12.4	350	120.5	134.1	N/A	N/A	350	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	5	5	100	13.3	350	121	133.7	N/A	N/A	350	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	5	5	100	14.3	350	121.4	133.4	N/A	N/A	350	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	5	5	100	13.1	395	135.1	151.8	N/A	N/A	395	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	5	5	100	29.8	398	143.1	147.5	N/A	N/A	398	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	5	5	100	46.5	401	151.5	143.4	N/A	N/A	401	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	5	5	100	63000	540000	250600	202279	N/A	N/A	540000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	5	5	100	63000	540000	250600	202279	N/A	N/A	540000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	5	5	100	63000	540000	250600	202279	N/A	N/A	540000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	5	5	100	4207	31330	14484	10120	N/A	N/A	31330	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	5	5	100	4367	35229	15490	11658	N/A	N/A	35229	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	5	5	100	4287	33279	14987	10886	N/A	N/A	33279	Maximum detected value
	Pesticides	Dieldrin	pg/g	5	5	100	628	20900	6078	8379	N/A	N/A	20900	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	5	5	100	867	24800	6627	10245	N/A	N/A	24800	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	5	5	100	4200	70000	22800	27996	N/A	N/A	70000	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	5	5	100	4200	70000	22800	27996	N/A	N/A	70000	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	5	5	100	4200	70000	22800	27996	N/A	N/A	70000	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	5	5	100	380	17000	5426	7281	N/A	N/A	17000	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	5	5	100	530	17000	5474	7239	N/A	N/A	17000	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	5	5	100	460	17000	5450	7260	N/A	N/A	17000	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	5	5	100	4600	87000	28360	35262	N/A	N/A	87000	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	5	5	100	4700	87000	28400	35228	N/A	N/A	87000	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	5	5	100	4700	87000	28400	35228	N/A	N/A	87000	Maximum detected value
	Metals	Arsenic	mg/kg	5	5	100	11.2	115	48.54	43.38	N/A	N/A	115	Maximum detected value
	Metals	Cadmium	mg/kg	5	5	100	0.432	13.7	4.458	5.273	N/A	N/A	13.7	Maximum detected value
	Metals	Chromium	mg/kg	5	5	100	41.4	276	143.1	85.04	N/A	N/A	276	Maximum detected value
	Metals	Copper	mg/kg	5	5	100	76.7	443	297.7	159.9	N/A	N/A	443	Maximum detected value
	Metals	Lead	mg/kg	5	5	100	66.5	2190	793.1	889.4	N/A	N/A	2190	Maximum detected value
	Metals	Mercury	ng/g	5	5	100	386	7390	2895	2665	N/A	N/A	7390	Maximum detected value
	Metals	Methylmercury	ng/g	5	5	100	0.485	11.9	4.139	4.654	N/A	N/A	11.9	Maximum detected value
	Metals	Nickel	mg/kg	5	5	100	39.5	124	74.14	37.4	N/A	N/A	124	Maximum detected value
	Metals	Selenium	mg/kg	5	5	100	0.725	3	1.747	0.971	N/A	N/A	3	Maximum detected value
	Metals	Silver	mg/kg	5	5	100	0.228	5.8	2.41	2.091	N/A	N/A	5.8	Maximum detected value
	Metals	Zinc	mg/kg	5	5	100	257	6810	2105	2775	N/A	N/A	6810	Maximum detected value

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North All Shorelines Only	Dioxins/Furans	2378-TCDD	ng/kg	21	21	100	2.18	137	57.45	43.32	N/A	N/A	73.76	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	21	21	100	4.18	242	96.1	74.28	N/A	N/A	124.1	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	21	21	100	4.57	242	96.22	74.29	N/A	N/A	124.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	21	21	100	4.97	242	96.33	74.35	N/A	N/A	124.3	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	21	21	100	3.2	208	81.96	63.89	N/A	N/A	106	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	21	21	100	4.71	208	82.12	63.87	N/A	N/A	106.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	21	21	100	6.23	208	82.3	63.84	N/A	N/A	106.3	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	21	21	100	3.25	200	81.74	63.43	N/A	N/A	105.6	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	21	21	100	3.77	200	81.88	63.49	N/A	N/A	105.8	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	21	21	100	4.3	200	81.99	63.48	N/A	N/A	105.9	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	21	21	100	23400	1200000	296171	292720	N/A	N/A	447146	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	21	21	100	33900	1210000	303200	292919	N/A	N/A	449517	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	21	21	100	28700	1210000	299838	293590	N/A	N/A	448498	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	21	21	100	3.6	275	75.08	69.28	N/A	N/A	101.2	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	21	21	100	25.1	275	94.45	67.81	N/A	N/A	126.8	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	14.4	275	84.77	68.4	N/A	N/A	110.5	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	21	21	100	0.0121	1.4	0.384	0.42	N/A	N/A	0.641	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	21	21	100	0.502	1.77	0.891	0.41	N/A	N/A	1.045	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	0.272	1.46	0.638	0.379	N/A	N/A	0.811	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	0.0373	21	3.71	5.803	N/A	N/A	9.23	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	10.3	30	16.69	6.145	N/A	N/A	19	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	5.53	24.2	10.2	4.72	N/A	N/A	11.98	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	21	21	100	7.77	361	171.2	120.4	N/A	N/A	216.6	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	18.9	371	180.8	120.4	N/A	N/A	226.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	21	21	100	30.1	382	190.7	120.6	N/A	N/A	236.1	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	21	21	100	3.21	208	82.34	64.03	N/A	N/A	106.4	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	5.02	208	82.65	63.89	N/A	N/A	106.7	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	21	21	100	6.84	209	83.15	64.01	N/A	N/A	107.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	3.29	207	85.46	65.87	N/A	N/A	110.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	10.8	209	92.05	66.34	N/A	N/A	117	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	18.3	211	98.67	67.02	N/A	N/A	123.9	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	21	21	100	1600	390000	46148	80775	N/A	N/A	122980	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	21	21	100	1700	390000	46233	80741	N/A	N/A	123033	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	21	21	100	1600	390000	46167	80765	N/A	N/A	122990	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	21	21	100	633.8	20565	7826	6627	N/A	N/A	10320	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	21	21	100	835.8	20781	8206	6419	N/A	N/A	11736	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	21	21	100	734.8	20673	8016	6519	N/A	N/A	10469	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	21	19	90	119	2020	933.9	577	1020	1560	1160	95% KM (t) UCL
	Pesticides	Hexachlorobenzene	pg/g	21	21	100	42.1	2250	1047	697.7	N/A	N/A	1310	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	21	20	95	1100	12000	5193	3120	45	45	6397	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	21	20	95	1100	12000	5193	3120	45	45	6397	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	21	20	95	1100	12000	5193	3120	45	45	6397	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	21	20	95	90	1900	595	470	45	45	776.5	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	21	20	95	160	1900	628.3	450.1	45	45	867.2	95% KM Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	21	20	95	130	1900	612.1	459.3	45	45	789.5	95% KM (t) UCL
	PAHs	Total PAH (ND=0)	µg/kg	21	20	95	1100	13000	5769	3517	45	45	7127	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	21	20	95	1200	13000	5809	3497	45	45	7160	95% KM (t) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	21	20	95	1200	13000	5793	3505	45	45	7582	95% KM Adjusted Gamma UCL
	Metals	Arsenic	mg/kg	21	21	100	1.18	15.4	8.72	3.846	N/A	N/A	10.17	95% Student's-t UCL
	Metals	Cadmium	mg/kg	21	21	100	0.0858	2.52	0.888	0.578	N/A	N/A	1.106	95% Student's-t UCL
	Metals	Chromium	mg/kg	21	21	100	9.1	182	78.15	40.33	N/A	N/A	93.33	95% Student's-t UCL
	Metals	Copper	mg/kg	21	21	100	9.14	163	87.02	46.63	N/A	N/A	104.6	95% Student's-t UCL
	Metals	Lead	mg/kg	21	21	100	10.6	254	97.18	60.61	N/A	N/A	120	95% Student's-t UCL
	Metals	Mercury	ng/g	21	21	100	54.6	3700	1276	941.4	N/A	N/A	1815	95% Adjusted Gamma UCL
	Metals	Methylmercury	ng/g	21	21	100	0.065	4.43	1.397	1.35	N/A	N/A	2.243	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	21	21	100	5.89	58	27.93	15.37	N/A	N/A	33.72	95% Student's-t UCL
	Metals	Selenium	mg/kg	21	20	95	0.148	1.29	0.574	0.295	0.484	0.484	0.688	95% KM (t) UCL
	Metals	Silver	mg/kg	21	21	100	0.0759	2.37	1.175	0.734	N/A	N/A	1.451	95% Student's-t UCL
	Metals	Zinc	mg/kg	21	21	100	35.2	353	192.6	85.04	N/A	N/A	224.6	95% Student's-t UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast All Shorelines Only	Dioxins/Furans	2378-TCDD	ng/kg	14	14	100	2.53	261	48.93	67.56	N/A	N/A	103.3	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	14	14	100	8.53	321	78.35	81.67	N/A	N/A	117	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	14	14	100	8.78	321	78.46	81.59	N/A	N/A	117.1	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	14	14	100	9.03	321	78.57	81.53	N/A	N/A	117.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	14	14	100	6.5	295	64.91	75.7	N/A	N/A	122.5	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	14	14	100	6.75	295	65.03	75.63	N/A	N/A	122.2	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	14	14	100	7	296	65.2	75.81	N/A	N/A	122.2	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	14	14	100	6.96	296	65.63	76.03	N/A	N/A	123.7	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	14	14	100	7.21	297	65.79	76.2	N/A	N/A	123.6	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	14	14	100	7.46	297	65.98	76.18	N/A	N/A	123.6	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	14	14	100	30300	1400000	385393	389683	N/A	N/A	724795	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	14	14	100	48400	1400000	392014	386888	N/A	N/A	711346	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	14	14	100	39300	1400000	388729	388310	N/A	N/A	717338	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	14	14	100	7.3	282	90.59	83.23	N/A	N/A	130	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	14	14	100	26.6	294	108.8	81	N/A	N/A	147.1	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	14	14	100	17	288	99.71	82.03	N/A	N/A	138.5	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	14	14	100	0.0213	1.36	0.505	0.5	N/A	N/A	1.062	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	14	14	100	0.357	1.76	1.02	0.428	N/A	N/A	1.222	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	14	14	100	0.28	1.39	0.763	0.435	N/A	N/A	0.969	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	14	14	100	0.0553	19.8	4.935	7.372	N/A	N/A	13.65	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	14	14	100	8.28	25.4	18.15	5.336	N/A	N/A	20.67	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	14	14	100	5.77	21.9	11.54	5.388	N/A	N/A	14.09	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	14	14	100	17.1	511	168.8	152.9	N/A	N/A	241.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	14	14	100	29	518	178.2	151.6	N/A	N/A	249.9	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	14	14	100	39.3	525	187.3	150.4	N/A	N/A	258.5	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	14	14	100	6.53	297	65.45	76.24	N/A	N/A	123.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	14	14	100	7.1	297	65.79	76.08	N/A	N/A	123	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	14	14	100	7.67	297	66.2	75.97	N/A	N/A	122.7	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	14	14	100	7.06	315	70.64	81.53	N/A	N/A	109.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	14	14	100	13.5	317	77.33	80.07	N/A	N/A	133.2	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	14	14	100	20	320	84.19	79	N/A	N/A	121.6	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	14	14	100	2800	470000	85414	131840	N/A	N/A	186507	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	14	14	100	2900	470000	85493	131802	N/A	N/A	186349	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	14	14	100	2900	470000	85493	131802	N/A	N/A	186349	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	14	13	93	1977	18833	10191	6099	50.3	50.3	13196	95% KM (t) UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	14	13	93	2212	18912	10334	6104	50.3	50.3	13341	95% KM (t) UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	14	13	93	2095	18873	10263	6101	50.3	50.3	13269	95% KM (t) UCL
	Pesticides	Dieldrin	pg/g	14	13	93	413	15400	2286	3715	50.3	50.3	6981	KM H-UCL
	Pesticides	Hexachlorobenzene	pg/g	14	14	100	201	6650	1597	1761	N/A	N/A	2837	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	14	14	100	870	14000	5761	3521	N/A	N/A	7427	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	14	14	100	870	14000	5761	3521	N/A	N/A	7427	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	14	14	100	870	14000	5761	3521	N/A	N/A	7427	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	14	14	100	69	2900	898.5	803.7	N/A	N/A	1503	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	14	14	100	140	2900	912.9	790	N/A	N/A	1440	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	14	14	100	200	2900	926.4	778	N/A	N/A	1412	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=0)	µg/kg	14	14	100	990	16000	6628	4177	N/A	N/A	8605	95% Student's-t UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	14	14	100	1100	16000	6643	4155	N/A	N/A	8610	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	14	14	100	1200	16000	6657	4135	N/A	N/A	8614	95% Student's-t UCL
	Metals	Arsenic	mg/kg	14	14	100	5.59	55.6	15.22	13.81	N/A	N/A	22.74	95% H-UCL
	Metals	Cadmium	mg/kg	14	14	100	0.234	3.65	1.296	1.001	N/A	N/A	1.769	95% Student's-t UCL
	Metals	Chromium	mg/kg	14	14	100	27.1	280	106.1	73.41	N/A	N/A	140.9	95% Student's-t UCL
	Metals	Copper	mg/kg	14	14	100	25.8	319	122.8	97.98	N/A	N/A	193.1	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	14	14	100	41.7	441	144.6	106	N/A	N/A	208.9	95% Adjusted Gamma UCL
	Metals	Mercury	ng/g	14	14	100	171	3230	1462	1000	N/A	N/A	1935	95% Student's-t UCL
	Metals	Methylmercury	ng/g	14	14	100	0.153	2.3	1.136	0.722	N/A	N/A	1.478	95% Student's-t UCL
	Metals	Nickel	mg/kg	14	14	100	13.2	182	48.94	48.43	N/A	N/A	80.43	95% Adjusted Gamma UCL
	Metals	Selenium	mg/kg	14	14	100	0.192	3.74	0.837	0.901	N/A	N/A	1.357	95% Adjusted Gamma UCL
	Metals	Silver	mg/kg	14	14	100	0.206	4.32	1.556	1.278	N/A	N/A	2.16	95% Student's-t UCL
	Metals	Zinc	mg/kg	14	14	100	70.3	551	245	136.2	N/A	N/A	309.5	95% Student's-t UCL

Table C-1
Sediment (0-0.5 feet bss) EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest All Shorelines Only	Dioxins/Furans	2378-TCDD	ng/kg	16	16	100	1.76	271	41.02	66.11	N/A	N/A	82.97	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	16	16	100	5.14	417	81.81	103.9	N/A	N/A	153	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	16	16	100	5.14	417	81.89	103.9	N/A	N/A	153	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	16	16	100	5.14	418	82.01	104	N/A	N/A	153.2	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	16	16	100	3.45	346	61.8	85.15	N/A	N/A	117.8	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	16	16	100	3.45	346	61.88	85.11	N/A	N/A	117.9	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	16	16	100	3.45	347	62.06	85.36	N/A	N/A	118.2	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	16	16	100	3.56	353	63.54	86.68	N/A	N/A	120.4	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	16	16	100	3.56	353	63.67	86.7	N/A	N/A	120.5	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	16	16	100	3.56	354	63.8	86.9	N/A	N/A	120.7	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	16	16	100	30300	4000000	771275	1113383	N/A	N/A	1582428	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	16	16	100	40600	4000000	778584	1110664	N/A	N/A	1557565	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	16	16	100	35500	4000000	774634	1111582	N/A	N/A	1568078	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	16	16	100	5.74	2440	302.5	614.3	N/A	N/A	727.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	16	16	100	26.5	2440	317.7	607.5	N/A	N/A	979.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	16	16	100	17.3	2440	310.1	610.8	N/A	N/A	975.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	16	16	100	0.0163	11.7	1.497	2.973	N/A	N/A	3.794	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	16	16	100	0.536	11.7	1.96	2.779	N/A	N/A	3.064	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	16	16	100	0.281	11.7	1.729	2.871	N/A	N/A	4.858	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	16	16	100	0.0409	121	14.9	30.97	N/A	N/A	91.95	99% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	16	16	100	8.92	125	27.31	27.97	N/A	N/A	40.12	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	16	16	100	6.04	123	21.11	29.24	N/A	N/A	52.97	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	16	16	100	10.9	2490	384.4	643.4	N/A	N/A	842	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	16	16	100	22.8	2490	392.2	639.4	N/A	N/A	808.4	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	16	16	100	32	2490	399.8	635.6	N/A	N/A	789.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	16	16	100	3.47	350	63.34	85.94	N/A	N/A	120.2	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	16	16	100	3.81	350	63.67	85.84	N/A	N/A	119.9	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	16	16	100	4.14	350	63.96	85.7	N/A	N/A	119.5	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	16	16	100	3.6	395	78.51	98.89	N/A	N/A	150.9	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	16	16	100	10.5	398	84.77	96.98	N/A	N/A	145.3	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	16	16	100	16.4	401	91.16	95.25	N/A	N/A	146.1	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	16	16	100	4900	540000	150281	153545	N/A	N/A	217574	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	16	16	100	4900	540000	150288	153539	N/A	N/A	217578	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	16	16	100	4900	540000	150281	153545	N/A	N/A	217574	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	16	16	100	591.5	31330	10692	8563	N/A	N/A	14444	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	16	16	100	872.1	35229	11261	9102	N/A	N/A	15251	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	16	16	100	777.5	33279	10976	8824	N/A	N/A	14844	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	16	16	100	106	20900	2664	5003	N/A	N/A	5527	95% Adjusted Gamma UCL
	Pesticides	Hexachlorobenzene	pg/g	16	16	100	168.5	24800	2882	5968	N/A	N/A	5965	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	16	16	100	660	70000	15664	18486	N/A	N/A	30204	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	16	16	100	660	70000	15664	18486	N/A	N/A	30204	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	16	16	100	660	70000	15664	18486	N/A	N/A	30204	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	16	16	100	41	17000	3219	4664	N/A	N/A	7275	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	16	16	100	155	17000	3250	4643	N/A	N/A	6836	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	16	16	100	220	17000	3282	4621	N/A	N/A	6614	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=0)	µg/kg	16	16	100	780	87000	18934	23115	N/A	N/A	37325	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	16	16	100	900	87000	18978	23081	N/A	N/A	36958	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=1)	µg/kg	16	16	100	1000	87000	18998	23065	N/A	N/A	36751	95% Adjusted Gamma UCL
	Metals	Arsenic	mg/kg	16	16	100	4.26	115	22.13	29.33	N/A	N/A	37.45	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	16	16	100	0.142	13.7	2.088	3.302	N/A	N/A	3.966	95% Adjusted Gamma UCL
	Metals	Chromium	mg/kg	16	16	100	18.1	276	87.69	67.27	N/A	N/A	117.2	95% Student's-t UCL
	Metals	Copper	mg/kg	16	16	100	14.5	619	224.4	181.8	N/A	N/A	304.1	95% Student's-t UCL
	Metals	Lead	mg/kg	16	16	100	26.1	2190	376.4	570.5	N/A	N/A	998.1	95% Chebyshev (Mean, Sd) UCL
	Metals	Mercury	ng/g	16	16	100	142	7390	1914	1963	N/A	N/A	2774	95% Student's-t UCL
	Metals	Methylmercury	ng/g	16	16	100	0.334	11.9	2.107	2.854	N/A	N/A	3.695	95% H-UCL
	Metals	Nickel	mg/kg	16	16	100	10.3	282	61.69	68.68	N/A	N/A	99.46	95% Adjusted Gamma UCL
	Metals	Selenium	mg/kg	15	15	100	0.141	3	1.098	0.853	N/A	N/A	1.486	95% Student's-t UCL
	Metals	Silver	mg/kg	16	16	100	0.117	5.8	1.472	1.522	N/A	N/A	2.54	95% Adjusted Gamma UCL
	Metals	Zinc	mg/kg	16	16	100	79.6	6810	971.9	1705	N/A	N/A	2830	95% Chebyshev (Mean, Sd) UCL

Table C-2
Fish < 15 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	39	39	100	3.62	83	19.49	17.93	N/A	N/A	24.82	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	39	39	100	5.7	98.7	25.56	21.31	N/A	N/A	33	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	39	39	100	5.72	98.7	26.18	21.12	N/A	N/A	32.34	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	39	39	100	5.74	98.8	26.81	21	N/A	N/A	32.96	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	39	39	100	4.68	88.5	21.77	19.46	N/A	N/A	29.32	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	39	39	100	4.7	88.5	22.56	19.14	N/A	N/A	29.41	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	39	39	100	4.72	88.6	23.35	18.87	N/A	N/A	28.85	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	39	39	100	4.48	87.7	21.34	19.06	N/A	N/A	28.6	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	39	39	100	4.5	87.7	21.9	18.88	N/A	N/A	27.46	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	39	39	100	4.52	87.8	22.46	18.76	N/A	N/A	27.98	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	39	39	100	114000	3370000	884987	665355	N/A	N/A	1107696	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	39	39	100	114000	3370000	885038	665339	N/A	N/A	1107750	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	39	39	100	114000	3370000	884987	665355	N/A	N/A	1107696	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	39	39	100	6.12	333	55.58	66.47	N/A	N/A	102	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	39	39	100	6.125	333	55.64	66.46	N/A	N/A	102	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	39	39	100	6.12	333	55.61	66.46	N/A	N/A	102	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	39	39	100	0.142	5.52	0.874	0.899	N/A	N/A	1.101	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	39	39	100	0.142	5.52	0.876	0.898	N/A	N/A	1.103	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	39	39	100	0.142	5.52	0.875	0.899	N/A	N/A	1.102	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	39	39	100	1.2	73.1	10.44	12.3	N/A	N/A	19.03	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	39	39	100	1.8	73.9	10.84	12.4	N/A	N/A	14.1	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	39	39	100	1.52	73.5	10.64	12.35	N/A	N/A	13.93	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	39	39	100	17.95	342	81.16	77.9	N/A	N/A	135.5	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	39	39	100	18.1	342	81.82	77.7	N/A	N/A	136	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	39	39	100	18.2	342	82.45	77.49	N/A	N/A	136.5	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	39	39	100	4.92	89.3	22.64	19.52	N/A	N/A	28.48	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	39	39	100	4.98	89.4	23.44	19.2	N/A	N/A	29.07	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	39	39	100	5	89.4	24.24	18.93	N/A	N/A	29.76	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	39	39	100	6.56	90.7	31.79	21.83	N/A	N/A	38.91	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	39	39	100	6.87	91.1	32.55	21.72	N/A	N/A	39.56	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	39	39	100	7.18	91.5	33.28	21.64	N/A	N/A	40.25	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	39	39	100	22000	600000	194526	137865	N/A	N/A	243493	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	39	39	100	22000	600000	194526	137865	N/A	N/A	243493	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	39	39	100	22000	600000	194526	137865	N/A	N/A	243493	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	39	39	100	9432	127224	37261	27902	N/A	N/A	56736	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	39	39	100	9482	127260	37311	27901	N/A	N/A	56785	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	39	39	100	9457	127242	37286	27902	N/A	N/A	56761	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Dieldrin	pg/g	39	39	100	1310	16700	6114	3798	N/A	N/A	8765	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Hexachlorobenzene	pg/g	39	39	100	12.6	2620	612.3	703.9	N/A	N/A	1104	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	39	16	41	2.7	87	12.92	18.42	6.5	33	20.23	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total HMW PAH (ND=1)	µg/kg	39	16	41	44	310	43.97	69.22	6.5	33	93.87	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	39	16	41	32	160	30.12	37.42	6.5	33	57.69	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	39	19	49	2.8	160	22.74	38.38	6.5	33	38.99	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total LMW PAH (ND=1)	µg/kg	39	19	49	38	290	50.46	81.23	6.5	33	108.7	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	39	19	49	23	220	39.29	56.15	6.5	33	79.8	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	39	22	56	2.8	170	32.38	48.35	6.6	33	51.9	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total PAH (ND=1)	µg/kg	39	22	56	83	610	117.7	172.8	6.6	33	241.2	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	39	22	56	55	390	74.88	107.1	6.6	33	151.4	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	39	39	100	0.33	2.71	0.914	0.603	N/A	N/A	1.087	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	39	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value

Table C-2
Fish < 15 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide (cont.)	Metals	Chromium	mg/kg	39	32	82	0.115	1.24	0.36	0.225	0.385	0.4	0.418	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	39	38	97	0.651	14.5	2.814	2.388	0.396	0.396	3.572	95% GROS Adjusted Gamma UCL
	Metals	Lead	mg/kg	39	38	97	0.124	1.79	0.489	0.363	0.2	0.2	0.592	95% GROS Adjusted Gamma UCL
	Metals	Mercury	ng/g	39	39	100	16.6	187	56.53	34.21	N/A	N/A	66.98	95% H-UCL
	Metals	Methylmercury	ng/g	38	38	100	11.3	188	71.72	50.47	N/A	N/A	88.26	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	39	14	36	0.187	0.921	0.296	0.157	0.381	0.4	0.344	95% KM (t) UCL
	Metals	Selenium	mg/kg	39	39	100	0.392	0.975	0.673	0.144	N/A	N/A	0.712	95% Student's-t UCL
	Metals	Silver	mg/kg	39	29	74	0.0216	0.364	0.0669	0.0548	0.0952	0.1	0.079	95% GROS Adjusted Gamma UCL
	Metals	Zinc	mg/kg	39	39	100	18.1	72.7	37.94	12.18	N/A	N/A	41.38	95% Adjusted Gamma UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	16	16	100	5.84	83	30.26	21.16	N/A	N/A	39.53	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	16	16	100	8.82	98.7	37.96	24.95	N/A	N/A	48.9	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	16	16	100	8.97	98.7	38.33	24.81	N/A	N/A	49.21	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	16	16	100	9.12	98.8	38.72	24.74	N/A	N/A	49.56	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	16	16	100	6.7	88.5	33.46	22.72	N/A	N/A	43.41	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	16	16	100	7.96	88.5	34.01	22.41	N/A	N/A	43.83	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	16	16	100	9.21	88.6	34.59	22.15	N/A	N/A	44.29	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	16	16	100	6.68	87.7	32.76	22.36	N/A	N/A	42.56	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	16	16	100	6.95	87.7	33.15	22.2	N/A	N/A	42.88	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	16	16	100	7.22	87.8	33.55	22.09	N/A	N/A	43.24	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	16	16	100	127000	2540000	921875	666696	N/A	N/A	1214063	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	16	16	100	127000	2540000	921875	666696	N/A	N/A	1214063	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	16	16	100	127000	2540000	921875	666696	N/A	N/A	1214063	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	16	16	100	6.12	185	61.69	63.39	N/A	N/A	108.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	16	16	100	6.125	185	61.72	63.4	N/A	N/A	108.7	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	16	16	100	6.12	185	61.71	63.4	N/A	N/A	108.7	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	16	16	100	0.142	2.29	0.808	0.58	N/A	N/A	1.062	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	16	16	100	0.142	2.29	0.81	0.579	N/A	N/A	1.063	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	16	16	100	0.142	2.29	0.809	0.579	N/A	N/A	1.062	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	16	16	100	1.65	28.4	9.036	8.136	N/A	N/A	12.6	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	16	16	100	1.8	29.1	9.398	8.248	N/A	N/A	13.01	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	16	16	100	1.73	28.7	9.211	8.182	N/A	N/A	12.8	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	16	16	100	17.95	272	99.7	82.25	N/A	N/A	135.7	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	16	16	100	18.1	272	100.1	82.02	N/A	N/A	136	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	16	16	100	18.2	272	100.5	81.8	N/A	N/A	136.3	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	16	16	100	6.85	89.3	34.26	22.91	N/A	N/A	44.31	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	16	16	100	8.1	89.4	34.83	22.62	N/A	N/A	44.74	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	16	16	100	9.36	89.4	35.4	22.34	N/A	N/A	45.19	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	16	16	100	8.34	90.7	41.8	24.33	N/A	N/A	52.46	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	16	16	100	8.68	91.1	42.37	24.23	N/A	N/A	52.99	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	16	16	100	9.03	91.5	42.92	24.16	N/A	N/A	53.51	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	16	16	100	22000	600000	174594	140910	N/A	N/A	269733	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	16	16	100	22000	600000	174594	140910	N/A	N/A	269733	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	16	16	100	22000	600000	174594	140910	N/A	N/A	269733	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	16	16	100	9432	127224	47365	33167	N/A	N/A	61901	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	16	16	100	9482	127260	47437	33159	N/A	N/A	61969	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	16	16	100	9457	127242	47401	33163	N/A	N/A	61935	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	16	16	100	1880	16700	7861	4226	N/A	N/A	9713	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	16	16	100	12.6	2620	751.7	861.5	N/A	N/A	2620	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PAHs	Total HMW PAH (ND=0)	µg/kg	16	9	56	3.4	69	15.72	18.69	6.5	33	24.51	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	16	9	56	44	310	70.63	95.53	6.5	33	181	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	16	9	56	33	160	43.06	49.5	6.5	33	83.7	95% KM Adjusted Gamma UCL

Table C-2
Fish < 15 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
North (cont.)	PAHs	Total LMW PAH (ND=0)	µg/kg	16	13	81	3.1	160	41.34	50.97	13	33	84.75	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total LMW PAH (ND=1)	µg/kg	16	13	81	39	290	98.75	107.1	13	33	220.2	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	16	13	81	23	220	70.66	74.61	13	33	155.3	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	16	13	81	4	170	54.7	56.61	13	33	80.57	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	16	13	81	83	610	216.1	227	13	33	473.6	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	16	13	81	56	390	135.9	137.9	13	33	292.4	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	16	16	100	0.354	2.36	0.904	0.616	N/A	N/A	1.251	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	16	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	16	13	81	0.145	1.24	0.473	0.286	0.385	0.4	0.627	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	16	16	100	0.781	14.5	3.664	3.274	N/A	N/A	5.356	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	16	15	94	0.124	1.79	0.587	0.485	0.2	0.2	0.807	95% KM (t) UCL
	Metals	Mercury	ng/g	16	16	100	24.9	98.2	57.69	25.35	N/A	N/A	68.8	95% Student's-t UCL
	Metals	Methylmercury	ng/g	15	15	100	22	188	74.45	49.62	N/A	N/A	106.3	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	16	5	31	0.187	0.425	0.277	0.0753	0.385	0.4	0.425	Maximum detected value
	Metals	Selenium	mg/kg	16	16	100	0.392	0.893	0.701	0.13	N/A	N/A	0.758	95% Student's-t UCL
	Metals	Silver	mg/kg	16	13	81	0.0231	0.364	0.0864	0.0759	0.0952	0.099	0.115	KM H-UCL
	Metals	Zinc	mg/kg	16	16	100	23.8	72.7	38.1	12.81	N/A	N/A	43.71	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	13	13	100	3.91	52.3	14.24	12.66	N/A	N/A	22.56	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	13	13	100	6.735	66.7	20.49	16.1	N/A	N/A	28.45	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	13	13	100	7.19	67	21.16	15.89	N/A	N/A	29.01	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	13	13	100	7.31	67.3	21.83	15.75	N/A	N/A	29.61	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	13	13	100	4.77	58.3	16.39	14.2	N/A	N/A	25.88	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	13	13	100	5.98	58.6	17.29	13.85	N/A	N/A	26.11	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	13	13	100	5.99	58.8	18.17	13.55	N/A	N/A	26.58	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	13	13	100	4.75	56.8	16.02	13.75	N/A	N/A	25.13	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	13	13	100	4.99	57.1	16.72	13.58	N/A	N/A	25.51	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	13	13	100	5.24	57.4	17.4	13.49	N/A	N/A	26.13	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	13	13	100	114000	1350000	617115	365647	N/A	N/A	797861	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	13	13	100	114000	1350000	617269	365677	N/A	N/A	798030	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	13	13	100	114000	1350000	617115	365647	N/A	N/A	797861	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	13	13	100	12.2	119	37.83	39.02	N/A	N/A	85	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	13	13	100	12.2	119	37.97	39	N/A	N/A	85.12	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	13	13	100	12.2	119	37.9	39	N/A	N/A	85.05	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	13	13	100	0.147	0.93	0.506	0.271	N/A	N/A	0.64	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	13	13	100	0.147	0.933	0.511	0.268	N/A	N/A	0.643	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	13	13	100	0.147	0.932	0.509	0.269	N/A	N/A	0.642	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	13	13	100	1.2	11.8	5.407	4.055	N/A	N/A	10.31	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	13	13	100	1.85	12	5.764	3.919	N/A	N/A	9.886	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	13	13	100	1.52	11.9	5.59	3.991	N/A	N/A	10.13	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	13	13	100	19.5	186	58.32	53.74	N/A	N/A	123.3	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	13	13	100	19.7	186	59.1	53.4	N/A	N/A	123.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	13	13	100	19.8	186	59.78	53	N/A	N/A	123.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	13	13	100	4.92	58.9	16.89	14.33	N/A	N/A	26.54	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	13	13	100	6.13	59.2	17.8	13.98	N/A	N/A	26.77	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	13	13	100	6.19	59.5	18.7	13.7	N/A	N/A	27.27	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	13	13	100	6.56	59.4	21.43	14.78	N/A	N/A	28.74	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	13	13	100	6.87	60	22.31	14.61	N/A	N/A	29.53	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	13	13	100	7.18	60.6	23.16	14.52	N/A	N/A	30.33	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	13	13	100	27000	300000	134615	81055	N/A	N/A	174682	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	13	13	100	27000	300000	134615	81055	N/A	N/A	174682	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	13	13	100	27000	300000	134615	81055	N/A	N/A	174682	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	13	13	100	10730	91468	37326	25667	N/A	N/A	50013	95% Student's-t UCL

Table C-2
Fish < 15 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southeast (cont.)	Pesticides	Total Chlordane (ND=1)	pg/g	13	13	100	10808	91501	37367	25651	N/A	N/A	50046	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	13	13	100	10769	91485	37346	25659	N/A	N/A	50030	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	13	13	100	1820	10600	5522	3440	N/A	N/A	8401	95% Adjusted Gamma UCL
	Pesticides	Hexachlorobenzene	pg/g	13	13	100	17	2290	755.1	651.2	N/A	N/A	1077	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	13	4	31	2.7	20	6.4	4.992	6.6	33	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	13	4	31	46	62	21.88	23.16	6.6	33	62	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	13	4	31	32	33	17.42	12.64	6.6	33	33	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	13	2	15	3.5	14	4.667	3.3	6.5	33	14	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	13	2	15	41	43	11.96	12.81	6.5	33	43	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	13	2	15	23	28	10.72	7.986	6.5	33	28	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	13	4	31	5.9	20	9.15	5.801	6.6	33	20	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	13	4	31	91	110	35.34	43.27	6.6	33	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	13	4	31	55	59	21.88	22.93	6.6	33	59	Maximum detected value
	Metals	Arsenic	mg/kg	13	13	100	0.33	2.71	0.869	0.719	N/A	N/A	1.349	95% H-UCL
	Metals	Cadmium	mg/kg	13	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	13	11	85	0.151	0.485	0.28	0.095	0.4	0.4	0.332	95% KM (t) UCL
	Metals	Copper	mg/kg	13	12	92	0.804	5	2.17	1.374	0.396	0.396	2.879	95% KM (t) UCL
	Metals	Lead	mg/kg	13	13	100	0.154	0.545	0.336	0.117	N/A	N/A	0.394	95% Student's-t UCL
	Metals	Mercury	ng/g	13	13	100	26.1	187	70.38	47.28	N/A	N/A	93.75	95% Student's-t UCL
	Metals	Methylmercury	ng/g	13	13	100	21.3	176	83.88	59.85	N/A	N/A	113.5	95% Student's-t UCL
	Metals	Nickel	mg/kg	13	4	31	0.204	0.42	0.236	0.0544	0.381	0.4	0.42	Maximum detected value
	Metals	Selenium	mg/kg	13	13	100	0.413	0.917	0.638	0.158	N/A	N/A	0.716	95% Student's-t UCL
	Metals	Silver	mg/kg	13	10	77	0.0216	0.101	0.0535	0.0312	0.0962	0.1	0.0715	95% KM (t) UCL
	Metals	Zinc	mg/kg	13	13	100	23.5	41.8	32.37	6.016	N/A	N/A	35.34	95% Student's-t UCL
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	10	10	100	3.62	20.3	9.066	5.604	N/A	N/A	13.95	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	10	10	100	5.7	22.4	12.32	5.453	N/A	N/A	15.48	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	10	10	100	5.72	25.1	13.26	6.074	N/A	N/A	16.78	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	10	10	100	5.74	27.8	14.21	6.908	N/A	N/A	18.21	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	10	10	100	4.68	21.4	10.07	5.781	N/A	N/A	14.99	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	10	10	100	4.7	22.9	11.09	5.813	N/A	N/A	14.46	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	10	10	100	4.72	24.3	12.11	6.097	N/A	N/A	15.65	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	10	10	100	4.48	21.4	9.99	5.739	N/A	N/A	14.89	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	10	10	100	4.5	22.4	10.63	5.789	N/A	N/A	13.99	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	10	10	100	4.52	23.4	11.28	5.991	N/A	N/A	14.75	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	10	10	100	152000	3370000	1174200	866657	N/A	N/A	2040426	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	10	10	100	152000	3370000	1174200	866657	N/A	N/A	2040426	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	10	10	100	152000	3370000	1174200	866657	N/A	N/A	2040426	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	10	10	100	11.8	333	68.88	95.96	N/A	N/A	156.4	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	10	10	100	11.8	333	68.88	95.96	N/A	N/A	156.4	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	10	10	100	11.8	333	68.88	95.96	N/A	N/A	156.4	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	10	10	100	0.189	5.52	1.457	1.475	N/A	N/A	3.251	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	10	10	100	0.189	5.52	1.458	1.475	N/A	N/A	3.254	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	10	10	100	0.189	5.52	1.458	1.475	N/A	N/A	3.254	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	10	10	100	2.32	73.1	19.24	19.5	N/A	N/A	46.11	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	10	10	100	2.46	73.9	19.74	19.65	N/A	N/A	46.82	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	10	10	100	2.39	73.5	19.51	19.57	N/A	N/A	46.48	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	10	10	100	21.4	342	81.19	95.58	N/A	N/A	163.8	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	10	10	100	21.4	342	82.14	95.58	N/A	N/A	165.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	10	10	100	21.5	342	83.1	95.59	N/A	N/A	167.4	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	10	10	100	4.95	22.7	11.54	5.884	N/A	N/A	14.95	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	10	10	100	4.98	24.2	12.55	5.965	N/A	N/A	16.01	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	10	10	100	5	25.7	13.58	6.314	N/A	N/A	17.24	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	10	10	100	7.07	80	29.24	19.87	N/A	N/A	40.75	95% Student's-t UCL

Table C-2
Fish < 15 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southwest (cont.)	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	10	10	100	7.17	80.7	30.15	19.98	N/A	N/A	41.73	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	10	10	100	7.26	81.3	31.03	20.11	N/A	N/A	42.68	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	10	10	100	43000	510000	304300	138269	N/A	N/A	384452	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	10	10	100	43000	510000	304300	138269	N/A	N/A	384452	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	10	10	100	43000	510000	304300	138269	N/A	N/A	384452	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	10	10	100	11340	39920	21011	10022	N/A	N/A	26820	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	10	10	100	11369	39920	21037	10025	N/A	N/A	26848	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	10	10	100	11355	39920	21024	10023	N/A	N/A	26834	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	10	10	100	1310	7270	4088	2207	N/A	N/A	5368	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	10	10	100	20.2	484	203.6	200.3	N/A	N/A	479.6	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	10	3	30	2.9	87	17.63	25.84	6.6	33	87	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	10	3	30	63	110	30.22	37.59	6.6	33	110	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	10	3	30	33	97	23.32	29.35	6.6	33	97	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	10	4	40	2.8	85	15.77	23.82	6.7	33	85	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	10	4	40	38	91	25.32	26.67	6.7	33	91	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	10	4	40	23	88	27.41	21.67	6.7	33	88	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	10	5	50	2.8	170	27.22	48.91	32	33	170	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	10	5	50	110	200	82	55.75	32	33	200	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	10	5	50	56	190	60.7	46.18	32	33	190	Maximum detected value
	Metals	Arsenic	mg/kg	10	10	100	0.49	2.01	0.988	0.45	N/A	N/A	1.249	95% Student's-t UCL
	Metals	Cadmium	mg/kg	10	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	10	8	80	0.115	0.51	0.281	0.142	0.392	0.396	0.37	95% KM (t) UCL
	Metals	Copper	mg/kg	10	10	100	0.651	4.6	2.294	1.393	N/A	N/A	3.101	95% Student's-t UCL
	Metals	Lead	mg/kg	10	10	100	0.199	1.06	0.53	0.288	N/A	N/A	0.696	95% Student's-t UCL
	Metals	Mercury	ng/g	10	10	100	16.6	55.1	36.66	13.13	N/A	N/A	44.27	95% Student's-t UCL
	Metals	Methylmercury	ng/g	10	10	100	11.3	122	51.81	34.59	N/A	N/A	71.86	95% Student's-t UCL
	Metals	Nickel	mg/kg	10	5	50	0.213	0.921	0.404	0.258	0.392	0.396	0.921	Maximum detected value
	Metals	Selenium	mg/kg	10	10	100	0.481	0.975	0.674	0.152	N/A	N/A	0.762	95% Student's-t UCL
	Metals	Silver	mg/kg	10	6	60	0.0308	0.0702	0.0528	0.0124	0.0971	0.099	0.063	95% KM (t) UCL
	Metals	Zinc	mg/kg	10	10	100	18.1	69.6	44.92	14.33	N/A	N/A	53.23	95% Student's-t UCL

Table C-3
Fish < 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	67	67	100	1.58	203	27.07	35.79	N/A	N/A	36.7	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	67	67	100	2.26	223	36.71	41.86	N/A	N/A	48.82	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	67	67	100	4.7	223	37.43	41.9	N/A	N/A	47.75	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	67	67	100	4.78	223	38.13	41.88	N/A	N/A	47.89	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	67	67	100	1.9	211	30.72	38.12	N/A	N/A	41.24	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	67	67	100	3.66	211	31.52	38	N/A	N/A	51.76	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	67	67	100	3.68	211	32.35	37.96	N/A	N/A	40.24	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	67	67	100	1.81	209	30.05	37.52	N/A	N/A	40.23	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	67	67	100	3.65	209	30.73	37.54	N/A	N/A	50.72	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	67	67	100	3.68	209	31.39	37.52	N/A	N/A	39.35	95% H-UCL
	PCBs	Total PCBs (ND=0)	ng/kg	67	67	100	114000	3530000	987940	766045	N/A	N/A	1167911	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	67	67	100	114000	3530000	988000	766014	N/A	N/A	1167969	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	67	67	100	114000	3530000	987955	766035	N/A	N/A	1167924	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	67	67	100	3.28	395	77.12	87.37	N/A	N/A	123.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	67	67	100	3.78	395	77.21	87.32	N/A	N/A	123.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	67	67	100	3.53	395	77.17	87.34	N/A	N/A	123.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	67	67	100	0.0935	5.52	0.847	0.811	N/A	N/A	0.996	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	67	67	100	0.0937	5.52	0.849	0.81	N/A	N/A	0.997	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	67	67	100	0.0936	5.52	0.848	0.81	N/A	N/A	0.996	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	67	67	100	0.418	73.1	8.757	10.78	N/A	N/A	11.42	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	67	67	100	0.564	73.9	9.086	10.88	N/A	N/A	11.54	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	67	67	100	0.491	73.5	8.924	10.83	N/A	N/A	11.46	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	67	67	100	7.08	608	113.8	119.1	N/A	N/A	177.3	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	67	67	100	9.52	611	114.6	119.1	N/A	N/A	178	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	67	67	100	12	613	115.3	119.1	N/A	N/A	178.8	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	67	67	100	2.07	212	31.57	38.3	N/A	N/A	42.07	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	67	67	100	3.84	212	32.39	38.24	N/A	N/A	40.88	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	67	67	100	3.86	212	33.2	38.14	N/A	N/A	41.09	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	67	67	100	2.77	212	38.82	38.36	N/A	N/A	46.57	95% Approximate Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	67	67	100	5.31	212	39.66	38.39	N/A	N/A	50.07	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	67	67	100	6.09	213	40.47	38.45	N/A	N/A	50.1	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	67	67	100	12000	1100000	254858	230223	N/A	N/A	311314	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	67	67	100	12000	1100000	254858	230223	N/A	N/A	311314	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	67	67	100	12000	1100000	254858	230223	N/A	N/A	311314	95% Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	67	67	100	4251	212287	60433	55903	N/A	N/A	90203	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	67	67	100	4290	212326	60479	55904	N/A	N/A	90250	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	67	67	100	4270	212307	60456	55903	N/A	N/A	90226	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Dieldrin	pg/g	67	67	100	443	28300	8497	6969	N/A	N/A	10229	95% Approximate Gamma UCL
	Pesticides	Hexachlorobenzene	pg/g	67	67	100	12.6	6210	1170	1333	N/A	N/A	1543	95% Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	67	22	33	2.7	87	11.05	15.07	6.5	33	14.95	95% KM Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	67	22	33	44	310	46.51	81.57	6.5	33	90.97	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	67	22	33	32	160	29.73	42.58	6.5	33	53.26	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	67	37	55	2.8	610	36.95	79.93	6.5	33	60.69	95% KM Approximate Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	67	37	55	38	610	79.15	110.9	6.5	33	139	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	67	37	55	23	610	60.23	90.03	6.5	33	109	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	67	40	60	2.8	640	43.97	85.78	6.6	33	68.52	95% KM Approximate Gamma UCL
	PAHs	Total PAH (ND=1)	µg/kg	67	40	60	83	750	180.2	220.4	6.6	33	299	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	67	40	60	55	700	111.6	141.8	6.6	33	188	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	67	67	100	0.326	2.71	0.867	0.567	N/A	N/A	1.169	95% Chebyshev (Mean, Sd) UCL
	Metals	Cadmium	mg/kg	67	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	67	50	75	0.0997	2.13	0.356	0.309	0.381	0.4	0.404	95% GROS Approximate Gamma UCL
	Metals	Copper	mg/kg	67	65	97	0.47	50	7.56	10.63	0.392	0.396	10.49	KM H-UCL
	Metals	Lead	mg/kg	67	64	96	0.0381	1.79	0.361	0.326	0.19	0.2	0.426	95% GROS Approximate Gamma UCL
	Metals	Mercury	ng/g	67	67	100	16.6	287	82.56	56.02	N/A	N/A	94.34	95% Approximate Gamma UCL
	Metals	Methylmercury	ng/g	66	66	100	11.3	338	97.31	67.11	N/A	N/A	112.7	95% Approximate Gamma UCL

Table C-3
Fish < 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide (cont.)	Metals	Nickel	mg/kg	67	20	30	0.187	0.921	0.283	0.147	0.381	0.4	0.318	95% KM (t) UCL
	Metals	Selenium	mg/kg	67	67	100	0.392	2.04	0.837	0.397	N/A	N/A	0.914	95% H-UCL
	Metals	Silver	mg/kg	67	48	72	0.0216	0.889	0.151	0.183	0.0952	0.1	0.187	KM H-UCL
	Metals	Zinc	mg/kg	67	67	100	10.59	72.7	31.67	12.34	N/A	N/A	34.18	95% Approximate Gamma UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	25	25	100	4.58	203	43.09	49.2	N/A	N/A	63.3	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	25	25	100	6.19	223	53.33	56.74	N/A	N/A	76.79	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	25	25	100	6.19	223	53.84	57.05	N/A	N/A	77.33	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	25	25	100	6.19	223	54.29	57.21	N/A	N/A	77.79	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	25	25	100	5.56	211	47.15	51.89	N/A	N/A	68.59	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	25	25	100	5.56	211	47.69	51.95	N/A	N/A	68.95	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	25	25	100	5.56	211	48.29	52.14	N/A	N/A	69.47	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	25	25	100	5.4	209	46.23	51.2	N/A	N/A	67.32	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	25	25	100	5.4	209	46.72	51.43	N/A	N/A	67.77	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	25	25	100	5.4	209	47.16	51.57	N/A	N/A	68.21	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	25	25	100	127000	3530000	1104100	895324	N/A	N/A	1528670	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	25	25	100	127000	3530000	1104180	895270	N/A	N/A	1528724	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	25	25	100	127000	3530000	1104140	895295	N/A	N/A	1528693	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	25	25	100	3.28	395	91.84	111.6	N/A	N/A	252.1	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	25	25	100	3.78	395	92.01	111.5	N/A	N/A	243.8	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	25	25	100	3.53	395	91.92	111.5	N/A	N/A	247.5	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	25	25	100	0.142	3.48	0.913	0.769	N/A	N/A	1.226	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	25	25	100	0.142	3.48	0.915	0.768	N/A	N/A	1.228	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	25	25	100	0.142	3.48	0.914	0.769	N/A	N/A	1.227	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	25	25	100	1.65	41.1	8.978	9.583	N/A	N/A	13.66	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	25	25	100	1.8	41.45	9.333	9.659	N/A	N/A	13.13	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	25	25	100	1.73	41.3	9.153	9.618	N/A	N/A	12.93	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	25	25	100	15.1	608	145.2	156.4	N/A	N/A	219.2	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	25	25	100	15.9	611	145.7	156.8	N/A	N/A	219.5	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	25	25	100	16.6	613	146.3	157	N/A	N/A	219.8	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	25	25	100	6.09	212	48.07	52.17	N/A	N/A	69.67	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	25	25	100	6.1	212	48.66	52.34	N/A	N/A	70.11	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	25	25	100	6.11	212	49.22	52.42	N/A	N/A	70.54	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	25	25	100	8.34	212	55.23	51.59	N/A	N/A	77.27	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	25	25	100	8.68	212	55.87	51.87	N/A	N/A	77.89	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	25	25	100	9.03	213	56.5	52.17	N/A	N/A	78.54	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	25	25	100	21000	600000	205140	163591	N/A	N/A	261117	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	25	25	100	21000	600000	205140	163591	N/A	N/A	261117	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	25	25	100	21000	600000	205140	163591	N/A	N/A	261117	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	25	25	100	5685	212287	68924	64436	N/A	N/A	100737	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	25	25	100	5722	212326	68983	64430	N/A	N/A	100784	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	25	25	100	5704	212307	68954	64433	N/A	N/A	100760	95% Adjusted Gamma UCL
	Pesticides	Dieldrin	pg/g	25	25	100	752	22500	8779	5757	N/A	N/A	10749	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	25	25	100	12.6	6210	1486	1689	N/A	N/A	2665	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	25	12	48	2.8	69	13.46	16.47	6.5	33	22.44	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total HMW PAH (ND=1)	µg/kg	25	12	48	44	310	59.88	83.82	6.5	33	136.2	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	25	12	48	33	160	36.46	44.03	6.5	33	52.2	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	25	20	80	3.1	610	66.21	120.9	13	33	146.2	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total LMW PAH (ND=1)	µg/kg	25	20	80	39	610	121.4	143.4	13	33	249.7	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	25	20	80	23	610	95.21	127.1	13	33	208.9	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	25	20	80	4	640	76.55	126.1	13	33	155.3	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total PAH (ND=1)	µg/kg	25	20	80	83	750	243.9	244.6	13	33	462.7	95% KM (Chebyshev) UCL

Table C-3
Fish < 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
North (cont.)	PAHs	Total PAH (ND=1/2)	µg/kg	25	20	80	56	700	160.8	173	13	33	315.6	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	25	25	100	0.326	2.36	0.822	0.575	N/A	N/A	1.035	95% H-UCL
	Metals	Cadmium	mg/kg	25	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	25	20	80	0.128	2.13	0.476	0.431	0.381	0.4	0.622	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	25	25	100	0.47	39.5	5.971	8.474	N/A	N/A	9.153	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	25	23	92	0.0381	1.79	0.464	0.433	0.198	0.2	0.659	95% GROS Adjusted Gamma UCL
	Metals	Mercury	ng/g	25	25	100	24.9	275.5	80.46	55.71	N/A	N/A	99.52	95% Student's-t UCL
	Metals	Methylmercury	ng/g	24	24	100	22	338	108.7	82	N/A	N/A	137.4	95% Student's-t UCL
	Metals	Nickel	mg/kg	25	8	32	0.187	0.598	0.282	0.1	0.381	0.4	0.332	95% KM (t) UCL
	Metals	Selenium	mg/kg	25	25	100	0.392	1.78	0.772	0.3	N/A	N/A	0.882	95% Adjusted Gamma UCL
	Metals	Silver	mg/kg	25	18	72	0.0231	0.61	0.125	0.136	0.0952	0.099	0.172	95% GROS Adjusted Gamma UCL
	Metals	Zinc	mg/kg	25	25	100	10.59	72.7	32.94	12.95	N/A	N/A	38	95% Adjusted Gamma UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	21	21	100	1.58	75.5	23.23	23.67	N/A	N/A	36.06	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	21	21	100	2.26	95.3	32.11	30.9	N/A	N/A	48.82	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	21	21	100	4.7	95.3	32.88	30.76	N/A	N/A	48.91	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	21	21	100	4.78	95.3	33.64	30.67	N/A	N/A	49.39	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	21	21	100	1.9	84.8	26.62	26.81	N/A	N/A	41.24	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	21	21	100	3.66	84.8	27.53	26.57	N/A	N/A	41.3	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	21	21	100	3.68	84.8	28.42	26.36	N/A	N/A	41.77	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	21	21	100	1.81	83.5	25.99	26.18	N/A	N/A	40.18	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	21	21	100	3.65	83.5	26.78	26.04	N/A	N/A	40.32	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	21	21	100	3.68	83.5	27.55	25.95	N/A	N/A	40.86	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	21	21	100	114000	1780000	712357	489232	N/A	N/A	896487	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	21	21	100	114000	1780000	712452	489227	N/A	N/A	896580	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	21	21	100	114000	1780000	712357	489232	N/A	N/A	896487	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	21	21	100	4.82	210	57.27	59.15	N/A	N/A	113.5	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	21	21	100	4.83	210	57.36	59.11	N/A	N/A	113.6	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	4.82	210	57.32	59.12	N/A	N/A	113.6	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	21	21	100	0.147	1.24	0.527	0.307	N/A	N/A	0.643	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	21	21	100	0.147	1.25	0.53	0.307	N/A	N/A	0.646	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	0.147	1.24	0.528	0.306	N/A	N/A	0.644	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	1.2	14.1	4.879	4.046	N/A	N/A	8.728	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	1.85	14.9	5.18	4.063	N/A	N/A	9.044	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	1.52	14.5	5.032	4.056	N/A	N/A	8.89	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	21	21	100	7.08	293	89.32	87.68	N/A	N/A	172.7	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	9.52	293	90.16	87.53	N/A	N/A	173.4	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	21	21	100	12	293	90.94	87.36	N/A	N/A	174	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	21	21	100	2.07	85.4	27.14	27	N/A	N/A	41.82	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	3.84	85.4	28.05	26.76	N/A	N/A	41.91	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	21	21	100	3.86	85.4	28.96	26.55	N/A	N/A	42.41	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	4.05	90.3	30.88	26.97	N/A	N/A	45.14	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	5.99	90.7	31.81	26.82	N/A	N/A	45.59	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	6.09	91.1	32.72	26.71	N/A	N/A	46.26	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	21	21	100	17000	500000	152810	133761	N/A	N/A	224125	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	21	21	100	17000	500000	152810	133761	N/A	N/A	224125	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	21	21	100	17000	500000	152810	133761	N/A	N/A	224125	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	21	21	100	4641	162828	51676	47640	N/A	N/A	69606	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	21	21	100	4681	162828	51715	47634	N/A	N/A	69642	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	21	21	100	4661	162828	51695	47637	N/A	N/A	69624	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	21	21	100	700	21500	6119	4938	N/A	N/A	7978	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	21	21	100	17	4640	1101	1131	N/A	N/A	1823	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	21	4	19	2.7	20	5.877	4.3	6.6	33	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	21	4	19	46	62	16.06	19.68	6.6	33	62	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	21	4	19	32	33	13.44	11.32	6.6	33	33	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	21	5	24	3.5	25	8.154	6.592	6.5	33	25	Maximum detected value

Table C-3
Fish < 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southeast (cont.)	PAHs	Total LMW PAH (ND=1)	µg/kg	21	5	24	41	84	20	25.66	6.5	33	84	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	21	5	24	23	51	15.54	14.72	6.5	33	51	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	21	7	33	5.9	25	10.66	7.015	6.6	33	14.29	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	21	7	33	91	210	52.97	72.4	6.6	33	101.3	95% KM Adjusted Gamma UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	21	7	33	55	120	31.3	38.6	6.6	33	47	95% KM (t) UCL
	Metals	Arsenic	mg/kg	21	21	100	0.33	2.71	0.87	0.642	N/A	N/A	1.156	95% H-UCL
	Metals	Cadmium	mg/kg	21	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	21	16	76	0.151	0.887	0.31	0.158	0.381	0.4	0.373	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	21	20	95	0.683	23	4.112	5.106	0.396	0.396	7.373	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	Metals	Lead	mg/kg	21	20	95	0.0455	0.545	0.277	0.133	0.19	0.19	0.328	95% KM (t) UCL
	Metals	Mercury	ng/g	21	21	100	26.1	187	87.12	51.89	N/A	N/A	106.7	95% Student's-t UCL
	Metals	Methylmercury	ng/g	21	21	100	21.3	216	96.83	60.91	N/A	N/A	119.8	95% Student's-t UCL
	Metals	Nickel	mg/kg	21	6	29	0.204	0.685	0.266	0.119	0.381	0.4	0.316	95% KM (t) UCL
	Metals	Selenium	mg/kg	21	21	100	0.413	1.59	0.711	0.261	N/A	N/A	0.809	95% Student's-t UCL
	Metals	Silver	mg/kg	21	15	71	0.0216	0.466	0.0949	0.1	0.0952	0.1	0.135	95% KM (t) UCL
	Metals	Zinc	mg/kg	21	21	100	18	41.8	29.42	6.698	N/A	N/A	31.94	95% Student's-t UCL
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	21	21	100	2	60.8	11.84	13.51	N/A	N/A	18.04	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	21	21	100	3.8	85	21.51	18.83	N/A	N/A	30.18	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	21	21	100	5.72	85	22.44	18.61	N/A	N/A	30.68	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	21	21	100	5.74	85.1	23.38	18.49	N/A	N/A	31.49	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	21	21	100	2.37	70.3	15.25	15.5	N/A	N/A	21.82	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	21	21	100	4.7	70.3	16.27	15.24	N/A	N/A	22.36	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	21	21	100	4.72	70.3	17.29	15.08	N/A	N/A	23.21	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	21	21	100	2.35	68.6	14.85	15.07	N/A	N/A	21.22	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	21	21	100	4.5	68.7	15.64	14.91	N/A	N/A	21.62	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	21	21	100	4.52	68.7	16.43	14.82	N/A	N/A	22.17	95% H-UCL
	PCBs	Total PCBs (ND=0)	ng/kg	21	21	100	131000	3370000	1125238	786666	N/A	N/A	1544439	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	21	21	100	131000	3370000	1125238	786666	N/A	N/A	1544439	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	21	21	100	131000	3370000	1125238	786666	N/A	N/A	1544439	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	21	21	100	8.48	333	79.46	77.88	N/A	N/A	118.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	21	21	100	8.48	333	79.46	77.88	N/A	N/A	118.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	8.48	333	79.46	77.88	N/A	N/A	118.6	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	21	21	100	0.0935	5.52	1.089	1.091	N/A	N/A	2.126	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	21	21	100	0.0937	5.52	1.089	1.091	N/A	N/A	2.127	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	0.0936	5.52	1.089	1.091	N/A	N/A	2.127	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	0.418	73.1	12.37	15.09	N/A	N/A	19.16	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	0.564	73.9	12.7	15.25	N/A	N/A	19.46	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	0.491	73.5	12.54	15.17	N/A	N/A	19.32	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	21	21	100	12.3	342	101.1	87.95	N/A	N/A	146.4	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	21	21	100	14.8	342	102	87.58	N/A	N/A	146.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	21	21	100	17.3	342	102.9	87.24	N/A	N/A	147	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	21	21	100	2.47	71.4	16.34	15.54	N/A	N/A	22.98	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	21	21	100	4.94	71.4	17.36	15.27	N/A	N/A	23.51	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	21	21	100	5	71.4	18.38	15.11	N/A	N/A	24.4	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	21	21	100	2.77	80	27.23	19.73	N/A	N/A	37.15	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	21	21	100	5.31	80.7	28.2	19.6	N/A	N/A	35.57	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	21	21	100	7.26	81.3	29.14	19.51	N/A	N/A	38.01	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	21	21	100	12000	1100000	416095	289102	N/A	N/A	524903	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	21	21	100	12000	1100000	416095	289102	N/A	N/A	524903	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	21	21	100	12000	1100000	416095	289102	N/A	N/A	524903	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	21	21	100	4251	169390	59083	53743	N/A	N/A	90137	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	21	21	100	4290	169467	59121	53758	N/A	N/A	90166	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	21	21	100	4270	169429	59102	53750	N/A	N/A	90151	95% Adjusted Gamma UCL
	Pesticides	Dieldrin	pg/g	21	21	100	443	28300	10540	9257	N/A	N/A	16188	95% Adjusted Gamma UCL

Table C-3
Fish < 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southwest (cont.)	Pesticides	Hexachlorobenzene	pg/g	21	21	100	20.2	4030	861.8	968.2	N/A	N/A	1516	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	21	6	29	2.9	87	14.33	18.64	6.6	33	23.29	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	21	6	29	63	310	61.19	105.4	6.6	33	104.6	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	21	6	29	33	160	36.48	54.89	6.6	33	59.1	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	21	12	57	2.8	120	31.2	32.4	6.7	33	44.26	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	21	12	57	38	220	89.68	90.04	6.7	33	179.1	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	21	12	57	23	170	62.98	54.56	6.7	33	84.67	95% KM (t) UCL
	PAHs	Total PAH (ND=0)	µg/kg	21	13	62	2.8	170	38.86	45.56	13	33	56.99	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	21	13	62	110	540	235.4	230.5	13	33	463.6	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	21	13	62	56	330	137.2	127.3	13	33	263.2	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	21	21	100	0.41	2.12	0.919	0.495	N/A	N/A	1.105	95% Student's-t UCL
	Metals	Cadmium	mg/kg	21	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	21	14	67	0.0997	0.766	0.245	0.176	0.385	0.396	0.315	95% KM (t) UCL
	Metals	Copper	mg/kg	21	20	95	0.651	50	12.9	14.46	0.392	0.392	21.75	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	Metals	Lead	mg/kg	21	21	100	0.0541	1.06	0.322	0.286	N/A	N/A	0.464	95% Adjusted Gamma UCL
	Metals	Mercury	ng/g	21	21	100	16.6	287	80.5	62.51	N/A	N/A	104	95% Student's-t UCL
	Metals	Methylmercury	ng/g	21	21	100	11.3	239	84.74	53.56	N/A	N/A	104.9	95% Student's-t UCL
	Metals	Nickel	mg/kg	21	6	29	0.188	0.921	0.294	0.207	0.381	0.396	0.38	95% KM (t) UCL
	Metals	Selenium	mg/kg	21	21	100	0.423	2.04	1.04	0.526	N/A	N/A	1.239	95% Student's-t UCL
	Metals	Silver	mg/kg	21	15	71	0.0308	0.889	0.237	0.253	0.0971	0.099	0.336	95% KM (t) UCL
	Metals	Zinc	mg/kg	21	21	100	16.6	69.6	32.42	15.75	N/A	N/A	39.42	95% Adjusted Gamma UCL

Table C-4
All Fish Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	89	89	100	1.58	203	21.6	32.5	N/A	N/A	36.62	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	89	89	100	2.26	223	29.99	38.22	N/A	N/A	37.81	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	89	89	100	3.16	223	30.78	38.2	N/A	N/A	37.07	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	89	89	100	3.31	223	31.56	38.14	N/A	N/A	37.35	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	89	89	100	1.9	211	24.97	34.6	N/A	N/A	31.22	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	89	89	100	2.77	211	25.78	34.49	N/A	N/A	41.71	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	89	89	100	2.82	211	26.59	34.47	N/A	N/A	42.52	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	89	89	100	1.81	209	24.32	34.08	N/A	N/A	40.07	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	89	89	100	2.59	209	25.02	34.08	N/A	N/A	40.77	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	89	89	100	2.66	209	25.7	34.06	N/A	N/A	41.44	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCBs (ND=0)	ng/kg	89	89	100	101000	3530000	878348	708239	N/A	N/A	1012703	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	89	89	100	101000	3530000	878635	708199	N/A	N/A	1013013	95% Approximate Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	89	89	100	101000	3530000	878404	708219	N/A	N/A	1012763	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	89	89	100	1.74	395	61.17	80.99	N/A	N/A	98.59	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	89	89	100	2.72	395	61.54	80.77	N/A	N/A	98.86	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	89	89	100	2.23	395	61.36	80.88	N/A	N/A	98.73	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	89	89	100	0.0935	5.52	0.774	0.759	N/A	N/A	0.893	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	89	89	100	0.0937	5.52	0.784	0.756	N/A	N/A	0.902	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	89	89	100	0.0936	5.52	0.779	0.757	N/A	N/A	0.897	95% Approximate Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	89	89	100	0.418	73.1	8.096	10.29	N/A	N/A	10.03	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	89	89	100	0.564	73.9	8.619	10.31	N/A	N/A	10.4	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	89	89	100	0.491	73.5	8.359	10.29	N/A	N/A	10.16	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	89	89	100	5.76	608	91.16	110.9	N/A	N/A	142.4	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	89	89	100	6.51	611	92.14	110.8	N/A	N/A	143.3	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	89	89	100	7.25	613	93.09	110.6	N/A	N/A	144.2	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	89	89	100	2.07	212	25.75	34.79	N/A	N/A	32	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	89	89	100	2.91	212	26.57	34.73	N/A	N/A	42.62	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	89	89	100	2.96	212	27.39	34.65	N/A	N/A	43.4	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	89	89	100	2.77	212	32.42	35.44	N/A	N/A	40.88	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	89	89	100	4.03	212	33.38	35.39	N/A	N/A	40.53	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	89	89	100	4.1	213	34.32	35.38	N/A	N/A	40.94	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	89	89	100	4700	1100000	247480	211236	N/A	N/A	292010	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	89	89	100	4700	1100000	247480	211236	N/A	N/A	292010	95% Approximate Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	89	89	100	4700	1100000	247480	211236	N/A	N/A	292010	95% Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	89	89	100	1114	212287	56575	50231	N/A	N/A	66703	95% Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	89	89	100	1149	212326	56632	50229	N/A	N/A	66753	95% Approximate Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	89	89	100	1132	212307	56603	50230	N/A	N/A	66728	95% Approximate Gamma UCL
	Pesticides	Dieldrin	pg/g	89	89	100	253	28300	8420	6606	N/A	N/A	11473	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Hexachlorobenzene	pg/g	89	89	100	12.6	6210	1488	1488	N/A	N/A	2176	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	89	30	34	2.7	87	10.43	13.59	6.5	33	13.33	95% KM Approximate Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	89	30	34	44	310	47.85	83.03	6.5	33	86.87	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	89	30	34	32	160	29.69	43.1	6.5	33	50.1	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	89	55	62	2.8	610	34.41	70.91	6.5	33	41.32	KM H-UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	89	55	62	38	610	82.66	106.2	6.5	33	132.2	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	89	55	62	23	610	60.48	83.13	6.5	33	99.35	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	89	58	65	2.8	640	40.84	76.46	6.6	33	51.8	KM H-UCL
	PAHs	Total PAH (ND=1)	µg/kg	89	58	65	83	750	188.2	214.7	6.6	33	288.3	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	89	58	65	55	700	114	134.6	6.6	33	176.7	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	89	89	100	0.326	2.71	0.896	0.548	N/A	N/A	1.149	95% Chebyshev (Mean, Sd) UCL
	Metals	Cadmium	mg/kg	89	1	1	0.0593	0.0593	0.0593	0	0.0952	0.1	0.0593	Maximum detected value
	Metals	Chromium	mg/kg	89	59	66	0.0997	2.13	0.318	0.28	0.381	0.4	0.356	95% GROS Approximate Gamma UCL
	Metals	Copper	mg/kg	89	87	98	0.47	50	5.905	9.67	0.392	0.396	10.4	95% KM (Chebyshev) UCL
	Metals	Lead	mg/kg	89	83	93	0.0381	1.79	0.325	0.298	0.19	0.2	0.373	95% GROS Approximate Gamma UCL
	Metals	Mercury	ng/g	89	89	100	16.6	347	102.9	73.08	N/A	N/A	116.3	95% Approximate Gamma UCL
	Metals	Methylmercury	ng/g	88	88	100	11.3	399.5	118	81.54	N/A	N/A	134	95% Approximate Gamma UCL
	Metals	Nickel	mg/kg	89	26	29	0.187	1.29	0.29	0.177	0.381	0.4	0.325	95% KM (t) UCL
	Metals	Selenium	mg/kg	89	89	100	0.392	2.04	0.812	0.398	N/A	N/A	0.875	95% H-UCL
	Metals	Silver	mg/kg	89	62	70	0.02	0.889	0.12	0.168	0.0952	0.1	0.199	95% KM (Chebyshev) UCL
	Metals	Zinc	mg/kg	89	89	100	10.59	72.7	30.73	11.49	N/A	N/A	32.76	95% Approximate Gamma UCL

Table C-4
All Fish Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
North	Dioxins/Furans	2378-TCDD	ng/kg	32	32	100	3.92	203	35.11	45.97	N/A	N/A	50.47	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	32	32	100	6.19	223	44.64	52.68	N/A	N/A	65.91	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	32	32	100	6.19	223	45.26	52.86	N/A	N/A	65.6	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	32	32	100	6.19	223	45.82	52.93	N/A	N/A	65.63	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	32	32	100	5.56	211	39.04	48.29	N/A	N/A	60.42	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	32	32	100	5.56	211	39.62	48.31	N/A	N/A	59.65	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	32	32	100	5.56	211	40.24	48.45	N/A	N/A	55.63	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	32	32	100	5.4	209	38.13	47.7	N/A	N/A	53.68	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	32	32	100	5.4	209	38.66	47.86	N/A	N/A	58.92	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	32	32	100	5.4	209	39.17	47.94	N/A	N/A	58.8	95% H-UCL
	PCBs	Total PCBs (ND=0)	ng/kg	32	32	100	127000	3530000	993953	816477	N/A	N/A	1286555	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	32	32	100	127000	3530000	994125	816390	N/A	N/A	1286712	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	32	32	100	127000	3530000	994047	816431	N/A	N/A	1286643	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	32	32	100	3.28	395	76.23	103.1	N/A	N/A	179.9	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	32	32	100	3.78	395	76.65	102.8	N/A	N/A	168.1	95% H-UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	32	32	100	3.53	395	76.44	102.9	N/A	N/A	173	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	32	32	100	0.142	3.48	0.863	0.744	N/A	N/A	1.108	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	32	32	100	0.142	3.48	0.871	0.741	N/A	N/A	1.115	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	32	32	100	0.142	3.48	0.867	0.743	N/A	N/A	1.112	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	32	32	100	1.65	41.1	8.943	10.15	N/A	N/A	16.76	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	32	32	100	1.8	41.45	9.414	10.18	N/A	N/A	12.97	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	32	32	100	1.73	41.3	9.178	10.16	N/A	N/A	12.74	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	32	32	100	12.1	608	120.9	145.6	N/A	N/A	207.8	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	32	32	100	14.3	611	121.7	145.8	N/A	N/A	234	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	32	32	100	16.55	613	122.4	145.8	N/A	N/A	234.8	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	32	32	100	6.09	212	39.91	48.55	N/A	N/A	61.19	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	32	32	100	6.11	212	41.12	48.71	N/A	N/A	60.47	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	32	32	100	6.11	212	41.12	48.71	N/A	N/A	56.59	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	32	32	100	8.155	212	47.08	48.39	N/A	N/A	63.63	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	32	32	100	8.68	212	47.84	48.52	N/A	N/A	85.23	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	32	32	100	9.03	213	48.59	48.68	N/A	N/A	86.1	95% Chebyshev (Mean, Sd) UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	32	32	100	21000	600000	203234	146181	N/A	N/A	265368	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	32	32	100	21000	600000	203234	146181	N/A	N/A	265368	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	32	32	100	21000	600000	203234	146181	N/A	N/A	265368	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	32	32	100	5685	212287	65733	57779	N/A	N/A	88291	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	32	32	100	5722	212326	65813	57764	N/A	N/A	88366	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	32	32	100	5704	212307	65773	57771	N/A	N/A	88328	95% Adjusted Gamma UCL
	Pesticides	Dieldrin	pg/g	32	32	100	752	22500	8654	5415	N/A	N/A	10277	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	32	32	100	12.6	6210	1779	1730	N/A	N/A	2297	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	32	15	47	2.8	69	12.88	15.31	6.5	33	19.6	95% KM Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	32	15	47	44	310	53.27	76.18	6.5	33	114	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	32	15	47	33	160	32.81	40.18	6.5	33	64.86	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	32	27	84	3.1	610	56.99	108.3	13	33	114.9	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total LMW PAH (ND=1)	µg/kg	32	27	84	39	610	114.2	130.2	13	33	216.4	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	32	27	84	23	610	86.51	114.2	13	33	176.2	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	32	27	84	4	640	66.46	113.4	13	33	123.9	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total PAH (ND=1)	µg/kg	32	27	84	83	750	238.1	226.7	13	33	416.1	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	32	27	84	56	700	152.4	156.9	13	33	270.5	KM H-UCL
	Metals	Arsenic	mg/kg	32	32	100	0.326	2.36	0.825	0.532	N/A	N/A	0.99	95% H-UCL
	Metals	Cadmium	mg/kg	32	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	32	24	75	0.128	2.13	0.427	0.394	0.381	0.4	0.535	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	32	32	100	0.47	39.5	4.836	7.768	N/A	N/A	7.141	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	32	29	91	0.0381	1.79	0.419	0.398	0.196	0.2	0.556	95% GROS Adjusted Gamma UCL
	Metals	Mercury	ng/g	32	32	100	24.9	347	106.7	87.47	N/A	N/A	136	95% Adjusted Gamma UCL
	Metals	Methylmercury	ng/g	31	31	100	22	399.5	136.9	104.9	N/A	N/A	177	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	32	9	28	0.187	0.598	0.267	0.0937	0.381	0.4	0.309	95% KM (t) UCL
	Metals	Selenium	mg/kg	32	32	100	0.392	1.78	0.729	0.28	N/A	N/A	0.814	95% Adjusted Gamma UCL
	Metals	Silver	mg/kg	32	21	66	0.02	0.61	0.105	0.127	0.0952	0.1	0.139	KM H-UCL
	Metals	Zinc	mg/kg	32	32	100	10.59	72.7	31.54	12.3	N/A	N/A	35.65	95% Adjusted Gamma UCL

Table C-4
All Fish Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	27	27	100	1.58	75.5	19.01	22.3	N/A	N/A	28.47	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	27	27	100	2.26	95.3	27.12	28.8	N/A	N/A	45.42	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	27	27	100	4.7	95.3	27.91	28.66	N/A	N/A	43.12	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	27	27	100	4.78	95.3	28.69	28.57	N/A	N/A	42.99	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	27	27	100	1.9	84.8	22.37	24.93	N/A	N/A	32.59	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	27	27	100	3.66	84.8	23.18	24.79	N/A	N/A	36.66	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	27	27	100	3.68	84.8	23.98	24.68	N/A	N/A	33.65	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	27	27	100	1.81	83.5	21.7	24.43	N/A	N/A	31.74	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	27	27	100	3.32	83.5	22.41	24.35	N/A	N/A	36.16	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	27	27	100	3.4	83.5	23.12	24.33	N/A	N/A	32.78	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	27	27	100	114000	1780000	662833	447879	N/A	N/A	809848	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	27	27	100	114000	1780000	663130	447854	N/A	N/A	810136	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	27	27	100	114000	1780000	662907	447881	N/A	N/A	809923	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	27	27	100	1.74	210	45.26	56.71	N/A	N/A	92.83	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	27	27	100	2.72	210	45.74	56.38	N/A	N/A	93.04	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	27	27	100	2.23	210	45.5	56.54	N/A	N/A	92.93	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	27	27	100	0.147	1.24	0.475	0.294	N/A	N/A	0.571	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	27	27	100	0.147	1.25	0.496	0.29	N/A	N/A	0.591	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	27	27	100	0.147	1.24	0.485	0.29	N/A	N/A	0.58	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	27	27	100	0.896	14.1	4.254	3.798	N/A	N/A	7.44	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	27	27	100	1.53	14.9	5	3.816	N/A	N/A	8.201	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	27	27	100	1.21	14.5	4.628	3.751	N/A	N/A	7.775	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	27	27	100	6.88	293	72.33	83.49	N/A	N/A	142.4	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	27	27	100	7.88	293	73.38	83.21	N/A	N/A	143.2	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	27	27	100	8.88	293	74.39	82.91	N/A	N/A	143.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	27	27	100	2.07	85.4	22.84	25.13	N/A	N/A	33.13	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	27	27	100	3.84	85.4	23.66	24.97	N/A	N/A	33.55	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	27	27	100	3.86	85.4	24.48	24.86	N/A	N/A	34.23	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	27	27	100	4.05	90.3	25.96	25.53	N/A	N/A	36.47	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	27	27	100	4.62	90.7	27.04	25.33	N/A	N/A	37.24	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	27	27	100	5.01	91.1	28.11	25.17	N/A	N/A	38.16	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	27	27	100	17000	500000	163852	123794	N/A	N/A	204487	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	27	27	100	17000	500000	163852	123794	N/A	N/A	204487	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	27	27	100	17000	500000	163852	123794	N/A	N/A	204487	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	27	27	100	4641	162828	51914	42022	N/A	N/A	65708	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	27	27	100	4681	162828	51958	42017	N/A	N/A	65749	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	27	27	100	4661	162828	51936	42019	N/A	N/A	65729	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	27	27	100	700	21500	6829	4695	N/A	N/A	8370	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	27	27	100	17	4640	1348	1141	N/A	N/A	1723	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	27	5	19	2.7	20	5.411	3.646	6.6	33	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	27	5	19	46	65	16.12	20.16	6.6	33	65	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	27	5	19	32	34	12.51	10.87	6.6	33	34	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	27	11	41	3.5	25	8.402	5.316	6.5	33	9.901	95% GROS Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	27	11	41	41	85	30.15	30.89	6.5	33	40.78	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	27	11	41	23	51	21.36	15.98	6.5	33	27.22	95% KM (BCA) UCL
	PAHs	Total PAH (ND=0)	µg/kg	27	13	48	5.9	25	10.02	6.029	6.6	33	16.31	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1)	µg/kg	27	13	48	91	220	77.13	81.94	6.6	33	105.1	95% KM (t) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	27	13	48	55	120	43.39	42.45	6.6	33	57.89	95% KM (t) UCL
	Metals	Arsenic	mg/kg	27	27	100	0.33	2.71	0.888	0.575	N/A	N/A	1.099	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	27	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	27	17	63	0.14	0.887	0.289	0.149	0.381	0.4	0.339	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	27	26	96	0.618	23	3.364	4.715	0.396	0.396	7.398	95% KM (Chebyshev) UCL
	Metals	Lead	mg/kg	27	26	96	0.0455	0.545	0.256	0.13	0.19	0.19	0.3	95% KM (t) UCL
	Metals	Mercury	ng/g	27	27	100	26.1	245	101.7	57.25	N/A	N/A	120.5	95% Student's-t UCL
	Metals	Methylmercury	ng/g	27	27	100	21.3	225	109.7	61.12	N/A	N/A	129.7	95% Student's-t UCL
	Metals	Nickel	mg/kg	27	8	30	0.204	1.29	0.294	0.223	0.381	0.4	0.372	95% KM (t) UCL
	Metals	Selenium	mg/kg	27	27	100	0.413	1.83	0.834	0.379	N/A	N/A	0.968	95% Adjusted Gamma UCL
	Metals	Silver	mg/kg	27	21	78	0.02	0.466	0.0783	0.0932	0.0952	0.1	0.159	95% KM (Chebyshev) UCL
	Metals	Zinc	mg/kg	27	27	100	18	41.8	29.88	6.308	N/A	N/A	31.95	95% Student's-t UCL

Table C-4
All Fish Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	30	30	100	1.69	60.8	9.537	11.93	N/A	N/A	13.51	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	30	30	100	2.78	85	16.94	17.36	N/A	N/A	23.07	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	30	30	100	3.16	85	17.93	17.17	N/A	N/A	23.77	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	30	30	100	3.31	85.1	18.92	17.08	N/A	N/A	24.68	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	30	30	100	2.37	70.3	12.31	13.85	N/A	N/A	16.72	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	30	30	100	2.77	70.3	13.35	13.65	N/A	N/A	17.51	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	30	30	100	2.82	70.3	14.4	13.56	N/A	N/A	18.73	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	30	30	100	2.28	68.6	11.95	13.48	N/A	N/A	16.25	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	30	30	100	2.59	68.7	12.81	13.36	N/A	N/A	16.9	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	30	30	100	2.66	68.7	13.66	13.31	N/A	N/A	17.76	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	30	30	100	101000	3370000	949000	752659	N/A	N/A	1182488	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	30	30	100	101000	3370000	949400	752670	N/A	N/A	1182891	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	30	30	100	101000	3370000	949000	752659	N/A	N/A	1182488	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	30	30	100	2.48	333	59.43	71.97	N/A	N/A	87.65	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	30	30	100	2.96	333	59.65	71.83	N/A	N/A	87.36	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	30	30	100	2.72	333	59.54	71.89	N/A	N/A	87.49	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	30	30	100	0.0935	5.52	0.948	0.978	N/A	N/A	1.271	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	30	30	100	0.0937	5.52	0.95	0.978	N/A	N/A	1.272	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	30	30	100	0.0936	5.52	0.95	0.978	N/A	N/A	1.272	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	30	30	100	0.418	73.1	10.65	13.3	N/A	N/A	15.08	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	30	30	100	0.564	73.9	11.03	13.41	N/A	N/A	15.45	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	30	30	100	0.491	73.5	10.84	13.35	N/A	N/A	15.27	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	30	30	100	5.76	342	76.43	82.77	N/A	N/A	109.2	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	30	30	100	6.51	342	77.51	82.38	N/A	N/A	109.4	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	30	30	100	7.25	342	78.62	82.02	N/A	N/A	109.9	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	30	30	100	2.47	71.4	13.26	13.99	N/A	N/A	17.82	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	30	30	100	2.91	71.4	14.3	13.79	N/A	N/A	18.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	30	30	100	2.96	71.4	15.35	13.7	N/A	N/A	19.62	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	30	30	100	2.77	80	22.61	18.65	N/A	N/A	29.81	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	30	30	100	4.03	80.7	23.66	18.54	N/A	N/A	29.41	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	30	30	100	4.1	81.3	24.69	18.47	N/A	N/A	30.42	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	30	30	100	4700	1100000	369940	273191	N/A	N/A	454689	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	30	30	100	4700	1100000	369940	273191	N/A	N/A	454689	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	30	30	100	4700	1100000	369940	273191	N/A	N/A	454689	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	30	30	100	1114	169390	51000	48577	N/A	N/A	72610	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	30	30	100	1149	169467	51046	48587	N/A	N/A	72624	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	30	30	100	1132	169429	51023	48582	N/A	N/A	72617	95% Adjusted Gamma UCL
	Pesticides	Dieldrin	pg/g	30	30	100	253	28300	9604	8802	N/A	N/A	13858	95% Adjusted Gamma UCL
	Pesticides	Hexachlorobenzene	pg/g	30	30	100	20.2	5970	1304	1485	N/A	N/A	2048	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	30	10	33	2.9	87	13.11	15.9	6.6	33	20.52	95% KM Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	30	10	33	63	310	70.77	111.5	6.6	33	164.3	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	30	10	33	33	160	40.83	57.43	6.6	33	89.01	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	30	17	57	2.8	120	33.63	35.1	6.7	33	45.04	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	30	17	57	38	290	97.5	103	6.7	33	130.4	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	30	17	57	23	200	67.86	64.87	6.7	33	88.75	95% KM (t) UCL
	PAHs	Total PAH (ND=0)	µg/kg	30	18	60	2.8	170	41.07	45.36	13	33	55.74	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	30	18	60	110	620	238.5	241.6	13	33	436.3	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	30	18	60	56	360	140.1	135.6	13	33	251.2	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	30	30	100	0.41	2.255	0.978	0.549	N/A	N/A	1.415	95% Chebyshev (Mean, Sd) UCL
	Metals	Cadmium	mg/kg	30	1	3	0.0593	0.0593	0.0593	0	0.0952	0.1	0.0593	Maximum detected value
	Metals	Chromium	mg/kg	30	18	60	0.0997	0.766	0.217	0.156	0.385	0.4	0.271	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	30	29	97	0.61	50	9.331	13.28	0.392	0.392	20.08	95% KM (Chebyshev) UCL
	Metals	Lead	mg/kg	30	28	93	0.0469	1.06	0.287	0.255	0.192	0.196	0.384	95% GROS Adjusted Gamma UCL
	Metals	Mercury	ng/g	30	30	100	16.6	287	99.91	71.16	N/A	N/A	122	95% Student's-t UCL
	Metals	Methylmercury	ng/g	30	30	100	11.3	293	106	67.99	N/A	N/A	127.1	95% Student's-t UCL
	Metals	Nickel	mg/kg	30	9	30	0.188	0.921	0.301	0.198	0.381	0.396	0.367	95% KM (t) UCL
	Metals	Selenium	mg/kg	30	30	100	0.402	2.04	0.88	0.506	N/A	N/A	1.066	95% H-UCL
	Metals	Silver	mg/kg	30	20	67	0.022	0.889	0.174	0.232	0.0962	0.1	0.364	95% KM (Chebyshev) UCL
	Metals	Zinc	mg/kg	30	30	100	11.7	69.6	30.62	14.21	N/A	N/A	35.56	95% Adjusted Gamma UCL

Table C-5
Fish > 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	22	22	100	1.69	16.3	4.949	3.706	N/A	N/A	6.496	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	22	22	100	2.78	21.7	9.521	5.472	N/A	N/A	11.53	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	22	22	100	3.16	21.7	10.54	5.328	N/A	N/A	12.49	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	22	22	100	3.31	21.7	11.54	5.353	N/A	N/A	13.51	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	22	22	100	2.38	19.9	7.472	4.63	N/A	N/A	9.17	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	22	22	100	2.77	19.9	8.271	4.502	N/A	N/A	9.923	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	22	22	100	2.82	19.9	9.079	4.618	N/A	N/A	10.77	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	22	22	100	2.28	19.2	6.86	4.399	N/A	N/A	8.473	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	22	22	100	2.59	19.2	7.629	4.345	N/A	N/A	9.223	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	22	22	100	2.66	19.2	8.399	4.535	N/A	N/A	10.06	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	22	22	100	101000	1500000	544591	320360	N/A	N/A	662119	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	22	22	100	101000	1500000	545568	321216	N/A	N/A	663411	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	22	22	100	101000	1500000	544773	320436	N/A	N/A	662329	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	22	22	100	1.74	56.7	12.59	14.52	N/A	N/A	19.34	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	22	22	100	2.72	56.7	13.81	14.38	N/A	N/A	20.24	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	22	22	100	2.23	56.7	13.2	14.43	N/A	N/A	19.74	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	22	22	100	0.135	2.19	0.552	0.532	N/A	N/A	0.802	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	22	22	100	0.138	2.2	0.586	0.527	N/A	N/A	0.808	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	22	22	100	0.136	2.2	0.57	0.53	N/A	N/A	0.826	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	22	22	100	0.896	37.6	6.083	8.503	N/A	N/A	9.683	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	22	22	100	1.44	38.3	7.195	8.399	N/A	N/A	11.07	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	22	22	100	1.21	38	6.639	8.423	N/A	N/A	10.23	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	22	22	100	5.76	71.9	22.1	17.03	N/A	N/A	28.35	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	22	22	100	6.51	72	23.73	16.78	N/A	N/A	29.89	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	22	22	100	7.25	72	25.36	16.6	N/A	N/A	31.45	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	22	22	100	2.645	20.5	8.027	4.874	N/A	N/A	9.815	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	22	22	100	2.91	20.5	8.844	4.753	N/A	N/A	10.59	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	22	22	100	2.96	20.9	9.671	4.854	N/A	N/A	11.45	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	22	22	100	3.96	46.3	12.94	10.55	N/A	N/A	17.36	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	22	22	100	4.03	46.7	14.27	10.48	N/A	N/A	18.68	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	22	22	100	4.1	47.2	15.6	10.52	N/A	N/A	20.12	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	22	22	100	4700	610000	225009	140358	N/A	N/A	276501	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	22	22	100	4700	610000	225009	140358	N/A	N/A	276501	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	22	22	100	4700	610000	225009	140358	N/A	N/A	276501	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	22	22	100	1114	76530	44823	23649	N/A	N/A	53499	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	22	22	100	1149	76587	44914	23644	N/A	N/A	53588	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	22	22	100	1132	76558	44869	23646	N/A	N/A	53544	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	22	22	100	253	20900	8188	5495	N/A	N/A	10203	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	22	22	100	101	5970	2458	1543	N/A	N/A	3024	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	22	8	36	4.2	31	8.411	7.069	6.7	33	11.54	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	22	8	36	54.5	310	52.06	87.15	6.7	33	138.6	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	22	8	36	34	160	30.29	44.42	6.7	33	74.42	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	22	18	82	6.1	96	26.06	28.89	13	33	41.66	95% GROS Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	22	18	82	42	290	94.55	88.63	13	33	179.3	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	22	18	82	25	200	61.68	56.75	13	33	116	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	22	18	82	6.1	110	30.81	33.87	13	33	50.56	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total PAH (ND=1)	µg/kg	22	18	82	105	620	213.7	193.2	13	33	398.5	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	22	18	82	58	360	122.4	108.6	13	33	226.2	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	22	22	100	0.42	2.255	0.982	0.49	N/A	N/A	1.187	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	22	1	5	0.0593	0.0593	0.0593	0	0.0962	0.1	0.0593	Maximum detected value
	Metals	Chromium	mg/kg	22	9	41	0.105	0.348	0.194	0.0884	0.385	0.4	0.223	95% GROS Adjusted Gamma UCL
	Metals	Copper	mg/kg	22	22	100	0.61	2.94	0.864	0.479	N/A	N/A	1.04	95% Student's-t UCL
	Metals	Lead	mg/kg	22	19	86	0.0469	0.524	0.216	0.141	0.192	0.196	0.284	95% GROS Adjusted Gamma UCL
	Metals	Mercury	ng/g	22	22	100	48.15	347	164.9	84.69	N/A	N/A	196	95% Student's-t UCL
	Metals	Methylmercury	ng/g	22	22	100	64.15	399.5	180.2	90.62	N/A	N/A	213.4	95% Student's-t UCL

Table C-5
Fish > 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
NBSA-wide (cont.)	Metals	Nickel	mg/kg	22	6	27	0.206	1.29	0.306	0.247	0.385	0.4	0.405	95% KM (t) UCL
	Metals	Selenium	mg/kg	22	22	100	0.402	1.83	0.735	0.403	N/A	N/A	0.878	95% H-UCL
	Metals	Silver	mg/kg	22	14	64	0.02	0.0475	0.0277	0.00966	0.0962	0.1	0.0311	KM H-UCL
	Metals	Zinc	mg/kg	22	22	100	11.7	40.5	27.86	7.973	N/A	N/A	30.78	95% Student's-t UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	7	7	100	3.92	16.3	6.589	4.349	N/A	N/A	9.783	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	7	7	100	8.375	21.7	13.59	4.562	N/A	N/A	16.94	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	7	7	100	9.595	21.7	14.58	4.049	N/A	N/A	17.56	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	7	7	100	10.8	21.7	15.56	3.771	N/A	N/A	18.33	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	7	7	100	5.83	19.9	10.06	4.763	N/A	N/A	13.56	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	7	7	100	7.035	19.9	10.77	4.462	N/A	N/A	14.04	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	7	7	100	7.17	19.9	11.48	4.361	N/A	N/A	14.68	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	7	7	100	5.69	19.2	9.183	4.645	N/A	N/A	14.73	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	7	7	100	6.9	19.2	9.902	4.324	N/A	N/A	14.91	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	7	7	100	6.9	19.2	10.62	4.208	N/A	N/A	13.71	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	7	7	100	448000	695000	600571	82266	N/A	N/A	660992	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	7	7	100	448500	696000	601071	82500	N/A	N/A	661664	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	7	7	100	448000	696000	600857	82560	N/A	N/A	661494	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	7	7	100	3.44	56.7	20.47	20.91	N/A	N/A	35.83	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	7	7	100	4.44	56.7	21.8	20.65	N/A	N/A	36.97	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	7	7	100	3.94	56.7	21.14	20.76	N/A	N/A	36.39	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	7	7	100	0.329	2.19	0.687	0.67	N/A	N/A	1.791	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	7	7	100	0.356	2.2	0.716	0.664	N/A	N/A	1.809	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	7	7	100	0.343	2.2	0.702	0.668	N/A	N/A	1.803	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	7	7	100	1.96	37.6	8.816	12.83	N/A	N/A	29.95	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	7	7	100	2.6	38.3	9.705	12.73	N/A	N/A	32.66	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	7	7	100	2.28	38	9.268	12.79	N/A	N/A	34.6	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	7	7	100	12.1	71.9	34.06	21.65	N/A	N/A	49.97	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	7	7	100	14.3	72	35.72	20.84	N/A	N/A	51.03	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	7	7	100	16.55	72	37.37	20.06	N/A	N/A	52.11	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	7	7	100	6.19	20.5	10.76	4.872	N/A	N/A	14.33	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	7	7	100	7.395	20.5	11.47	4.515	N/A	N/A	14.78	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	7	7	100	7.73	20.5	12.19	4.348	N/A	N/A	15.38	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	7	7	100	8.155	46.3	18	13.73	N/A	N/A	37.41	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	7	7	100	9.735	46.7	19.17	13.23	N/A	N/A	34.19	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	7	7	100	11.34	47.2	20.36	12.81	N/A	N/A	33.86	95% H-UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	7	7	100	135000	310000	196429	57352	N/A	N/A	238551	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	7	7	100	135000	310000	196429	57352	N/A	N/A	238551	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	7	7	100	135000	310000	196429	57352	N/A	N/A	238551	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	7	7	100	18783	75510	54336	21119	N/A	N/A	69847	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	7	7	100	18783	75590	54490	21054	N/A	N/A	69954	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	7	7	100	18783	75550	54413	21086	N/A	N/A	69900	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	7	7	100	3280	15000	8209	4314	N/A	N/A	11377	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	7	7	100	556	5130	2824	1557	N/A	N/A	3968	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	7	3	43	5	31	10.63	9.221	13	33	31	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	7	3	43	54.5	65	33.36	23.68	13	33	65	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	7	3	43	34.5	43	23.5	12.39	13	33	43	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	7	7	100	7.6	36.5	22.51	10.46	N/A	N/A	30.2	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	7	7	100	46	220	88.43	60.39	N/A	N/A	166.3	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	7	7	100	36	120	55.43	28.84	N/A	N/A	76.61	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	7	7	100	7.6	67.5	28.8	20.51	N/A	N/A	43.86	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	7	7	100	105	550	217.1	155.7	N/A	N/A	431.1	95% Adjusted Gamma UCL

Table C-5
Fish > 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
North (cont.)	PAHs	Total PAH (ND=1/2)	µg/kg	7	7	100	72	280	122.4	71.81	N/A	N/A	175.1	95% Student's-t UCL
	Metals	Arsenic	mg/kg	7	7	100	0.544	1.5	0.833	0.372	N/A	N/A	1.299	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	7	0	0	N/A	N/A	N/A	N/A	0.0971	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	7	4	57	0.148	0.348	0.251	0.0942	0.392	0.396	0.348	Maximum detected value
	Metals	Copper	mg/kg	7	7	100	0.653	1.1	0.782	0.182	N/A	N/A	0.915	95% Student's-t UCL
	Metals	Lead	mg/kg	7	6	86	0.137	0.524	0.259	0.143	0.196	0.196	0.375	95% KM (t) UCL
	Metals	Mercury	ng/g	7	7	100	48.15	347	200.6	118.2	N/A	N/A	287.4	95% Student's-t UCL
	Metals	Methylmercury	ng/g	7	7	100	64.15	399.5	233.5	123.1	N/A	N/A	323.9	95% Student's-t UCL
	Metals	Nickel	mg/kg	7	1	14	0.206	0.206	0.206	0	0.388	0.396	0.206	Maximum detected value
	Metals	Selenium	mg/kg	7	7	100	0.454	0.696	0.574	0.0869	N/A	N/A	0.638	95% Student's-t UCL
	Metals	Silver	mg/kg	7	3	43	0.02	0.0433	0.0278	0.0109	0.0971	0.1	0.0433	Maximum detected value
	Metals	Zinc	mg/kg	7	7	100	13.2	35.6	26.57	8.565	N/A	N/A	32.86	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	1.89	9.27	4.203	2.812	N/A	N/A	6.517	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	4.79	16.7	9.638	4.655	N/A	N/A	13.47	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	5.31	17.2	10.52	4.383	N/A	N/A	14.13	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	5.82	17.7	11.38	4.289	N/A	N/A	14.91	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	3.69	14	7.487	3.966	N/A	N/A	10.75	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.74	14	7.948	3.715	N/A	N/A	11	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	3.79	14.1	8.428	3.787	N/A	N/A	11.54	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	3.25	13	6.658	3.731	N/A	N/A	9.728	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	3.32	13	7.125	3.507	N/A	N/A	10.01	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	3.4	13.1	7.613	3.608	N/A	N/A	10.58	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	275000	710000	489500	198368	N/A	N/A	652686	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	275000	712000	490500	199076	N/A	N/A	654268	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	275000	711000	489833	198734	N/A	N/A	653320	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	1.74	5.67	3.215	1.447	N/A	N/A	4.405	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	2.72	8.27	5.073	2.325	N/A	N/A	6.986	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	2.23	6.11	4.143	1.725	N/A	N/A	5.562	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.15	0.475	0.293	0.138	N/A	N/A	0.406	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.177	0.632	0.375	0.197	N/A	N/A	0.537	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.164	0.524	0.334	0.163	N/A	N/A	0.468	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	0.896	4.77	2.067	1.463	N/A	N/A	3.27	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	1.53	8.03	4.37	3.017	N/A	N/A	6.852	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	1.21	5.48	3.217	2.069	N/A	N/A	4.919	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	6.88	20.6	12.85	5.704	N/A	N/A	17.54	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	7.88	23.3	14.65	6.01	N/A	N/A	19.6	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	8.88	25.9	16.46	6.449	N/A	N/A	21.77	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	3.86	14.4	7.775	4.066	N/A	N/A	11.12	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.92	14.6	8.288	3.877	N/A	N/A	11.48	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	3.98	14.7	8.81	3.944	N/A	N/A	12.05	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	4.23	15.5	8.72	4.558	N/A	N/A	12.47	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	4.62	18.3	10.35	5.264	N/A	N/A	14.68	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	5.01	21.1	11.98	6.143	N/A	N/A	17.03	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	85000	300000	202500	76273	N/A	N/A	265245	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	85000	300000	202500	76273	N/A	N/A	265245	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	85000	300000	202500	76273	N/A	N/A	265245	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	37320	68816	52749	10158	N/A	N/A	61105	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	37372	68855	52807	10153	N/A	N/A	61159	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	37346	68836	52778	10156	N/A	N/A	61132	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	6310	14300	9313	2744	N/A	N/A	11571	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	1270	3390	2213	706	N/A	N/A	2794	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	1	17	4.3	4.3	4.3	0	6.7	13	4.3	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	1	17	65	65	16.42	21.73	6.7	13	65	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	1	17	34	34	11.25	10.17	6.7	13	34	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	6	100	6.1	10	7.617	1.35	N/A	N/A	8.727	95% Student's-t UCL

Table C-5
Fish > 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southeast (cont.)	PAHs	Total LMW PAH (ND=1)	µg/kg	6	6	100	42	85	65.67	20.98	N/A	N/A	82.93	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	6	100	25	46	36.5	10.17	N/A	N/A	44.87	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	6	6	100	6.1	14	8.283	2.881	N/A	N/A	12.3	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=1)	µg/kg	6	6	100	110	220	161.7	56.72	N/A	N/A	208.3	95% Student's-t UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	6	6	100	58	110	85.67	26.75	N/A	N/A	107.7	95% Student's-t UCL
	Metals	Arsenic	mg/kg	6	6	100	0.585	1.19	0.953	0.247	N/A	N/A	1.156	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0971	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	6	1	17	0.14	0.14	0.14	0	0.388	0.4	0.14	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	0.618	0.9	0.748	0.098	N/A	N/A	0.829	95% Student's-t UCL
	Metals	Lead	mg/kg	6	6	100	0.113	0.339	0.182	0.0984	N/A	N/A	0.263	95% Student's-t UCL
	Metals	Mercury	ng/g	6	6	100	113	245	152.8	47.37	N/A	N/A	191.8	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	121	225	154.7	38.23	N/A	N/A	186.1	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	2	33	0.213	1.29	0.393	0.401	0.388	0.4	1.29	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.899	1.83	1.265	0.433	N/A	N/A	1.621	95% Student's-t UCL
	Metals	Silver	mg/kg	6	6	100	0.02	0.0475	0.0274	0.0103	N/A	N/A	0.0421	95% Adjusted Gamma UCL
	Metals	Zinc	mg/kg	6	6	100	25.2	39.9	31.5	4.838	N/A	N/A	35.48	95% Student's-t UCL
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	9	9	100	1.69	12.1	4.171	3.671	N/A	N/A	9.504	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	9	9	100	2.78	15.6	6.276	4.803	N/A	N/A	13.25	95% Chebyshev (Mean, Sd) UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	9	9	100	3.16	18.1	7.403	4.985	N/A	N/A	10.49	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	9	9	100	3.31	20.6	8.534	5.363	N/A	N/A	11.86	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	9	9	100	2.38	14.2	5.449	4.356	N/A	N/A	10.07	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	9	9	100	2.77	16.7	6.547	4.56	N/A	N/A	10.88	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	9	9	100	2.82	19.2	7.647	5.01	N/A	N/A	10.75	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	9	9	100	2.28	13.9	5.187	4.243	N/A	N/A	9.583	95% H-UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	9	9	100	2.59	16.4	6.197	4.564	N/A	N/A	10.61	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	9	9	100	2.66	18.9	7.193	5.113	N/A	N/A	10.36	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	9	9	100	101000	1500000	537778	484423	N/A	N/A	838047	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	9	9	100	101000	1500000	539111	485753	N/A	N/A	840205	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	9	9	100	101000	1500000	537778	484423	N/A	N/A	838047	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	9	9	100	2.48	28.9	12.7	10.19	N/A	N/A	19.02	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	9	9	100	2.96	29.1	13.43	10.3	N/A	N/A	19.81	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	2.72	28.9	13.07	10.24	N/A	N/A	19.42	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	9	9	100	0.135	1.66	0.621	0.568	N/A	N/A	0.973	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	9	9	100	0.138	1.67	0.625	0.569	N/A	N/A	0.978	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	0.136	1.67	0.624	0.57	N/A	N/A	0.977	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	1.44	18.7	6.635	6.788	N/A	N/A	14.99	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	1.44	18.7	7.127	6.813	N/A	N/A	11.35	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	1.44	18.7	6.875	6.785	N/A	N/A	11.08	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	9	9	100	5.76	42.2	18.96	13.74	N/A	N/A	27.48	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	6.51	45.9	20.46	13.83	N/A	N/A	29.03	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	9	9	100	7.25	49.6	21.94	14.04	N/A	N/A	30.64	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	9	9	100	2.645	15.9	6.073	4.834	N/A	N/A	11.33	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	2.91	18.4	7.174	5.023	N/A	N/A	10.29	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	9	9	100	2.96	20.9	8.287	5.448	N/A	N/A	13.59	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	3.96	32.6	11.82	10.03	N/A	N/A	18.03	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	4.03	35.1	13.08	10.28	N/A	N/A	23.99	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	4.1	37.6	14.31	10.59	N/A	N/A	20.88	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	9	9	100	4700	610000	262244	207259	N/A	N/A	390714	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	9	9	100	4700	610000	262244	207259	N/A	N/A	390714	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	9	9	100	4700	610000	262244	207259	N/A	N/A	390714	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	9	9	100	1114	76530	32141	27601	N/A	N/A	49250	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	9	9	100	1149	76587	32203	27603	N/A	N/A	49312	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	9	9	100	1132	76558	32172	27602	N/A	N/A	49281	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	9	9	100	253	20900	7421	7680	N/A	N/A	12181	95% Student's-t UCL

Table C-5
Fish > 30 cm in Length Dietary EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	Selected EPC Type
Southwest (cont.)	Pesticides	Hexachlorobenzene	pg/g	9	9	100	101	5970	2336	1985	N/A	N/A	3567	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	9	4	44	4.2	20	10.27	6.344	13	33	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	9	4	44	65	310	96.67	119.1	13	33	310	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	9	4	44	34	160	54.56	59.25	13	33	160	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	9	5	56	6.9	96	40.06	39.52	13	33	96	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	9	5	56	47	290	118.6	124	13	33	290	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	9	5	56	27	200	82.26	80.46	13	33	200	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	9	5	56	11	110	47.89	43.04	13	33	110	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	9	5	56	110	620	245.8	265.4	13	33	620	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	9	5	56	61	360	147	153.2	13	33	360	Maximum detected value
	Metals	Arsenic	mg/kg	9	9	100	0.42	2.255	1.116	0.669	N/A	N/A	1.531	95% Student's-t UCL
	Metals	Cadmium	mg/kg	9	1	11	0.0593	0.0593	0.0593	0	0.0962	0.1	0.0593	Maximum detected value
	Metals	Chromium	mg/kg	9	4	44	0.105	0.242	0.151	0.0543	0.385	0.4	0.242	Maximum detected value
	Metals	Copper	mg/kg	9	9	100	0.61	2.94	1.005	0.731	N/A	N/A	1.458	95% Student's-t UCL
	Metals	Lead	mg/kg	9	7	78	0.0469	0.469	0.203	0.159	0.192	0.196	0.311	95% KM (t) UCL
	Metals	Mercury	ng/g	9	9	100	57	262	145.2	72.71	N/A	N/A	190.3	95% Student's-t UCL
	Metals	Methylmercury	ng/g	9	9	100	77.8	293	155.7	74.97	N/A	N/A	202.1	95% Student's-t UCL
	Metals	Nickel	mg/kg	9	3	33	0.486	0.681	0.441	0.095	0.385	0.396	0.681	Maximum detected value
	Metals	Selenium	mg/kg	9	9	100	0.402	0.74	0.506	0.108	N/A	N/A	0.574	95% Student's-t UCL
	Metals	Silver	mg/kg	9	5	56	0.022	0.0461	0.0279	0.00918	0.0962	0.1	0.0461	Maximum detected value
	Metals	Zinc	mg/kg	9	9	100	11.7	40.5	26.43	9.139	N/A	N/A	32.1	95% Student's-t UCL

Table C-6
Polychaete Worm Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	8	8	100	1.2	17.1	4.906	5.148	N/A	N/A	11.32	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	8	8	100	3.85	21.1	8.336	5.417	N/A	N/A	13.89	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	8	8	100	5.37	23.6	10.19	5.873	N/A	N/A	14.12	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	8	8	100	5.37	26.1	12.04	6.503	N/A	N/A	16.39	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	8	8	100	1.83	18.4	6.023	5.208	N/A	N/A	11.87	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	8	8	100	3.41	20.9	7.874	5.645	N/A	N/A	14.09	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	8	8	100	3.41	23.3	9.709	6.229	N/A	N/A	13.88	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	8	8	100	1.8	18.2	5.946	5.155	N/A	N/A	11.74	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	8	8	100	3.34	20.7	7.799	5.587	N/A	N/A	13.95	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	8	8	100	3.34	23.2	9.653	6.205	N/A	N/A	13.81	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	8	8	100	27600	84200	48256	20555	N/A	N/A	62025	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	8	8	100	27700	84400	48413	20577	N/A	N/A	62195	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	8	8	100	27700	84300	48338	20571	N/A	N/A	62117	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	8	8	100	5.35	22.8	10.68	6.914	N/A	N/A	21.34	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	8	8	100	5.36	22.8	10.74	6.868	N/A	N/A	21.33	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	8	8	100	5.35	22.8	10.71	6.891	N/A	N/A	21.33	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	8	8	100	0.0218	0.122	0.0614	0.0327	N/A	N/A	0.0833	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	8	8	100	0.022	0.122	0.0633	0.0313	N/A	N/A	0.0843	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	8	8	100	0.0219	0.122	0.0624	0.0319	N/A	N/A	0.0837	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	8	8	100	0.063	1.51	0.639	0.474	N/A	N/A	0.957	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	8	8	100	0.211	1.66	0.818	0.459	N/A	N/A	1.125	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	8	8	100	0.137	1.58	0.728	0.464	N/A	N/A	1.039	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	8	8	100	9.2	43.9	19.01	11.89	N/A	N/A	26.98	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	8	8	100	10.7	46.4	20.91	12.37	N/A	N/A	29.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	8	8	100	10.7	48.9	22.79	12.92	N/A	N/A	31.44	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	8	8	100	1.88	18.4	6.076	5.195	N/A	N/A	11.9	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	8	8	100	3.46	20.9	7.928	5.633	N/A	N/A	11.7	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	8	8	100	3.46	23.4	9.785	6.253	N/A	N/A	13.97	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	8	8	100	2.43	18.4	6.591	5.089	N/A	N/A	10	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	8	8	100	4.07	21	8.542	5.544	N/A	N/A	12.26	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	8	8	100	4.14	23.5	10.46	6.137	N/A	N/A	14.57	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	8	8	100	1500	6100	3050	1743	N/A	N/A	4217	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	8	8	100	1600	6100	3088	1716	N/A	N/A	4237	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	8	8	100	1600	6100	3088	1716	N/A	N/A	4237	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	8	8	100	765.6	2779	1895	780.1	N/A	N/A	2418	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	8	8	100	881.1	2857	1995	765.2	N/A	N/A	2508	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	8	8	100	823.4	2818	1945	772.6	N/A	N/A	2463	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	8	8	100	438	3140	1298	806.7	N/A	N/A	2209	95% Adjusted Gamma UCL
	Pesticides	Hexachlorobenzene	pg/g	8	8	100	106	556	269.4	174.1	N/A	N/A	386	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	8	6	75	9	55	20.98	18.27	13	13	51.84	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	8	6	75	120	140	100.8	50.91	13	13	138.1	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	8	6	75	68	96	60.75	29.13	13	13	76	95% KM (BCA) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	8	0	0	N/A	N/A	N/A	N/A	13	13	13	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	8	0	0	N/A	N/A	N/A	N/A	13	13	13	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	8	0	0	N/A	N/A	N/A	N/A	13	13	13	Maximum non-detected value
	PAHs	Total PAH (ND=0)	µg/kg	8	6	75	9	55	20.98	18.27	13	13	51.84	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1)	µg/kg	8	6	75	210	230	168.3	89.77	13	13	230	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PAHs	Total PAH (ND=1/2)	µg/kg	8	6	75	110	140	94.5	47.95	13	13	129.7	95% KM (t) UCL
	Metals	Arsenic	mg/kg	8	8	100	2.17	2.935	2.582	0.286	N/A	N/A	2.773	95% Student's-t UCL
	Metals	Cadmium	mg/kg	8	7	88	0.0516	0.121	0.0755	0.023	0.098	0.098	0.0923	95% KM (t) UCL
	Metals	Chromium	mg/kg	8	6	75	0.223	0.927	0.433	0.268	0.388	0.388	0.63	95% KM (t) UCL
	Metals	Copper	mg/kg	8	8	100	1.67	2.44	2.003	0.246	N/A	N/A	2.167	95% Student's-t UCL
	Metals	Lead	mg/kg	8	8	100	0.256	0.839	0.53	0.214	N/A	N/A	0.674	95% Student's-t UCL
	Metals	Mercury	ng/g	8	8	100	24	34	27.02	4.125	N/A	N/A	29.78	95% Student's-t UCL
	Metals	Methylmercury	ng/g	8	1	13	3.7	3.7	1.775	0.728	1.5	2.1	3.7	Maximum detected value
	Metals	Nickel	mg/kg	8	8	100	0.312	0.57	0.452	0.098	N/A	N/A	0.518	95% Student's-t UCL
	Metals	Selenium	mg/kg	8	8	100	0.282	0.387	0.334	0.0366	N/A	N/A	0.359	95% Student's-t UCL
	Metals	Silver	mg/kg	8	8	100	0.0204	0.041	0.0323	0.0073	N/A	N/A	0.0372	95% Student's-t UCL
	Metals	Zinc	mg/kg	8	8	100	16.4	46.3	27.66	11.38	N/A	N/A	35.29	95% Student's-t UCL

Table C-7
Softshell Clam Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	18	18	100	1.69	13.4	5.178	2.8	N/A	N/A	6.556	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	18	18	100	4.34	18.6	8.644	3.486	N/A	N/A	10.07	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	18	18	100	4.34	18.6	9.066	3.674	N/A	N/A	10.57	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	18	18	100	4.34	18.6	9.491	4.069	N/A	N/A	11.16	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	18	18	100	2.87	15.6	6.373	3.054	N/A	N/A	7.625	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	18	18	100	2.87	15.6	6.855	3.262	N/A	N/A	8.192	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	18	18	100	2.87	15.6	7.336	3.697	N/A	N/A	8.852	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	18	18	100	2.73	15.2	6.298	2.996	N/A	N/A	7.527	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	18	18	100	2.73	15.2	6.728	3.228	N/A	N/A	8.051	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	18	18	100	2.73	15.3	7.159	3.683	N/A	N/A	8.669	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	18	18	100	0.0679	47.6	8.371	12.34	N/A	N/A	16.31	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	18	18	100	0.988	47.6	8.432	12.31	N/A	N/A	21.08	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	18	18	100	0.55	47.6	8.398	12.32	N/A	N/A	21.06	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	18	18	100	0.00854	0.481	0.102	0.112	N/A	N/A	0.157	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	18	18	100	0.0327	0.481	0.104	0.111	N/A	N/A	0.153	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	18	18	100	0.0219	0.481	0.103	0.111	N/A	N/A	0.155	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	18	18	100	0.0512	6.59	1.28	1.466	N/A	N/A	2.002	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	18	18	100	0.522	6.73	1.444	1.447	N/A	N/A	1.951	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	18	18	100	0.364	6.66	1.362	1.456	N/A	N/A	1.985	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=0)	ng/kg	18	18	100	33000	431000	101594	93428	N/A	N/A	143181	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	18	18	100	33200	431000	101689	93379	N/A	N/A	143223	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	18	18	100	33100	431000	101628	93411	N/A	N/A	143197	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	18	18	100	5.95	60.5	17.03	13.51	N/A	N/A	23.3	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	18	18	100	5.95	60.5	17.48	13.34	N/A	N/A	23.67	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	18	18	100	5.96	60.5	17.93	13.25	N/A	N/A	24.13	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	18	18	100	2.94	15.6	6.471	3.037	N/A	N/A	7.716	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	18	18	100	2.94	15.6	6.955	3.242	N/A	N/A	8.284	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	18	18	100	2.94	15.6	7.438	3.68	N/A	N/A	8.947	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	18	18	100	3.91	16.2	7.585	3.209	N/A	N/A	8.901	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	18	18	100	3.98	16.2	8.09	3.352	N/A	N/A	9.465	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	18	18	100	4.05	16.8	8.607	3.734	N/A	N/A	10.14	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	18	18	100	5000	54000	17400	15496	N/A	N/A	25982	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	18	18	100	5000	54000	17406	15492	N/A	N/A	25981	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	18	18	100	5000	54000	17400	15496	N/A	N/A	25982	95% Adjusted Gamma UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	18	18	100	1782	5846	3073	989.7	N/A	N/A	3478	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	18	18	100	2178	5884	3207	965.1	N/A	N/A	3602	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	18	18	100	1980	5865	3140	975.4	N/A	N/A	3540	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	18	18	100	342	897	554.3	167.7	N/A	N/A	623.1	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	18	18	100	120	606	233.5	106.3	N/A	N/A	279	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	18	18	100	170	580	330	128.8	N/A	N/A	382.8	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	18	18	100	170	580	330	128.8	N/A	N/A	382.8	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	18	18	100	170	580	330	128.8	N/A	N/A	382.8	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	18	18	100	9.6	170	39.92	39.33	N/A	N/A	58.82	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	18	18	100	34	170	54.11	32.53	N/A	N/A	67.45	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	18	18	100	25	170	46.83	35.81	N/A	N/A	59.57	95% H-UCL
	PAHs	Total PAH (ND=0)	µg/kg	18	18	100	180	720	367.8	161.5	N/A	N/A	434	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	18	18	100	200	720	383.9	152	N/A	N/A	446.2	95% Student's-t UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	18	18	100	190	720	376.7	156.2	N/A	N/A	440.7	95% Student's-t UCL
	Metals	Arsenic	mg/kg	18	18	100	1.43	12.4	4.65	2.976	N/A	N/A	5.87	95% Student's-t UCL
	Metals	Cadmium	mg/kg	18	17	94	0.13	0.345	0.203	0.0584	0.1	0.1	0.227	95% KM (t) UCL
	Metals	Chromium	mg/kg	18	17	94	1.18	7.47	3.398	1.881	0.4	0.4	4.193	95% KM (t) UCL
	Metals	Copper	mg/kg	18	18	100	6.29	30.2	10.62	5.485	N/A	N/A	12.89	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	18	17	94	4.61	94.8	16.4	20.31	0.2	0.2	28.96	95% GROS Adjusted Gamma UCL

Table C-7
Softshell Clam Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Mercury	ng/g	18	18	100	50.5	391	103.9	80.64	N/A	N/A	186.7	95% Chebyshev (Mean, Sd) UCL
	Metals	Methylmercury	ng/g	18	18	100	14.7	63.2	35.37	14.44	N/A	N/A	41.29	95% Student's-t UCL
	Metals	Nickel	mg/kg	18	17	94	1.03	4.99	2.163	1.062	0.4	0.4	2.755	95% KM Adjusted Gamma UCL
	Metals	Selenium	mg/kg	18	18	100	0.744	1.12	0.907	0.104	N/A	N/A	0.95	95% Student's-t UCL
	Metals	Silver	mg/kg	18	18	100	0.142	0.816	0.37	0.171	N/A	N/A	0.44	95% Student's-t UCL
	Metals	Zinc	mg/kg	18	18	100	21.9	140	36.51	26.77	N/A	N/A	47.48	95% Student's-t UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	8	8	100	3.63	13.4	6.188	3.084	N/A	N/A	9.186	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	8	8	100	5.57	18.6	9.473	3.937	N/A	N/A	13.27	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	8	8	100	5.57	18.6	9.794	3.914	N/A	N/A	13.67	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	8	8	100	5.57	18.6	10.12	4.082	N/A	N/A	12.86	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	8	8	100	4.32	15.6	7.494	3.489	N/A	N/A	10.89	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	8	8	100	4.32	15.6	7.949	3.4	N/A	N/A	10.23	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	8	8	100	4.32	15.6	8.4	3.545	N/A	N/A	10.77	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	8	8	100	4.28	15.2	7.37	3.374	N/A	N/A	10.65	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	8	8	100	4.28	15.2	7.708	3.357	N/A	N/A	9.956	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	8	8	100	4.28	15.2	8.049	3.562	N/A	N/A	10.43	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	8	8	100	33000	144000	70488	41425	N/A	N/A	98236	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	8	8	100	33200	144000	70588	41358	N/A	N/A	98290	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	8	8	100	33100	144000	70525	41399	N/A	N/A	98256	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	8	8	100	0.0679	15.1	3.969	5.091	N/A	N/A	14.78	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	8	8	100	0.988	15.1	4.092	4.994	N/A	N/A	11.62	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	8	8	100	0.55	15.1	4.029	5.04	N/A	N/A	12.18	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	8	8	100	0.00854	0.0852	0.0501	0.0274	N/A	N/A	0.0684	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	8	8	100	0.0327	0.0854	0.0536	0.0229	N/A	N/A	0.0689	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	8	8	100	0.0219	0.0853	0.0518	0.0248	N/A	N/A	0.0684	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	8	8	100	0.0512	1.16	0.629	0.356	N/A	N/A	0.868	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	8	8	100	0.522	1.31	0.818	0.263	N/A	N/A	0.994	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	8	8	100	0.364	1.23	0.723	0.298	N/A	N/A	0.922	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	8	8	100	7.81	24.6	13.45	5.938	N/A	N/A	17.43	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	8	8	100	8.29	24.6	13.84	5.671	N/A	N/A	17.63	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	8	8	100	8.77	24.6	14.21	5.528	N/A	N/A	17.91	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	8	8	100	4.36	15.6	7.535	3.474	N/A	N/A	10.92	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	8	8	100	4.36	15.6	7.994	3.385	N/A	N/A	10.26	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	8	8	100	4.36	15.6	8.453	3.538	N/A	N/A	10.82	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	8	8	100	4.65	16.2	8.005	3.539	N/A	N/A	11.44	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	8	8	100	4.73	16.2	8.436	3.465	N/A	N/A	10.76	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	8	8	100	4.8	16.2	8.869	3.604	N/A	N/A	11.28	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	8	8	100	5200	14000	7625	3215	N/A	N/A	9778	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	8	8	100	5200	14000	7638	3207	N/A	N/A	9786	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	8	8	100	5200	14000	7625	3215	N/A	N/A	9778	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	8	8	100	1782	4305	2864	884	N/A	N/A	3456	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	8	8	100	2178	4382	3014	867.1	N/A	N/A	3595	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	8	8	100	1980	4344	2939	872.5	N/A	N/A	3524	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	8	8	100	342	648	482.3	115.9	N/A	N/A	559.9	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	8	8	100	120	270	202	42.63	N/A	N/A	230.6	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	8	8	100	220	500	347.5	96.33	N/A	N/A	412	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	8	8	100	220	500	347.5	96.33	N/A	N/A	412	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	8	8	100	220	500	347.5	96.33	N/A	N/A	412	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	8	8	100	13	59	30.13	15.77	N/A	N/A	40.69	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	8	8	100	34	65	43	10.01	N/A	N/A	49.71	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	8	8	100	26	62	36.38	12.59	N/A	N/A	44.81	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	8	8	100	230	550	375	110.2	N/A	N/A	448.8	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	8	8	100	260	560	391.3	102.6	N/A	N/A	460	95% Student's-t UCL

Table C-7
Softshell Clam Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	PAHs	Total PAH (ND=1/2)	µg/kg	8	8	100	250	560	385	105.7	N/A	N/A	455.8	95% Student's-t UCL
	Metals	Arsenic	mg/kg	8	8	100	3.73	8.67	5.415	1.73	N/A	N/A	6.574	95% Student's-t UCL
	Metals	Cadmium	mg/kg	8	8	100	0.138	0.243	0.203	0.0354	N/A	N/A	0.226	95% Student's-t UCL
	Metals	Chromium	mg/kg	8	8	100	2.13	5.18	3.624	1.192	N/A	N/A	4.422	95% Student's-t UCL
	Metals	Copper	mg/kg	8	8	100	6.29	11.1	8.543	1.815	N/A	N/A	9.758	95% Student's-t UCL
	Metals	Lead	mg/kg	8	8	100	4.98	27.1	16.03	7.229	N/A	N/A	20.87	95% Student's-t UCL
	Metals	Mercury	ng/g	8	8	100	50.5	391	120.7	111.9	N/A	N/A	239.2	95% Adjusted Gamma UCL
	Metals	Methylmercury	ng/g	8	8	100	21.6	60.9	36.85	12.9	N/A	N/A	45.49	95% Student's-t UCL
	Metals	Nickel	mg/kg	8	8	100	1.35	4.19	2.471	0.877	N/A	N/A	3.059	95% Student's-t UCL
	Metals	Selenium	mg/kg	8	8	100	0.869	1.12	0.968	0.108	N/A	N/A	1.04	95% Student's-t UCL
	Metals	Silver	mg/kg	8	8	100	0.244	0.549	0.388	0.0983	N/A	N/A	0.453	95% Student's-t UCL
	Metals	Zinc	mg/kg	8	8	100	24.8	32.4	28.74	2.816	N/A	N/A	30.62	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	4	4	100	2.75	9.59	4.963	3.129	N/A	N/A	9.59	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	4	4	100	5.01	12.9	7.97	3.438	N/A	N/A	12.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	4	4	100	5.01	15.3	9.165	4.393	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	4	4	100	5.01	17.7	10.37	5.531	N/A	N/A	17.7	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	4	4	100	3.48	10.5	5.868	3.18	N/A	N/A	10.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	4	4	100	3.48	12.9	7.063	4.091	N/A	N/A	12.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	4	4	100	3.48	15.3	8.26	5.213	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	4	4	100	3.48	10.5	5.888	3.17	N/A	N/A	10.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	4	4	100	3.48	12.9	7.083	4.085	N/A	N/A	12.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	4	4	100	3.48	15.3	8.28	5.209	N/A	N/A	15.3	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	4	4	100	43400	85000	61700	20811	N/A	N/A	85000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	4	4	100	43500	85200	61825	20848	N/A	N/A	85200	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	4	4	100	43400	85100	61725	20848	N/A	N/A	85100	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	4	4	100	1.04	2.58	1.628	0.675	N/A	N/A	2.58	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	4	4	100	1.05	2.58	1.633	0.672	N/A	N/A	2.58	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	4	4	100	1.04	2.58	1.63	0.675	N/A	N/A	2.58	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	4	4	100	0.0343	0.0966	0.0577	0.0288	N/A	N/A	0.0966	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	4	4	100	0.0346	0.0969	0.058	0.0288	N/A	N/A	0.0969	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	4	4	100	0.0345	0.0967	0.0578	0.0288	N/A	N/A	0.0967	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	4	4	100	0.466	1.34	0.798	0.398	N/A	N/A	1.34	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	4	4	100	0.613	1.48	0.944	0.395	N/A	N/A	1.48	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	4	4	100	0.54	1.41	0.871	0.396	N/A	N/A	1.41	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	4	4	100	6.29	15.5	9.6	4.05	N/A	N/A	15.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	4	4	100	6.3	17.9	10.8	5.035	N/A	N/A	17.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	4	4	100	6.3	20.3	12	6.174	N/A	N/A	20.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	4	4	100	3.51	10.6	5.925	3.208	N/A	N/A	10.6	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	4	4	100	3.51	13	7.123	4.121	N/A	N/A	13	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	4	4	100	3.51	15.4	8.318	5.244	N/A	N/A	15.4	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	4	4	100	3.95	11.9	6.703	3.555	N/A	N/A	11.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	4	4	100	4.02	14.3	7.95	4.469	N/A	N/A	14.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	4	4	100	4.1	16.8	9.23	5.608	N/A	N/A	16.8	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	4	4	100	5000	12000	8300	3151	N/A	N/A	12000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	4	4	100	5000	12000	8300	3151	N/A	N/A	12000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	4	4	100	5000	12000	8300	3151	N/A	N/A	12000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	4	4	100	2406	3766	2972	577	N/A	N/A	3766	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	4	4	100	2485	3805	3039	559.1	N/A	N/A	3805	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	4	4	100	2446	3786	3006	568	N/A	N/A	3786	Maximum detected value
	Pesticides	Dieldrin	pg/g	4	4	100	393	753	561	151.4	N/A	N/A	753	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	4	4	100	141	265	183.3	55.54	N/A	N/A	265	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	4	4	100	170	260	212.5	37.75	N/A	N/A	260	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	4	4	100	170	260	212.5	37.75	N/A	N/A	260	Maximum detected value

Table C-7
Softshell Clam Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	PAHs	Total HMW PAH (ND=1/2)	µg/kg	4	4	100	170	260	212.5	37.75	N/A	N/A	260	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	4	4	100	9.6	35	20.9	11.12	N/A	N/A	35	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	4	4	100	35	54	44	7.789	N/A	N/A	54	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	4	4	100	25	44	32.25	8.808	N/A	N/A	44	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	4	4	100	180	280	230	40.82	N/A	N/A	280	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	4	4	100	200	300	255	42.03	N/A	N/A	300	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	4	4	100	190	290	242.5	41.13	N/A	N/A	290	Maximum detected value
	Metals	Arsenic	mg/kg	4	4	100	1.43	2.86	2.155	0.585	N/A	N/A	2.86	Maximum detected value
	Metals	Cadmium	mg/kg	4	4	100	0.162	0.264	0.21	0.0419	N/A	N/A	0.264	Maximum detected value
	Metals	Chromium	mg/kg	4	4	100	1.78	7.47	4.058	2.788	N/A	N/A	7.47	Maximum detected value
	Metals	Copper	mg/kg	4	4	100	7.62	13.8	9.65	2.806	N/A	N/A	13.8	Maximum detected value
	Metals	Lead	mg/kg	4	4	100	4.89	11	8.453	2.574	N/A	N/A	11	Maximum detected value
	Metals	Mercury	ng/g	4	4	100	55.3	101	73.43	19.64	N/A	N/A	101	Maximum detected value
	Metals	Methylmercury	ng/g	4	4	100	18	46.6	36.13	13.23	N/A	N/A	46.6	Maximum detected value
	Metals	Nickel	mg/kg	4	4	100	1.64	2.56	2.025	0.407	N/A	N/A	2.56	Maximum detected value
	Metals	Selenium	mg/kg	4	4	100	0.744	0.878	0.803	0.0557	N/A	N/A	0.878	Maximum detected value
	Metals	Silver	mg/kg	4	4	100	0.245	0.816	0.515	0.247	N/A	N/A	0.816	Maximum detected value
	Metals	Zinc	mg/kg	4	4	100	21.9	31.3	27.75	4.064	N/A	N/A	31.3	Maximum detected value
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	1.69	7.08	3.977	2.014	N/A	N/A	5.633	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	4.34	12.9	7.988	3.248	N/A	N/A	10.66	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	4.34	12.9	8.03	3.276	N/A	N/A	10.73	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	4.34	12.9	8.065	3.303	N/A	N/A	10.78	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	2.87	8.31	5.217	2.186	N/A	N/A	7.015	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	2.87	8.31	5.258	2.222	N/A	N/A	7.087	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	2.87	8.31	5.3	2.263	N/A	N/A	7.162	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	2.73	8.38	5.143	2.232	N/A	N/A	6.979	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	2.73	8.38	5.185	2.269	N/A	N/A	7.051	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	2.73	8.38	5.225	2.308	N/A	N/A	7.123	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	55300	431000	169667	136503	N/A	N/A	281960	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	55500	431000	169733	136441	N/A	N/A	281975	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	55400	431000	169700	136472	N/A	N/A	281967	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	1.61	47.6	18.74	16.88	N/A	N/A	32.62	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	1.61	47.6	18.75	16.88	N/A	N/A	32.64	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	1.61	47.6	18.74	16.88	N/A	N/A	32.62	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.072	0.481	0.201	0.153	N/A	N/A	0.327	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.0723	0.481	0.201	0.153	N/A	N/A	0.327	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.0721	0.481	0.201	0.153	N/A	N/A	0.327	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	0.7	6.59	2.47	2.115	N/A	N/A	6.59	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	0.847	6.73	2.613	2.113	N/A	N/A	6.73	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	0.773	6.66	2.542	2.114	N/A	N/A	6.66	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	5.95	60.5	26.74	19.58	N/A	N/A	42.85	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	5.95	60.5	26.79	19.6	N/A	N/A	42.92	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	5.96	60.5	26.84	19.63	N/A	N/A	42.99	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	2.94	8.57	5.417	2.214	N/A	N/A	7.238	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	2.94	8.57	5.458	2.25	N/A	N/A	7.309	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	2.94	8.57	5.5	2.289	N/A	N/A	7.383	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	3.91	10.8	7.613	2.999	N/A	N/A	10.08	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	3.98	10.9	7.722	3.008	N/A	N/A	10.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	4.05	11	7.843	3.039	N/A	N/A	10.34	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	19000	54000	36500	11794	N/A	N/A	46202	95% Student's-t UCL

Table C-7
Softshell Clam Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	19000	54000	36500	11794	N/A	N/A	46202	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	19000	54000	36500	11794	N/A	N/A	46202	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	2156	5846	3418	1347	N/A	N/A	4527	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	2367	5884	3575	1297	N/A	N/A	4642	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	2288	5865	3497	1321	N/A	N/A	4583	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	417	897	646	211.3	N/A	N/A	819.8	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	193	606	309	153.5	N/A	N/A	435.2	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	6	100	190	580	385	165.6	N/A	N/A	521.2	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	6	100	190	580	385	165.6	N/A	N/A	521.2	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	6	100	190	580	385	165.6	N/A	N/A	521.2	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	6	100	13	170	65.67	60	N/A	N/A	115	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	6	100	35	170	75.67	50.84	N/A	N/A	117.5	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	6	100	25	170	70.5	55.44	N/A	N/A	116.1	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	6	6	100	200	720	450	217.4	N/A	N/A	628.9	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	6	6	100	230	720	460	205.9	N/A	N/A	629.4	95% Student's-t UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	6	6	100	220	720	455	210.9	N/A	N/A	628.5	95% Student's-t UCL
	Metals	Arsenic	mg/kg	6	6	100	1.59	12.4	5.293	4.393	N/A	N/A	8.907	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	5	83	0.13	0.345	0.197	0.0885	0.1	0.1	0.345	Maximum detected value
	Metals	Chromium	mg/kg	6	5	83	1.18	5.81	2.658	2.04	0.4	0.4	5.81	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	6.94	30.2	14.05	8.437	N/A	N/A	20.99	95% Student's-t UCL
	Metals	Lead	mg/kg	6	5	83	4.61	94.8	22.2	33.13	0.2	0.2	94.8	Maximum detected value
	Metals	Mercury	ng/g	6	6	100	62.3	213	101.7	56.21	N/A	N/A	190.4	95% Adjusted Gamma UCL
	Metals	Methylmercury	ng/g	6	6	100	14.7	63.2	32.9	18.98	N/A	N/A	48.51	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	5	83	1.03	4.99	1.843	1.47	0.4	0.4	4.99	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.797	0.969	0.896	0.0622	N/A	N/A	0.947	95% Student's-t UCL
	Metals	Silver	mg/kg	6	6	100	0.142	0.433	0.249	0.121	N/A	N/A	0.349	95% Student's-t UCL
	Metals	Zinc	mg/kg	6	6	100	22.4	140	52.7	44.08	N/A	N/A	138.3	95% Adjusted Gamma UCL

Table C-8
Blue Crab Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	37	37	100	4.6	44.9	22.49	9.139	N/A	N/A	25.03	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	37	37	100	12.3	63	36.66	11.9	N/A	N/A	39.96	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	37	37	100	12.5	63	37.24	11.75	N/A	N/A	40.5	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	37	37	100	12.6	63	37.82	11.66	N/A	N/A	41.06	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	37	37	100	6.67	50.6	26.4	10.26	N/A	N/A	29.25	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	37	37	100	6.68	50.6	27.13	10.12	N/A	N/A	29.94	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	37	37	100	6.69	50.6	27.86	10.04	N/A	N/A	30.65	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	37	37	100	6.6	49.8	25.91	10.05	N/A	N/A	28.7	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	37	37	100	6.73	49.8	26.51	9.913	N/A	N/A	29.26	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	37	37	100	6.86	49.8	27.1	9.824	N/A	N/A	29.83	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	37	37	100	169000	597000	334568	104012	N/A	N/A	363437	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	37	37	100	169000	597000	335514	104186	N/A	N/A	364431	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	37	37	100	169000	597000	335108	104139	N/A	N/A	364012	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	37	37	100	11.8	177	57.93	43.35	N/A	N/A	72.17	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	37	37	100	12	177	57.99	43.32	N/A	N/A	72.21	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	37	37	100	11.9	177	57.96	43.33	N/A	N/A	72.19	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	37	37	100	0.326	1.39	0.804	0.262	N/A	N/A	0.876	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	37	37	100	0.331	1.39	0.807	0.262	N/A	N/A	0.88	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	37	37	100	0.329	1.39	0.805	0.262	N/A	N/A	0.878	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	37	37	100	1.39	20.1	10.05	3.599	N/A	N/A	11.05	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	37	37	100	1.47	20.2	10.38	3.658	N/A	N/A	11.39	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	37	37	100	1.43	20.1	10.21	3.621	N/A	N/A	11.21	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	37	37	100	33.5	238	94.59	48.76	N/A	N/A	109.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	37	37	100	33.7	238	95.17	48.42	N/A	N/A	110	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	37	37	100	33.8	238	95.81	48.14	N/A	N/A	110.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	37	37	100	7.36	51.4	27.19	10.43	N/A	N/A	30.08	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	37	37	100	7.37	51.4	27.93	10.29	N/A	N/A	30.79	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	37	37	100	7.39	51.4	28.66	10.2	N/A	N/A	31.49	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	37	37	100	15	63.5	35.99	12.62	N/A	N/A	39.49	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	37	37	100	16.6	63.6	36.73	12.43	N/A	N/A	40.18	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	37	37	100	17.1	63.8	37.48	12.27	N/A	N/A	40.88	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	37	37	100	45400	264000	103651	46348	N/A	N/A	116515	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	37	37	100	45400	264000	103757	46349	N/A	N/A	116621	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	37	37	100	45400	264000	103705	46362	N/A	N/A	116573	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	37	37	100	16500	90500	32397	14745	N/A	N/A	36003	95% H-UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	37	37	100	16700	90600	32532	14719	N/A	N/A	36134	95% H-UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	37	37	100	16600	90600	32465	14737	N/A	N/A	36071	95% H-UCL
	Pesticides	Dieldrin	pg/g	36	36	100	1850	11100	5222	2266	N/A	N/A	5860	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	37	37	100	480	2090	954.8	396.7	N/A	N/A	1065	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	37	34	92	4.35	196	31.2	42.71	6.6	32	40.95	KM H-UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	37	34	92	14.5	206	45.42	42.92	6.6	32	76.65	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	37	34	92	9.51	201	38.37	42.41	6.6	32	69.23	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	37	35	95	3.78	382	25.65	60.94	6.7	32	69.96	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	37	35	95	10.7	452	43.5	71.09	6.7	32	95.19	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	37	35	95	7.45	417	34.64	65.85	6.7	32	82.52	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	37	35	95	4.32	384	53.04	76.51	6.7	32	76.01	KM H-UCL
	PAHs	Total PAH (ND=1)	µg/kg	37	35	95	23.6	643	101.5	111.3	6.7	32	182.4	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	37	35	95	13.7	520	77.63	93.17	6.7	32	145.4	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	37	37	100	1.5	3.81	2.496	0.532	N/A	N/A	2.644	95% Student's-t UCL
	Metals	Cadmium	mg/kg	37	37	100	0.148	0.668	0.315	0.142	N/A	N/A	0.354	95% Student's-t UCL
	Metals	Chromium	mg/kg	37	37	100	0.177	0.711	0.263	0.0971	N/A	N/A	0.29	95% Student's-t UCL
	Metals	Copper	mg/kg	37	37	100	18.7	47.9	28.91	6.521	N/A	N/A	30.72	95% Student's-t UCL
	Metals	Lead	mg/kg	37	37	100	0.224	5.04	0.665	0.783	N/A	N/A	1.226	95% Chebyshev (Mean, Sd) UCL
	Metals	Mercury	ng/g	37	37	100	39.7	180	116.5	28.19	N/A	N/A	124.3	95% Student's-t UCL
	Metals	Methylmercury	ng/g	34	34	100	29.7	207	123.9	39.96	N/A	N/A	135.5	95% Student's-t UCL

Table C-8
Blue Crab Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Nickel	mg/kg	37	36	97	0.195	1.11	0.313	0.154	0.392	0.392	0.34	KM H-UCL
	Metals	Selenium	mg/kg	37	37	100	0.697	1.37	1.068	0.156	N/A	N/A	1.111	95% Student's-t UCL
	Metals	Silver	mg/kg	37	37	100	0.266	1.41	0.785	0.217	N/A	N/A	0.845	95% Student's-t UCL
	Metals	Zinc	mg/kg	37	37	100	28.8	53	40.37	6.603	N/A	N/A	42.2	95% Student's-t UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	12	12	100	19.9	44.9	31.03	7.217	N/A	N/A	34.77	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	12	12	100	33.9	63	47.78	8.96	N/A	N/A	52.42	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	12	12	100	34.1	63	48.09	8.839	N/A	N/A	52.67	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	12	12	100	34.3	63	48.43	8.778	N/A	N/A	52.98	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	12	12	100	24.3	50.6	36.25	7.673	N/A	N/A	40.23	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	12	12	100	25	50.6	36.73	7.563	N/A	N/A	40.65	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	12	12	100	25.7	50.6	37.19	7.536	N/A	N/A	41.1	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	12	12	100	23.7	49.8	35.53	7.642	N/A	N/A	39.5	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	12	12	100	24	49.8	35.88	7.554	N/A	N/A	39.8	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	12	12	100	24.3	49.8	36.22	7.543	N/A	N/A	40.13	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	12	12	100	300000	597000	439583	85240	N/A	N/A	483774	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	12	12	100	302000	597000	440833	85031	N/A	N/A	484916	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	12	12	100	300000	597000	440417	85206	N/A	N/A	484590	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	12	12	100	19	177	71.94	52.11	N/A	N/A	114.8	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	12	12	100	19	177	71.97	52.1	N/A	N/A	114.8	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	12	12	100	19	177	71.95	52.11	N/A	N/A	114.8	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	12	12	100	0.689	1.39	1.046	0.217	N/A	N/A	1.158	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	12	12	100	0.69	1.39	1.048	0.216	N/A	N/A	1.16	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	12	12	100	0.689	1.39	1.047	0.216	N/A	N/A	1.159	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	12	12	100	9.18	20.1	13.22	3.134	N/A	N/A	14.84	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	12	12	100	9.26	20.2	13.56	3.17	N/A	N/A	15.2	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	12	12	100	9.22	20.1	13.39	3.134	N/A	N/A	15.01	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	12	12	100	52.8	238	119.7	54.25	N/A	N/A	147.8	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	12	12	100	53	238	120	54.06	N/A	N/A	148	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	12	12	100	53.2	238	120.4	53.94	N/A	N/A	148.4	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	12	12	100	25.1	51.4	37.28	7.756	N/A	N/A	41.3	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	12	12	100	25.8	51.4	37.77	7.637	N/A	N/A	41.73	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	12	12	100	26.5	51.4	38.21	7.602	N/A	N/A	42.15	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	12	12	100	34.7	63.5	48.78	9.414	N/A	N/A	53.66	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	12	12	100	35.1	63.6	49.27	9.23	N/A	N/A	54.05	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	12	12	100	35.4	63.8	49.77	9.151	N/A	N/A	54.51	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	12	12	100	45400	181000	94517	38476	N/A	N/A	114464	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	12	12	100	45400	181000	94517	38476	N/A	N/A	114464	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	12	12	100	45400	181000	94517	38476	N/A	N/A	114464	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	12	12	100	26100	90500	45542	19024	N/A	N/A	55404	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	12	12	100	26100	90600	45625	19010	N/A	N/A	55480	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	12	12	100	26100	90600	45592	19014	N/A	N/A	55449	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	11	11	100	2400	11100	6891	2586	N/A	N/A	8304	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	12	12	100	916	2090	1375	347.1	N/A	N/A	1554	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	12	11	92	15.6	177	44.68	44.32	6.7	6.7	91.56	95% KM Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	12	11	92	25.7	181	56.23	44.45	6.7	6.7	80.4	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	12	11	92	20.6	179	50.51	44.13	6.7	6.7	94.27	95% KM Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	12	11	92	8.56	64.5	23.86	15.81	6.7	6.7	32.45	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	12	11	92	22.9	99.4	44.92	28.46	6.7	6.7	60.39	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	12	11	92	15.8	82.1	34.49	21.84	6.7	6.7	46.36	95% KM (t) UCL
	PAHs	Total PAH (ND=0)	µg/kg	12	11	92	22.3	205	66.48	52.72	6.7	6.7	95.15	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	12	11	92	46.2	267	116.7	79.38	6.7	6.7	159.8	95% KM (t) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	12	11	92	34.5	235	91.42	64.04	6.7	6.7	126.2	95% KM (t) UCL
	Metals	Arsenic	mg/kg	12	12	100	1.5	2.5	2.045	0.296	N/A	N/A	2.198	95% Student's-t UCL
	Metals	Cadmium	mg/kg	12	12	100	0.148	0.505	0.259	0.119	N/A	N/A	0.337	95% Adjusted Gamma UCL
	Metals	Chromium	mg/kg	12	12	100	0.223	0.711	0.312	0.133	N/A	N/A	0.381	95% Student's-t UCL

Table C-8
Blue Crab Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	Metals	Copper	mg/kg	12	12	100	22	47.9	29.81	6.887	N/A	N/A	33.38	95% Student's-t UCL
	Metals	Lead	mg/kg	12	12	100	0.369	1.28	0.643	0.303	N/A	N/A	0.8	95% Student's-t UCL
	Metals	Mercury	ng/g	12	12	100	102	180	137.3	27.91	N/A	N/A	151.8	95% Student's-t UCL
	Metals	Methylmercury	ng/g	11	11	100	77.1	188	130.9	34.2	N/A	N/A	149.6	95% Student's-t UCL
	Metals	Nickel	mg/kg	12	12	100	0.238	1.11	0.376	0.246	N/A	N/A	0.503	95% Student's-t UCL
	Metals	Selenium	mg/kg	12	12	100	0.697	1.24	0.977	0.15	N/A	N/A	1.055	95% Student's-t UCL
	Metals	Silver	mg/kg	12	12	100	0.607	1.41	0.868	0.216	N/A	N/A	0.98	95% Student's-t UCL
	Metals	Zinc	mg/kg	12	12	100	28.8	53	42.1	7.857	N/A	N/A	46.17	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	13	13	100	13	33.3	22.45	6.253	N/A	N/A	25.54	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	13	13	100	21.4	50.2	36.39	8.71	N/A	N/A	40.7	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	13	13	100	21.4	50.4	37.2	8.53	N/A	N/A	41.42	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	13	13	100	21.4	50.4	38.04	8.394	N/A	N/A	42.19	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	13	13	100	15.1	38.3	26.23	7.09	N/A	N/A	29.74	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	13	13	100	15.1	38.3	27.14	6.939	N/A	N/A	30.57	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	13	13	100	15.1	38.3	28.09	6.904	N/A	N/A	31.51	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	13	13	100	14.9	37.5	25.71	6.929	N/A	N/A	29.13	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	13	13	100	14.9	37.5	26.51	6.795	N/A	N/A	29.87	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	13	13	100	14.9	37.5	27.31	6.729	N/A	N/A	30.63	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	13	13	100	169000	444000	310154	73696	N/A	N/A	346583	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	13	13	100	169000	447000	310769	74148	N/A	N/A	347422	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	13	13	100	169000	445000	310385	73771	N/A	N/A	346851	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	13	13	100	11.8	143	55.92	44.36	N/A	N/A	91.36	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	13	13	100	12	143	56.05	44.27	N/A	N/A	91.32	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	13	13	100	11.9	143	55.99	44.31	N/A	N/A	91.33	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	13	13	100	0.326	0.99	0.7	0.209	N/A	N/A	0.804	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	13	13	100	0.331	0.99	0.706	0.209	N/A	N/A	0.81	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	13	13	100	0.329	0.99	0.703	0.209	N/A	N/A	0.806	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	13	13	100	2.76	11.6	8.524	2.662	N/A	N/A	9.839	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	13	13	100	2.96	12	8.845	2.699	N/A	N/A	10.18	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	13	13	100	2.86	11.8	8.675	2.667	N/A	N/A	9.994	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	13	13	100	35.3	189	92.34	48.98	N/A	N/A	125.4	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	13	13	100	36	189	93.18	48.41	N/A	N/A	125.7	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	13	13	100	36.8	189	94.09	47.82	N/A	N/A	126	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	13	13	100	15.5	39.3	26.9	7.233	N/A	N/A	30.48	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	13	13	100	15.5	39.3	27.85	7.082	N/A	N/A	31.35	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	13	13	100	15.5	39.3	28.79	7.037	N/A	N/A	32.27	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	13	13	100	19.8	48.2	34.26	8.816	N/A	N/A	38.62	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	13	13	100	19.9	48.2	35.22	8.69	N/A	N/A	39.51	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	13	13	100	20	48.2	36.16	8.557	N/A	N/A	40.39	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	13	13	100	52300	136000	85731	23074	N/A	N/A	97137	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	13	13	100	52300	136000	85954	23181	N/A	N/A	97413	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	13	13	100	52300	136000	85808	23141	N/A	N/A	97247	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	13	13	100	21200	37700	29338	4687	N/A	N/A	31655	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	13	13	100	21200	37900	29523	4661	N/A	N/A	31827	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	13	13	100	21200	37800	29446	4672	N/A	N/A	31756	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	13	13	100	3050	7920	5404	1553	N/A	N/A	6172	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	13	13	100	563	1200	828.6	192.3	N/A	N/A	923.7	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	13	13	100	4.35	196	36.14	55.26	N/A	N/A	103	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	13	13	100	14.5	206	54.12	54.85	N/A	N/A	89.12	95% H-UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	13	13	100	9.51	201	45.19	54.5	N/A	N/A	80.82	95% H-UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	13	13	100	3.78	382	41.71	103.2	N/A	N/A	166.5	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	13	13	100	14.4	452	60.14	118.5	N/A	N/A	203.4	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	13	13	100	10.8	417	50.88	110.8	N/A	N/A	184.8	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total PAH (ND=0)	µg/kg	13	13	100	6.74	384	74.03	115	N/A	N/A	213.1	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total PAH (ND=1)	µg/kg	13	13	100	45.9	643	134.1	166.2	N/A	N/A	335.1	95% Chebyshev (Mean, Sd) UCL

Table C-8
Blue Crab Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	PAHs	Total PAH (ND=1/2)	µg/kg	13	13	100	28.5	520	104.6	140.5	N/A	N/A	274.4	95% Chebyshev (Mean, Sd) UCL
	Metals	Arsenic	mg/kg	13	13	100	1.94	3.5	2.524	0.456	N/A	N/A	2.749	95% Student's-t UCL
	Metals	Cadmium	mg/kg	13	13	100	0.171	0.668	0.345	0.147	N/A	N/A	0.417	95% Student's-t UCL
	Metals	Chromium	mg/kg	13	13	100	0.177	0.339	0.237	0.0501	N/A	N/A	0.261	95% Student's-t UCL
	Metals	Copper	mg/kg	13	13	100	18.7	39.8	27.42	5.989	N/A	N/A	30.38	95% Student's-t UCL
	Metals	Lead	mg/kg	13	13	100	0.224	1.18	0.477	0.249	N/A	N/A	0.627	95% Adjusted Gamma UCL
	Metals	Mercury	ng/g	13	13	100	107	144	121	13.75	N/A	N/A	127.8	95% Student's-t UCL
	Metals	Methylmercury	ng/g	11	11	100	54.1	207	125.2	47.14	N/A	N/A	150.9	95% Student's-t UCL
	Metals	Nickel	mg/kg	13	12	92	0.195	0.54	0.274	0.0858	0.392	0.392	0.313	KM H-UCL
	Metals	Selenium	mg/kg	13	13	100	0.922	1.37	1.146	0.135	N/A	N/A	1.212	95% Student's-t UCL
	Metals	Silver	mg/kg	13	13	100	0.522	1.19	0.794	0.192	N/A	N/A	0.889	95% Student's-t UCL
	Metals	Zinc	mg/kg	13	13	100	28.9	51.4	38.88	6.447	N/A	N/A	42.07	95% Student's-t UCL
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	12	12	100	4.6	19.7	14	4.516	N/A	N/A	16.34	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	12	12	100	12.3	33	25.83	6.157	N/A	N/A	29.03	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	12	12	100	12.5	33.1	26.42	6.176	N/A	N/A	29.62	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	12	12	100	12.6	34.3	26.98	6.294	N/A	N/A	30.25	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	12	12	100	6.67	22.9	16.73	4.769	N/A	N/A	19.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	12	12	100	6.68	23.8	17.52	4.896	N/A	N/A	20.05	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	12	12	100	6.69	25.6	18.29	5.146	N/A	N/A	20.96	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	12	12	100	6.6	22.6	16.52	4.716	N/A	N/A	18.96	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	12	12	100	6.73	22.9	17.14	4.759	N/A	N/A	19.61	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	12	12	100	6.86	24.3	17.76	4.875	N/A	N/A	20.29	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	12	12	100	181000	335000	256000	52401	N/A	N/A	283166	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	12	12	100	182000	336000	257000	52418	N/A	N/A	284175	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	12	12	100	182000	335000	256583	52427	N/A	N/A	283763	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	12	12	100	12.9	109	46.08	30.26	N/A	N/A	61.77	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	12	12	100	12.9	109	46.11	30.26	N/A	N/A	61.8	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	12	12	100	12.9	109	46.09	30.25	N/A	N/A	61.77	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	12	12	100	0.344	1.09	0.674	0.187	N/A	N/A	0.77	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	12	12	100	0.344	1.1	0.675	0.189	N/A	N/A	0.773	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	12	12	100	0.344	1.09	0.674	0.187	N/A	N/A	0.771	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	12	12	100	1.39	13.5	8.528	2.934	N/A	N/A	10.05	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	12	12	100	1.47	14.2	8.856	3.078	N/A	N/A	10.45	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	12	12	100	1.43	13.9	8.688	3.005	N/A	N/A	10.25	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	12	12	100	33.5	132	71.95	31.12	N/A	N/A	88.08	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	12	12	100	33.7	132	72.51	30.96	N/A	N/A	88.56	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	12	12	100	33.8	132	73.06	30.86	N/A	N/A	89.06	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	12	12	100	7.36	23.8	17.41	4.832	N/A	N/A	19.92	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	12	12	100	7.37	24.6	18.2	4.947	N/A	N/A	20.76	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	12	12	100	7.39	26.4	18.97	5.165	N/A	N/A	21.64	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	12	12	100	15	31.2	25.08	6.031	N/A	N/A	28.2	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	12	12	100	16.6	32.7	25.83	5.881	N/A	N/A	28.87	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	12	12	100	17.1	34.1	26.62	5.773	N/A	N/A	29.61	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	12	12	100	55100	264000	132200	60077	N/A	N/A	163345	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	12	12	100	55100	264000	132283	60070	N/A	N/A	163425	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	12	12	100	55100	264000	132283	60070	N/A	N/A	163425	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	12	12	100	16500	29300	22567	4551	N/A	N/A	24926	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	12	12	100	16700	29600	22700	4564	N/A	N/A	25066	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	12	12	100	16600	29400	22608	4545	N/A	N/A	24964	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	12	12	100	1850	5600	3494	1245	N/A	N/A	4140	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	12	12	100	480	1350	671.8	236.4	N/A	N/A	812.9	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	12	10	83	4.93	27.4	12.29	6.312	6.6	32	15.89	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	12	10	83	14.5	39.2	25.05	9.271	6.6	32	30.26	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	12	10	83	10.7	33.2	18.74	6.884	6.6	32	22.62	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	12	11	92	3.82	16.6	10.07	4.725	32	32	12.75	95% KM (t) UCL

Table C-8
Blue Crab Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	PAHs	Total LMW PAH (ND=1)	µg/kg	12	11	92	10.7	38.7	24.05	6.925	32	32	27.9	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	12	11	92	7.45	24.6	17.17	4.947	32	32	19.98	95% KM (t) UCL
	PAHs	Total PAH (ND=0)	µg/kg	12	11	92	4.32	34.4	16.97	8.457	32	32	21.71	95% KM (t) UCL
	PAHs	Total PAH (ND=1)	µg/kg	12	11	92	23.6	89.4	51.66	16.58	32	32	60.67	95% KM (t) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	12	11	92	13.7	50	34.69	9.683	32	32	40.13	95% KM (t) UCL
	Metals	Arsenic	mg/kg	12	12	100	2.29	3.81	2.918	0.441	N/A	N/A	3.146	95% Student's-t UCL
	Metals	Cadmium	mg/kg	12	12	100	0.157	0.591	0.338	0.152	N/A	N/A	0.417	95% Student's-t UCL
	Metals	Chromium	mg/kg	12	12	100	0.192	0.478	0.241	0.0806	N/A	N/A	0.283	95% Student's-t UCL
	Metals	Copper	mg/kg	12	12	100	20.7	42.1	29.62	6.968	N/A	N/A	33.23	95% Student's-t UCL
	Metals	Lead	mg/kg	12	12	100	0.298	5.04	0.89	1.322	N/A	N/A	1.409	95% H-UCL
	Metals	Mercury	ng/g	12	12	100	39.7	121	90.68	19.76	N/A	N/A	100.9	95% Student's-t UCL
	Metals	Methylmercury	ng/g	12	12	100	29.7	175	116.4	39.91	N/A	N/A	137.1	95% Student's-t UCL
	Metals	Nickel	mg/kg	12	12	100	0.21	0.416	0.292	0.0626	N/A	N/A	0.325	95% Student's-t UCL
	Metals	Selenium	mg/kg	12	12	100	0.781	1.28	1.075	0.144	N/A	N/A	1.149	95% Student's-t UCL
	Metals	Silver	mg/kg	12	12	100	0.266	1.06	0.691	0.224	N/A	N/A	0.807	95% Student's-t UCL
	Metals	Zinc	mg/kg	12	12	100	31.4	50	40.24	5.451	N/A	N/A	43.07	95% Student's-t UCL

Table C-9
***Fundulus* sp. Tissue EPCs for Risk Assessments**

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	17	17	100	3.62	39.5	20.63	12.18	N/A	N/A	25.78	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	17	17	100	5.7	56.1	25.17	15.22	N/A	N/A	31.62	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	17	17	100	5.72	56.1	25.7	15.36	N/A	N/A	32.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	17	17	100	5.74	56.1	26.26	15.57	N/A	N/A	32.85	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	17	17	100	4.68	48.2	22.94	13.78	N/A	N/A	28.77	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	17	17	100	4.7	48.2	23.53	13.83	N/A	N/A	29.39	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	17	17	100	4.72	48.9	24.12	13.95	N/A	N/A	30.03	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	17	17	100	4.48	45.3	22.35	13.23	N/A	N/A	27.95	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	17	17	100	4.5	45.3	22.8	13.37	N/A	N/A	28.46	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	17	17	100	4.52	47.4	23.26	13.58	N/A	N/A	29.01	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	17	17	100	275000	3370000	1217118	785695	N/A	N/A	1641685	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	17	17	100	275000	3370000	1217118	785695	N/A	N/A	1641685	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	17	17	100	275000	3370000	1217118	785695	N/A	N/A	1641685	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	17	17	100	6.12	333	54.84	81.42	N/A	N/A	140.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	17	17	100	6.125	333	54.85	81.42	N/A	N/A	140.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	17	17	100	6.12	333	54.85	81.42	N/A	N/A	140.9	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	17	17	100	0.315	5.52	1.313	1.177	N/A	N/A	1.786	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	17	17	100	0.315	5.52	1.314	1.177	N/A	N/A	1.787	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	17	17	100	0.315	5.52	1.313	1.177	N/A	N/A	1.787	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	17	17	100	4.75	73.1	17.58	15.32	N/A	N/A	23.29	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	17	17	100	4.895	73.9	17.98	15.48	N/A	N/A	23.84	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	17	17	100	4.825	73.5	17.78	15.4	N/A	N/A	23.56	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	17	17	100	17.95	342	80.01	80.99	N/A	N/A	120.5	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	17	17	100	18.1	342	80.55	80.85	N/A	N/A	121	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	17	17	100	18.2	342	81.1	80.72	N/A	N/A	121.6	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	17	17	100	5.67	49.3	24.25	13.65	N/A	N/A	30.03	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	17	17	100	5.7	49.3	24.84	13.73	N/A	N/A	30.66	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	17	17	100	5.72	49.8	25.44	13.85	N/A	N/A	31.3	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	17	17	100	15.55	80	39.93	18.55	N/A	N/A	47.79	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	17	17	100	15.7	80.7	40.59	18.66	N/A	N/A	48.49	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	17	17	100	15.95	81.3	41.21	18.79	N/A	N/A	49.17	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	17	17	100	42500	510000	244265	127426	N/A	N/A	298222	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	17	17	100	42500	510000	244265	127426	N/A	N/A	298222	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	17	17	100	42500	510000	244265	127426	N/A	N/A	298222	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	17	17	100	9432	68998	37493	17721	N/A	N/A	44997	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	17	17	100	9482	68998	37562	17721	N/A	N/A	45066	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	17	17	100	9457	68998	37528	17721	N/A	N/A	45032	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	17	17	100	3535	11500	7899	2506	N/A	N/A	8960	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	17	17	100	12.6	203	45.18	48.89	N/A	N/A	96.87	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	17	11	65	2.7	87	19.94	25.33	6.6	33	31.27	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	17	11	65	44	110	48.06	34.73	6.6	33	61.12	95% KM (BCA) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	17	11	65	32	97	34.61	26.86	6.6	33	52.28	95% KM Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	17	14	82	2.8	85	17.59	23.71	6.6	33	37.39	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total LMW PAH (ND=1)	µg/kg	17	14	82	38	91	40.28	20.55	6.6	33	49.31	95% KM (t) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	17	14	82	23	88	30.92	19.28	6.6	33	39.45	95% KM (t) UCL
	PAHs	Total PAH (ND=0)	µg/kg	17	14	82	2.8	170	35.8	47.62	6.6	33	75.26	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)
	PAHs	Total PAH (ND=1)	µg/kg	17	14	82	83	200	98.64	51.08	6.6	33	120.2	95% KM (BCA) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	17	14	82	56	190	66.75	46.16	6.6	33	87.04	95% KM (t) UCL
	Metals	Arsenic	mg/kg	17	17	100	0.49	2.36	0.902	0.441	N/A	N/A	1.104	95% Adjusted Gamma UCL
	Metals	Cadmium	mg/kg	17	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	17	15	88	0.13	1.24	0.465	0.274	0.392	0.4	0.603	KM H-UCL
	Metals	Copper	mg/kg	17	17	100	1.7	14.5	3.804	2.933	N/A	N/A	5.031	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	17	16	94	0.29	1.79	0.616	0.381	0.2	0.2	0.851	95% KM Adjusted Gamma UCL

Table C-9
***Fundulus* sp. Tissue EPCs for Risk Assessments**

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Mercury	ng/g	17	17	100	16.6	98.2	40.17	20.05	N/A	N/A	48.66	95% Student's-t UCL
	Metals	Methylmercury	ng/g	17	17	100	11.3	128	44.59	25.19	N/A	N/A	57.95	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	17	7	41	0.42	0.921	0.464	0.151	0.385	0.4	0.533	95% KM (t) UCL
	Metals	Selenium	mg/kg	17	17	100	0.392	0.975	0.692	0.131	N/A	N/A	0.747	95% Student's-t UCL
	Metals	Silver	mg/kg	17	17	100	0.0233	0.364	0.0738	0.0766	N/A	N/A	0.155	95% Chebyshev (Mean, Sd) UCL
	Metals	Zinc	mg/kg	17	17	100	23.5	72.7	44.6	14.1	N/A	N/A	51.74	95% Adjusted Gamma UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	8	8	100	10.06	39.5	29.53	11.34	N/A	N/A	37.13	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	8	8	100	11.85	56.1	36.52	14.54	N/A	N/A	46.26	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	8	8	100	11.95	56.1	36.88	14.83	N/A	N/A	46.82	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	8	8	100	12.05	56.1	37.27	15.18	N/A	N/A	47.44	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	8	8	100	10.9	48.2	33.16	12.96	N/A	N/A	41.84	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	8	8	100	11	48.2	33.65	13.08	N/A	N/A	42.41	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	8	8	100	11.15	48.9	34.16	13.28	N/A	N/A	43.05	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	8	8	100	10.8	45.3	32.14	12.36	N/A	N/A	40.42	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	8	8	100	10.95	45.3	32.51	12.63	N/A	N/A	40.96	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	8	8	100	11.05	47.4	32.89	12.96	N/A	N/A	41.57	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	8	8	100	275000	2540000	1204875	754521	N/A	N/A	1710279	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	8	8	100	275000	2540000	1204875	754521	N/A	N/A	1710279	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	8	8	100	275000	2540000	1204875	754521	N/A	N/A	1710279	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	8	8	100	6.12	159	47.78	53.86	N/A	N/A	136	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	8	8	100	6.125	159	47.78	53.86	N/A	N/A	136	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	8	8	100	6.12	159	47.78	53.86	N/A	N/A	136	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	8	8	100	0.315	2.29	1.125	0.642	N/A	N/A	1.555	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	8	8	100	0.315	2.29	1.125	0.642	N/A	N/A	1.555	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	8	8	100	0.315	2.29	1.125	0.642	N/A	N/A	1.555	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	8	8	100	4.75	28.4	15.01	7.65	N/A	N/A	20.13	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	8	8	100	4.895	29.1	15.39	7.855	N/A	N/A	20.65	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	8	8	100	4.825	28.7	15.19	7.741	N/A	N/A	20.37	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	8	8	100	17.95	197	84.31	56.74	N/A	N/A	122.3	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	8	8	100	18.1	197	84.68	56.68	N/A	N/A	122.6	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	8	8	100	18.2	197	85.06	56.62	N/A	N/A	123	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	8	8	100	11.2	49.3	34.29	13.19	N/A	N/A	43.12	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	8	8	100	11.3	49.3	34.79	13.31	N/A	N/A	43.7	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	8	8	100	11.45	49.8	35.28	13.48	N/A	N/A	44.31	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	8	8	100	15.55	62.7	47.14	16.96	N/A	N/A	58.5	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	8	8	100	15.7	63.1	47.7	17.15	N/A	N/A	59.19	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	8	8	100	15.95	63.5	48.24	17.37	N/A	N/A	59.88	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	8	8	100	42500	230000	164063	62076	N/A	N/A	205643	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	8	8	100	42500	230000	164063	62076	N/A	N/A	205643	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	8	8	100	42500	230000	164063	62076	N/A	N/A	205643	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	8	8	100	9432	63023	42599	18624	N/A	N/A	55074	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	8	8	100	9482	63023	42716	18605	N/A	N/A	55179	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	8	8	100	9457	63023	42658	18614	N/A	N/A	55126	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	8	8	100	3535	11500	9136	2606	N/A	N/A	10881	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	8	8	100	12.6	117	40.23	35.84	N/A	N/A	84.63	95% Adjusted Gamma UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	8	7	88	3.4	69	23.28	23.64	6.6	6.6	40.38	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	8	7	88	44	110	58.89	26.52	6.6	6.6	74.13	95% KM (BCA) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	8	7	88	33	88	41.26	21.79	6.6	6.6	70.99	95% KM Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	8	8	100	3.1	74	18.09	24.1	N/A	N/A	54.77	95% Adjusted Gamma UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	8	8	100	39	74	46	11.46	N/A	N/A	53.68	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	8	8	100	23	74	32.13	17.37	N/A	N/A	43.76	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	8	8	100	4.7	140	40.56	47.14	N/A	N/A	72.14	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	8	8	100	83	180	112.3	28.82	N/A	N/A	131.6	95% Student's-t UCL

Table C-9
***Fundulus* sp. Tissue EPCs for Risk Assessments**

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	PAHs	Total PAH (ND=1/2)	µg/kg	8	8	100	56	160	76.25	35.67	N/A	N/A	100.1	95% Student's-t UCL
	Metals	Arsenic	mg/kg	8	8	100	0.535	2.36	0.92	0.599	N/A	N/A	1.322	95% Student's-t UCL
	Metals	Cadmium	mg/kg	8	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	8	7	88	0.333	1.24	0.591	0.339	0.4	0.4	0.836	95% KM (t) UCL
	Metals	Copper	mg/kg	8	8	100	1.94	14.5	4.749	4.088	N/A	N/A	9.182	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	8	7	88	0.29	1.79	0.666	0.475	0.2	0.2	1.01	95% KM (t) UCL
	Metals	Mercury	ng/g	8	8	100	30.5	98.2	51.83	24.17	N/A	N/A	68.01	95% Student's-t UCL
	Metals	Methylmercury	ng/g	8	8	100	31.7	128	54.09	31.08	N/A	N/A	74.91	95% Student's-t UCL
	Metals	Nickel	mg/kg	8	2	25	0.423	0.425	0.395	0.0168	0.385	0.4	0.425	Maximum detected value
	Metals	Selenium	mg/kg	8	8	100	0.392	0.802	0.683	0.134	N/A	N/A	0.768	95% Modified-t UCL
	Metals	Silver	mg/kg	8	8	100	0.0412	0.364	0.102	0.107	N/A	N/A	0.267	95% Chebyshev (Mean, Sd) UCL
	Metals	Zinc	mg/kg	8	8	100	32.4	72.7	45.11	14.54	N/A	N/A	54.85	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	3	3	100	14.2	18.1	16.03	1.96	N/A	N/A	18.1	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	3	3	100	16.5	19.5	18.37	1.629	N/A	N/A	19.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	3	3	100	16.8	21.9	19.27	2.554	N/A	N/A	21.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	3	3	100	17.1	24.4	20.23	3.758	N/A	N/A	24.4	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	3	3	100	15.5	18.6	17.2	1.572	N/A	N/A	18.6	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	3	3	100	15.8	21.1	18.13	2.706	N/A	N/A	21.1	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	3	3	100	16.1	23.5	19.03	3.931	N/A	N/A	23.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	3	3	100	15.4	18.5	17	1.552	N/A	N/A	18.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	3	3	100	15.7	21	17.93	2.747	N/A	N/A	21	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	3	3	100	16	23.5	18.87	4.05	N/A	N/A	23.5	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	3	3	100	660000	838000	723667	99229	N/A	N/A	838000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	3	3	100	660000	838000	723667	99229	N/A	N/A	838000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	3	3	100	660000	838000	723667	99229	N/A	N/A	838000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	3	3	100	12.2	15.5	13.87	1.65	N/A	N/A	15.5	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	3	3	100	12.2	15.6	13.9	1.7	N/A	N/A	15.6	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	12.2	15.6	13.9	1.7	N/A	N/A	15.6	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	3	3	100	0.653	0.918	0.748	0.148	N/A	N/A	0.918	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	3	3	100	0.654	0.919	0.748	0.148	N/A	N/A	0.919	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	0.653	0.918	0.748	0.148	N/A	N/A	0.918	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	8.83	11.8	10.1	1.531	N/A	N/A	11.8	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	8.97	12	10.26	1.564	N/A	N/A	12	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	8.9	11.9	10.18	1.548	N/A	N/A	11.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	3	3	100	28.7	35	32.23	3.219	N/A	N/A	35	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	29	37.5	33.17	4.252	N/A	N/A	37.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	3	3	100	29.3	40	34.1	5.434	N/A	N/A	40	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	3	3	100	16.2	19.5	17.93	1.656	N/A	N/A	19.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	16.4	22	18.87	2.859	N/A	N/A	22	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	3	3	100	16.7	24.5	19.8	4.139	N/A	N/A	24.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	24.3	30.3	27.1	3.02	N/A	N/A	30.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	24.6	32.9	28.1	4.3	N/A	N/A	32.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	25	35.4	29.1	5.538	N/A	N/A	35.4	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	3	3	100	150000	210000	173333	32146	N/A	N/A	210000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	3	3	100	150000	210000	173333	32146	N/A	N/A	210000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	3	3	100	150000	210000	173333	32146	N/A	N/A	210000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	3	3	100	25663	68998	46177	21759	N/A	N/A	68998	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	3	3	100	25663	68998	46189	21757	N/A	N/A	68998	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	3	3	100	25663	68998	46183	21758	N/A	N/A	68998	Maximum detected value
	Pesticides	Dieldrin	pg/g	3	3	100	8930	9320	9073	214.6	N/A	N/A	9320	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	3	3	100	17	73.5	36.23	32.28	N/A	N/A	73.5	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	3	2	67	2.7	5.5	4.1	1.4	6.6	6.6	5.5	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	3	2	67	58	62	42.2	25.23	6.6	6.6	62	Maximum detected value

Table C-9
***Fundulus* sp. Tissue EPCs for Risk Assessments**

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	PAHs	Total HMW PAH (ND=1/2)	µg/kg	3	2	67	32	32	23.53	11.97	6.6	6.6	32	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	3	2	67	3.5	14	7	4.95	6.6	6.6	14	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	3	2	67	41	43	30.2	16.71	6.6	6.6	43	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	3	2	67	23	28	19.2	9.14	6.6	6.6	28	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	3	2	67	6.2	20	10.8	6.505	6.6	6.6	20	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	3	2	67	99	110	71.87	46.37	6.6	6.6	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	3	2	67	56	59	40.53	24.03	6.6	6.6	59	Maximum detected value
	Metals	Arsenic	mg/kg	3	3	100	0.684	0.763	0.728	0.0404	N/A	N/A	0.763	Maximum detected value
	Metals	Cadmium	mg/kg	3	0	0	N/A	N/A	N/A	N/A	0.0971	0.099	0.099	Maximum non-detected value
	Metals	Chromium	mg/kg	3	3	100	0.306	0.41	0.343	0.0584	N/A	N/A	0.41	Maximum detected value
	Metals	Copper	mg/kg	3	3	100	1.7	2.98	2.503	0.7	N/A	N/A	2.98	Maximum detected value
	Metals	Lead	mg/kg	3	3	100	0.297	0.49	0.396	0.0966	N/A	N/A	0.49	Maximum detected value
	Metals	Mercury	ng/g	3	3	100	26.1	31.9	29.5	3.027	N/A	N/A	31.9	Maximum detected value
	Metals	Methylmercury	ng/g	3	3	100	34.2	41.6	39	4.162	N/A	N/A	41.6	Maximum detected value
	Metals	Nickel	mg/kg	3	1	33	0.42	0.42	0.399	0.0151	0.388	0.392	0.42	Maximum detected value
	Metals	Selenium	mg/kg	3	3	100	0.575	0.69	0.632	0.0575	N/A	N/A	0.69	Maximum detected value
	Metals	Silver	mg/kg	3	3	100	0.0233	0.0512	0.0399	0.0147	N/A	N/A	0.0512	Maximum detected value
	Metals	Zinc	mg/kg	3	3	100	23.5	37.3	32.27	7.62	N/A	N/A	37.3	Maximum detected value
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	3.62	20.3	11.05	6.599	N/A	N/A	16.47	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	5.7	22.4	13.45	6.734	N/A	N/A	18.98	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	5.72	25.1	14	7.445	N/A	N/A	20.13	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	5.74	27.8	14.59	8.246	N/A	N/A	21.38	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	4.68	21.4	12.17	6.739	N/A	N/A	17.72	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	4.7	22.9	12.73	6.964	N/A	N/A	18.46	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	4.72	24.3	13.29	7.224	N/A	N/A	19.23	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	4.48	21.4	11.98	6.763	N/A	N/A	17.55	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	4.5	22.4	12.3	6.981	N/A	N/A	18.04	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	4.52	23.4	12.61	7.212	N/A	N/A	18.54	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	591000	3370000	1480167	972154	N/A	N/A	3249441	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	591000	3370000	1480167	972154	N/A	N/A	3249441	95% Adjusted Gamma UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	591000	3370000	1480167	972154	N/A	N/A	3249441	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	17.4	333	84.75	122.4	N/A	N/A	302.6	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	17.4	333	84.75	122.4	N/A	N/A	302.6	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	17.4	333	84.75	122.4	N/A	N/A	302.6	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.934	5.52	1.846	1.805	N/A	N/A	5.058	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.934	5.52	1.847	1.804	N/A	N/A	5.058	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.934	5.52	1.847	1.804	N/A	N/A	5.058	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	13.8	73.1	24.75	23.71	N/A	N/A	66.95	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	13.9	73.9	25.3	23.85	N/A	N/A	67.73	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	13.8	73.5	25.03	23.78	N/A	N/A	67.34	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	24.3	342	98.18	121.2	N/A	N/A	342	Maximum detected value (ProUCL-selected UCL greater than maximum
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	24.3	342	98.75	121	N/A	N/A	342	Maximum detected value (ProUCL-selected UCL greater than maximum
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	24.4	342	99.32	120.8	N/A	N/A	342	Maximum detected value (ProUCL-selected UCL greater than maximum
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	5.67	22.7	14.03	6.426	N/A	N/A	19.32	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	5.7	24.2	14.57	6.755	N/A	N/A	20.12	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	5.72	25.7	15.13	7.132	N/A	N/A	21	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	19.1	80	36.73	22.38	N/A	N/A	55.14	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	19.2	80.7	37.35	22.54	N/A	N/A	55.89	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	19.3	81.3	37.9	22.69	N/A	N/A	56.56	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	230000	510000	386667	92232	N/A	N/A	462540	95% Student's-t UCL

Table C-9
***Fundulus* sp. Tissue EPCs for Risk Assessments**

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	230000	510000	386667	92232	N/A	N/A	462540	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	230000	510000	386667	92232	N/A	N/A	462540	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	11554	39920	26344	9685	N/A	N/A	34312	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	11583	39920	26377	9680	N/A	N/A	34340	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	11569	39920	26361	9683	N/A	N/A	34326	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	4090	7270	5662	1134	N/A	N/A	6595	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	20.2	203	56.25	72.11	N/A	N/A	184.6	95% Chebyshev (Mean, Sd) UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	2	33	31	87	26.78	28.91	6.6	33	87	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	2	33	83	110	36.57	43.09	6.6	33	110	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	2	33	57	97	30.07	35.14	6.6	33	97	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	4	67	2.8	85	22.36	28.59	32	33	85	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	4	67	38	91	46.17	20.46	32	33	91	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	4	67	23	88	35.78	23.43	32	33	88	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	6	4	67	2.8	170	41.77	58.62	32	33	170	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	6	4	67	110	200	102.3	58.19	32	33	200	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	6	4	67	56	190	75.67	54.01	32	33	190	Maximum detected value
	Metals	Arsenic	mg/kg	6	6	100	0.49	1.29	0.965	0.309	N/A	N/A	1.218	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	6	5	83	0.13	0.51	0.34	0.152	0.392	0.392	0.51	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	1.89	4.6	3.193	1.017	N/A	N/A	4.03	95% Student's-t UCL
	Metals	Lead	mg/kg	6	6	100	0.306	1.06	0.659	0.306	N/A	N/A	0.91	95% Student's-t UCL
	Metals	Mercury	ng/g	6	6	100	16.6	36.6	29.97	7.361	N/A	N/A	36.02	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	11.3	58.5	34.72	19.76	N/A	N/A	50.98	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	4	67	0.454	0.921	0.592	0.197	0.392	0.392	0.921	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.555	0.975	0.733	0.156	N/A	N/A	0.861	95% Student's-t UCL
	Metals	Silver	mg/kg	6	6	100	0.0308	0.0702	0.0528	0.0136	N/A	N/A	0.064	95% Student's-t UCL
	Metals	Zinc	mg/kg	6	6	100	39	69.6	50.08	13.76	N/A	N/A	61.41	95% Student's-t UCL

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Whole Body	Dioxins/Furans	2378-TCDD	ng/kg	27	27	100	3.66	203	48.47	47.75	N/A	N/A	69.62	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	27	27	100	17	223	66.75	51.3	N/A	N/A	85.63	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	27	27	100	19.5	223	67.37	51.51	N/A	N/A	86.26	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	27	27	100	21.2	223	67.93	51.6	N/A	N/A	86.82	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	27	27	100	7	211	55.33	49.17	N/A	N/A	71.47	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	27	27	100	9.3	211	55.89	49.22	N/A	N/A	75.55	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	27	27	100	9.33	211	56.47	49.4	N/A	N/A	76.11	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	27	27	100	6.47	209	54.1	48.62	N/A	N/A	70.06	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	27	27	100	8.79	209	54.7	48.77	N/A	N/A	74.23	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	27	27	100	8.81	209	55.25	48.84	N/A	N/A	74.72	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCBs (ND=0)	ng/kg	27	27	100	569000	3530000	1371444	715406	N/A	N/A	1623350	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCBs (ND=1)	ng/kg	27	27	100	569000	3530000	1371481	715379	N/A	N/A	1623374	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCBs (ND=1/2)	ng/kg	27	27	100	569000	3530000	1371444	715406	N/A	N/A	1623350	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	27	27	100	51.8	395	141.5	85.21	N/A	N/A	171	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	27	27	100	51.8	395	141.6	85.18	N/A	N/A	171.1	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	27	27	100	51.8	395	141.6	85.19	N/A	N/A	171.1	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	27	27	100	0.355	3.48	0.948	0.612	N/A	N/A	1.142	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	27	27	100	0.355	3.48	0.95	0.611	N/A	N/A	1.143	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	27	27	100	0.355	3.48	0.949	0.611	N/A	N/A	1.142	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	27	27	100	1.56	41.1	6.744	7.985	N/A	N/A	13.44	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	27	27	100	1.71	41.45	7.069	7.977	N/A	N/A	9.615	95% H-UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	27	27	100	1.64	41.3	6.91	7.985	N/A	N/A	13.61	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	27	27	100	68.8	608	208.3	122.8	N/A	N/A	248.6	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	27	27	100	71.3	611	208.9	123.2	N/A	N/A	249.3	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	27	27	100	73.7	613	209.5	123.4	N/A	N/A	250	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	27	27	100	7.35	212	56.28	49.32	N/A	N/A	72.47	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	27	27	100	9.82	212	56.88	49.49	N/A	N/A	76.48	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	27	27	100	10.2	212	57.43	49.56	N/A	N/A	76.98	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	27	27	100	8.03	212	60.86	48.48	N/A	N/A	79.73	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	27	27	100	10.6	212	61.61	48.67	N/A	N/A	80.33	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	27	27	100	13.1	213	62.34	48.91	N/A	N/A	81.01	95% Adjusted Gamma UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	27	27	100	100000	1100000	417407	251344	N/A	N/A	499910	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	27	27	100	100000	1100000	417407	251344	N/A	N/A	499910	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	27	27	100	100000	1100000	417407	251344	N/A	N/A	499910	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=0)	pg/g	27	27	100	45609	212287	114330	49047	N/A	N/A	130430	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1)	pg/g	27	27	100	45609	212326	114372	49052	N/A	N/A	130473	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1/2)	pg/g	27	27	100	45609	212307	114351	49049	N/A	N/A	130451	95% Student's-t UCL
	Whole Body	Pesticides	Dieldrin	pg/g	27	27	100	5590	28300	14305	6738	N/A	N/A	16963	95% Adjusted Gamma UCL
	Whole Body	Pesticides	Hexachlorobenzene	pg/g	27	27	100	900	6210	2240	1321	N/A	N/A	2710	95% Adjusted Gamma UCL
	Whole Body	PAHs	Total HMW PAH (ND=0)	µg/kg	27	7	26	8.3	32	12.6	6.317	13	33	14.61	95% GROS Adjusted Gamma UCL
	Whole Body	PAHs	Total HMW PAH (ND=1)	µg/kg	27	7	26	125	310	76.85	115.4	13	33	117.8	95% KM (t) UCL
	Whole Body	PAHs	Total HMW PAH (ND=1/2)	µg/kg	27	7	26	66.5	160	44.83	57.28	13	33	65.14	95% KM (t) UCL
	Whole Body	PAHs	Total LMW PAH (ND=0)	µg/kg	27	20	74	6.1	610	76.35	113.3	13	33	139	95% KM Adjusted Gamma UCL
	Whole Body	PAHs	Total LMW PAH (ND=1)	µg/kg	27	20	74	71	610	162.7	134.4	13	33	223.5	95% KM Adjusted Gamma UCL
	Whole Body	PAHs	Total LMW PAH (ND=1/2)	µg/kg	27	20	74	45	610	118	118.7	13	33	174.7	95% KM Adjusted Gamma UCL
	Whole Body	PAHs	Total PAH (ND=0)	µg/kg	27	20	74	6.1	640	80.63	119.4	13	33	146.6	95% KM Adjusted Gamma UCL
	Whole Body	PAHs	Total PAH (ND=1)	µg/kg	27	20	74	200	750	358.7	249.2	13	33	441	95% KM (BCA) UCL
	Whole Body	PAHs	Total PAH (ND=1/2)	µg/kg	27	20	74	110	700	219.5	166.5	13	33	275.5	95% KM (t) UCL
	Whole Body	Metals	Arsenic	mg/kg	27	27	100	0.326	0.885	0.499	0.135	N/A	N/A	0.547	95% Adjusted Gamma UCL
	Whole Body	Metals	Cadmium	mg/kg	27	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Whole Body	Metals	Chromium	mg/kg	27	19	70	0.0997	2.13	0.341	0.405	0.385	0.4	0.47	95% GROS Adjusted Gamma UCL
	Whole Body	Metals	Copper	mg/kg	27	27	100	2.26	50	15.58	13.08	N/A	N/A	21.33	95% Adjusted Gamma UCL
	Whole Body	Metals	Lead	mg/kg	27	25	93	0.0609	0.285	0.183	0.0645	0.19	0.198	0.205	95% KM (t) UCL
	Whole Body	Metals	Mercury	ng/g	27	27	100	63.9	287	127.4	53.67	N/A	N/A	145.9	95% Adjusted Gamma UCL
	Whole Body	Metals	Methylmercury	ng/g	27	27	100	83.4	338	148.2	64.42	N/A	N/A	169.4	95% Student's-t UCL
	Whole Body	Metals	Nickel	mg/kg	27	2	7	0.512	0.685	0.397	0.0616	0.381	0.4	0.685	Maximum detected value
	Whole Body	Metals	Selenium	mg/kg	27	27	100	0.754	2.04	1.185	0.403	N/A	N/A	1.317	95% Student's-t UCL
	Whole Body	Metals	Silver	mg/kg	27	27	100	0.0591	0.889	0.287	0.224	N/A	N/A	0.379	95% Adjusted Gamma UCL
	Whole Body	Metals	Zinc	mg/kg	27	27	100	16.6	41.8	26.19	6.197	N/A	N/A	28.22	95% Student's-t UCL

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North	Whole Body	Dioxins/Furans	2378-TCDD	ng/kg	9	9	100	19.3	203	85.21	61.74	N/A	N/A	123.5	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	9	9	100	31.2	223	104.5	67.63	N/A	N/A	174.6	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	9	9	100	31.2	223	105.2	68.07	N/A	N/A	175.9	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	9	9	100	31.2	223	105.7	68.33	N/A	N/A	176.8	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	9	9	100	23.5	211	92.23	63.9	N/A	N/A	131.8	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	9	9	100	23.5	211	92.77	64.07	N/A	N/A	162	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	9	9	100	23.5	211	93.41	64.44	N/A	N/A	163	95% Adjusted Gamma UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	9	9	100	22.9	209	90.75	63.18	N/A	N/A	129.9	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	9	9	100	22.9	209	91.39	63.51	N/A	N/A	130.8	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	9	9	100	22.9	209	91.92	63.68	N/A	N/A	161	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCBs (ND=0)	ng/kg	9	9	100	958000	3530000	1692000	943510	N/A	N/A	2276834	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=1)	ng/kg	9	9	100	958000	3530000	1692000	943510	N/A	N/A	2276834	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=1/2)	ng/kg	9	9	100	958000	3530000	1692000	943510	N/A	N/A	2276834	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	9	9	100	86.5	395	201.1	114.9	N/A	N/A	314	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	9	9	100	87	395	201.1	114.8	N/A	N/A	313.9	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	86.8	395	201.1	114.8	N/A	N/A	314	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	9	9	100	0.556	3.48	1.235	0.947	N/A	N/A	2.04	95% H-UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	9	9	100	0.567	3.48	1.238	0.945	N/A	N/A	2.028	95% H-UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	0.567	3.48	1.236	0.946	N/A	N/A	2.034	95% H-UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	2.37	41.1	7.934	12.56	N/A	N/A	26.18	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	2.38	41.45	8.388	12.53	N/A	N/A	26.59	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	2.38	41.3	8.164	12.55	N/A	N/A	26.4	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	9	9	100	118	608	305.5	153.7	N/A	N/A	400.7	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	118	611	306.2	154.7	N/A	N/A	402.1	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	9	9	100	118	613	306.7	155.5	N/A	N/A	403.1	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	9	9	100	24.1	212	93.48	63.97	N/A	N/A	162.3	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	24.1	212	94.13	64.34	N/A	N/A	163.4	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	9	9	100	24.1	212	94.67	64.53	N/A	N/A	164.1	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	25.2	212	98.72	61.99	N/A	N/A	137.1	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	25.6	212	99.54	62.39	N/A	N/A	138.2	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	25.9	213	100.4	62.86	N/A	N/A	139.3	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	9	9	100	190000	600000	375556	133614	N/A	N/A	458376	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	9	9	100	190000	600000	375556	133614	N/A	N/A	458376	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	9	9	100	190000	600000	375556	133614	N/A	N/A	458376	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=0)	pg/g	9	9	100	69314	212287	138587	55729	N/A	N/A	173131	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1)	pg/g	9	9	100	69351	212326	138625	55735	N/A	N/A	173172	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1/2)	pg/g	9	9	100	69333	212307	138606	55732	N/A	N/A	173151	95% Student's-t UCL
	Whole Body	Pesticides	Dieldrin	pg/g	9	9	100	7390	22500	13736	4819	N/A	N/A	16723	95% Student's-t UCL
	Whole Body	Pesticides	Hexachlorobenzene	pg/g	9	9	100	1380	6210	2957	1604	N/A	N/A	3951	95% Student's-t UCL
	Whole Body	PAHs	Total HMW PAH (ND=0)	µg/kg	9	4	44	8.3	32	15.32	8.744	13	33	32	Maximum detected value
	Whole Body	PAHs	Total HMW PAH (ND=1)	µg/kg	9	4	44	125	310	105.6	119.3	13	33	310	Maximum detected value
	Whole Body	PAHs	Total HMW PAH (ND=1/2)	µg/kg	9	4	44	66.5	160	59.5	59.31	13	33	160	Maximum detected value
	Whole Body	PAHs	Total LMW PAH (ND=0)	µg/kg	9	9	100	51	610	160.8	171.3	N/A	N/A	409.7	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PAHs	Total LMW PAH (ND=1)	µg/kg	9	9	100	77	610	273.2	152.2	N/A	N/A	494.3	95% Chebyshev (Mean, Sd) UCL
	Whole Body	PAHs	Total LMW PAH (ND=1/2)	µg/kg	9	9	100	64	610	214.8	158.1	N/A	N/A	386.9	95% H-UCL
	Whole Body	PAHs	Total PAH (ND=0)	µg/kg	9	9	100	51	640	168.4	180	N/A	N/A	308.1	95% H-UCL
	Whole Body	PAHs	Total PAH (ND=1)	µg/kg	9	9	100	210	750	532.8	187.9	N/A	N/A	644.8	95% Modified-t UCL
	Whole Body	PAHs	Total PAH (ND=1/2)	µg/kg	9	9	100	130	700	351.7	163.9	N/A	N/A	589.9	95% Chebyshev (Mean, Sd) UCL
	Whole Body	Metals	Arsenic	mg/kg	9	9	100	0.326	0.472	0.412	0.0485	N/A	N/A	0.442	95% Student's-t UCL
	Whole Body	Metals	Cadmium	mg/kg	9	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Whole Body	Metals	Chromium	mg/kg	9	7	78	0.128	2.13	0.495	0.599	0.392	0.396	1.614	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but
	Whole Body	Metals	Copper	mg/kg	9	9	100	2.26	39.5	11.42	11.9	N/A	N/A	25.28	95% Adjusted Gamma UCL
	Whole Body	Metals	Lead	mg/kg	9	8	89	0.159	0.285	0.218	0.0472	0.198	0.198	0.249	95% KM (t) UCL
	Whole Body	Metals	Mercury	ng/g	9	9	100	70.1	275.5	124.4	65.78	N/A	N/A	165.1	95% Student's-t UCL
	Whole Body	Metals	Methylmercury	ng/g	9	9	100	93.2	338	177.9	88.39	N/A	N/A	232.7	95% Student's-t UCL
	Whole Body	Metals	Nickel	mg/kg	9	0	0	N/A	N/A	N/A	N/A	0.385	0.4	0.4	Maximum non-detected value
	Whole Body	Metals	Selenium	mg/kg	9	9	100	0.774	1.78	1.042	0.335	N/A	N/A	1.249	95% Student's-t UCL
	Whole Body	Metals	Silver	mg/kg	9	9	100	0.0591	0.61	0.209	0.186	N/A	N/A	0.407	95% Adjusted Gamma UCL
	Whole Body	Metals	Zinc	mg/kg	9	9	100	20	39.5	27.92	5.711	N/A	N/A	31.46	95% Student's-t UCL

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast	Whole Body	Dioxins/Furans	2378-TCDD	ng/kg	9	9	100	15.7	75.5	43.21	23.98	N/A	N/A	58.08	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	9	9	100	24.8	95.3	60.14	28.25	N/A	N/A	77.66	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	9	9	100	24.8	95.3	60.71	28.25	N/A	N/A	78.22	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	9	9	100	24.8	95.3	61.28	28.29	N/A	N/A	78.81	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	9	9	100	19.1	84.8	50	26.03	N/A	N/A	66.13	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	9	9	100	19.1	84.8	50.58	26.02	N/A	N/A	66.7	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	9	9	100	19.1	84.8	51.13	26.05	N/A	N/A	67.28	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	9	9	100	18.5	83.5	48.63	25.74	N/A	N/A	64.59	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	9	9	100	18.5	83.5	49.21	25.72	N/A	N/A	65.15	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	9	9	100	18.5	83.5	49.79	25.76	N/A	N/A	65.75	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=0)	ng/kg	9	9	100	569000	1780000	1140333	378424	N/A	N/A	1374899	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=1)	ng/kg	9	9	100	569000	1780000	1140444	378337	N/A	N/A	1374956	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=1/2)	ng/kg	9	9	100	569000	1780000	1140333	378424	N/A	N/A	1374899	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	9	9	100	59.8	210	117.1	41.03	N/A	N/A	142.5	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	9	9	100	59.8	210	117.1	40.98	N/A	N/A	142.5	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	59.8	210	117.1	41.01	N/A	N/A	142.5	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	9	9	100	0.508	1.24	0.732	0.252	N/A	N/A	0.951	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	9	9	100	0.509	1.25	0.734	0.255	N/A	N/A	0.955	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	0.509	1.24	0.732	0.252	N/A	N/A	0.951	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	1.93	14.1	5.272	4.719	N/A	N/A	10.77	95% Adjusted Gamma UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	2.1	14.9	5.617	4.779	N/A	N/A	12.02	95% H-UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	2.03	14.5	5.45	4.755	N/A	N/A	12.1	95% H-UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	9	9	100	84.6	293	177.1	63.06	N/A	N/A	216.2	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	84.6	293	177.7	62.99	N/A	N/A	216.8	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	9	9	100	84.6	293	178.3	62.99	N/A	N/A	217.3	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	9	9	100	19.8	85.4	50.73	26.1	N/A	N/A	66.91	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	19.8	85.4	51.3	26.09	N/A	N/A	67.47	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	9	9	100	19.8	85.4	51.88	26.11	N/A	N/A	68.06	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	23	90.3	53.92	25.79	N/A	N/A	69.91	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	23.4	90.7	54.68	25.71	N/A	N/A	70.61	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	23.7	91.1	55.39	25.68	N/A	N/A	71.31	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	9	9	100	100000	500000	250000	143440	N/A	N/A	391704	95% Adjusted Gamma UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	9	9	100	100000	500000	250000	143440	N/A	N/A	391704	95% Adjusted Gamma UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	9	9	100	100000	500000	250000	143440	N/A	N/A	391704	95% Adjusted Gamma UCL
	Whole Body	Pesticides	Total Chlordane (ND=0)	pg/g	9	9	100	51449	162828	92055	44720	N/A	N/A	119775	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1)	pg/g	9	9	100	51489	162828	92093	44716	N/A	N/A	119810	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1/2)	pg/g	9	9	100	51469	162828	92074	44718	N/A	N/A	119792	95% Student's-t UCL
	Whole Body	Pesticides	Dieldrin	pg/g	9	9	100	5590	21500	9517	4751	N/A	N/A	13409	95% Adjusted Gamma UCL
	Whole Body	Pesticides	Hexachlorobenzene	pg/g	9	9	100	1070	4640	2069	1116	N/A	N/A	2761	95% Student's-t UCL
	Whole Body	PAHs	Total HMW PAH (ND=0)	µg/kg	9	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	Whole Body	PAHs	Total HMW PAH (ND=1)	µg/kg	9	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	Whole Body	PAHs	Total HMW PAH (ND=1/2)	µg/kg	9	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	Whole Body	PAHs	Total LMW PAH (ND=0)	µg/kg	9	3	33	6.1	25	14.05	8.228	13	33	25	Maximum detected value
	Whole Body	PAHs	Total LMW PAH (ND=1)	µg/kg	9	3	33	71	84	34.44	30.48	13	33	84	Maximum detected value
	Whole Body	PAHs	Total LMW PAH (ND=1/2)	µg/kg	9	3	33	45	51	24.33	16.11	13	33	51	Maximum detected value
	Whole Body	PAHs	Total PAH (ND=0)	µg/kg	9	3	33	6.1	25	14.05	8.228	13	33	25	Maximum detected value
	Whole Body	PAHs	Total PAH (ND=1)	µg/kg	9	3	33	200	210	77.56	91.34	13	33	210	Maximum detected value
	Whole Body	PAHs	Total PAH (ND=1/2)	µg/kg	9	3	33	110	120	46.44	47.38	13	33	120	Maximum detected value
	Whole Body	Metals	Arsenic	mg/kg	9	9	100	0.35	0.602	0.465	0.0998	N/A	N/A	0.527	95% Student's-t UCL
	Whole Body	Metals	Cadmium	mg/kg	9	0	0	N/A	N/A	N/A	N/A	0.0952	0.1	0.1	Maximum non-detected value
	Whole Body	Metals	Chromium	mg/kg	9	7	78	0.151	0.887	0.318	0.223	0.396	0.4	0.469	95% KM (t) UCL
	Whole Body	Metals	Copper	mg/kg	9	9	100	2.71	23	7.898	6.266	N/A	N/A	11.78	95% Student's-t UCL
	Whole Body	Metals	Lead	mg/kg	9	8	89	0.197	0.27	0.224	0.0263	0.19	0.19	0.242	95% KM (t) UCL
	Whole Body	Metals	Mercury	ng/g	9	9	100	63.9	179	121.3	39.41	N/A	N/A	145.7	95% Student's-t UCL
	Whole Body	Metals	Methylmercury	ng/g	9	9	100	83.4	216	141.2	43.02	N/A	N/A	167.9	95% Student's-t UCL
	Whole Body	Metals	Nickel	mg/kg	9	2	22	0.512	0.685	0.429	0.0992	0.381	0.4	0.685	Maximum detected value
	Whole Body	Metals	Selenium	mg/kg	9	9	100	0.754	1.59	0.93	0.256	N/A	N/A	1.088	95% Student's-t UCL
	Whole Body	Metals	Silver	mg/kg	9	9	100	0.0798	0.466	0.171	0.12	N/A	N/A	0.245	95% Student's-t UCL
	Whole Body	Metals	Zinc	mg/kg	9	9	100	25.3	41.8	30.06	5.017	N/A	N/A	33.17	95% Student's-t UCL
Southwest	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	9	9	100	68.8	287	142.3	69.2	N/A	N/A	185.2	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	71.3	287	142.8	68.8	N/A	N/A	185.5	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	9	9	100	73.7	287	143.4	68.4	N/A	N/A	185.8	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	9	9	100	7.35	71.4	24.63	20.35	N/A	N/A	37.24	95% Student's-t UCL

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	9.82	71.4	25.2	20.32	N/A	N/A	37.79	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	9	9	100	10.2	71.4	25.75	20.35	N/A	N/A	38.36	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	8.03	73.1	29.95	19.77	N/A	N/A	42.21	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	10.6	73.5	30.61	19.8	N/A	N/A	42.88	95% Student's-t UCL
	Whole Body	Dioxins/Furans	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	13.1	73.9	31.25	19.9	N/A	N/A	43.59	95% Student's-t UCL
	Whole Body	Dioxins/Furans	2378-TCDD	ng/kg	9	9	100	3.66	60.8	16.99	18.97	N/A	N/A	28.74	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=0)	ng/kg	9	9	100	707000	2390000	1282000	667281	N/A	N/A	1695613	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=1)	ng/kg	9	9	100	707000	2390000	1282000	667281	N/A	N/A	1695613	95% Student's-t UCL
	Whole Body	PCBs	Total PCBs (ND=1/2)	ng/kg	9	9	100	707000	2390000	1282000	667281	N/A	N/A	1695613	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	9	9	100	51.8	202	106.4	51.64	N/A	N/A	138.5	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	9	9	100	51.8	202	106.4	51.64	N/A	N/A	138.5	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	9	9	100	51.8	202	106.4	51.64	N/A	N/A	138.5	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	9	9	100	0.355	1.25	0.878	0.322	N/A	N/A	1.078	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	9	9	100	0.355	1.25	0.878	0.322	N/A	N/A	1.078	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	9	9	100	0.355	1.25	0.878	0.322	N/A	N/A	1.078	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	9	9	100	1.56	14.3	7.024	4.817	N/A	N/A	10.01	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	9	9	100	1.71	14.3	7.201	4.762	N/A	N/A	10.15	95% Student's-t UCL
	Whole Body	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	9	9	100	1.64	14.3	7.116	4.79	N/A	N/A	10.09	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	9	9	100	17	85	35.66	21.07	N/A	N/A	48.72	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	9	9	100	19.5	85	36.22	20.98	N/A	N/A	49.22	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	9	9	100	21.2	85.1	36.81	20.97	N/A	N/A	49.81	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	9	9	100	7	70.3	23.76	20.25	N/A	N/A	36.31	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	9	9	100	9.3	70.3	24.31	20.23	N/A	N/A	36.85	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	9	9	100	9.33	70.3	24.88	20.26	N/A	N/A	37.43	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	9	9	100	6.47	68.6	22.92	19.79	N/A	N/A	35.18	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	9	9	100	8.79	68.7	23.48	19.78	N/A	N/A	35.75	95% Student's-t UCL
	Whole Body	PCBs	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	9	9	100	8.81	68.7	24.04	19.81	N/A	N/A	36.32	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	9	9	100	210000	1100000	626667	290043	N/A	N/A	806450	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	9	9	100	210000	1100000	626667	290043	N/A	N/A	806450	95% Student's-t UCL
	Whole Body	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	9	9	100	210000	1100000	626667	290043	N/A	N/A	806450	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=0)	pg/g	9	9	100	45609	169390	112348	38574	N/A	N/A	136258	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1)	pg/g	9	9	100	45609	169467	112400	38592	N/A	N/A	136321	95% Student's-t UCL
	Whole Body	Pesticides	Total Chlordane (ND=1/2)	pg/g	9	9	100	45609	169429	112374	38583	N/A	N/A	136290	95% Student's-t UCL
	Whole Body	Pesticides	Dieldrin	pg/g	9	9	100	8270	28300	19663	6579	N/A	N/A	23741	95% Student's-t UCL
	Whole Body	Pesticides	Hexachlorobenzene	pg/g	9	9	100	900	4030	1696	954	N/A	N/A	2287	95% Student's-t UCL
	Whole Body	PAHs	Total HMW PAH (ND=0)	µg/kg	9	3	33	13	16	14.33	1.247	32	33	16	Maximum detected value
	Whole Body	PAHs	Total HMW PAH (ND=1)	µg/kg	9	3	33	310	310	124.7	131.1	32	33	310	Maximum detected value
	Whole Body	PAHs	Total HMW PAH (ND=1/2)	µg/kg	9	3	33	160	160	74.67	60.34	32	33	160	Maximum detected value
	Whole Body	PAHs	Total LMW PAH (ND=0)	µg/kg	9	8	89	15	120	53.17	30.8	33	33	73.7	95% KM (t) UCL
	Whole Body	PAHs	Total LMW PAH (ND=1)	µg/kg	9	8	89	180	220	182.6	54.42	33	33	218.6	95% KM (t) UCL
	Whole Body	PAHs	Total LMW PAH (ND=1/2)	µg/kg	9	8	89	110	170	117	35.1	33	33	140.3	95% KM (t) UCL
	Whole Body	PAHs	Total PAH (ND=0)	µg/kg	9	8	89	15	140	58.39	37.83	33	33	83.57	95% KM (t) UCL
	Whole Body	PAHs	Total PAH (ND=1)	µg/kg	9	8	89	500	540	468.1	154.2	33	33	540	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	Whole Body	PAHs	Total PAH (ND=1/2)	µg/kg	9	8	89	280	330	262.6	82.71	33	33	317.4	95% KM (t) UCL
	Whole Body	Metals	Arsenic	mg/kg	9	9	100	0.41	0.885	0.62	0.145	N/A	N/A	0.71	95% Student's-t UCL
	Whole Body	Metals	Cadmium	mg/kg	9	0	0	N/A	N/A	N/A	N/A	0.0952	0.099	0.099	Maximum non-detected value
	Whole Body	Metals	Chromium	mg/kg	9	5	56	0.0997	0.766	0.191	0.204	0.385	0.396	0.766	Maximum detected value
	Whole Body	Metals	Copper	mg/kg	9	9	100	14.1	50	27.42	11.46	N/A	N/A	34.52	95% Student's-t UCL
	Whole Body	Metals	Lead	mg/kg	9	9	100	0.0609	0.181	0.117	0.0399	N/A	N/A	0.142	95% Student's-t UCL
	Whole Body	Metals	Mercury	ng/g	9	9	100	98.2	287	136.4	57.76	N/A	N/A	172.2	95% Student's-t UCL
	Whole Body	Metals	Methylmercury	ng/g	9	9	100	85.9	239	125.6	46.93	N/A	N/A	154.7	95% Student's-t UCL
	Whole Body	Metals	Nickel	mg/kg	9	0	0	N/A	N/A	N/A	N/A	0.381	0.396	0.396	Maximum detected value
	Whole Body	Metals	Selenium	mg/kg	9	9	100	1.07	2.04	1.583	0.276	N/A	N/A	1.754	95% Student's-t UCL
	Whole Body	Metals	Silver	mg/kg	9	9	100	0.216	0.889	0.483	0.22	N/A	N/A	0.619	95% Student's-t UCL
	Whole Body	Metals	Zinc	mg/kg	9	9	100	16.6	25	20.58	3.376	N/A	N/A	22.67	95% Student's-t UCL
NBSA-wide	Liver	Dioxins/Furans	2378-TCDD	ng/kg	11	11	100	9.07	108	48.39	31.99	N/A	N/A	65.87	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	11	11	100	30.5	147	76.84	37.91	N/A	N/A	97.55	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	11	11	100	33	147	77.92	37.73	N/A	N/A	98.54	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	11	11	100	35.5	147	79.07	37.78	N/A	N/A	99.72	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	11	11	100	14.7	121	59.6	34.91	N/A	N/A	78.68	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	11	11	100	17.2	123	60.76	34.91	N/A	N/A	79.84	95% Student's-t UCL

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	11	11	100	19.7	125	61.84	34.79	N/A	N/A	80.85	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	11	11	100	13.9	117	57.33	33.87	N/A	N/A	75.84	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	11	11	100	16.4	119	58.4	33.7	N/A	N/A	76.82	95% Student's-t UCL
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	11	11	100	18.9	122	59.56	33.76	N/A	N/A	78.01	95% Student's-t UCL
	Liver	PCBs	Total PCBs (ND=0)	ng/kg	11	11	100	1010000	2910000	1751818	580686	N/A	N/A	2069150	95% Student's-t UCL
	Liver	PCBs	Total PCBs (ND=1)	ng/kg	11	11	100	1010000	2910000	1751818	580686	N/A	N/A	2069150	95% Student's-t UCL
	Liver	PCBs	Total PCBs (ND=1/2)	ng/kg	11	11	100	1010000	2910000	1751818	580686	N/A	N/A	2069150	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	11	11	100	119	364	205.6	78.44	N/A	N/A	248.5	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	11	11	100	119	364	205.8	78.47	N/A	N/A	248.7	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	11	11	100	119	364	205.7	78.45	N/A	N/A	248.6	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	11	11	100	0.745	6.09	2.967	1.72	N/A	N/A	3.907	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	11	11	100	0.745	6.09	2.97	1.719	N/A	N/A	3.909	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	11	11	100	0.745	6.09	2.969	1.719	N/A	N/A	3.908	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	11	11	100	3.59	96.5	44.21	31.12	N/A	N/A	61.22	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	11	11	100	3.59	97.3	44.7	31.15	N/A	N/A	61.72	95% Student's-t UCL
	Liver	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	11	11	100	3.59	96.9	44.46	31.13	N/A	N/A	61.47	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	11	11	100	149	511	282.6	113.4	N/A	N/A	344.6	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	11	11	100	152	511	283.9	113.2	N/A	N/A	345.8	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	11	11	100	154	511	285.1	113.3	N/A	N/A	347	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	11	11	100	15.5	127	62.6	36.32	N/A	N/A	82.45	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	11	11	100	18	128	63.68	36.15	N/A	N/A	83.44	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	11	11	100	20.4	130	64.75	36.02	N/A	N/A	84.43	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	11	11	100	17.5	213	101.6	60.66	N/A	N/A	134.8	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	11	11	100	20	213	102.9	60.38	N/A	N/A	135.9	95% Student's-t UCL
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	11	11	100	22.5	214	104.2	60.3	N/A	N/A	137.1	95% Student's-t UCL
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	11	11	100	180000	1000000	463636	234063	N/A	N/A	591547	95% Student's-t UCL
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	11	11	100	180000	1000000	463636	234063	N/A	N/A	591547	95% Student's-t UCL
	Liver	Pesticides	Total Chlordane (ND=0)	pg/g	11	11	100	46090	137863	84721	27836	N/A	N/A	99933	95% Student's-t UCL
	Liver	Pesticides	Total Chlordane (ND=1)	pg/g	11	11	100	46168	137902	84792	27834	N/A	N/A	100002	95% Student's-t UCL
	Liver	Pesticides	Total Chlordane (ND=1/2)	pg/g	11	11	100	46129	137883	84756	27835	N/A	N/A	99968	95% Student's-t UCL
	Liver	Pesticides	Dieldrin	pg/g	11	11	100	8200	21700	17099	5223	N/A	N/A	19891	95% Modified-t UCL
	Liver	Pesticides	Hexachlorobenzene	pg/g	11	11	100	1580	3520	2475	628.1	N/A	N/A	2818	95% Student's-t UCL
	Liver	PAHs	Total HMW PAH (ND=0)	µg/kg	11	8	73	5.5	20	11.89	4.631	13	33	14.92	95% KM (t) UCL
	Liver	PAHs	Total HMW PAH (ND=1)	µg/kg	11	8	73	120	320	136.3	101.3	13	33	190.9	95% KM (BCA) UCL
	Liver	PAHs	Total HMW PAH (ND=1/2)	µg/kg	11	8	73	64	170	73.91	51.05	13	33	103.4	95% KM (BCA) UCL
	Liver	PAHs	Total LMW PAH (ND=0)	µg/kg	11	8	73	14	83	34.66	19.85	33	33	46.47	95% KM (t) UCL
	Liver	PAHs	Total LMW PAH (ND=1)	µg/kg	11	8	73	74	220	86.18	51.4	33	33	115	95% KM (BCA) UCL
	Liver	PAHs	Total LMW PAH (ND=1/2)	µg/kg	11	8	73	46	130	62.36	30.2	33	33	80.01	95% KM (t) UCL
	Liver	PAHs	Total PAH (ND=0)	µg/kg	11	10	91	14	100	39.36	25.97	33	33	54.37	95% KM (t) UCL
	Liver	PAHs	Total PAH (ND=1)	µg/kg	11	10	91	200	550	298.5	165.2	33	33	383	95% KM (BCA) UCL
	Liver	PAHs	Total PAH (ND=1/2)	µg/kg	11	10	91	110	290	168.5	80.98	33	33	215.1	95% KM (t) UCL
	Liver	Metals	Arsenic	mg/kg	10	10	100	1.05	16.3	3.067	4.671	N/A	N/A	9.506	95% Chebyshev (Mean, Sd) UCL
	Liver	Metals	Cadmium	mg/kg	10	6	60	0.12	0.245	0.178	0.0385	0.588	5	0.209	95% KM (t) UCL
	Liver	Metals	Chromium	mg/kg	10	5	50	0.102	5.23	0.709	1.515	0.367	4	5.23	95% GROS Adjusted Gamma UCL
	Liver	Metals	Copper	mg/kg	10	10	100	542	7800	1945	2126	N/A	N/A	3622	95% Adjusted Gamma UCL
	Liver	Metals	Lead	mg/kg	10	6	60	0.0913	0.156	0.125	0.0207	1.05	10	0.142	95% KM (t) UCL
	Liver	Metals	Mercury	ng/g	10	10	100	141	282	201.1	41.48	N/A	N/A	225.1	95% Student's-t UCL
	Liver	Metals	Methylmercury	ng/g	10	10	100	64.1	132	89.2	22.8	N/A	N/A	102.4	95% Student's-t UCL
	Liver	Metals	Nickel	mg/kg	10	2	20	0.175	0.223	0.199	0.024	0.377	20	0.223	Maximum detected value
	Liver	Metals	Selenium	mg/kg	10	10	100	15.6	204	51.8	55.37	N/A	N/A	95.18	95% Adjusted Gamma UCL
	Liver	Metals	Silver	mg/kg	10	10	100	12	159	43.64	42.72	N/A	N/A	78.39	95% Adjusted Gamma UCL
	Liver	Metals	Zinc	mg/kg	10	10	100	48.8	405	113	105	N/A	N/A	173.6	95% H-UCL
North	Liver	Dioxins/Furans	2378-TCDD	ng/kg	3	3	100	50.9	108	86.63	31.14	N/A	N/A	108	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	3	3	100	69.1	147	118.7	43.1	N/A	N/A	147	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	3	3	100	69.1	147	119.4	43.6	N/A	N/A	147	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	3	3	100	69.1	147	120.4	44.41	N/A	N/A	147	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	3	3	100	58.9	121	99.97	35.57	N/A	N/A	121	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	3	3	100	58.9	123	101	36.44	N/A	N/A	123	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	3	3	100	58.9	125	101.6	37.06	N/A	N/A	125	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	3	3	100	57.4	117	96.8	34.13	N/A	N/A	117	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	3	3	100	57.4	119	97.47	34.73	N/A	N/A	119	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	3	3	100	57.4	122	98.47	35.69	N/A	N/A	122	Maximum detected value

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	Liver	PCBs	Total PCBs (ND=0)	ng/kg	3	3	100	1010000	2910000	2170000	1017251	N/A	N/A	2910000	Maximum detected value
	Liver	PCBs	Total PCBs (ND=1)	ng/kg	3	3	100	1010000	2910000	2170000	1017251	N/A	N/A	2910000	Maximum detected value
	Liver	PCBs	Total PCBs (ND=1/2)	ng/kg	3	3	100	1010000	2910000	2170000	1017251	N/A	N/A	2910000	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	3	3	100	125	364	273.7	129.7	N/A	N/A	364	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	3	3	100	125	364	273.7	129.7	N/A	N/A	364	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	125	364	273.7	129.7	N/A	N/A	364	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	3	3	100	1.4	6.09	4.293	2.53	N/A	N/A	6.09	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	3	3	100	1.4	6.09	4.293	2.53	N/A	N/A	6.09	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	1.4	6.09	4.293	2.53	N/A	N/A	6.09	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	17.7	96.5	67.67	43.44	N/A	N/A	96.5	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	18.5	97.3	68.2	43.25	N/A	N/A	97.3	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	18.1	96.9	67.93	43.35	N/A	N/A	96.9	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	3	3	100	195	511	392.7	172.3	N/A	N/A	511	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	195	511	393.3	172.8	N/A	N/A	511	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	3	3	100	195	511	394.3	173.5	N/A	N/A	511	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	3	3	100	60.3	127	104.4	38.22	N/A	N/A	127	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	60.3	128	105.1	38.8	N/A	N/A	128	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	3	3	100	60.3	130	105.8	39.4	N/A	N/A	130	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	75.2	213	164.7	77.62	N/A	N/A	213	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	75.5	213	165.5	77.98	N/A	N/A	213	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	75.9	214	166.6	78.6	N/A	N/A	214	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	3	3	100	270000	400000	313333	75056	N/A	N/A	400000	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	3	3	100	270000	400000	313333	75056	N/A	N/A	400000	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	3	3	100	270000	400000	313333	75056	N/A	N/A	400000	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=0)	pg/g	3	3	100	46090	137863	94924	46170	N/A	N/A	137863	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=1)	pg/g	3	3	100	46168	137902	94990	46152	N/A	N/A	137902	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=1/2)	pg/g	3	3	100	46129	137883	94957	46161	N/A	N/A	137883	Maximum detected value
	Liver	Pesticides	Dieldrin	pg/g	3	3	100	8200	21500	16967	7594	N/A	N/A	21500	Maximum detected value
	Liver	Pesticides	Hexachlorobenzene	pg/g	3	3	100	2020	3520	2973	828.6	N/A	N/A	3520	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=0)	µg/kg	3	2	67	8.1	15	10.4	3.253	13	13	15	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=1)	µg/kg	3	2	67	130	310	151	122.2	13	13	310	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=1/2)	µg/kg	3	2	67	67	160	80	60.71	13	13	160	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=0)	µg/kg	3	2	67	14	22	18	4	33	33	22	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=1)	µg/kg	3	2	67	74	79	62	20.61	33	33	79	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=1/2)	µg/kg	3	2	67	46	48	42.33	6.65	33	33	48	Maximum detected value
	Liver	PAHs	Total PAH (ND=0)	µg/kg	3	3	100	14	30	19.67	8.963	N/A	N/A	30	Maximum detected value
	Liver	PAHs	Total PAH (ND=1)	µg/kg	3	3	100	200	540	316.7	193.5	N/A	N/A	540	Maximum detected value
	Liver	PAHs	Total PAH (ND=1/2)	µg/kg	3	3	100	110	280	166.7	98.15	N/A	N/A	280	Maximum detected value
	Liver	Metals	Arsenic	mg/kg	2	2	100	1.05	1.32	1.185	0.191	N/A	N/A	1.32	Maximum detected value
	Liver	Metals	Cadmium	mg/kg	2	2	100	0.12	0.201	0.161	0.0573	N/A	N/A	0.201	Maximum detected value
	Liver	Metals	Chromium	mg/kg	2	1	50	0.154	0.154	0.154	0	0.889	0.889	0.154	Maximum detected value
	Liver	Metals	Copper	mg/kg	2	2	100	542	987	764.5	314.7	N/A	N/A	987	Maximum detected value
	Liver	Metals	Lead	mg/kg	2	2	100	0.118	0.118	0.118	0	N/A	N/A	0.118	Maximum detected value
	Liver	Metals	Mercury	ng/g	2	2	100	141	282	211.5	99.7	N/A	N/A	282	Maximum detected value
	Liver	Metals	Methylmercury	ng/g	2	2	100	71	132	101.5	43.13	N/A	N/A	132	Maximum detected value
	Liver	Metals	Nickel	mg/kg	2	1	50	0.223	0.223	0.223	0	0.889	0.889	0.223	Maximum detected value
	Liver	Metals	Selenium	mg/kg	2	2	100	15.6	32	23.8	11.6	N/A	N/A	32	Maximum detected value
	Liver	Metals	Silver	mg/kg	2	2	100	12	22.8	17.4	7.637	N/A	N/A	22.8	Maximum detected value
	Liver	Metals	Zinc	mg/kg	2	2	100	48.8	77.7	63.25	20.44	N/A	N/A	77.7	Maximum detected value
Southeast	Liver	Dioxins/Furans	2378-TCDD	ng/kg	3	3	100	37.5	56.9	46.13	9.874	N/A	N/A	56.9	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	3	3	100	61.9	84.6	72.37	11.45	N/A	N/A	84.6	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	3	3	100	61.9	87	74	12.57	N/A	N/A	87	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	3	3	100	61.9	89.4	75.6	13.75	N/A	N/A	89.4	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	3	3	100	48.9	67.3	56.83	9.458	N/A	N/A	67.3	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	3	3	100	48.9	69.7	58.43	10.51	N/A	N/A	69.7	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	3	3	100	48.9	72.1	60.07	11.62	N/A	N/A	72.1	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	3	3	100	46.6	64.7	54.23	9.377	N/A	N/A	64.7	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	3	3	100	46.6	67.1	55.87	10.39	N/A	N/A	67.1	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	3	3	100	46.6	69.5	57.47	11.49	N/A	N/A	69.5	Maximum detected value
	Liver	PCBs	Total PCBs (ND=0)	ng/kg	3	3	100	1170000	1720000	1463333	276827	N/A	N/A	1720000	Maximum detected value
	Liver	PCBs	Total PCBs (ND=1)	ng/kg	3	3	100	1170000	1720000	1463333	276827	N/A	N/A	1720000	Maximum detected value
	Liver	PCBs	Total PCBs (ND=1/2)	ng/kg	3	3	100	1170000	1720000	1463333	276827	N/A	N/A	1720000	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	3	3	100	149	196	176.7	24.58	N/A	N/A	196	Maximum detected value

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	Liver	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	3	3	100	149	196	176.7	24.58	N/A	N/A	196	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	149	196	176.7	24.58	N/A	N/A	196	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	3	3	100	1.66	2.18	1.93	0.261	N/A	N/A	2.18	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	3	3	100	1.67	2.18	1.937	0.256	N/A	N/A	2.18	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	1.67	2.18	1.933	0.255	N/A	N/A	2.18	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	21	27.3	24.1	3.151	N/A	N/A	27.3	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	21.7	28.1	24.83	3.202	N/A	N/A	28.1	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	21.4	27.7	24.5	3.151	N/A	N/A	27.7	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	3	3	100	211	281	249	35.38	N/A	N/A	281	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	211	283	250.7	36.56	N/A	N/A	283	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	3	3	100	211	286	252.3	38.08	N/A	N/A	286	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	3	3	100	50.5	69.4	58.7	9.695	N/A	N/A	69.4	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	50.5	71.9	60.37	10.8	N/A	N/A	71.9	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	3	3	100	50.5	74.3	61.97	11.92	N/A	N/A	74.3	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	67.5	92	78.3	12.5	N/A	N/A	92	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	67.9	94.8	80.3	13.57	N/A	N/A	94.8	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	68.3	97.6	82.33	14.69	N/A	N/A	97.6	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	3	3	100	180000	360000	286667	94516	N/A	N/A	360000	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	3	3	100	180000	360000	286667	94516	N/A	N/A	360000	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	3	3	100	180000	360000	286667	94516	N/A	N/A	360000	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=0)	pg/g	3	3	100	47430	73610	62757	13651	N/A	N/A	73610	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=1)	pg/g	3	3	100	47469	73688	62822	13673	N/A	N/A	73688	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=1/2)	pg/g	3	3	100	47450	73649	62789	13662	N/A	N/A	73649	Maximum detected value
	Liver	Pesticides	Dieldrin	pg/g	3	3	100	9190	13600	11830	2330	N/A	N/A	13600	Maximum detected value
	Liver	Pesticides	Hexachlorobenzene	pg/g	3	3	100	1580	2710	2187	569.6	N/A	N/A	2710	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=0)	µg/kg	3	1	33	20	20	20	0	33	33	20	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=1)	µg/kg	3	1	33	320	320	128.7	135.3	33	33	320	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=1/2)	µg/kg	3	1	33	170	170	78.67	64.58	33	33	170	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=0)	µg/kg	3	1	33	26	26	26	0	33	33	26	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=1)	µg/kg	3	1	33	220	220	95.33	88.15	33	33	220	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=1/2)	µg/kg	3	1	33	130	130	65.33	45.73	33	33	130	Maximum detected value
	Liver	PAHs	Total PAH (ND=0)	µg/kg	3	2	67	20	26	23	3	33	33	26	Maximum detected value
	Liver	PAHs	Total PAH (ND=1)	µg/kg	3	2	67	550	550	377.7	243.7	33	33	550	Maximum detected value
	Liver	PAHs	Total PAH (ND=1/2)	µg/kg	3	2	67	280	290	201	118.9	33	33	290	Maximum detected value
	Liver	Metals	Arsenic	mg/kg	3	3	100	1.2	1.34	1.263	0.0709	N/A	N/A	1.34	Maximum detected value
	Liver	Metals	Cadmium	mg/kg	3	3	100	0.161	0.175	0.167	0.00737	N/A	N/A	0.175	Maximum detected value
	Liver	Metals	Chromium	mg/kg	3	2	67	0.102	0.116	0.109	0.007	0.367	0.367	0.116	Maximum detected value
	Liver	Metals	Copper	mg/kg	3	3	100	811	1000	896.7	95.73	N/A	N/A	1000	Maximum detected value
	Liver	Metals	Lead	mg/kg	3	3	100	0.0913	0.144	0.119	0.0265	N/A	N/A	0.144	Maximum detected value
	Liver	Metals	Mercury	ng/g	3	3	100	170	219	199	25.71	N/A	N/A	219	Maximum detected value
	Liver	Metals	Methylmercury	ng/g	3	3	100	96.2	116	105.4	9.974	N/A	N/A	116	Maximum detected value
	Liver	Metals	Nickel	mg/kg	3	1	33	0.175	0.175	0.175	0	0.377	0.381	0.175	Maximum detected value
	Liver	Metals	Selenium	mg/kg	3	3	100	20.8	25.1	23.33	2.25	N/A	N/A	25.1	Maximum detected value
	Liver	Metals	Silver	mg/kg	3	3	100	19.9	22.8	21.1	1.513	N/A	N/A	22.8	Maximum detected value
	Liver	Metals	Zinc	mg/kg	3	3	100	60.5	65.6	62.97	2.554	N/A	N/A	65.6	Maximum detected value
Southwest	Liver	Dioxins/Furans	2378-TCDD	ng/kg	5	5	100	9.07	57.1	26.79	18.46	N/A	N/A	57.1	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	5	5	100	30.5	96.6	54.4	25.28	N/A	N/A	96.6	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	5	5	100	33	96.6	55.4	24.41	N/A	N/A	96.6	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	5	5	100	35.5	96.6	56.38	23.59	N/A	N/A	96.6	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	5	5	100	14.7	73.7	37.04	22.48	N/A	N/A	73.7	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	5	5	100	17.2	73.7	38.04	21.58	N/A	N/A	73.7	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	5	5	100	19.7	73.7	39.02	20.74	N/A	N/A	73.7	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	5	5	100	13.9	70.8	35.5	21.7	N/A	N/A	70.8	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	5	5	100	16.4	70.8	36.48	20.8	N/A	N/A	70.8	Maximum detected value
	Liver	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	5	5	100	18.9	70.8	37.48	19.95	N/A	N/A	70.8	Maximum detected value
	Liver	PCBs	Total PCBs (ND=0)	ng/kg	5	5	100	1230000	2030000	1674000	293479	N/A	N/A	2030000	Maximum detected value
	Liver	PCBs	Total PCBs (ND=1)	ng/kg	5	5	100	1230000	2030000	1674000	293479	N/A	N/A	2030000	Maximum detected value
	Liver	PCBs	Total PCBs (ND=1/2)	ng/kg	5	5	100	1230000	2030000	1674000	293479	N/A	N/A	2030000	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	5	5	100	119	229	182.2	43.31	N/A	N/A	229	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	5	5	100	119	229	182.6	43.71	N/A	N/A	229	Maximum detected value
	Liver	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	5	5	100	119	229	182.4	43.51	N/A	N/A	229	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	5	5	100	0.745	4.2	2.793	1.413	N/A	N/A	4.2	Maximum detected value
	Liver	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	5	5	100	0.745	4.2	2.795	1.414	N/A	N/A	4.2	Maximum detected value

Table C-10
White Perch Tissue EPCs for Risk Assessments

Assessment Zone	Tissue Type	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Liver	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	5	5	100	0.745	4.2	2.795	1.414	N/A	N/A	4.2	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	5	5	100	3.59	68.7	42.2	27.42	N/A	N/A	68.7	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	5	5	100	3.59	69.4	42.52	27.73	N/A	N/A	69.4	Maximum detected value
	Liver	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	5	5	100	3.59	69.1	42.36	27.58	N/A	N/A	69.1	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	5	5	100	149	313	236.8	64.41	N/A	N/A	313	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	5	5	100	152	314	238.2	63.4	N/A	N/A	314	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	5	5	100	154	315	239.2	62.84	N/A	N/A	315	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	5	5	100	15.5	77.4	39.84	23.42	N/A	N/A	77.4	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	5	5	100	18	77.4	40.82	22.53	N/A	N/A	77.4	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	5	5	100	20.4	77.4	41.8	21.69	N/A	N/A	77.4	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	5	5	100	17.5	131	77.8	44.77	N/A	N/A	131	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	5	5	100	20	131	78.82	43.97	N/A	N/A	131	Maximum detected value
	Liver	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	5	5	100	22.5	131	79.82	43.21	N/A	N/A	131	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	5	5	100	500000	1000000	660000	202608	N/A	N/A	1000000	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	5	5	100	500000	1000000	660000	202608	N/A	N/A	1000000	Maximum detected value
	Liver	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	5	5	100	500000	1000000	660000	202608	N/A	N/A	1000000	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=0)	pg/g	5	5	100	63850	108300	91778	16613	N/A	N/A	108300	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=1)	pg/g	5	5	100	63925	108377	91855	16614	N/A	N/A	108377	Maximum detected value
	Liver	Pesticides	Total Chlordane (ND=1/2)	pg/g	5	5	100	63888	108339	91816	16613	N/A	N/A	108339	Maximum detected value
	Liver	Pesticides	Dieldrin	pg/g	5	5	100	17500	21700	20340	1640	N/A	N/A	21700	Maximum detected value
	Liver	Pesticides	Hexachlorobenzene	pg/g	5	5	100	1620	2810	2348	460.4	N/A	N/A	2810	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=0)	µg/kg	5	5	100	5.5	17	11.14	4.555	N/A	N/A	17	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=1)	µg/kg	5	5	100	120	190	140	28.28	N/A	N/A	190	Maximum detected value
	Liver	PAHs	Total HMW PAH (ND=1/2)	µg/kg	5	5	100	64	100	75.4	14.45	N/A	N/A	100	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=0)	µg/kg	5	5	100	29	83	50.2	22.04	N/A	N/A	83	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=1)	µg/kg	5	5	100	76	120	95.2	22.71	N/A	N/A	120	Maximum detected value
	Liver	PAHs	Total LMW PAH (ND=1/2)	µg/kg	5	5	100	55	100	72.6	21.63	N/A	N/A	100	Maximum detected value
	Liver	PAHs	Total PAH (ND=0)	µg/kg	5	5	100	38	100	61.4	26.15	N/A	N/A	100	Maximum detected value
	Liver	PAHs	Total PAH (ND=1)	µg/kg	5	5	100	200	320	240	50.5	N/A	N/A	320	Maximum detected value
	Liver	PAHs	Total PAH (ND=1/2)	µg/kg	5	5	100	120	200	150	37.42	N/A	N/A	200	Maximum detected value
	Liver	Metals	Arsenic	mg/kg	5	5	100	1.68	16.3	4.902	6.376	N/A	N/A	16.3	Maximum detected value
	Liver	Metals	Cadmium	mg/kg	5	1	20	0.245	0.245	0.245	0	0.588	5	0.245	Maximum detected value
	Liver	Metals	Chromium	mg/kg	5	2	40	0.54	5.23	1.478	1.876	2.35	4	5.23	Maximum detected value
	Liver	Metals	Copper	mg/kg	5	5	100	1600	7800	3046	2666	N/A	N/A	7800	Maximum detected value
	Liver	Metals	Lead	mg/kg	5	1	20	0.156	0.156	0.156	0	1.05	10	0.156	Maximum detected value
	Liver	Metals	Mercury	ng/g	5	5	100	173	240	198.2	31.44	N/A	N/A	240	Maximum detected value
	Liver	Metals	Methylmercury	ng/g	5	5	100	64.1	92.6	74.56	10.71	N/A	N/A	92.6	Maximum detected value
	Liver	Metals	Nickel	mg/kg	5	0	0	N/A	N/A	N/A	N/A	2.11	20	20	Maximum non-detected value
	Liver	Metals	Selenium	mg/kg	5	5	100	41	204	80.08	69.72	N/A	N/A	204	Maximum detected value
	Liver	Metals	Silver	mg/kg	5	5	100	34.8	159	67.66	51.42	N/A	N/A	159	Maximum detected value
	Liver	Metals	Zinc	mg/kg	5	5	100	90	405	163	135.9	N/A	N/A	405	Maximum detected value

Table C-11
Combined Summer/Winter Flounder Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	18	18	100	1.58	16.4	5.459	3.896	N/A	N/A	7.056	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	18	18	100	2.26	18.6	7.477	4.389	N/A	N/A	9.277	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	18	18	100	3.16	18.6	8.399	3.996	N/A	N/A	10.04	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	18	18	100	3.31	18.6	9.314	3.914	N/A	N/A	10.92	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	18	18	100	1.9	17.7	6.12	4.115	N/A	N/A	7.807	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	18	18	100	3.66	17.7	7.278	3.641	N/A	N/A	8.771	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	18	18	100	3.68	17.7	8.441	3.544	N/A	N/A	9.894	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	18	18	100	1.81	17.4	6.046	4.074	N/A	N/A	7.716	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	18	18	100	2.95	17.4	6.993	3.698	N/A	N/A	8.781	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	18	18	100	3.22	17.4	7.936	3.653	N/A	N/A	9.434	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	18	18	100	111000	599500	207611	135282	N/A	N/A	263081	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	18	18	100	111000	599500	207722	135471	N/A	N/A	263269	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	18	18	100	111000	599500	207667	135398	N/A	N/A	263184	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	18	18	100	3.09	21	12.23	5.101	N/A	N/A	14.33	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	18	18	100	3.59	21	12.46	5.032	N/A	N/A	14.52	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	18	18	100	3.34	21	12.35	5.054	N/A	N/A	14.42	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	18	18	100	0.0935	0.592	0.248	0.142	N/A	N/A	0.307	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	18	18	100	0.0937	0.592	0.25	0.144	N/A	N/A	0.309	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	18	18	100	0.0936	0.592	0.249	0.143	N/A	N/A	0.308	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	18	18	100	0.418	7.64	3.199	2.017	N/A	N/A	4.691	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	18	18	100	0.564	8.36	3.426	2.205	N/A	N/A	4.829	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	18	18	100	0.491	7.88	3.312	2.107	N/A	N/A	4.75	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	18	18	100	6.85	31.85	19.72	7.889	N/A	N/A	22.95	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	18	18	100	9.49	34.2	20.74	7.397	N/A	N/A	23.78	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	18	18	100	11.72	36.7	21.78	7.064	N/A	N/A	24.68	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	18	18	100	2.07	18.3	6.37	4.186	N/A	N/A	8.086	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	18	18	100	3.84	18.3	7.531	3.71	N/A	N/A	9.052	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	18	18	100	3.86	18.3	8.693	3.599	N/A	N/A	10.17	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	18	18	100	2.77	25.05	9.248	5.295	N/A	N/A	11.42	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	18	18	100	5.31	25.05	10.31	4.823	N/A	N/A	12.28	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	18	18	100	6.09	25.05	11.36	4.595	N/A	N/A	13.24	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	18	18	100	4700	45000	29011	11764	N/A	N/A	33835	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	18	18	100	4700	45000	29011	11764	N/A	N/A	33835	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	18	18	100	4700	45000	29011	11764	N/A	N/A	33835	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	18	18	100	1114	16649	9765	4157	N/A	N/A	11469	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	18	18	100	1149	16649	9804	4149	N/A	N/A	11506	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	18	18	100	1132	16649	9785	4153	N/A	N/A	11488	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	18	18	100	253	3040	1498	839.1	N/A	N/A	1842	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	18	18	100	101	1360	586.4	417.2	N/A	N/A	757.4	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	18	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	18	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	18	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	18	1	6	5.7	5.7	5.7	0	13	33	5.7	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	18	1	6	46	46	14.83	7.559	13	33	46	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	18	1	6	26	26	14.63	4.299	13	33	26	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	18	1	6	5.7	5.7	5.7	0	13	33	5.7	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	18	1	6	110	110	18.39	22.22	13	33	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	18	1	6	59	59	15.56	10.54	13	33	59	Maximum detected value
	Metals	Arsenic	mg/kg	18	18	100	0.517	2.71	1.699	0.508	N/A	N/A	1.908	95% Student's-t UCL
	Metals	Cadmium	mg/kg	18	1	6	0.0593	0.0593	0.0593	0	0.0952	0.099	0.0593	Maximum detected value
	Metals	Chromium	mg/kg	18	14	78	0.115	0.638	0.301	0.146	0.381	0.396	0.365	95% KM (t) UCL
	Metals	Copper	mg/kg	18	17	94	0.47	1.73	0.94	0.342	0.392	0.392	1.084	95% KM (t) UCL
	Metals	Lead	mg/kg	18	16	89	0.0381	1.56	0.368	0.386	0.192	0.196	0.532	95% KM (t) UCL

Table C-11
Combined Summer/Winter Flounder Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Mercury	ng/g	18	18	100	24.9	187	66.44	44.26	N/A	N/A	84.59	95% Student's-t UCL
	Metals	Methylmercury	ng/g	17	17	100	21.3	126.5	61.15	38.2	N/A	N/A	88.85	95% H-UCL
	Metals	Nickel	mg/kg	18	10	56	0.187	0.598	0.248	0.0932	0.381	0.396	0.277	KM H-UCL
	Metals	Selenium	mg/kg	18	18	100	0.402	0.701	0.525	0.105	N/A	N/A	0.568	95% Student's-t UCL
	Metals	Silver	mg/kg	18	4	22	0.022	0.0235	0.0227	0.000665	0.0952	0.099	0.0235	Maximum detected value
	Metals	Zinc	mg/kg	18	18	100	10.59	31	21.88	6.261	N/A	N/A	24.45	95% Student's-t UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	4.58	16.4	8.745	4.236	N/A	N/A	12.23	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	6.19	18.6	11.45	4.249	N/A	N/A	14.95	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	6.19	18.6	11.89	4.262	N/A	N/A	15.4	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	6.19	18.6	12.34	4.507	N/A	N/A	16.04	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	5.56	17.7	9.635	4.387	N/A	N/A	13.24	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	5.56	17.7	10.26	4.166	N/A	N/A	13.68	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	5.56	17.7	10.88	4.201	N/A	N/A	14.34	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	5.4	17.4	9.545	4.314	N/A	N/A	13.09	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	5.4	17.4	10.01	4.225	N/A	N/A	13.48	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	5.4	17.4	10.47	4.373	N/A	N/A	14.07	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	127000	599500	281917	201597	N/A	N/A	599500	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	127000	599500	282083	201787	N/A	N/A	599500	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	127000	599500	282083	201787	N/A	N/A	599500	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	10.2	21	15.21	3.893	N/A	N/A	18.41	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	12.7	21	15.74	3.233	N/A	N/A	18.4	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	11.8	21	15.48	3.518	N/A	N/A	18.37	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.142	0.592	0.323	0.188	N/A	N/A	0.478	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.142	0.592	0.327	0.191	N/A	N/A	0.484	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.142	0.592	0.325	0.19	N/A	N/A	0.481	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	1.65	7.64	4.162	2.642	N/A	N/A	7.64	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	1.8	8.36	4.418	2.817	N/A	N/A	8.36	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	1.73	7.88	4.29	2.723	N/A	N/A	7.88	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	16.4	31.85	26.66	6.363	N/A	N/A	31.85	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	18	34.2	27.38	6.301	N/A	N/A	32.56	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	19.6	36.7	28.08	6.441	N/A	N/A	33.37	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	6.09	18.3	9.958	4.479	N/A	N/A	13.64	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	6.1	18.3	10.59	4.243	N/A	N/A	14.08	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	6.11	18.3	11.22	4.259	N/A	N/A	14.72	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	8.34	25.05	13.72	5.864	N/A	N/A	18.54	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	8.68	25.05	14.31	5.619	N/A	N/A	18.93	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	9.03	25.05	14.88	5.548	N/A	N/A	19.44	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	21000	45000	31167	9928	N/A	N/A	39334	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	21000	45000	31167	9928	N/A	N/A	39334	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	21000	45000	31167	9928	N/A	N/A	39334	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	5685	16649	11424	3796	N/A	N/A	14547	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	5722	16649	11447	3779	N/A	N/A	14556	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	5704	16649	11436	3788	N/A	N/A	14551	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	752	2710	1850	797.3	N/A	N/A	2505	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	219	1360	947.7	511.8	N/A	N/A	1360	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	1	17	5.7	5.7	5.7	0	13	33	5.7	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	1	17	46	46	18.5	12.3	13	33	46	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	1	17	26	26	19.5	6.5	13	33	26	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	6	1	17	5.7	5.7	5.7	0	13	33	5.7	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	6	1	17	110	110	29.17	36.15	13	33	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	6	1	17	59	59	20.67	17.14	13	33	59	Maximum detected value

Table C-11
Combined Summer/Winter Flounder Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	Metals	Arsenic	mg/kg	6	6	100	0.517	1.92	1.398	0.572	N/A	N/A	1.869	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0952	0.099	0.099	Maximum non-detected value
	Metals	Chromium	mg/kg	6	5	83	0.16	0.638	0.385	0.172	0.381	0.381	0.638	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	0.47	1.73	1.152	0.477	N/A	N/A	1.544	95% Student's-t UCL
	Metals	Lead	mg/kg	6	6	100	0.0381	1.56	0.636	0.569	N/A	N/A	1.105	95% Student's-t UCL
	Metals	Mercury	ng/g	6	6	100	24.9	131	60.43	40.04	N/A	N/A	93.37	95% Student's-t UCL
	Metals	Methylmercury	ng/g	5	5	100	22	126.5	65.58	45.49	N/A	N/A	126.5	Maximum detected value
	Metals	Nickel	mg/kg	6	5	83	0.187	0.598	0.304	0.139	0.381	0.381	0.598	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.444	0.698	0.565	0.102	N/A	N/A	0.649	95% Student's-t UCL
	Metals	Silver	mg/kg	6	1	17	0.0231	0.0231	0.0231	0	0.0952	0.099	0.0231	Maximum detected value
	Metals	Zinc	mg/kg	6	6	100	10.59	31	23.65	8.13	N/A	N/A	30.34	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	1.58	11.1	4.898	3.266	N/A	N/A	7.585	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	2.26	12.5	6.961	3.466	N/A	N/A	9.812	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	4.7	12.6	7.813	2.985	N/A	N/A	10.27	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	4.78	12.6	8.65	2.946	N/A	N/A	11.07	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	1.9	12	5.541	3.457	N/A	N/A	8.385	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.66	12	6.559	2.976	N/A	N/A	9.007	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	3.68	12	7.579	2.936	N/A	N/A	9.994	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	1.81	11.8	5.479	3.402	N/A	N/A	8.278	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	3.65	11.9	6.349	3.017	N/A	N/A	8.831	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	3.68	11.9	7.205	3.056	N/A	N/A	9.719	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	114000	198000	154417	33158	N/A	N/A	181694	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	114000	198000	154417	33158	N/A	N/A	181694	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	114000	198000	154417	33158	N/A	N/A	181694	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	4.82	15.7	10.5	4.199	N/A	N/A	13.95	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	4.83	15.7	10.55	4.244	N/A	N/A	14.04	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	4.82	15.7	10.53	4.231	N/A	N/A	14.01	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.147	0.281	0.193	0.0463	N/A	N/A	0.232	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.147	0.281	0.194	0.0462	N/A	N/A	0.232	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.147	0.281	0.194	0.0463	N/A	N/A	0.232	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	1.81	4.18	2.553	0.829	N/A	N/A	3.712	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	1.95	4.18	2.675	0.773	N/A	N/A	3.741	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	1.88	4.18	2.614	0.801	N/A	N/A	3.727	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	7.08	24.2	17.46	6.045	N/A	N/A	22.44	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	9.52	24.2	18.33	5.592	N/A	N/A	22.93	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	12	25.65	19.21	5.383	N/A	N/A	23.64	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	2.07	12.3	5.738	3.506	N/A	N/A	8.623	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.84	12.3	6.756	3.022	N/A	N/A	9.242	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	3.86	12.3	7.769	2.965	N/A	N/A	10.21	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	4.05	16	8.033	4.169	N/A	N/A	11.46	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	5.99	16	8.951	3.722	N/A	N/A	12.01	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	6.09	16.1	9.885	3.694	N/A	N/A	12.92	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	17000	45000	29500	10193	N/A	N/A	37885	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	17000	45000	29500	10193	N/A	N/A	37885	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	17000	45000	29500	10193	N/A	N/A	37885	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	4641	12871	10039	3193	N/A	N/A	12666	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	4681	12949	10085	3198	N/A	N/A	12716	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	4661	12910	10062	3196	N/A	N/A	12691	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	700	2120	1419	613.5	N/A	N/A	1924	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	195	711	460.9	225	N/A	N/A	646	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value

Table C-11
Combined Summer/Winter Flounder Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	PAHs	Total LMW PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	Metals	Arsenic	mg/kg	6	6	100	1.19	2.71	1.741	0.561	N/A	N/A	2.202	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0952	0.099	0.099	Maximum non-detected value
	Metals	Chromium	mg/kg	6	4	67	0.188	0.485	0.306	0.0971	0.381	0.396	0.485	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	0.683	1.22	0.922	0.231	N/A	N/A	1.112	95% Student's-t UCL
	Metals	Lead	mg/kg	6	6	100	0.0455	0.545	0.312	0.206	N/A	N/A	0.481	95% Student's-t UCL
	Metals	Mercury	ng/g	6	6	100	26.4	187	71.17	61.2	N/A	N/A	121.5	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	21.3	106	43.67	31.33	N/A	N/A	98.41	95% Adjusted Gamma UCL
	Metals	Nickel	mg/kg	6	3	50	0.204	0.232	0.22	0.0119	0.381	0.396	0.232	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.463	0.675	0.546	0.0795	N/A	N/A	0.612	95% Student's-t UCL
	Metals	Silver	mg/kg	6	2	33	0.022	0.0235	0.0228	0.00075	0.0952	0.099	0.0235	Maximum detected value
	Metals	Zinc	mg/kg	6	6	100	18	30.7	23.14	4.978	N/A	N/A	27.24	95% Student's-t UCL
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	1.755	4.16	2.734	0.868	N/A	N/A	3.448	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	3.01	6.66	4.018	1.344	N/A	N/A	5.124	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	3.16	6.69	5.489	1.414	N/A	N/A	6.652	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	3.31	8.86	6.956	2.22	N/A	N/A	8.782	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	2.37	4.76	3.183	0.891	N/A	N/A	3.916	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.715	7.04	5.021	1.226	N/A	N/A	6.029	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	4.81	10.7	6.863	2.327	N/A	N/A	8.777	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	2.31	4.75	3.113	0.914	N/A	N/A	3.865	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	2.95	5.99	4.622	1.178	N/A	N/A	5.59	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	3.22	8.64	6.133	2.16	N/A	N/A	7.91	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	111000	375000	186500	99639	N/A	N/A	268467	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	111000	376000	186667	100017	N/A	N/A	268945	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	111000	375000	186500	99639	N/A	N/A	268467	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	3.09	20.3	11	6.294	N/A	N/A	16.18	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	3.59	20.3	11.09	6.169	N/A	N/A	16.16	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	3.34	20.3	11.04	6.231	N/A	N/A	16.17	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.0935	0.482	0.228	0.142	N/A	N/A	0.345	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.0937	0.484	0.229	0.142	N/A	N/A	0.346	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.0936	0.483	0.229	0.142	N/A	N/A	0.346	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	0.418	6.57	2.882	2.104	N/A	N/A	4.613	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	0.564	7.71	3.184	2.464	N/A	N/A	5.211	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	0.491	7.14	3.033	2.281	N/A	N/A	4.909	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	6.85	23.3	15.03	6.654	N/A	N/A	20.5	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	9.49	23.4	16.53	5.825	N/A	N/A	21.32	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	11.72	23.6	18.05	5.2	N/A	N/A	22.33	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	2.47	4.95	3.413	0.894	N/A	N/A	4.148	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.885	7.34	5.249	1.219	N/A	N/A	6.252	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	5	11	7.093	2.32	N/A	N/A	9.002	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	2.77	9.24	5.997	2.273	N/A	N/A	7.866	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	5.31	10.1	7.66	1.965	N/A	N/A	9.276	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	7.26	12.6	9.313	2.206	N/A	N/A	11.13	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	4700	43000	26367	15932	N/A	N/A	39473	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	4700	43000	26367	15932	N/A	N/A	39473	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	4700	43000	26367	15932	N/A	N/A	39473	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	1114	15248	7831	5125	N/A	N/A	12047	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	1149	15287	7882	5124	N/A	N/A	12097	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	1132	15267	7856	5125	N/A	N/A	12072	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	253	3040	1225	1066	N/A	N/A	2102	95% Student's-t UCL

Table C-11
Combined Summer/Winter Flounder Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Pesticides	Hexachlorobenzene	pg/g	6	6	100	101	614	350.6	192.1	N/A	N/A	508.6	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=0)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=1)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	6	0	0	N/A	N/A	N/A	N/A	13	33	33	Maximum non-detected value
	Metals	Arsenic	mg/kg	6	6	100	1.71	2.255	1.959	0.207	N/A	N/A	2.13	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	1	17	0.0593	0.0593	0.0593	0	0.0962	0.099	0.0593	Maximum detected value
	Metals	Chromium	mg/kg	6	5	83	0.115	0.419	0.222	0.101	0.392	0.392	0.419	Maximum detected value
	Metals	Copper	mg/kg	6	5	83	0.704	0.954	0.745	0.183	0.392	0.392	0.954	Maximum detected value
	Metals	Lead	mg/kg	6	4	67	0.0469	0.366	0.155	0.148	0.192	0.196	0.366	Maximum detected value
	Metals	Mercury	ng/g	6	6	100	25.4	120	67.72	35.2	N/A	N/A	96.67	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	28.3	121	74.93	37.64	N/A	N/A	105.9	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	2	33	0.188	0.213	0.201	0.0125	0.385	0.396	0.213	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.402	0.701	0.464	0.117	N/A	N/A	0.561	95% Student's-t UCL
	Metals	Silver	mg/kg	6	1	17	0.022	0.022	0.022	0	0.0962	0.098	0.022	Maximum detected value
	Metals	Zinc	mg/kg	6	6	100	11.7	27.1	18.85	5.073	N/A	N/A	23.02	95% Student's-t UCL

Table C-12
American Eel Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	18	18	100	1.69	16.3	5.571	3.95	N/A	N/A	7.19	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	18	18	100	2.78	21.7	10.43	5.243	N/A	N/A	12.58	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	18	18	100	3.78	21.7	11.42	5.141	N/A	N/A	13.53	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	18	18	100	4.29	21.7	12.4	5.218	N/A	N/A	14.54	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	18	18	100	2.38	19.9	8.485	4.668	N/A	N/A	10.4	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	18	18	100	2.77	19.9	9.126	4.646	N/A	N/A	11.03	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	18	18	100	2.82	19.9	9.774	4.869	N/A	N/A	11.77	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	18	18	100	2.28	19.2	7.734	4.506	N/A	N/A	9.582	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	18	18	100	2.59	19.2	8.393	4.504	N/A	N/A	10.24	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	18	18	100	2.66	19.2	9.053	4.744	N/A	N/A	11	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	18	18	100	101000	1500000	603333	315390	N/A	N/A	732653	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	18	18	100	101000	1500000	604500	316278	N/A	N/A	734183	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	18	18	100	101000	1500000	603556	315442	N/A	N/A	732896	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	18	18	100	1.74	42	9.673	11.3	N/A	N/A	15.53	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	18	18	100	2.72	44.4	11.17	11.46	N/A	N/A	16.95	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	18	18	100	2.23	43.2	10.43	11.36	N/A	N/A	16.19	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	18	18	100	0.136	2.19	0.597	0.575	N/A	N/A	0.923	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	18	18	100	0.139	2.2	0.637	0.565	N/A	N/A	0.924	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	18	18	100	0.137	2.2	0.617	0.57	N/A	N/A	0.948	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	18	18	100	0.896	37.6	6.324	9.397	N/A	N/A	15.98	95% Chebyshev (Mean, Sd) UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	18	18	100	1.44	38.3	7.59	9.24	N/A	N/A	12.19	95% Adjusted Gamma UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	18	18	100	1.21	38	6.957	9.29	N/A	N/A	12.26	95% H-UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	18	18	100	5.76	54.9	20.1	13.61	N/A	N/A	25.68	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	18	18	100	6.51	56.6	21.85	13.66	N/A	N/A	27.45	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	18	18	100	7.25	58.3	23.58	13.81	N/A	N/A	29.24	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	18	18	100	2.79	20.5	9.085	4.893	N/A	N/A	11.09	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	18	18	100	2.91	20.5	9.745	4.886	N/A	N/A	11.75	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	18	18	100	2.96	20.9	10.42	5.098	N/A	N/A	12.51	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	18	18	100	3.96	46.3	14.06	11.3	N/A	N/A	19.86	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	18	18	100	4.03	46.7	15.36	11.26	N/A	N/A	21.21	95% Adjusted Gamma UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	18	18	100	4.1	47.2	16.65	11.35	N/A	N/A	22.69	95% Adjusted Gamma UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	18	18	100	85000	610000	255833	123458	N/A	N/A	306455	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	18	18	100	85000	610000	255833	123458	N/A	N/A	306455	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	18	18	100	85000	610000	255833	123458	N/A	N/A	306455	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	18	18	100	13587	76530	53544	17131	N/A	N/A	60568	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	18	18	100	13652	76587	53604	17130	N/A	N/A	60628	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	18	18	100	13619	76558	53574	17131	N/A	N/A	60598	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	18	18	100	2890	20900	9763	4854	N/A	N/A	11754	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	18	18	100	1270	5970	3085	1253	N/A	N/A	3599	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	18	7	39	2.8	20	6.858	5.121	6.7	33	9.472	95% KM (t) UCL
	PAHs	Total HMW PAH (ND=1)	µg/kg	18	7	39	62	310	59.37	94.25	6.7	33	164	95% KM (Chebyshev) UCL
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	18	7	39	33	160	33.4	47.95	6.7	33	86.61	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=0)	µg/kg	18	17	94	6.1	96	27.62	31.12	33	33	47.13	KM H-UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	18	17	94	42	290	112.1	88.75	33	33	206.1	95% KM (Chebyshev) UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	18	17	94	25	200	70.43	58.96	33	33	132.9	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=0)	µg/kg	18	17	94	6.1	110	31.51	35.45	33	33	69.08	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1)	µg/kg	18	17	94	110	620	254.9	189.8	33	33	455.9	95% KM (Chebyshev) UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	18	17	94	58	360	143.5	108.2	33	33	258.1	95% KM (Chebyshev) UCL
	Metals	Arsenic	mg/kg	18	18	100	0.42	1.5	0.808	0.279	N/A	N/A	0.923	95% Student's-t UCL
	Metals	Cadmium	mg/kg	18	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	18	5	28	0.105	0.348	0.186	0.0844	0.385	0.4	0.348	Maximum detected value
	Metals	Copper	mg/kg	18	18	100	0.61	2.94	0.873	0.526	N/A	N/A	1.088	95% Student's-t UCL
	Metals	Lead	mg/kg	18	17	94	0.0502	0.482	0.232	0.14	0.196	0.196	0.326	KM H-UCL
	Metals	Mercury	ng/g	18	18	100	43.3	347	182.2	83.88	N/A	N/A	216.5	95% Student's-t UCL

Table C-12
American Eel Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Methylmercury	ng/g	18	18	100	77.8	399.5	202.5	85.36	N/A	N/A	237.5	95% Student's-t UCL
	Metals	Nickel	mg/kg	18	7	39	0.206	1.29	0.34	0.268	0.385	0.4	0.459	95% KM (t) UCL
	Metals	Selenium	mg/kg	18	18	100	0.467	1.83	0.811	0.41	N/A	N/A	0.979	95% H-UCL
	Metals	Silver	mg/kg	18	13	72	0.02	0.0475	0.0281	0.00989	0.0971	0.1	0.0322	KM H-UCL
	Metals	Zinc	mg/kg	18	18	100	25.1	40.5	31.36	4.711	N/A	N/A	33.29	95% Student's-t UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	4.34	16.3	7.45	4.448	N/A	N/A	14.59	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	8.685	21.7	13.88	4.415	N/A	N/A	17.51	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	10.38	21.7	14.91	3.938	N/A	N/A	18.15	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	12.1	21.7	15.93	3.724	N/A	N/A	19	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	6.855	19.9	11.22	4.512	N/A	N/A	14.93	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	8.1	19.9	11.85	4.154	N/A	N/A	17.81	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	9.36	19.9	12.48	4.034	N/A	N/A	15.8	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	6.13	19.2	10.14	4.617	N/A	N/A	17.14	95% Adjusted Gamma UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	7.405	19.2	10.78	4.242	N/A	N/A	14.27	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	8.66	19.2	11.43	4.099	N/A	N/A	14.8	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	542000	695000	616667	58428	N/A	N/A	664732	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	542000	696000	617333	58729	N/A	N/A	665646	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	542000	696000	617000	58815	N/A	N/A	665384	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	3.28	42	11.67	15.1	N/A	N/A	42	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	3.78	44.4	13.3	15.68	N/A	N/A	44.4	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	3.53	43.2	12.49	15.37	N/A	N/A	43.2	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.292	2.19	0.697	0.738	N/A	N/A	2.073	95% H-UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.295	2.2	0.731	0.73	N/A	N/A	2.2	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.293	2.2	0.715	0.736	N/A	N/A	2.087	95% H-UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	1.83	37.6	8.751	14.23	N/A	N/A	37.6	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	1.83	38.3	9.738	14.15	N/A	N/A	38.3	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	1.83	38	9.254	14.2	N/A	N/A	38	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	12.1	54.9	25.57	15.96	N/A	N/A	38.7	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	14.3	56.6	27.42	15.69	N/A	N/A	40.32	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	16.55	58.3	29.26	15.54	N/A	N/A	42.04	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	7.195	20.5	11.93	4.571	N/A	N/A	15.69	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	8.455	20.5	12.56	4.152	N/A	N/A	15.97	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	9.705	20.5	13.22	3.945	N/A	N/A	16.46	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	8.155	46.3	18.89	14.8	N/A	N/A	46.3	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	9.735	46.7	20.04	14.29	N/A	N/A	31.8	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	11.1	47.2	21.21	13.88	N/A	N/A	32.62	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	150000	220000	181667	24833	N/A	N/A	202095	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	150000	220000	181667	24833	N/A	N/A	202095	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	150000	220000	181667	24833	N/A	N/A	202095	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	41460	75510	62277	12882	N/A	N/A	72874	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	41540	75590	62336	12879	N/A	N/A	72931	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	41500	75550	62306	12880	N/A	N/A	72902	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	3280	15000	9172	4190	N/A	N/A	12618	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	2270	5130	3673	980.1	N/A	N/A	4480	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	2	33	2.8	8.1	5.45	2.65	13	33	8.1	Maximum detected value

Table C-12
American Eel Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	PAHs	Total HMW PAH (ND=1)	µg/kg	6	2	33	62	63	29.5	23.34	13	33	63	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	2	33	33	34.5	19.92	9.791	13	33	34.5	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	6	100	7.6	34.5	18.02	9.148	N/A	N/A	25.54	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	6	100	53	220	96.08	62.41	N/A	N/A	178.8	95% H-UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	6	100	33	120	57.08	31.4	N/A	N/A	82.92	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	6	6	100	7.6	42.5	19.85	11.87	N/A	N/A	29.62	95% Student's-t UCL
	PAHs	Total PAH (ND=1)	µg/kg	6	6	100	115	550	237.5	160.2	N/A	N/A	526	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	6	6	100	66	280	127.5	77.54	N/A	N/A	257.4	95% Adjusted Gamma UCL
	Metals	Arsenic	mg/kg	6	6	100	0.544	1.5	0.784	0.359	N/A	N/A	1.079	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0971	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	6	3	50	0.165	0.348	0.228	0.0851	0.392	0.396	0.348	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	0.653	0.984	0.75	0.133	N/A	N/A	0.924	95% Adjusted Gamma UCL
	Metals	Lead	mg/kg	6	5	83	0.137	0.482	0.255	0.143	0.196	0.196	0.482	Maximum detected value
	Metals	Mercury	ng/g	6	6	100	43.3	347	223.3	111.6	N/A	N/A	315.1	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	138	399.5	267.8	97	N/A	N/A	347.5	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	2	33	0.206	0.448	0.246	0.0902	0.392	0.396	0.448	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.562	0.696	0.613	0.0508	N/A	N/A	0.654	95% Student's-t UCL
	Metals	Silver	mg/kg	6	3	50	0.02	0.0433	0.0278	0.0109	0.0971	0.1	0.0433	Maximum detected value
	Metals	Zinc	mg/kg	6	6	100	25.3	35.6	31.03	4.495	N/A	N/A	34.72	95% Student's-t UCL
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	1.89	9.27	4.203	2.812	N/A	N/A	6.517	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	4.79	16.7	9.638	4.655	N/A	N/A	13.47	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	5.31	17.2	10.52	4.383	N/A	N/A	14.13	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	5.82	17.7	11.38	4.289	N/A	N/A	14.91	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	3.69	14	7.487	3.966	N/A	N/A	10.75	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.74	14	7.948	3.715	N/A	N/A	11	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	3.79	14.1	8.428	3.787	N/A	N/A	11.54	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	3.25	13	6.658	3.731	N/A	N/A	9.728	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	3.32	13	7.125	3.507	N/A	N/A	10.01	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	3.4	13.1	7.613	3.608	N/A	N/A	10.58	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	275000	710000	489500	198368	N/A	N/A	652686	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	275000	712000	490500	199076	N/A	N/A	654268	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	275000	711000	489833	198734	N/A	N/A	653320	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	1.74	5.67	3.215	1.447	N/A	N/A	4.405	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	2.72	8.27	5.073	2.325	N/A	N/A	6.986	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	2.23	6.11	4.143	1.725	N/A	N/A	5.562	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.15	0.475	0.293	0.138	N/A	N/A	0.406	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.177	0.632	0.375	0.197	N/A	N/A	0.537	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.164	0.524	0.334	0.163	N/A	N/A	0.468	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	0.896	4.77	2.067	1.463	N/A	N/A	3.27	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	1.53	8.03	4.37	3.017	N/A	N/A	6.852	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	1.21	5.48	3.217	2.069	N/A	N/A	4.919	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	6.88	20.6	12.85	5.704	N/A	N/A	17.54	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	7.88	23.3	14.65	6.01	N/A	N/A	19.6	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	8.88	25.9	16.46	6.449	N/A	N/A	21.77	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	3.86	14.4	7.775	4.066	N/A	N/A	11.12	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	3.92	14.6	8.288	3.877	N/A	N/A	11.48	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	3.98	14.7	8.81	3.944	N/A	N/A	12.05	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	4.23	15.5	8.72	4.558	N/A	N/A	12.47	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	4.62	18.3	10.35	5.264	N/A	N/A	14.68	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	5.01	21.1	11.98	6.143	N/A	N/A	17.03	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	85000	300000	202500	76273	N/A	N/A	265245	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	85000	300000	202500	76273	N/A	N/A	265245	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	85000	300000	202500	76273	N/A	N/A	265245	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	37320	68816	52749	10158	N/A	N/A	61105	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	37372	68855	52807	10153	N/A	N/A	61159	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	37346	68836	52778	10156	N/A	N/A	61132	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	6	6	100	6310	14300	9313	2744	N/A	N/A	11571	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	1270	3390	2213	706	N/A	N/A	2794	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	1	17	4.3	4.3	4.3	0	6.7	13	4.3	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	1	17	65	65	16.42	21.73	6.7	13	65	Maximum detected value

Table C-12
American Eel Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	1	17	34	34	11.25	10.17	6.7	13	34	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	6	100	6.1	10	7.617	1.35	N/A	N/A	8.727	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	6	100	42	85	65.67	20.98	N/A	N/A	82.93	95% Student's-t UCL
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	6	100	25	46	36.5	10.17	N/A	N/A	44.87	95% Student's-t UCL
	PAHs	Total PAH (ND=0)	µg/kg	6	6	100	6.1	14	8.283	2.881	N/A	N/A	12.3	95% Adjusted Gamma UCL
	PAHs	Total PAH (ND=1)	µg/kg	6	6	100	110	220	161.7	56.72	N/A	N/A	208.3	95% Student's-t UCL
	PAHs	Total PAH (ND=1/2)	µg/kg	6	6	100	58	110	85.67	26.75	N/A	N/A	107.7	95% Student's-t UCL
	Metals	Arsenic	mg/kg	6	6	100	0.585	1.19	0.953	0.247	N/A	N/A	1.156	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0971	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	6	1	17	0.14	0.14	0.14	0	0.388	0.4	0.14	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	0.618	0.9	0.748	0.098	N/A	N/A	0.829	95% Student's-t UCL
	Metals	Lead	mg/kg	6	6	100	0.113	0.339	0.182	0.0984	N/A	N/A	0.263	95% Student's-t UCL
	Metals	Mercury	ng/g	6	6	100	113	245	152.8	47.37	N/A	N/A	191.8	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	121	225	154.7	38.23	N/A	N/A	186.1	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	2	33	0.213	1.29	0.393	0.401	0.388	0.4	1.29	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.899	1.83	1.265	0.433	N/A	N/A	1.621	95% Student's-t UCL
	Metals	Silver	mg/kg	6	6	100	0.02	0.0475	0.0274	0.0103	N/A	N/A	0.0421	95% Adjusted Gamma UCL
	Metals	Zinc	mg/kg	6	6	100	25.2	39.9	31.5	4.838	N/A	N/A	35.48	95% Student's-t UCL
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	6	6	100	1.69	12.1	5.058	4.309	N/A	N/A	8.603	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	6	6	100	2.78	15.6	7.772	5.365	N/A	N/A	12.18	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	6	6	100	3.78	18.1	8.832	5.613	N/A	N/A	13.45	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	6	6	100	4.29	20.6	9.898	6.047	N/A	N/A	14.87	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	6	6	100	2.38	14.2	6.748	4.919	N/A	N/A	10.8	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	6	6	100	2.77	16.7	7.58	5.378	N/A	N/A	12	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	6	6	100	2.82	19.2	8.413	6.066	N/A	N/A	13.4	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	6	6	100	2.28	13.9	6.407	4.833	N/A	N/A	10.38	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	6	6	100	2.59	16.4	7.27	5.327	N/A	N/A	11.65	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	6	6	100	2.66	18.9	8.113	6.03	N/A	N/A	13.07	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	6	6	100	101000	1500000	703833	517257	N/A	N/A	1129349	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	6	6	100	101000	1500000	705667	518607	N/A	N/A	1132293	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	6	6	100	101000	1500000	703833	517257	N/A	N/A	1129349	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	6	6	100	2.48	28.9	14.13	11.18	N/A	N/A	23.33	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	6	6	100	2.96	29.1	15.13	11.26	N/A	N/A	24.39	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	2.72	28.9	14.64	11.21	N/A	N/A	23.87	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	6	6	100	0.136	1.66	0.8	0.621	N/A	N/A	1.311	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	6	6	100	0.139	1.67	0.806	0.621	N/A	N/A	1.317	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	0.137	1.67	0.804	0.623	N/A	N/A	1.316	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	1.44	18.7	8.155	7.92	N/A	N/A	18.7	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	1.44	18.7	8.663	7.857	N/A	N/A	15.13	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	1.44	18.7	8.4	7.871	N/A	N/A	14.88	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	6	6	100	5.76	42.2	21.88	15.49	N/A	N/A	34.62	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	6	6	100	6.51	45.9	23.47	15.79	N/A	N/A	36.46	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	6	6	100	7.25	49.6	25.01	16.23	N/A	N/A	38.36	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	6	6	100	2.79	15.9	7.553	5.424	N/A	N/A	12.02	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	6	6	100	2.91	18.4	8.388	5.885	N/A	N/A	13.23	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	6	6	100	2.96	20.9	9.24	6.564	N/A	N/A	14.64	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	6	6	100	3.96	32.6	14.55	11.47	N/A	N/A	23.99	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	6	6	100	4.03	35.1	15.68	11.95	N/A	N/A	25.51	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	6	6	100	4.1	37.6	16.77	12.5	N/A	N/A	27.06	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	6	6	100	240000	610000	383333	125963	N/A	N/A	486956	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	6	6	100	240000	610000	383333	125963	N/A	N/A	486956	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	6	6	100	240000	610000	383333	125963	N/A	N/A	486956	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	6	6	100	13587	76530	45607	23681	N/A	N/A	65088	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	6	6	100	13652	76587	45668	23684	N/A	N/A	65151	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	6	6	100	13619	76558	45637	23683	N/A	N/A	65120	95% Student's-t UCL

Table C-12
American Eel Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Pesticides	Dieldrin	pg/g	6	6	100	2890	20900	10805	7285	N/A	N/A	16798	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	6	6	100	1760	5970	3368	1568	N/A	N/A	4658	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	6	4	67	4.2	20	13.3	5.725	33	33	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	6	4	67	65	310	145.2	120.1	33	33	310	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	6	4	67	34	160	82	56.82	33	33	160	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	6	5	83	6.9	96	56.63	38.97	33	33	96	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	6	5	83	47	290	174.7	117	33	33	290	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	6	5	83	27	200	117.7	77.21	33	33	200	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	6	5	83	11	110	66.33	41.93	33	33	110	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	6	5	83	110	620	365.5	250.5	33	33	620	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	6	5	83	61	360	217.3	143	33	33	360	Maximum detected value
	Metals	Arsenic	mg/kg	6	6	100	0.42	0.978	0.689	0.181	N/A	N/A	0.837	95% Student's-t UCL
	Metals	Cadmium	mg/kg	6	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	6	1	17	0.105	0.105	0.105	0	0.385	0.4	0.105	Maximum detected value
	Metals	Copper	mg/kg	6	6	100	0.61	2.94	1.121	0.895	N/A	N/A	2.714	95% Chebyshev (Mean, Sd) UCL
	Metals	Lead	mg/kg	6	6	100	0.0502	0.469	0.265	0.175	N/A	N/A	0.409	95% Student's-t UCL
	Metals	Mercury	ng/g	6	6	100	57	262	170.3	77.43	N/A	N/A	234	95% Student's-t UCL
	Metals	Methylmercury	ng/g	6	6	100	77.8	293	185.1	75.4	N/A	N/A	247.2	95% Student's-t UCL
	Metals	Nickel	mg/kg	6	3	50	0.486	0.681	0.469	0.106	0.385	0.396	0.681	Maximum detected value
	Metals	Selenium	mg/kg	6	6	100	0.467	0.74	0.557	0.0983	N/A	N/A	0.638	95% Student's-t UCL
	Metals	Silver	mg/kg	6	4	67	0.0226	0.0461	0.0294	0.00971	0.0971	0.1	0.0461	Maximum detected value
	Metals	Zinc	mg/kg	6	6	100	25.1	40.5	31.55	5.624	N/A	N/A	36.18	95% Student's-t UCL

Table C-13
Atlantic Menhaden Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	2	2	100	3.92	4.74	4.33	0.58	N/A	N/A	4.74	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	2	2	100	8.375	15.3	11.84	4.897	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	2	2	100	9.595	15.3	12.45	4.034	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	2	2	100	10.8	15.3	13.05	3.186	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	2	2	100	5.83	7.17	6.5	0.948	N/A	N/A	7.17	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	2	2	100	7.035	7.17	7.103	0.0955	N/A	N/A	7.17	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	2	2	100	7.17	8.245	7.708	0.76	N/A	N/A	8.245	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	2	2	100	5.69	6.9	6.295	0.856	N/A	N/A	6.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	2	2	100	6.9	6.9	6.9	0	N/A	N/A	6.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	2	2	100	6.9	8.095	7.498	0.845	N/A	N/A	8.095	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	2	2	100	448000	617000	532500	119501	N/A	N/A	617000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	2	2	100	448500	617000	532750	119147	N/A	N/A	617000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	2	2	100	448000	617000	532500	119501	N/A	N/A	617000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	2	2	100	19.87	56.7	38.29	26.04	N/A	N/A	56.7	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	2	2	100	19.88	56.7	38.29	26.04	N/A	N/A	56.7	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	2	2	100	19.87	56.7	38.29	26.04	N/A	N/A	56.7	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	2	2	100	0.359	0.561	0.46	0.143	N/A	N/A	0.561	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	2	2	100	0.359	0.561	0.46	0.143	N/A	N/A	0.561	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	2	2	100	0.359	0.561	0.46	0.143	N/A	N/A	0.561	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	2	2	100	4.67	6.37	5.52	1.202	N/A	N/A	6.37	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	2	2	100	4.82	6.52	5.67	1.202	N/A	N/A	6.52	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	2	2	100	4.74	6.44	5.59	1.202	N/A	N/A	6.44	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	2	2	100	28.25	71.9	50.08	30.87	N/A	N/A	71.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	2	2	100	29.45	72	50.73	30.09	N/A	N/A	72	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	2	2	100	30.65	72	51.33	29.24	N/A	N/A	72	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	2	2	100	6.19	7.73	6.96	1.089	N/A	N/A	7.73	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	2	2	100	7.395	7.73	7.563	0.237	N/A	N/A	7.73	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	2	2	100	7.73	8.59	8.16	0.608	N/A	N/A	8.59	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	2	2	100	10.35	13.3	11.83	2.086	N/A	N/A	13.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	2	2	100	11.65	13.3	12.48	1.167	N/A	N/A	13.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	2	2	100	12.95	13.4	13.18	0.318	N/A	N/A	13.4	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	2	2	100	135000	310000	222500	123744	N/A	N/A	310000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	2	2	100	135000	310000	222500	123744	N/A	N/A	310000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	2	2	100	135000	310000	222500	123744	N/A	N/A	310000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	2	2	100	18783	39850	29317	14897	N/A	N/A	39850	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	2	2	100	18783	40627	29705	15446	N/A	N/A	40627	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	2	2	100	18783	40239	29511	15171	N/A	N/A	40239	Maximum detected value
	Pesticides	Dieldrin	pg/g	2	2	100	3660	8550	6105	3458	N/A	N/A	8550	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	2	2	100	556	1360	958	568.5	N/A	N/A	1360	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	2	2	100	5	31	18	18.38	N/A	N/A	31	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	2	2	100	54.5	65	59.75	7.425	N/A	N/A	65	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	2	2	100	35	43	39	5.657	N/A	N/A	43	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	2	2	100	26	36.5	31.25	7.425	N/A	N/A	36.5	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	2	2	100	46	49.5	47.75	2.475	N/A	N/A	49.5	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	2	2	100	36	42.5	39.25	4.596	N/A	N/A	42.5	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	2	2	100	31	67.5	49.25	25.81	N/A	N/A	67.5	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	2	2	100	105	110	107.5	3.536	N/A	N/A	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	2	2	100	72	85.5	78.75	9.546	N/A	N/A	85.5	Maximum detected value
	Metals	Arsenic	mg/kg	2	2	100	0.605	1.21	0.907	0.428	N/A	N/A	1.21	Maximum detected value
	Metals	Cadmium	mg/kg	2	0	0	N/A	N/A	N/A	N/A	0.0971	0.098	0.098	Maximum non-detected value
	Metals	Chromium	mg/kg	2	2	100	0.148	0.341	0.245	0.136	N/A	N/A	0.341	Maximum detected value
	Metals	Copper	mg/kg	2	2	100	0.709	1.1	0.905	0.276	N/A	N/A	1.1	Maximum detected value
	Metals	Lead	mg/kg	2	2	100	0.243	0.524	0.383	0.198	N/A	N/A	0.524	Maximum detected value
	Metals	Mercury	ng/g	2	2	100	48.15	59.2	53.68	7.814	N/A	N/A	59.2	Maximum detected value

Table C-13
Atlantic Menhaden Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Methylmercury	ng/g	2	2	100	64.15	102	83.08	26.76	N/A	N/A	102	Maximum detected value
	Metals	Nickel	mg/kg	2	0	0	N/A	N/A	N/A	N/A	0.388	0.392	0.392	Maximum non-detected value
	Metals	Selenium	mg/kg	2	2	100	0.454	0.478	0.466	0.017	N/A	N/A	0.478	Maximum detected value
	Metals	Silver	mg/kg	2	0	0	N/A	N/A	N/A	N/A	0.0971	0.098	0.098	Maximum non-detected value
	Metals	Zinc	mg/kg	2	2	100	13.2	18.35	15.78	3.642	N/A	N/A	18.35	Maximum detected value
North	Dioxins/Furans	2378-TCDD	ng/kg	2	2	100	3.92	4.74	4.33	0.58	N/A	N/A	4.74	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	2	2	100	8.375	15.3	11.84	4.897	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	2	2	100	9.595	15.3	12.45	4.034	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	2	2	100	10.8	15.3	13.05	3.186	N/A	N/A	15.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	2	2	100	5.83	7.17	6.5	0.948	N/A	N/A	7.17	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	2	2	100	7.035	7.17	7.103	0.0955	N/A	N/A	7.17	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	2	2	100	7.17	8.245	7.708	0.76	N/A	N/A	8.245	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	2	2	100	5.69	6.9	6.295	0.856	N/A	N/A	6.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	2	2	100	6.9	6.9	6.9	0	N/A	N/A	6.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	2	2	100	6.9	8.095	7.498	0.845	N/A	N/A	8.095	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	2	2	100	448000	617000	532500	119501	N/A	N/A	617000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	2	2	100	448500	617000	532750	119147	N/A	N/A	617000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	2	2	100	448000	617000	532500	119501	N/A	N/A	617000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	2	2	100	19.87	56.7	38.29	26.04	N/A	N/A	56.7	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	2	2	100	19.88	56.7	38.29	26.04	N/A	N/A	56.7	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	2	2	100	19.87	56.7	38.29	26.04	N/A	N/A	56.7	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	2	2	100	0.359	0.561	0.46	0.143	N/A	N/A	0.561	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	2	2	100	0.359	0.561	0.46	0.143	N/A	N/A	0.561	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	2	2	100	0.359	0.561	0.46	0.143	N/A	N/A	0.561	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	2	2	100	4.67	6.37	5.52	1.202	N/A	N/A	6.37	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	2	2	100	4.82	6.52	5.67	1.202	N/A	N/A	6.52	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	2	2	100	4.74	6.44	5.59	1.202	N/A	N/A	6.44	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	2	2	100	28.25	71.9	50.08	30.87	N/A	N/A	71.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	2	2	100	29.45	72	50.73	30.09	N/A	N/A	72	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	2	2	100	30.65	72	51.33	29.24	N/A	N/A	72	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	2	2	100	6.19	7.73	6.96	1.089	N/A	N/A	7.73	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	2	2	100	7.395	7.73	7.563	0.237	N/A	N/A	7.73	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	2	2	100	7.73	8.59	8.16	0.608	N/A	N/A	8.59	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	2	2	100	10.35	13.3	11.83	2.086	N/A	N/A	13.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	2	2	100	11.65	13.3	12.48	1.167	N/A	N/A	13.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	2	2	100	12.95	13.4	13.18	0.318	N/A	N/A	13.4	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	2	2	100	135000	310000	222500	123744	N/A	N/A	310000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	2	2	100	135000	310000	222500	123744	N/A	N/A	310000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	2	2	100	135000	310000	222500	123744	N/A	N/A	310000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	2	2	100	18783	39850	29317	14897	N/A	N/A	39850	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	2	2	100	18783	40627	29705	15446	N/A	N/A	40627	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	2	2	100	18783	40239	29511	15171	N/A	N/A	40239	Maximum detected value
	Pesticides	Dieldrin	pg/g	2	2	100	3660	8550	6105	3458	N/A	N/A	8550	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	2	2	100	556	1360	958	568.5	N/A	N/A	1360	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	2	2	100	5	31	18	18.38	N/A	N/A	31	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	2	2	100	54.5	65	59.75	7.425	N/A	N/A	65	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	2	2	100	35	43	39	5.657	N/A	N/A	43	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	2	2	100	26	36.5	31.25	7.425	N/A	N/A	36.5	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	2	2	100	46	49.5	47.75	2.475	N/A	N/A	49.5	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	2	2	100	36	42.5	39.25	4.596	N/A	N/A	42.5	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	2	2	100	31	67.5	49.25	25.81	N/A	N/A	67.5	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	2	2	100	105	110	107.5	3.536	N/A	N/A	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	2	2	100	72	85.5	78.75	9.546	N/A	N/A	85.5	Maximum detected value
	Metals	Arsenic	mg/kg	2	2	100	0.605	1.21	0.907	0.428	N/A	N/A	1.21	Maximum detected value

Table C-13
Atlantic Menhaden Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	Metals	Cadmium	mg/kg	2	0	0	N/A	N/A	N/A	N/A	0.0971	0.098	0.098	Maximum non-detected value
	Metals	Chromium	mg/kg	2	2	100	0.148	0.341	0.245	0.136	N/A	N/A	0.341	Maximum detected value
	Metals	Copper	mg/kg	2	2	100	0.709	1.1	0.905	0.276	N/A	N/A	1.1	Maximum detected value
	Metals	Lead	mg/kg	2	2	100	0.243	0.524	0.383	0.198	N/A	N/A	0.524	Maximum detected value
	Metals	Mercury	ng/g	2	2	100	48.15	59.2	53.68	7.814	N/A	N/A	59.2	Maximum detected value
	Metals	Methylmercury	ng/g	2	2	100	64.15	102	83.08	26.76	N/A	N/A	102	Maximum detected value
	Metals	Nickel	mg/kg	2	0	0	N/A	N/A	N/A	N/A	0.388	0.392	0.392	Maximum non-detected value
	Metals	Selenium	mg/kg	2	2	100	0.454	0.478	0.466	0.017	N/A	N/A	0.478	Maximum detected value
	Metals	Silver	mg/kg	2	0	0	N/A	N/A	N/A	N/A	0.0971	0.098	0.098	Maximum non-detected value
	Metals	Zinc	mg/kg	2	2	100	13.2	18.35	15.78	3.642	N/A	N/A	18.35	Maximum detected value

Table C-14
Atlantic Silverside Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide	Dioxins/Furans	2378-TCDD	ng/kg	7	7	100	5.91	14.5	8.037	2.929	N/A	N/A	10.19	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	7	7	100	11	20.4	13.21	3.262	N/A	N/A	15.61	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	7	7	100	11.2	20.8	14.57	3.345	N/A	N/A	17.03	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	7	7	100	11.3	21.1	15.89	3.952	N/A	N/A	18.79	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	7	7	100	6.81	15.6	8.944	2.993	N/A	N/A	11.14	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	7	7	100	8.73	16.8	10.8	2.802	N/A	N/A	12.86	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	7	7	100	9.96	18.1	12.68	3.049	N/A	N/A	14.92	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	7	7	100	6.81	15.6	9.017	2.969	N/A	N/A	11.2	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	7	7	100	7.78	16.1	10.2	2.894	N/A	N/A	12.33	95% Student's-t UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	7	7	100	8.03	16.6	11.38	3.309	N/A	N/A	13.81	95% Student's-t UCL
	PCBs	Total PCBs (ND=0)	ng/kg	7	7	100	483000	1150000	684429	277751	N/A	N/A	888424	95% Student's-t UCL
	PCBs	Total PCBs (ND=1)	ng/kg	7	7	100	483000	1150000	684571	277635	N/A	N/A	888481	95% Student's-t UCL
	PCBs	Total PCBs (ND=1/2)	ng/kg	7	7	100	483000	1150000	684429	277751	N/A	N/A	888424	95% Student's-t UCL
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	7	7	100	9.38	83.2	31.35	31.46	N/A	N/A	83.2	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	7	7	100	9.38	83.2	31.48	31.37	N/A	N/A	83.2	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	7	7	100	9.38	83.2	31.41	31.42	N/A	N/A	83.2	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	7	7	100	0.225	1.43	0.693	0.473	N/A	N/A	1.041	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	7	7	100	0.251	1.43	0.701	0.466	N/A	N/A	1.043	95% Student's-t UCL
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	7	7	100	0.238	1.43	0.697	0.469	N/A	N/A	1.042	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	7	7	100	1.2	17.5	8.167	6.43	N/A	N/A	12.89	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	7	7	100	1.85	18.2	8.697	6.487	N/A	N/A	13.46	95% Student's-t UCL
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	7	7	100	1.52	17.9	8.446	6.48	N/A	N/A	13.21	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	7	7	100	23.6	94.5	44.56	30.56	N/A	N/A	94.5	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	7	7	100	23.7	97.7	45.99	31.64	N/A	N/A	97.7	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	7	7	100	23.8	101	47.39	32.77	N/A	N/A	101	Maximum detected value (ProUCL-selected UCL greater than maximum value)
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	7	7	100	8.02	16.1	9.643	2.893	N/A	N/A	11.77	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	7	7	100	9.25	17.3	11.53	2.807	N/A	N/A	13.59	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	7	7	100	10.5	18.6	13.41	3.147	N/A	N/A	15.73	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	7	7	100	9.17	24.6	17.2	6.421	N/A	N/A	21.91	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	7	7	100	9.74	27.7	18.65	6.829	N/A	N/A	23.66	95% Student's-t UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	7	7	100	10.3	31.2	20.09	7.471	N/A	N/A	25.57	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	7	7	100	74000	260000	147286	77282	N/A	N/A	204046	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	7	7	100	74000	260000	147286	77282	N/A	N/A	204046	95% Student's-t UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	7	7	100	74000	260000	147286	77282	N/A	N/A	204046	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=0)	pg/g	7	7	100	11340	26060	16095	4944	N/A	N/A	19726	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1)	pg/g	7	7	100	11369	26060	16123	4930	N/A	N/A	19743	95% Student's-t UCL
	Pesticides	Total Chlordane (ND=1/2)	pg/g	7	7	100	11355	26060	16109	4937	N/A	N/A	19735	95% Student's-t UCL
	Pesticides	Dieldrin	pg/g	7	7	100	1310	2780	1999	487.1	N/A	N/A	2356	95% Student's-t UCL
	Pesticides	Hexachlorobenzene	pg/g	7	7	100	292	752	454.7	160.7	N/A	N/A	572.8	95% Student's-t UCL
	PAHs	Total HMW PAH (ND=0)	µg/kg	7	3	43	2.9	20	7.52	6.383	6.5	33	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	7	3	43	46	63	27.71	24.95	6.5	33	63	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	7	3	43	32	33	20.14	13.01	6.5	33	33	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	7	1	14	4	4	4	0	6.5	33	4	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	7	1	14	43	43	11.71	12.77	6.5	33	43	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	7	1	14	24	24	10	7	6.5	33	24	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	7	4	57	2.9	20	7.413	6.39	6.6	33	20	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	7	4	57	91	110	61.54	47.96	6.6	33	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	7	4	57	55	57	34.69	24.33	6.6	33	57	Maximum detected value

Table C-14
Atlantic Silverside Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
NBSA-wide (cont.)	Metals	Arsenic	mg/kg	7	7	100	0.33	0.846	0.564	0.176	N/A	N/A	0.693	95% Student's-t UCL
	Metals	Cadmium	mg/kg	7	0	0	N/A	N/A	N/A	N/A	0.0962	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	7	4	57	0.115	0.297	0.207	0.0644	0.385	0.4	0.297	Maximum detected value
	Metals	Copper	mg/kg	7	6	86	0.651	1.21	0.834	0.247	0.396	0.396	1.032	95% KM (t) UCL
	Metals	Lead	mg/kg	7	7	100	0.124	0.426	0.277	0.121	N/A	N/A	0.365	95% Student's-t UCL
	Metals	Mercury	ng/g	7	7	100	53	85.1	65.07	11.93	N/A	N/A	73.84	95% Student's-t UCL
	Metals	Methylmercury	ng/g	7	7	100	62.7	176	110.7	40.43	N/A	N/A	140.4	95% Student's-t UCL
	Metals	Nickel	mg/kg	7	0	0	N/A	N/A	N/A	N/A	0.385	0.4	0.4	Maximum non-detected value
	Metals	Selenium	mg/kg	7	7	100	0.413	0.645	0.503	0.0737	N/A	N/A	0.557	95% Student's-t UCL
	Metals	Silver	mg/kg	7	1	14	0.0216	0.0216	0.0216	0	0.0962	0.1	0.0216	Maximum detected value
	Metals	Zinc	mg/kg	7	7	100	34.9	46.7	39.99	3.895	N/A	N/A	42.85	95% Student's-t UCL
North	Dioxins/Furans	2378-TCDD	ng/kg	1	1	100	14.5	14.5	N/A	N/A	N/A	N/A	14.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	1	1	100	20.4	20.4	N/A	N/A	N/A	N/A	20.4	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	1	1	100	20.8	20.8	N/A	N/A	N/A	N/A	20.8	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	1	1	100	21.1	21.1	N/A	N/A	N/A	N/A	21.1	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	1	1	100	15.6	15.6	N/A	N/A	N/A	N/A	15.6	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	1	1	100	16.8	16.8	N/A	N/A	N/A	N/A	16.8	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	1	1	100	18.1	18.1	N/A	N/A	N/A	N/A	18.1	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	1	1	100	15.6	15.6	N/A	N/A	N/A	N/A	15.6	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	1	1	100	16.1	16.1	N/A	N/A	N/A	N/A	16.1	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	1	1	100	16.6	16.6	N/A	N/A	N/A	N/A	16.6	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	1	1	100	483000	483000	N/A	N/A	N/A	N/A	483000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	1	1	100	483000	483000	N/A	N/A	N/A	N/A	483000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	1	1	100	483000	483000	N/A	N/A	N/A	N/A	483000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	1	1	100	9.38	9.38	N/A	N/A	N/A	N/A	9.38	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	1	1	100	9.38	9.38	N/A	N/A	N/A	N/A	9.38	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	1	1	100	9.38	9.38	N/A	N/A	N/A	N/A	9.38	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	1	1	100	0.473	0.473	N/A	N/A	N/A	N/A	0.473	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	1	1	100	0.474	0.474	N/A	N/A	N/A	N/A	0.474	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	1	1	100	0.474	0.474	N/A	N/A	N/A	N/A	0.474	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	1	1	100	6.2	6.2	N/A	N/A	N/A	N/A	6.2	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	1	1	100	6.35	6.35	N/A	N/A	N/A	N/A	6.35	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	1	1	100	6.27	6.27	N/A	N/A	N/A	N/A	6.27	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	1	1	100	29.8	29.8	N/A	N/A	N/A	N/A	29.8	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	1	1	100	30.1	30.1	N/A	N/A	N/A	N/A	30.1	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	1	1	100	30.5	30.5	N/A	N/A	N/A	N/A	30.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	1	1	100	16.1	16.1	N/A	N/A	N/A	N/A	16.1	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	1	1	100	17.3	17.3	N/A	N/A	N/A	N/A	17.3	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	1	1	100	18.6	18.6	N/A	N/A	N/A	N/A	18.6	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	1	1	100	21.8	21.8	N/A	N/A	N/A	N/A	21.8	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	1	1	100	22.4	22.4	N/A	N/A	N/A	N/A	22.4	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	1	1	100	22.9	22.9	N/A	N/A	N/A	N/A	22.9	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	1	1	100	89000	89000	N/A	N/A	N/A	N/A	89000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	1	1	100	89000	89000	N/A	N/A	N/A	N/A	89000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	1	1	100	89000	89000	N/A	N/A	N/A	N/A	89000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	1	1	100	14545	14545	N/A	N/A	N/A	N/A	14545	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	1	1	100	14545	14545	N/A	N/A	N/A	N/A	14545	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	1	1	100	14545	14545	N/A	N/A	N/A	N/A	14545	Maximum detected value
	Pesticides	Dieldrin	pg/g	1	1	100	1880	1880	N/A	N/A	N/A	N/A	1880	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	1	1	100	345	345	N/A	N/A	N/A	N/A	345	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	1	0	0	N/A	N/A	N/A	N/A	6.5	6.5	6.5	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	1	0	0	N/A	N/A	N/A	N/A	6.5	6.5	6.5	Maximum non-detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	1	0	0	N/A	N/A	N/A	N/A	6.5	6.5	6.5	Maximum non-detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	1	1	100	4	4	N/A	N/A	N/A	N/A	4	Maximum detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	1	1	100	43	43	N/A	N/A	N/A	N/A	43	Maximum detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	1	1	100	24	24	N/A	N/A	N/A	N/A	24	Maximum detected value
	PAHs	Total PAH (ND=0)	µg/kg	1	1	100	4	4	N/A	N/A	N/A	N/A	4	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	1	1	100	110	110	N/A	N/A	N/A	N/A	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	1	1	100	56	56	N/A	N/A	N/A	N/A	56	Maximum detected value

Table C-14
Atlantic Silverside Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
North (cont.)	Metals	Arsenic	mg/kg	1	1	100	0.423	0.423	N/A	N/A	N/A	N/A	0.423	Maximum detected value
	Metals	Cadmium	mg/kg	1	0	0	N/A	N/A	N/A	N/A	0.0962	0.0962	0.0962	Maximum non-detected value
	Metals	Chromium	mg/kg	1	0	0	N/A	N/A	N/A	N/A	0.385	0.385	0.385	Maximum non-detected value
	Metals	Copper	mg/kg	1	1	100	0.781	0.781	N/A	N/A	N/A	N/A	0.781	Maximum detected value
	Metals	Lead	mg/kg	1	1	100	0.124	0.124	N/A	N/A	N/A	N/A	0.124	Maximum detected value
	Metals	Mercury	ng/g	1	1	100	71.7	71.7	N/A	N/A	N/A	N/A	71.7	Maximum detected value
	Metals	Methylmercury	ng/g	1	1	100	110	110	N/A	N/A	N/A	N/A	110	Maximum detected value
	Metals	Nickel	mg/kg	1	0	0	N/A	N/A	N/A	N/A	0.385	0.385	0.385	Maximum non-detected value
	Metals	Selenium	mg/kg	1	1	100	0.49	0.49	N/A	N/A	N/A	N/A	0.49	Maximum detected value
	Metals	Silver	mg/kg	1	0	0	N/A	N/A	N/A	N/A	0.0962	0.0962	0.0962	Maximum non-detected value
	Metals	Zinc	mg/kg	1	1	100	37.7	37.7	N/A	N/A	N/A	N/A	37.7	Maximum detected value
Southeast	Dioxins/Furans	2378-TCDD	ng/kg	3	3	100	6.37	8	7.177	0.815	N/A	N/A	8	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	3	3	100	11	13.3	12.07	1.159	N/A	N/A	13.3	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	3	3	100	11.2	16.1	13.1	2.629	N/A	N/A	16.1	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	3	3	100	11.3	18.8	14.1	4.095	N/A	N/A	18.8	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	3	3	100	7.49	8.71	8.04	0.619	N/A	N/A	8.71	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	3	3	100	8.73	11.2	9.7	1.318	N/A	N/A	11.2	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	3	3	100	9.96	13.7	11.35	2.044	N/A	N/A	13.7	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	3	3	100	7.53	8.77	8.09	0.629	N/A	N/A	8.77	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	3	3	100	7.78	11.5	9.167	2.033	N/A	N/A	11.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	3	3	100	8.03	14.2	10.23	3.442	N/A	N/A	14.2	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	3	3	100	490000	565000	533000	38691	N/A	N/A	565000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	3	3	100	491000	565000	533333	38136	N/A	N/A	565000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	3	3	100	490000	565000	533000	38691	N/A	N/A	565000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	3	3	100	12.6	19	14.83	3.612	N/A	N/A	19	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	3	3	100	13	19	15.13	3.355	N/A	N/A	19	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	12.8	19	14.97	3.496	N/A	N/A	19	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	3	3	100	0.225	0.528	0.358	0.155	N/A	N/A	0.528	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	3	3	100	0.251	0.529	0.375	0.141	N/A	N/A	0.529	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	0.238	0.529	0.367	0.148	N/A	N/A	0.529	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	1.2	6.42	3.13	2.863	N/A	N/A	6.42	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	1.85	7.15	3.8	2.914	N/A	N/A	7.15	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	1.52	6.78	3.463	2.886	N/A	N/A	6.78	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	3	3	100	24.8	30	26.9	2.74	N/A	N/A	30	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	25.2	30.2	28.1	2.594	N/A	N/A	30.2	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	3	3	100	25.5	31.8	29.2	3.291	N/A	N/A	31.8	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	3	3	100	8.02	9.03	8.4	0.549	N/A	N/A	9.03	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	9.25	11.6	10.08	1.316	N/A	N/A	11.6	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	3	3	100	10.5	14.1	11.77	2.023	N/A	N/A	14.1	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	9.17	14	11.22	2.495	N/A	N/A	14	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	9.74	14.6	12.65	2.566	N/A	N/A	14.6	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	10.3	16.6	14.03	3.308	N/A	N/A	16.6	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	3	3	100	74000	97000	87333	11930	N/A	N/A	97000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	3	3	100	74000	97000	87333	11930	N/A	N/A	97000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	3	3	100	74000	97000	87333	11930	N/A	N/A	97000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	3	3	100	13065	26060	19312	6512	N/A	N/A	26060	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	3	3	100	13197	26060	19368	6447	N/A	N/A	26060	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	3	3	100	13131	26060	19340	6480	N/A	N/A	26060	Maximum detected value
	Pesticides	Dieldrin	pg/g	3	3	100	1860	2780	2370	468.1	N/A	N/A	2780	Maximum detected value
	Pesticides	Hexachlorobenzene	pg/g	3	3	100	292	752	541.3	232.4	N/A	N/A	752	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	3	2	67	5.9	20	10.6	6.647	6.6	6.6	20	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	3	2	67	46	59	37.2	22.28	6.6	6.6	59	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	3	2	67	32	33	23.87	12.22	6.6	6.6	33	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	3	0	0	N/A	N/A	N/A	N/A	6.5	6.6	6.6	Maximum non-detected value

Table C-14
Atlantic Silverside Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southeast (cont.)	PAHs	Total LMW PAH (ND=1)	µg/kg	3	0	0	N/A	N/A	N/A	N/A	6.5	6.6	6.6	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	3	0	0	N/A	N/A	N/A	N/A	6.5	6.6	6.6	Maximum non-detected value
	PAHs	Total PAH (ND=0)	µg/kg	3	2	67	5.9	20	10.6	6.647	6.6	6.6	20	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	3	2	67	91	100	65.87	42.07	6.6	6.6	100	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	3	2	67	55	55	38.87	22.82	6.6	6.6	55	Maximum detected value
	Metals	Arsenic	mg/kg	3	3	100	0.33	0.668	0.482	0.172	N/A	N/A	0.668	Maximum detected value
	Metals	Cadmium	mg/kg	3	0	0	N/A	N/A	N/A	N/A	0.098	0.1	0.1	Maximum non-detected value
	Metals	Chromium	mg/kg	3	2	67	0.206	0.297	0.252	0.0455	0.4	0.4	0.297	Maximum detected value
	Metals	Copper	mg/kg	3	2	67	0.804	1.03	0.743	0.262	0.396	0.396	1.03	Maximum detected value
	Metals	Lead	mg/kg	3	3	100	0.154	0.399	0.277	0.123	N/A	N/A	0.399	Maximum detected value
	Metals	Mercury	ng/g	3	3	100	68.3	85.1	74.13	9.504	N/A	N/A	85.1	Maximum detected value
	Metals	Methylmercury	ng/g	3	3	100	62.7	176	127.9	58.55	N/A	N/A	176	Maximum detected value
	Metals	Nickel	mg/kg	3	0	0	N/A	N/A	N/A	N/A	0.392	0.4	0.4	Maximum non-detected value
	Metals	Selenium	mg/kg	3	3	100	0.413	0.528	0.463	0.0588	N/A	N/A	0.528	Maximum detected value
	Metals	Silver	mg/kg	3	1	33	0.0216	0.0216	0.0216	0	0.099	0.1	0.0216	Maximum detected value
	Metals	Zinc	mg/kg	3	3	100	34.9	39.3	37.2	2.207	N/A	N/A	39.3	Maximum detected value
Southwest	Dioxins/Furans	2378-TCDD	ng/kg	3	3	100	5.91	7.38	6.743	0.754	N/A	N/A	7.38	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=0)	ng/kg	3	3	100	11.4	12.7	11.97	0.666	N/A	N/A	12.7	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1/2)	ng/kg	3	3	100	11.9	15.5	13.97	1.858	N/A	N/A	15.5	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Bird (ND=1)	ng/kg	3	3	100	12	18.2	15.93	3.42	N/A	N/A	18.2	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	3	3	100	6.81	8.15	7.63	0.719	N/A	N/A	8.15	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	3	3	100	9.16	10.9	9.907	0.896	N/A	N/A	10.9	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	3	3	100	10.4	15	12.2	2.458	N/A	N/A	15	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=0)	ng/kg	3	3	100	6.81	8.35	7.75	0.824	N/A	N/A	8.35	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1/2)	ng/kg	3	3	100	8.33	9.88	9.267	0.824	N/A	N/A	9.88	Maximum detected value
	Dioxins/Furans	Total Dioxin/Furan TEQ Mammal (ND=1)	ng/kg	3	3	100	8.58	13	10.79	2.21	N/A	N/A	13	Maximum detected value
	PCBs	Total PCBs (ND=0)	ng/kg	3	3	100	539000	1150000	903000	321865	N/A	N/A	1150000	Maximum detected value
	PCBs	Total PCBs (ND=1)	ng/kg	3	3	100	539000	1150000	903000	321865	N/A	N/A	1150000	Maximum detected value
	PCBs	Total PCBs (ND=1/2)	ng/kg	3	3	100	539000	1150000	903000	321865	N/A	N/A	1150000	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=0)	ng/kg	3	3	100	11.8	83.2	55.2	38.11	N/A	N/A	83.2	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1)	ng/kg	3	3	100	11.8	83.2	55.2	38.11	N/A	N/A	83.2	Maximum detected value
	PCBs	Total PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	11.8	83.2	55.2	38.11	N/A	N/A	83.2	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=0)	ng/kg	3	3	100	0.587	1.43	1.102	0.452	N/A	N/A	1.43	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1)	ng/kg	3	3	100	0.588	1.43	1.103	0.451	N/A	N/A	1.43	Maximum detected value
	PCBs	Total PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	0.587	1.43	1.102	0.452	N/A	N/A	1.43	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	7.88	17.5	13.86	5.219	N/A	N/A	17.5	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	8.03	18.2	14.38	5.535	N/A	N/A	18.2	Maximum detected value
	PCBs	Total PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	7.96	17.9	14.15	5.403	N/A	N/A	17.9	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=0)	ng/kg	3	3	100	23.6	94.5	67.13	38.11	N/A	N/A	94.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	ng/kg	3	3	100	23.7	97.7	69.17	39.8	N/A	N/A	97.7	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Bird (ND=1)	ng/kg	3	3	100	23.8	101	71.2	41.5	N/A	N/A	101	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	3	3	100	8.24	9.44	8.733	0.628	N/A	N/A	9.44	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	3	3	100	9.74	12.4	11.05	1.331	N/A	N/A	12.4	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	3	3	100	11	16.5	13.33	2.843	N/A	N/A	16.5	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	ng/kg	3	3	100	16	24.6	21.63	4.881	N/A	N/A	24.6	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	ng/kg	3	3	100	16.3	27.7	23.4	6.194	N/A	N/A	27.7	Maximum detected value
	PCBs	Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	ng/kg	3	3	100	16.6	31.2	25.2	7.639	N/A	N/A	31.2	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	pg/g	3	3	100	190000	260000	226667	35119	N/A	N/A	260000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1)	pg/g	3	3	100	190000	260000	226667	35119	N/A	N/A	260000	Maximum detected value
	Pesticides	Total DDx (2,4 & 4,4) (ND=1/2)	pg/g	3	3	100	190000	260000	226667	35119	N/A	N/A	260000	Maximum detected value
	Pesticides	Total Chlordane (ND=0)	pg/g	3	3	100	11340	14734	13394	1806	N/A	N/A	14734	Maximum detected value
	Pesticides	Total Chlordane (ND=1)	pg/g	3	3	100	11369	14734	13403	1789	N/A	N/A	14734	Maximum detected value
	Pesticides	Total Chlordane (ND=1/2)	pg/g	3	3	100	11355	14734	13399	1798	N/A	N/A	14734	Maximum detected value
	Pesticides	Dieldrin	pg/g	3	3	100	1310	1980	1667	337.1	N/A	N/A	1980	Maximum detected value

Table C-14
Atlantic Silverside Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	Selected EPC	UCL Type
Southwest (cont.)	Pesticides	Hexachlorobenzene	pg/g	3	3	100	350	446	404.7	49.37	N/A	N/A	446	Maximum detected value
	PAHs	Total HMW PAH (ND=0)	µg/kg	3	1	33	2.9	2.9	2.9	0	33	33	2.9	Maximum detected value
	PAHs	Total HMW PAH (ND=1)	µg/kg	3	1	33	63	63	43	14.14	33	33	63	Maximum detected value
	PAHs	Total HMW PAH (ND=1/2)	µg/kg	3	1	33	33	33	33	0	33	33	33	Maximum detected value
	PAHs	Total LMW PAH (ND=0)	µg/kg	3	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1)	µg/kg	3	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total LMW PAH (ND=1/2)	µg/kg	3	0	0	N/A	N/A	N/A	N/A	6.7	33	33	Maximum non-detected value
	PAHs	Total PAH (ND=0)	µg/kg	3	1	33	2.9	2.9	2.9	0	33	33	2.9	Maximum detected value
	PAHs	Total PAH (ND=1)	µg/kg	3	1	33	110	110	58.67	36.3	33	33	110	Maximum detected value
	PAHs	Total PAH (ND=1/2)	µg/kg	3	1	33	57	57	41	11.31	33	33	57	Maximum detected value
	Metals	Arsenic	mg/kg	3	3	100	0.597	0.846	0.694	0.133	N/A	N/A	0.846	Maximum detected value
	Metals	Cadmium	mg/kg	3	0	0	N/A	N/A	N/A	N/A	0.098	0.099	0.099	Maximum non-detected value
	Metals	Chromium	mg/kg	3	2	67	0.115	0.211	0.163	0.048	0.396	0.396	0.211	Maximum detected value
	Metals	Copper	mg/kg	3	3	100	0.651	1.21	0.942	0.28	N/A	N/A	1.21	Maximum detected value
	Metals	Lead	mg/kg	3	3	100	0.199	0.426	0.327	0.116	N/A	N/A	0.426	Maximum detected value
	Metals	Mercury	ng/g	3	3	100	53	55.1	53.8	1.136	N/A	N/A	55.1	Maximum detected value
	Metals	Methylmercury	ng/g	3	3	100	76.6	122	93.83	24.6	N/A	N/A	122	Maximum detected value
	Metals	Nickel	mg/kg	3	0	0	N/A	N/A	N/A	N/A	0.392	0.396	0.396	Maximum non-detected value
	Metals	Selenium	mg/kg	3	3	100	0.481	0.645	0.546	0.0869	N/A	N/A	0.645	Maximum detected value
	Metals	Silver	mg/kg	3	0	0	N/A	N/A	N/A	N/A	0.098	0.099	0.099	Maximum non-detected value
	Metals	Zinc	mg/kg	3	3	100	41.9	46.7	43.53	2.743	N/A	N/A	46.7	Maximum detected value

Table C-15
***Fundulus* sp. Fish Egg Tissue EPCs for Risk Assessments**

Assessment Zone	Chemical Group	COPEC Adjustment	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Kaplan Meier Mean	Kaplan Meier Standard Deviation	Minimum ND	Maximum ND	UCL	UCL Type	Conversion factor[a,b,c]
NBSA-wide	Dioxins/Furans	lipid normalized[a,b]	2378-TCDD	ng/kg	17	17	100	100.6	1348	593	352.6	N/A	N/A	742.3	95% Student's-t UCL	0.6213
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	17	17	100	130	1503	660.3	399.6	N/A	N/A	829.6	95% Student's-t UCL	0.6213
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	17	17	100	130	1507	660.7	400	N/A	N/A	830.1	95% Student's-t UCL	0.6213
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	17	17	100	130	1507	660.7	400	N/A	N/A	830.1	95% Student's-t UCL	0.6213
	PCBs	lipid normalized[a,b]	Total PCBs (ND=0)	ng/kg	17	17	100	10784314	82195122	33892363	19071427	N/A	N/A	41967949	95% Student's-t UCL	0.6213
	PCBs	lipid normalized[a,b]	Total PCBs (ND=1)	ng/kg	17	17	100	10784314	82195122	33892363	19071427	N/A	N/A	41967949	95% Student's-t UCL	0.6213
	PCBs	lipid normalized[a,b]	Total PCBs (ND=1/2)	ng/kg	17	17	100	10784314	82195122	33892363	19071427	N/A	N/A	41967949	95% Student's-t UCL	0.6213
	PCBs	lipid normalized[a,b]	Total PCB TEQ Fish (ND=0)	ng/kg	17	17	100	12.33	134.6	36.39	28	N/A	N/A	49.08	95% Adjusted Gamma UCL	0.6213
	PCBs	lipid normalized[a,b]	Total PCB TEQ Fish (ND=1)	ng/kg	17	17	100	12.33	134.6	36.41	28	N/A	N/A	49.11	95% Adjusted Gamma UCL	0.6213
	PCBs	lipid normalized[a,b]	Total PCB TEQ Fish (ND=1/2)	ng/kg	17	17	100	12.33	134.6	36.41	28	N/A	N/A	49.11	95% Adjusted Gamma UCL	0.6213
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	17	17	100	157.5	1538	696.9	395.3	N/A	N/A	864.3	95% Student's-t UCL	0.6213
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	17	17	100	157.8	1538	697.2	395.3	N/A	N/A	864.6	95% Student's-t UCL	0.6213
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	17	17	100	157.8	1541	697.6	395.7	N/A	N/A	865.1	95% Student's-t UCL	0.6213
	Metals	none (wet weight)[c]	Mercury	ng/g	17	17	100	16.6	98.2	40.17	20.05	N/A	N/A	48.66	95% Student's-t UCL	0.101
	Metals	none (wet weight)[c]	Methylmercury	ng/g	17	17	100	11.3	128	44.59	25.19	N/A	N/A	57.95	95% Adjusted Gamma UCL	0.101
	Dioxins/Furans	lipid normalized[a,b]	2378-TCDD	ng/kg	17	17	100	100.6	1348	593	352.6	N/A	N/A	742.3	95% Student's-t UCL	1.0
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	17	17	100	130	1503	660.3	399.6	N/A	N/A	829.6	95% Student's-t UCL	1.0
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan TEQ Fish (ND=1/2)	ng/kg	17	17	100	130	1507	660.7	400	N/A	N/A	830.1	95% Student's-t UCL	1.0
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan TEQ Fish (ND=1)	ng/kg	17	17	100	130	1507	660.7	400	N/A	N/A	830.1	95% Student's-t UCL	1.0
	PCBs	lipid normalized[a,b]	Total PCBs (ND=0)	ng/kg	17	17	100	10784314	82195122	33892363	19071427	N/A	N/A	41967949	95% Student's-t UCL	1.0
	PCBs	lipid normalized[a,b]	Total PCBs (ND=1)	ng/kg	17	17	100	10784314	82195122	33892363	19071427	N/A	N/A	41967949	95% Student's-t UCL	1.0
	PCBs	lipid normalized[a,b]	Total PCBs (ND=1/2)	ng/kg	17	17	100	10784314	82195122	33892363	19071427	N/A	N/A	41967949	95% Student's-t UCL	1.0
	PCBs	lipid normalized[a,b]	Total PCB TEQ Fish (ND=0)	ng/kg	17	17	100	12.33	134.6	36.39	28	N/A	N/A	49.08	95% Adjusted Gamma UCL	1.0
	PCBs	lipid normalized[a,b]	Total PCB TEQ Fish (ND=1)	ng/kg	17	17	100	12.33	134.6	36.41	28	N/A	N/A	49.11	95% Adjusted Gamma UCL	1.0
	PCBs	lipid normalized[a,b]	Total PCB TEQ Fish (ND=1/2)	ng/kg	17	17	100	12.33	134.6	36.41	28	N/A	N/A	49.11	95% Adjusted Gamma UCL	1.0
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	17	17	100	157.5	1538	696.9	395.3	N/A	N/A	864.3	95% Student's-t UCL	1.0
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	ng/kg	17	17	100	157.8	1538	697.2	395.3	N/A	N/A	864.6	95% Student's-t UCL	1.0
	Dioxins/Furans	lipid normalized[a,b]	Total Dioxin/Furan/PCB TEQ Fish (ND=1)	ng/kg	17	17	100	157.8	1541	697.6	395.7	N/A	N/A	865.1	95% Student's-t UCL	1.0
	Metals	none (wet weight)[c]	Mercury	ng/g	17	17	100	16.6	98.2	40.17	20.05	N/A	N/A	48.66	95% Student's-t UCL	1.0
	Metals	none (wet weight)[c]	Methylmercury	ng/g	17	17	100	11.3	128	44.59	25.19	N/A	N/A	57.95	95% Adjusted Gamma UCL	1.0

Notes:

[a] The relationship between lipid-normalized organic chemicals (PCBs, dioxins, and pesticides) in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): $EPC_{egg,lipid} = 0.6213 \times EPC_{adult,lipid}$. The conversion factor (i.e., 0.6213) between egg and adult lipid-normalized tissue concentrations is from Niimi (1983). A conversion factor of 1.0 was also evaluated.

[b] The UCL lipid value in the Lower Passaic River Study Area mummichog eggs (3.3 percent) was used to convert lipid-normalized egg concentrations from the equation in note 'a' to wet weight egg concentrations for comparison to fish egg TRVs.

[c] The relationship between mercury and methylmercury in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): $EPC_{egg,ww} = 0.101 \times EPC_{adult,ww}$. The conversion factor (0.101) between egg and adult tissue concentrations is from Niimi (1983). A conversion factor of 1.0 was also evaluated.

Reference:

Niimi, A.J. 1983. Biological and toxicological effects of environmental contaminants in fish and their eggs. *Can J Fish Aquat Sci* 40:306-312.

Table C-16

***Fundulus* sp. Egg Mercury EPCs Using Adult Tissue and Conversion Factors from the Literature**

Constituent	EPC Adult (mg/kg ww)	CF[a]	CF Source	EPC Egg (mg/kg ww)
Mercury	0.049	0.101	Niimi (1983)	0.0049
Methylmercury	0.058	0.101	Niimi (1983)	0.0059
Mercury	0.049	1.000	Russell et al (1999)	0.0487
Methylmercury	0.058	1.000	Russell et al (1999)	0.0580

Notes:

[a] The relationship between mercury and methylmercury in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): $EPC_{egg,ww} = 0.101 \times EPC_{adult,ww}$. The conversion factor (0.101) between egg and adult tissue concentrations is from Niimi (1983). A conversion factor of 1.0 was also evaluated.

Reference:

Niimi, A.J. 1983. Biological and toxicological effects of environmental contaminants in fish and their eggs. *Can J Fish Aquat Sci* 40:306-312.

Table C-17

***Fundulus* sp. Egg PCB and TEQ EPCs Using Adult Tissue and Conversion Factors from the Literature**

Constituent	EPC Adult (mg/kg-lipid ww)	CF[a]	CF Source	Egg % lipid[b]	EPC Egg (mg/kg ww)
2378-TCDD	7.42E-04	0.6213	Niimi (1983)	3.3	1.52E-05
Total TEQ	8.30E-04	0.6213	Niimi (1983)	3.3	1.70E-05
Total PCBs	42.0	0.6213	Niimi (1983)	3.3	0.860
Total PCB TEQ	4.91E-05	0.6213	Niimi (1983)	3.3	1.01E-06
Total PCB Dioxin TEQ	8.64E-04	0.6213	Niimi (1983)	3.3	1.77E-05
2378-TCDD	7.42E-04	1	Russell et al. (1999)	3.3	2.45E-05
Total TEQ	8.30E-04	1	Russell et al. (1999)	3.3	2.74E-05
Total PCBs	42.0	1	Russell et al. (1999)	3.3	1.38
Total PCB TEQ	4.91E-05	1	Russell et al. (1999)	3.3	1.62E-06
Total PCB Dioxin TEQ	8.64E-04	1	Russell et al. (1999)	3.3	2.85E-05

Notes:

[a] The relationship between lipid-normalized organic chemicals (PCBs, dioxins, and pesticides) in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): $EPC_{egg,lipid} = 0.6213 \times EPC_{adult,lipid}$. The conversion factor (i.e., 0.6213) between egg and adult lipid-normalized tissue concentrations is from Niimi (1983). A conversion factor of 1.0 was also evaluated.

[b] The UCL lipid value in LPRSA mummichog eggs (3.3%) was used to convert lipid-normalized egg concentrations to wet weight egg concentrations for comparison to fish egg TRVs

References:

Niimi, A.J. 1983. Biological and toxicological effects of environmental contaminants in fish and their eggs. *Can J Fish Aquat Sci* 40:306-312.

Russell, R.W., F.A.P.C. Gobas, and G.D. Haffner. 1999. Maternal transfer and in ovo exposure of organochlorines in oviparous organisms: a model and field verification. *Environ Sci Technol* 33(3):416-420.

Table C-18
Bird Egg Tissue EPCs for Risk Assessments

Assessment Zone	Chemical Group	Vlookup	COPEC	Units	N	Number of Detects	Detection Frequency (%)	Minimum Detect	Maximum Detect	Mean	Parsons (2003) Source	Selected EPC	Selected EPC Type
NBSA-wide	Dioxins/Furans	2378-TCDD	2378-TCDD	ng/kg	14	14	100%	8.59	201	59.8	Table 9.2	90	95 UCL
	Dioxins/Furans	Total Dioxin/Furan TEQ Fish (ND=0)	Total Dioxin/Furan TEQ Fish (ND=0)	ng/kg	14	NA	NA	NA	NA	92	Table 9.2	134	95 UCL
	PCBs	Total PCBs (ND=0)	Total PCBs (ND=0)	ng/kg	14	NA	NA	1980	40400	13900	Table 8.13	19195	95 UCL
	PCBs	Total PCB TEQ Fish (ND=0)	Total PCB TEQ Fish (ND=0)	ng/kg	14	NA	NA	NA	NA	322	Tables 8.1 - 8.11	503	95 UCL
	PCBs	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	Total Dioxin/Furan/PCB TEQ Fish (ND=0)	ng/kg	14	NA	NA	NA	NA	414	Tables 8.1 - 8.11; 9.2	553	95 UCL
	Pesticides	Total DDx (2,4 & 4,4) (ND=0)	Total DDx (2,4 & 4,4) (ND=0)	pg/g	10	NA	NA	NA	NA	3870000	Table 6.7	6430978	95 UCL
	Pesticides	Dieldrin	Dieldrin	pg/g	10	10	100%	111	223	158	Table 6.3	179	95 UCL
	Metals	Mercury	Mercury	ng/g	14	14	100%	85.4	1130	338	Table 4.1	508	95 UCL
	Metals	Methylmercury	Methylmercury	ng/g	2	3	100%	175	320	230	Table 4.2	320	Maximum value

Reference:
Parsons, K.C. 2003. Chemical Residens in Cormorants From New York Harbor and Control Location. NYDEC. February 28.

APPENDIX D

Toxicity Profiles and Selection of Toxicity Reference Values

ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

BASELINE ECOLOGICAL RISK ASSESSMENT APPENDIX D: TOXICITY PROFILES AND TOXICITY REFERENCE VALUES

Newark Bay Study Area

Newark, New Jersey

July 2020

CONTENTS

Acronyms and Abbreviations xiii

1 INTRODUCTION 1

2 POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS 6

2.1 Benthic Invertebrates 7

2.1.1 Toxicity Profile 7

2.1.2 TRVs 8

2.2 Fish 9

2.2.1 Toxicity Profile 9

2.2.2 TRVs 9

2.2.2.1 Fish Whole-Body Tissue 10

2.2.2.2 Fish Eggs 10

2.3 Birds 11

2.3.1 Toxicity Profile 11

2.3.2 TRVs 11

2.3.2.1 Bird Diet 12

2.3.2.2 Bird Eggs 12

2.4 Mammals 12

2.4.1 Toxicity Profile 12

2.4.2 TRVs 13

3 POLYCHLORINATED BIPHENYLS 15

3.1 Benthic Invertebrates 16

3.1.1 Toxicity Profile 16

3.1.2 TRVs 16

3.2 Fish 17

3.2.1 Toxicity Profile 17

3.2.2 TRVs 17

3.2.2.1 Fish Whole-Body Tissue 18

3.2.2.2 Fish Eggs 18

3.3 Birds 19

3.3.1 Toxicity Profile 19
3.3.2 TRVs 19
3.3.2.1 Bird Diet 20
3.3.2.2 Bird Eggs 20
3.4 Mammals 20
3.4.1 Toxicity Profile 20
3.4.2 TRVs 21
4 ORGANOCHLORINE PESTICIDES – TOTAL DDX 23
4.1 Benthic Invertebrates 23
4.1.1 Toxicity Profile 23
4.1.2 TRVs 24
4.2 Fish 25
4.2.1 Toxicity Profile 25
4.2.2 TRVs 25
4.3 Birds 26
4.3.1 Toxicity Profile 26
4.3.2 TRVs 26
4.3.2.1 Bird Diet 27
4.3.2.2 Bird Eggs 28
4.4 Mammals 28
4.4.1 Toxicity Profile 28
4.4.2 TRVs 28
5 ORGANOCHLORINE PESTICIDES – DIELDRIN 30
5.1 Benthic Invertebrates 30
5.1.1 Toxicity Profile 30
5.1.2 TRVs 30
5.2 Fish 31
5.2.1 Toxicity Profile 31
5.2.2 TRVs 31
5.3 Birds 32

5.3.1 Toxicity Profile 32
5.3.2 TRVs 32
5.3.2.1 Bird Diet 33
5.3.2.2 Bird Eggs 33
5.4 Mammals 34
5.4.1 Toxicity Profile 34
5.4.2 TRVs 34
6 ORGANOCHLORINE PESTICIDES – TOTAL CHLORDANE 35
6.1 Benthic Invertebrates 35
6.1.1 Toxicity Profile 35
6.1.2 TRVs 35
6.2 Fish 36
6.2.1 Toxicity Profile 36
6.2.2 TRVs 36
6.3 Birds 37
6.3.1 Toxicity Profile 37
6.3.2 TRVs 37
6.4 Mammals 38
6.4.1 Toxicity Profile 38
6.4.2 TRVs 38
7 ORGANOCHLORINE PESTICIDES – HEXACHLOROBENZENE 40
7.1 Benthic Invertebrates 40
7.1.1 Toxicity Profile 40
7.1.2 TRVs 41
7.2 Fish 41
7.2.1 Toxicity Profile 41
7.2.2 TRVs 42
7.3 Birds 42
7.3.1 Toxicity Profile 42
7.3.2 TRVs 42

7.4 Mammals 43
7.4.1 Toxicity Profile 43
7.4.2 TRVs 43
8 POLYCYCLIC AROMATIC HYDROCARBONS 45
8.1 Benthic Invertebrates 46
8.1.1 Toxicity Profile 46
8.1.2 TRVs 46
8.2 Fish 48
8.2.1 Toxicity Profile 48
8.2.2 TRVs 48
8.3 Birds 49
8.3.1 Toxicity Profile 49
8.3.2 TRVs 49
8.4 Mammals 51
8.4.1 Toxicity Profile 51
8.4.2 TRVs 51
9 ARSENIC 52
9.1 Benthic Invertebrates 53
9.1.1 Toxicity Profile 53
9.1.2 TRVs 53
9.2 Fish 54
9.2.1 Toxicity Profile 54
9.2.2 TRVs 54
9.2.2.1 Fish Whole-Body Tissue 54
9.2.2.2 Fish Diet 55
9.3 Birds 55
9.3.1 Toxicity Profile 55
9.3.2 TRVs 55
9.4 Mammals 56
9.4.1 Toxicity Profile 56

9.4.2 TRVs 56
10 CADMIUM 58
10.1 Benthic Invertebrates 58
10.1.1 Toxicity Profile 58
10.1.2 TRVs 58
10.2 Fish 59
10.2.1 Toxicity Profile 59
10.2.2 TRVs 59
10.3 Birds 60
10.3.1 Toxicity Profile 60
10.3.2 TRVs 61
10.4 Mammals 61
10.4.1 Toxicity Profile 61
10.4.2 TRVs 61
11 CHROMIUM 63
11.1 Benthic Invertebrates 63
11.1.1 Toxicity Profile 63
11.1.2 TRVs 64
11.2 Fish 64
11.2.1 Toxicity Profile 64
11.2.2 TRVs 64
11.2.2.1 Fish Whole-Body Tissue 65
11.2.2.2 Fish Diet 65
11.3 Birds 66
11.3.1 Toxicity Profile 66
11.3.2 TRVs 66
11.4 Mammals 67
11.4.1 Toxicity Profile 67
11.4.2 TRVs 67
12 COPPER 69

12.1 Benthic Invertebrates 69
12.1.1 Toxicity Profile 69
12.1.2 TRVs 70
12.2 Fish 70
12.2.1 Toxicity Profile 70
12.2.2 TRVs 70
12.2.2.1 Fish Whole-Body Tissue 71
12.2.2.2 Fish Diet 72
12.3 Birds 72
12.3.1 Toxicity Profile 72
12.3.2 TRVs 72
12.4 Mammals 73
12.4.1 Toxicity Profile 73
12.4.2 TRVs 73
13 LEAD 75
13.1 Benthic Invertebrates 75
13.1.1 Toxicity Profile 75
13.1.2 TRVs 75
13.2 Fish 76
13.2.1 Toxicity Profile 76
13.2.2 TRVs 77
13.2.2.1 Fish Whole-Body Tissue 77
13.2.2.2 Fish Diet 78
13.3 Birds 78
13.3.1 Toxicity Profile 78
13.3.2 TRVs 78
13.4 Mammals 79
13.4.1 Toxicity Profile 79
13.4.2 TRVs 79
14 MERCURY/METHYLMERCURY 81

14.1 Benthic Invertebrates 81
14.1.1 Toxicity Profile 81
14.1.2 TRVs 82
14.2 Fish 82
14.2.1 Toxicity Profile 82
14.2.2 TRVs 83
14.2.2.1 Fish Whole-Body Tissue 83
14.2.2.2 Fish Eggs 84
14.2.2.3 Fish Diet 84
14.3 Birds 84
14.3.1 Toxicity Profile 84
14.3.2 TRVs 84
14.3.2.1 Bird Diet 85
14.3.2.2 Bird Eggs 85
14.4 Mammals 86
14.4.1 Toxicity Profile 86
14.4.2 TRVs 86
15 NICKEL 87
15.1 Benthic Invertebrates 87
15.1.1 Toxicity Profile 87
15.1.2 TRVs 87
15.2 Fish 88
15.2.1 Toxicity Profile 88
15.2.2 TRVs 88
15.3 Birds 89
15.3.1 Toxicity Profile 89
15.3.2 TRVs 89
15.4 Mammals 90
15.4.1 Toxicity Profile 90
15.4.2 TRVs 90

16 SELENIUM 92
16.1 Benthic Invertebrates 92
16.1.1 Toxicity Profile 92
16.1.2 TRVs 92
16.2 Fish 93
16.2.1 Toxicity Profile 93
16.2.2 TRVs 94
16.2.2.1 Fish Whole-Body Tissue 94
16.2.2.2 Fish Diet 94
16.3 Birds 95
16.3.1 Toxicity Profile 95
16.3.2 TRVs 95
16.4 Mammals 96
16.4.1 Toxicity Profile 96
16.4.2 TRVs 96
17 SILVER 97
17.1 Benthic Invertebrates 97
17.1.1 Toxicity Profile 97
17.1.2 TRVs 97
17.2 Fish 98
17.2.1 Toxicity Profile 98
17.2.2 TRVs 98
17.2.2.1 Fish Whole-Body Tissue 99
17.2.2.2 Fish Diet 99
17.3 Birds 99
17.3.1 Toxicity Profile 99
17.3.2 TRVs 100
17.4 Mammals 100
17.4.1 Toxicity Profile 100
17.4.2 TRVs 101

18 ZINC 102
18.1 Benthic Invertebrates 102
18.1.1 Toxicity Profile 102
18.1.2 TRVs 103
18.2 Fish 103
18.2.1 Toxicity Profile 103
18.2.2 TRVs 104
18.2.2.1 Fish Whole-Body Tissue 104
18.2.2.2 Fish Diet 104
18.3 Birds 105
18.3.1 Toxicity Profile 105
18.3.2 TRVs 105
18.4 Mammals 105
18.4.1 Toxicity Profile 105
18.4.2 TRVs 106
19 TRV UNCERTAINTIES 107
19.1 COPECs with Limited Toxicity Data TRVs 107
19.2 Non-COPEC Pesticides Detected in Sediments and Biota 108
19.3 Unbounded TRVs and TRV Estimated with Extrapolation Factors 108
19.4 Extrapolation of Laboratory-Based TRVs to Wildlife Populations 109
19.5 SSD Tissue TRV Uncertainty 110
20 REFERENCES 111

TABLES

Table D-1a COPECs Evaluated for Shellfish, Fish, and Wildlife Receptors in the BERA 3
Table D-1b Comparison of NBSA and LPR COPECs 5
Table D-2 Benthic Invertebrate 2,3,7,8-TCDD TRVs 8
Table D-3 Fish 2,3,7,8-TCDD and Total TEQ[1] TRVs 9
Table D-4 Bird 2,3,7,8-TCDD and TEQ[1] TRVs 11
Table D-6. Benthic Invertebrate PCB TRVs 16
Table D-7 Fish PCB TRVs 18
Table D-8 Bird PCB TRVs 19
Table D-9 Mammal PCB TRVs 21
Table D-10 Benthic Invertebrate Total DDx[1] TRVs 24
Table D-11 Fish Total DDx[1] TRVs 25
Table D-12 Bird Total DDx[1] TRVs 27
Table D-13 Mammal Total DDx[1] TRVs 28
Table D-14 Benthic Invertebrate Dieldrin TRVs 31
Table D-16 Bird Dieldrin TRVs 33
Table D-17 Mammal Dieldrin TRVs 34
Table D-18 Benthic Invertebrate Total Chlordane TRVs 36
Table D-19 Fish Chlordane TRVs 36
Table D-20 Bird Chlordane TRVs 38
Table D-21 Mammal Chlordane TRVs 39
Table D-22 Benthic Invertebrate Hexachlorobenzene TRVs 41
Table D-23 Fish Hexachlorobenzene TRVs 42
Table D-24 Bird Hexachlorobenzene TRVs 43
Table D-25 Mammal Hexachlorobenzene TRVs 44
Table D-26 Benthic Invertebrate Total PAH TRVs 47
Table D-27 Fish Total PAH TRVs 49
Table D-28 Bird Total PAH TRVs 50
Table D-29 Mammal Total PAH TRVs 51
Table D-30 Benthic Invertebrate Arsenic TRVs 53

Table D-31 Fish Arsenic TRVs 54
Table D-32 Bird Arsenic TRVs 56
Table D-33 Mammal Arsenic TRVs 57
Table D-34 Benthic Invertebrate Cadmium TRVs 59
Table D-35 Fish Cadmium TRVs 60
Table D-36 Bird Cadmium TRVs 61
Table D-37 Mammal Cadmium TRVs 62
Table D-38 Benthic Invertebrate Chromium TRVs 64
Table D-39 Fish Chromium TRVs 65
Table D-40 Bird Chromium TRVs 66
Table D-41 Mammal Chromium TRVs 67
Table D-42 Benthic Invertebrate Copper TRVs 70
Table D-43 Fish Copper TRVs 71
Table D-44 Bird Copper TRVs 72
Table D-45 Mammal Copper TRVs 73
Table D-46 Benthic Invertebrate Lead TRVs 76
Table D-47 Fish Lead TRVs 77
Table D-48 Bird Lead TRVs 78
Table D-49 Mammal Lead TRVs 79
Table D-50 Benthic Invertebrate Mercury and Methylmercury TRVs 82
Table D-51 Fish Methylmercury TRVs 83
Table D-52 Bird Methylmercury TRVs 85
Table D-53 Mammal Methylmercury TRVs 86
Table D-54 Benthic Invertebrate Nickel TRVs 88
Table D-55 Fish Nickel TRVs 89
Table D-56 Bird Nickel TRVs 90
Table D-57 Mammal Nickel TRVs 91
Table D-58 Benthic Invertebrate Selenium TRVs 93
Table D-59 Fish Selenium TRVs 94
Table D-60 Bird Selenium TRVs 95
Table D-61 Mammal Selenium TRVs 96

Table D-62 Benthic Invertebrate Silver TRVs 98
Table D-63 Fish Silver TRVs 99
Table D-64 Bird Silver TRVs 100
Table D-65 Mammal Silver TRVs 101
Table D-66 Benthic Invertebrate Zinc TRVs 103
Table D-67 Fish Zinc TRVs 104
Table D-68 Bird Zinc TRVs 105
Table D-69 Mammal Zinc TRVs 106

ACRONYMS AND ABBREVIATIONS

%	percent
µg/kg	microgram per kilogram
µg/L	microgram per liter
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-*p*-dioxin
ACR	acute to chronic ratio
AhR	aryl hydrocarbon receptor
ATSDR	Agency for Toxic Substances and Disease Registry
BCF	bioconcentration factor
BERA	baseline ecological risk assessment
BTAG	Biological Technical Assistance Group
bw/day	body weight per day
COPEC	constituent of potential ecological concern
(CH3)2AsO(OH)	demethylarsinate
(CH3)3AsCH2COOH	arsenobetaine
CH3AsO(OH)2	monomethylarsonate
DASS	Diamond Alkali Superfund Site
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
dioxin	polychlorinated dibenzo-*p*-dioxin
dw	dry weight
Eco SSL	ecological soil screening level
ED10	effective dose at 10%
ERED	Environmental Residue-Effects Database
FIR	food ingestion rate
furan	polychlorinated dibenzofuran
HCB	hexachlorobenzene
HPAH	high molecular weight polycyclic aromatic hydrocarbon
HQ	hazard quotient
hr	hour
kg/day	kilogram per day

kg/L	kilogram per liter
LCL	lower confidence limit
LD50	lethal dose to 50%
LOAEL	lowest observed adverse effect level
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LPR	Lower Passaic River
LPR FFS	Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River
LPRSA	Lower Passaic River Study Area
LPRSA BERA	Lower Passaic River Study Area Baseline Ecological Risk Assessment
MFO	mixed-function oxidases
mg/kg	milligram per kilogram
mg/L	milligram per liter
mg/m3	milligram per cubic meter
mmHg	millimeter of mercury
NAS	National Academy of Sciences
NBSA	Newark Bay Study Area
NOAEL	no observed adverse effect level
NRCC	National Research Council of Canada
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
ppb	part per billion
ppm	part per million
SLERA	screening-level ecological risk assessment
SSD	species sensitivity distribution
SSL	soil screening level
TEF	toxic equivalency factor
TEQ	toxic equivalent
total DDx	sum of all six DDT isomers (2,4′-DDD, 4,4′-DDD, 2,4′-DDE, 4,4′-DDE, 2,4′-DDT and 4,4′-DDT)
TRV	toxicity reference value
UCL	upper confidence limit

USEPA	U.S. Environmental Protection Agency
Windward	Windward Environmental LLC
ww	wet weight

1 INTRODUCTION

This appendix presents toxicity profiles, selected toxicity reference values (TRVs), and the uncertainties associated with TRVs for the constituents of potential ecological concern (COPECs) identified in the Newark Bay Study Area (NBSA) Baseline Ecological Risk Assessment (BERA). The toxicity profiles are brief summaries regarding key ecotoxicological information on each chemical or chemical group identified as COPECs for the NBSA and help to inform the identification of TRVs for the receptors of concern evaluated in the BERA. These include the following:

- Benthic invertebrates (primarily epibenthic softshell clam [*Mya arenaria*] and blue crab [*Callinectes sapidus*])
- Fish (forage and predatory species at different trophic levels)
    - Mummichog/killifish (*Fundulus spp.*)
    - American eel (*Anguilla rostrata*)
    - Summer flounder (*Paralichthys dentatus*)/winter flounder (*Pseudopleuronectes americanus*)
    - White perch (*Morone americana*)
- Birds (benthivorous, omnivorous, and piscivorous water birds)
    - Spotted sandpiper (*Actitis macularius*)
    - Great blue heron (*Ardea herodias*)
    - Lesser scaup (*Aythya affinis*)
    - Double-crested cormorant (*Phalacrocorax auritus*)
- Mammals (semi-aquatic omnivores and predators)
    - Muskrat (*Ondatra zibethicus*)
    - River otter (*Lontra canadensis*)
    - Harbor seal (*Phoca vitulina*).

Toxicity profiles summarize characteristics of the COPEC that influence the fate, transport, and toxicity of the chemical/compounds and discuss what is generally known about potential toxicity to the various receptor groups. These profiles are generated through a review of the available scientific literature, but much of the information is acquired/excerpted from existing comprehensive toxicological profiles such as those prepared by the Agency for Toxic Substances and Disease Registry (ATSDR), and the *Handbook of Chemical Risk Assessment: Health Hazards to Humans, Plants, and Animals, Vol. 1-3 (Metals, Organics, Metaloids/Radiation, Index)* by Eisler (2000).

The TRVs are the specific effect thresholds identified and selected to assess tissue- and/or dietary-based risks using the standard risk calculation hazard quotient (HQ) approach, as described in BERA. The TRVs typically include two benchmarks: lowest observed adverse effect levels (LOAELs) and no observed adverse effect levels (NOAELs).

General TRV uncertainties, called out in the respective tables throughout this Appendix as "Key Uncertainties," are discussed in further detail in Section 19. Specific uncertainties with each TRV, if considered significant, are provided with the discussion of the basis of the TRV.

This report summarizes the basis of the TRVs, many of which came from the Lower Passaic River Study Area Baseline Ecological Risk Assessment (LPRSA BERA; Windward Environmental LLC [Windward] 2019) and the Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River (LPR FFS; U.S. Environmental Protection Agency [USEPA] 2014), as described in Section 3.5.2 of the BERA Report. The use of the same TRVs is based on the goal of maintaining, to the extent practicable, consistency with the technical approach and applications for estimating risks and drawing risk conclusions for the other operable units (OUs) of the Diamond Alkali Superfund Site (DASS), primarily the LPRSA BERA for OU4 (Windward 2019) and also the LPR FFS (USEPA 2014) for OU2. Unique TRVs for the NBSA were developed only for COPECs that were not assessed in the LPRSA BERA. In most cases, the alternate values were selected from the substantial list of studies that are included in the TRV database that was developed as part of the LPRSA BERA (Windward 2019, Appendix A, Appendix E). The derivation of the LPRSA TRVs that were adopted for this NBSA BERA are summarized in this appendix by COPEC and receptor. Additional details on their derivation is provided in Appendix A (specifically Section A-3) of the LPRSA BERA (Windward 2019).

For some receptors and COPECs, additional literature searches were performed to identify appropriate TRVs, as described in Sections 2 through 18 below. The toxicity studies that were evaluated for use in the BERA (LPRSA and NBSA) were considered acceptable for use in TRV derivation if they met the following requirements:

- The toxicity data were based on endpoints that directly measure survival, growth, or reproduction
- Toxicity effect levels were representative of NOAEL and/or LOAEL concentrations or doses
- The toxicity studies were conducted in a controlled environment using standardized and/or peer-reviewed experiment methods, in which a clear concentration- or dose-response relationship was reported
- The toxicity studies were based on the exposure of an organism to a single chemical or specific mixtures of related chemicals (i.e., mixtures of chemicals within the same class, such as PCBs)
- The toxicity data reflected a preferred exposure route relevant to the TRV type (e.g., ingestion exposure for dietary TRVs)
- TRVs were not based on bioaccumulation studies that did not measure effects on an appropriate endpoint (i.e., survival, growth, or reproduction).
- For regulated metals, acceptable LOAELs associated with adverse effects had to be above the optimal nutritional concentration for the species
- Unless no other data were available, TRVs for birds were not based on egg productivity or other reproductive endpoints in a domesticated species, such as chickens or Japanese quail, because of the differences in reproductive physiology (i.e. high egg-laying rates) between these species and wild bird species
- For tissue, TRVs were based on whole-body or egg tissue concentrations that were reported at the time that the effects were measured. Studies that did not report measured tissue concentrations were not considered, unless no other studies were available and a tissue concentration could be estimated

through the use of water or sediment exposure concentrations and bioconcentration factors reported in the study.

Table D-1a lists the NBSA COPECs, and Table D-1b compares the COPECs list between the NBSA (OU3), the LPRSA BERA (OU4; Windward 2019), and LPR FFS (OU2; USEPA 2014).

Table D-1a COPECs Evaluated for Shellfish, Fish, and Wildlife Receptors in the BERA

COPEC	COPECs for the NBSA BERA						
	Benthic Invertebrate Tissue	Fish Tissue	Fish Egg	Fish Diet	Bird Egg	Bird Diet	Mammal Diet
Dioxins/Furans							
2,3,7,8-TCDD	**X**	**X**	**X**		**X**	**X**	**X**
Total Dioxin/Furan TEQ Fish		**X**	**X**				
Total Dioxin/Furan TEQ Bird					**X**	**X**	
Total Dioxin/Furan TEQ Mammal							**X**
Polychlorinated Biphenyls (PCBs)							
Total PCBs	**X**	**X**	X		**X**	**X**	**X**
Total PCB TEQ Fish		**X**	**X**				
Total PCB TEQ Bird					**X**	**X**	
Total PCB TEQ Mammal							**X**
Total Dioxin/Furan/PCB TEQ Fish		**X**	**X**				
Total Dioxin/Furan/PCB TEQ Bird					**X**	**X**	
Total Dioxin/Furan/PCB TEQ Mammal							**X**
Pesticides							
Total DDx (2,4 & 4,4)	**X**	**X**			**X**	**X**	**X[a]**
Dieldrin	**X**	**X**			**X**	**X[a]**	**X**
Total Chlordane	X[a]	X[a]				X[a]	X[c]
Hexachlorobenzene	X[a]	X[a]				X[a]	X[a]
Polycyclic Aromatic Hydrocarbons (PAHs)							
Total HMW PAH	**X**					X[b]	X[b]
Total LMW PAH	**X**					X[b]	X[b]
Total PAH				X		X	X[d]
Metals/Inorganics							

COPEC	COPECs for the NBSA BERA						
	Benthic Invertebrate Tissue	Fish Tissue	Fish Egg	Fish Diet	Bird Egg	Bird Diet	Mammal Diet
Arsenic	X	X		X[a]		X[a]	X
Cadmium	X			X		X	X
Chromium	X	X[a]		X		X	X[c]
Copper	X[b]	**X[a]**		X		**X**	**X**
Lead	**X**	**X**		X[a]		**X**	**X**
Mercury/Methylmercury	**X**	**X**	**X**	X	**X**	**X**	**X**
Nickel	X			X		X	X
Selenium	X	X		X		X	X
Silver	X	X		X[a]		X[c]	X[c]
Zinc	X	X		X		X	X

Notes:
2,3,7,8-TCDD = tetrachlorodibenzo-*p*-dioxin
BERA = baseline ecological risk assessment
COPEC = constituent of potential ecological concern
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
HMW = high molecular weight
LMW = low molecular weight
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TEQ = toxic equivalency
Total DDx = sum of all six DDT isomers (2,4′-DDD, 4,4′-DDD, 2,4′ DDE, 4,4′-DDE, 2,4′-DDT and 4,4′-DDT)
Bold = COPECs evaluated in the LPRSA BERA and LPR FFS
[a]COPEC not evaluated in LPRSA BERA but TRV available in LPRSA BERA Appendix A3-1 or Appendix E1
[b]COPEC evaluated in LPR FFS but not in the LPRSA BERA
[c]COPEC not evaluated in LPRSA BERA; TRV derived from alternate source
[d] Both the LOAEL and NOAEL TRVs were the same as the LPR FFS TRVs derived for total HMW PAH

Table D-1b Comparison of NBSA and LPR COPECs

Chemical/Chemical Group	NBSA (OU3) BERA COPEC	OU2 LPR FFS COPECs	OU4 LPRSA BERA COPECs
Dioxins/Furans			
2,3,7,8-TCDD	X	X	X
Total Dioxin/Furan TEQ	X	X	X
Polychlorinated Biphenyls (PCBs)			
Total PCBs	X	X	X
Total PCB TEQ	X	X	X
Total Dioxin/Furan/PCB TEQ	X		X
Pesticides			
Total DDx	X	X	X
Dieldrin	X	X	X
Total Chlordane	X		
Hexachlorobenzene	X		
Polycyclic Aromatic Hydrocarbons (PAHs)			
Total HWW PAH	X	X	X
Total LMW PAH	X	X	X
Total PAHs	X		X
Metals/Inorganics			
Arsenic	X		X
Cadmium	X		X
Chromium	X		X
Copper	X	X	X
Lead	X	X	X
Mercury/Methylmercury	X	X	X
Nickel	X		X
Selenium	X		X
Silver	X		X
Zinc	X		X

2 POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

Polychlorinated dibenzo-*p*-dioxins and dibenzofurans are compounds that contain one to eight chlorine atoms attached to the carbon atoms of the parent chemical and are persistent environmental contaminants. They are commonly referred to as dioxins and furans, respectively, and reportedly cause various harmful health and environmental effects (Eisler 2000; Agency for Toxic Substances and Disease Registry [ATSDR] 1994a, 1998). While more than 200 dioxin and furan isomers exist, seven dioxins and 10 furans are known by the World Health Organization (WHO) to be particularly toxic (USEPA 2008a), with the most toxic isomers being 2,3,7,8-TCDD and 2,3,7,8-TCDF. Other dioxin-like chemicals, particularly coplanar polychlorinated biphenyls [PCBs], share structural and biochemical similarities with dioxins and furans as well as a common mode of action through which they exert similar effects on humans and wildlife. Including the coplanar PCBs, there are 29 dioxin-like compounds (17 dioxin and furan congeners and 12 PCB congeners).

In their pure form, dioxins and furans are colorless solids or crystals that enter the environment as mixtures containing a variety of individual components and impurities. In the environment, they tend to be associated with ash, soil, or any media with high organic content. In air and water, a portion of the dioxins and furans may be found in vapor or its dissolved state, depending on the amount of particulate matter, temperature, and other environmental factors (ATSDR 1998).

Dioxins and furans are known to occur naturally but are also produced by human activities. They are naturally produced from the incomplete combustion of organic material by forest fires or volcanic activity. Dioxins and furans are not intentionally manufactured by industry, except in small amounts for research purposes. They are, however, unintentionally produced by industrial, municipal, and domestic incineration and combustion processes. It is believed that dioxin emissions associated with human incineration and combustion activities are the predominant environmental source (ATSDR 1998; USEPA 2006a). Dioxins and furans are released to the environment primarily during combustion of fossil fuels and wood and during incineration processes for municipal and medical solid waste and hazardous waste (ATSDR 1994a, 1998). Dioxins are also produced in the manufacture of chlorinated chemicals, such as chlorophenols, chlorobenzenes, and chlorobiphenyl (USEPA 2006a). Additionally, dioxins have been detected at low concentrations in cigarette smoke, home-heating systems, and car exhaust. Burning materials that may contain chlorine, such as plastics, wood treated with pentachlorophenol (PCP), pesticide-treated wastes, other polychlorinated chemicals (e.g., PCBs), and bleached paper, can produce dioxins and furans (ATSDR 1998).

In aquatic environments, due to their hydrophobic nature, the majority of dioxins and furans ultimately become associated with the organic fraction of suspended and/or bed sediments and the lipid-rich tissues of aquatic organisms (Wenning et al. 2011; Saloranta et al. 2006; USEPA 1998a; Hoffman et al. 1995). Dioxins and furans have been shown to bioaccumulate via the ingestion of dioxin- and furan-laden food items and soil/sediment particles and are primarily eliminated slowly through digestion and egg production. Field studies and models have shown that fish body burdens of dioxins and furans are largely due to dietary rather than gill surface uptake (Saloranta et al. 2006; Micheletti et al. 2008). Concentrations of dioxins and furans (particularly tetra- and penta-chlorinated dibenzo-*p*-dioxins and tetra- and penta

chlorinated dibenzofurans) tend to be highest in top predator species in food webs wherein successive stages of dietary accumulation at each trophic level result in significant biomagnification (Khairy et al. 2014; Wenning et al. 2011; Saloranta et al. 2006; Micheletti et al. 2008).

In order to more readily assess the toxicity of dioxins and furans as a mixture, the system of toxicity equivalency factors (TEFs) was developed based on the toxicity of 2,3,7,8-TCDD. In this system, each isomer on the WHO list is assigned a factor (i.e., TEF) based on its potency relative to 2,3,7,8-TCDD; the estimated toxicity of all isomers present is summed to come up with an overall estimate of toxicity, called the 2,3,7,8-TCDD toxic equivalency (TEQ). These TEFs have been developed for ecological risk assessment of fish, birds, and mammals, as described in USEPA (2008a) and Van den Berg et al. (1998).

Toxicity for these compounds is thought to be broken into three modes of action: 1) irreversible chemical binding to macromolecules inhibiting their function, 2) accumulating to high concentrations in lipids resulting in stress-induced dosing, and 3) irreversible binding to cellular receptors and enzymes inhibiting biochemical communications between cells (USEPA 2008a; Eisler 2000; Van den Berg et al. 1998; Hoffman et al. 1995). Most, if not all, toxic effects of dioxins and furans are initiated by activation of the cellular aryl hydrocarbon receptor (AhR), a ligand-activated transcription factor that is involved in the regulation of biological responses to planar aromatic hydrocarbons (e.g., dioxins, furans, PCBs, and polycyclic aromatic hydrocarbons [PAHs]) (Farmahin et al. 2013). The AhR is involved in regulating xenobiotic-metabolizing enzymes, such as cytochrome p450.

Invertebrate and vertebrate organisms respond differently to elevated concentrations of dioxins and furans, with invertebrates being relatively tolerant of exposure compared to vertebrate species. This difference may be due to the absence of some receptors in invertebrates that are adversely affected in vertebrate species (Eisler 2000; Hoffman et al. 1995). Due to their tolerance to exposure, invertebrates may accumulate dioxins and furans into their tissues from sediments, making them more biologically available to vertebrate species in the aquatic environment (Eisler 2000; Hoffman et al.1995).

Laboratory toxicity data show that fish are generally more sensitive to 2,3,7,8-TCDD than plants, aquatic invertebrates, and other aquatic vertebrates (e.g., amphibians) (USEPA 2008a; Eisler 2000). The high lipid content in fish makes them highly susceptible to bioaccumulation of 2,3,7,8-TCDD in their tissues, which can essentially be transferred into the food web to higher-trophic-level organisms, such as birds and mammals (including humans). Effects of 2,3,7,8-TCDD exposure to mammals and birds are similar to fish and include delayed mortality, a “wasting” syndrome characterized by reduced food intake and reduced body weight, reproductive toxicity, histopathological alterations, developmental abnormalities, and immunosuppression (USEPA 2008a; Eisler 2000). More specific ecotoxicological information is provided below by receptor group.

2.1 Benthic Invertebrates

2.1.1 Toxicity Profile

Benthic invertebrates lack an AhR receptor and, as such, are not considered to be sensitive to the cellular mediated effects of these compounds like vertebrate organisms. However, invertebrates accumulate these compounds and thus create a potential exposure risk for organisms that consume these receptors. There is a great deal of uncertainty regarding the potential effects of dioxins/furans on invertebrates, and

the scientific literature on effects is relatively sparse and variable, compared to vertebrate organisms (Eisler 2000). The toxic effects of 2,3,7,8-TCDD exposure on the eastern oyster (*Crassostrea virginica*) have been studied by Cooper and Wintermyer (2009). Similarly, the toxic effects of dioxin exposure on crabs have been reported by Weis et al. (2011) and Reichmuth et al. (2010); both of these studies evaluated behavior endpoints.

2.1.2 TRVs

Table D-2 summarizes the benthic invertebrate TRVs used in the assessment, and the sections below describe how they were derived.

Table D-2 Benthic Invertebrate 2,3,7,8-TCDD TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.0003	0.003	Ashley et al. 1996 (crayfish survival)	1	a,b
		0.00000015	0.0000013	Wintermyer and Cooper 2003 (eastern oyster reproduction)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
ww = wet weight

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

Ashley et al. (1996) is the only study identified that reported a 2,3,7,8-TCDD TRV for crustaceans. A LOAEL of 0.003 milligram per kilogram (mg/kg) wet weight (ww) was reported for the survival of crayfish; a 25% mortality was observed after a 45-day exposure via cephalothoracic injection. No NOAEL was identified from this study. A NOAEL of 0.0003 mg/kg was estimated from the LOAEL using an extrapolation factor of 10. Several uncertainties are associated with these TRVs: mortality is generally not the most sensitive endpoint based on chemical exposure, tissue concentrations were not reported, the test individuals were wild-caught, and only 3 or 4 individuals were exposed per treatment. However, it is a reported TRV for a crustacean species, and the derivation of the NOAEL was conservative to account for the uncertainties.

The LPR FFS (USEPA 2014) derived a LOAEL TRV of 0.0000013 mg/kg ww and a NOAEL TRV of 0.00000015 mg/kg ww based on a 10-month field study of adult eastern oysters transplanted to two locations in New Jersey (Wintermyer and Cooper 2003). The results from one location (Arthur Kill), where 23 percent (%) fertilization success occurred, became the LOAEL and the results from the other location (Sandy Hook), where 54% fertilization success occurred, became the NOAEL. There are several uncertainties with this study: reported tissue concentrations were based on one composite of seven oysters from each site, the endpoint, fertilized egg development was based on one sample, the presence

of other contaminants were not considered or evaluated, and a true control group was not used for comparison. The application of this oyster TRV to blue crab is uncertain given the cross-taxonomic extrapolation, but provides for a bounding of risk estimates, given the lack of available TRVs for blue crab or crustaceans for non-survival endpoints.

2.2 Fish

2.2.1 Toxicity Profile

Dioxins and furans have been reported to generate a broad range of toxic effects in fish under controlled exposure conditions, including reduced survival, body weight loss, edema, hemorrhaging, craniofacial malformations, toxemia, and reproductive and developmental effects (Eisler 2000; Elonen et al. 1998; Fisk et al. 1997; Spehar et al. 1997; Tietge et al. 1998). Although toxicological sensitivity is species specific, teleost fish tend to be more sensitive to dioxins and furans than most other vertebrates (Walker and Peterson 1994). Recently, cardiovascular and other developmental impacts (such as swim bladder effects) in fish embryos from sublethal exposure to dioxin have been studied (Aluru et al. 2015; Chen 2015; Yue et al. 2015; Park et al. 2014). In addition, behavioral effects have been observed in fish as a result of exposure to dioxins/furans and related compounds (e.g., PCBs and PAHs) (Weis et al. 2011). While fish are sensitive to low dose exposures of dioxins and furans, Salomon (1994) showed that most dietary exposure is not absorbed by the gastrointestinal tract but rather most is eliminated in the feces.

2.2.2 TRVs

Table D-3 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-3 Fish 2,3,7,8-TCDD and Total TEQ[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	0.000012	0.00012	Windward 2019 (7 species SSD);	1	a,b
		0.00000089	0.0000018	Couillard et al. 2011 (mummichog behavior)	2	c
Fish whole-body tissue; Alternative TRV)	mg/kg ww	0.0000023	0.000023	Windward 2019 (7 species SSD)	1	a,b
Fish egg	mg/kg ww	0.0000072	0.000086	Steevens et al. 2005 (10 species; growth, survival, reproduction, and behavior)	1, 2	a

Notes:
[1] = Total TEQ refers to total dioxin/furan TEQ, total PCB TEQ, and total PCB and dioxin/furan/PCB TEQ.
KU = Key Uncertainty
a = TRV based on a species sensitivity distribution (SSD)
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
c = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

2.2.2.1 Fish Whole-Body Tissue

The NOAEL and LOAEL TRVs of 0.000012 and 0.00012 mg/kg ww, respectively, for 2,3,7,8-TCDD and TEQ derived in the LPRSA BERA (Windward 2019) were based on an SSD developed from nine studies and seven fish species where the LOAELs for the adverse effects on reproduction, growth, or survival ranged from 0.000085 to 0.014 mg/kg ww. The selected LOAEL represents the geometric mean 5th percentile LOAEL of the SSD models evaluated (i.e., the Pearson6, log-logistic, and Weibull distributions). The NOAEL TRV (0.000012 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.,

The LPRSA BERA also derived an alternative TRV for whole body fish tissue using the same dataset. A 5th percentile LOAEL (0.000023 mg/kg ww) based on the beta general distribution was selected as a conservative TRV. The NOAEL was estimated using an uncertainty factor of 10.

The LPR FFS (USEPA 2014) LOAEL and NOAEL of 0.0000018 and 0.00000089 mg/kg ww, respectively, for 2,3,7,8-TCDD and TEQ were also used as TRVs and are based on reported impacts on prey capture behavior in newly hatched mummichogs following topical exposure of the eggs to PCB 126 at doses of 50 kilograms per liter (kg/L) (Couillard et al. 2011). Larvae tissue concentrations were estimated from empirical data on the ratio of larval tissue concentration to topical dose measured in a previous study (Couillard et al. 2008). The estimated larval tissue concentrations (0.000355 and 0.000178 mg/kg ww) were converted to estimated TEQ concentrations by multiplying the fish toxic equivalency factor (TEF) for PCB 126 (0.005), resulting in the LOAEL and NOAEL of 0.0000018 and 0.00000089 mg/kg ww, respectively. There are several uncertainties associated with these LPR FFS (USEPA 2014) TRVs: 1) this study is more relevant to the fish egg assessment than adult fish; 2) the assessment endpoints of growth, reproduction, and survival showed no adverse effects, even at the highest doses; 3) relating a study on the toxicity of one PCB congener (126) to the toxicity of a sum of toxic dioxin congeners and dioxin-like PCBs; and 4) concentrations in mummichog larvae were not measured in the same study that recorded impacts on behavior. The larval tissue concentrations were estimated from data in another study that provided a ratio of larval tissue concentration to topical, and this ratio was based on one data point (Couillard et al. 2008, 2011). These extrapolated TRVs in fish larvae are also an order of magnitude lower than the measured TRVs for fish eggs from multiple species described below, indicating a large degree of uncertainty with the derivation/use of this TRV.

2.2.2.2 Fish Eggs

Steevens et al. (2005) developed an SSD for 2,3,7,8-TCDD based toxicity studies on 10 species of early life stage fish. The 5th percentile upper confidence limit (UCL) and lower confidence limit (LCL) values of 0.000086 and 0.0000072 mg/kg ww, respectively, from this SSD were selected as the fish eggs TRVs for dioxins/furans and TEQ. These TRVs were used in both the LPRSA BERA (Windward 2019) and in the LPR FFS (USEPA 2014).

2.3 Birds

2.3.1 Toxicity Profile

In birds, dioxins and furans have been reported to produce various effects under controlled exposure conditions. Some effects in laboratory testing have included mortality, body weight loss, effects on egg production and hatchability, and embryo survival (Eisler 2000; Hoffman et al. 1998; Powell et al. 1998; Powell et al. 1997; Janz and Bellward 1996; Nosek et al. 1992a, 1992b; Schwetz et al. 1973)). For wild birds in aquatic habitats, reported effects included increased embryo and hatchling mortality, teratogenicity, reduced growth, edema, alternations in thyroid function, hepatic porphyria, and increased hepatic retinoid levels (Janz and Bellward 1996). Bird species' sensitivity to dioxin-like compounds varies more than 1,000-fold in association with differences in the structural characteristics of the AhR (Farmahin et al. 2013; Cohen-Barnhouse et al. 2011; Head et al. 2008). Eighty-six bird species have been grouped into three classes of sensitivity to dioxin-like compounds: 1) high sensitivity; 2) moderate sensitivity; and 3) low sensitivity (Farmahin et al. 2013). Chickens (*Gallus domesticus*) have demonstrated to be among the most sensitive species. The spotted sandpiper (a Lower Passaic River Study Area [LPRSA]-focal species) is in the moderate sensitivity group, and the belted kingfisher (*Megaceryle alcyon*) and great blue heron (also LPRSA-focal species) are in the low sensitivity group. While causation is difficult to establish, because local populations of birds are exposed to mixtures of chemicals, area-specific studies on immunotoxicity and adverse reproductive effects based on exposure to PCBs (and dioxins) have been conducted (Grasman et al. 2012).

2.3.2 TRVs

Table D-4 summarizes the bird TRVs used in the assessment, and the sections below describe how they were derived.

Table D-4 Bird 2,3,7,8-TCDD and TEQ[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.000014	0.00014	Nosek et al. 1992a (ring-necked pheasant [*Phasianus colchicus*] mortality, growth, and reproduction)	1	a
		0.0000028	0.000028		2	a
Bird egg	mg/kg ww	0.000025	0.00025	Windward 2019 (five species reproduction)	1	b, c
		0.000059	0.00015	USEPA 2003 (multiple species, including chicken reproduction)	2	b

Notes:
[1] = Total TEQ refers to total dioxin/furan TEQ, total polychlorinated biphenyl (PCB) TEQ, and total PCB and dioxin/furan TEQ.
KU = Key Uncertainty
a = TRV based on a single study
b = TRV based on an SSD
c = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

2.3.2.1 Bird Diet

The selected TRVs were derived in the LPRSA BERA (Windward 2019). Toxicity data were limited for the dietary effects of dioxins/furans and dioxin-like PCBs on birds. Only two studies were found acceptable for evaluation of the 2,3,7,8-TCDD TRV—one study on ring-necked pheasants exposed by intra-peritoneal injection (Nosek et al. 1992a) and the second study on chickens exposed by oral intubation (Schwetz et al. 1973). The ring-necked pheasant study had the lowest LOAEL of 0.000143 mg/kg body weight (bw)/day (Nosek et al. 1992a) and was based on a 57% increase in mortality observed 16 weeks after the initiation of 10 weeks of weekly injections of 2,3,7,8-TCDD. No mortality was observed at the NOAEL of 0.0000143 mg/kg bw/day. The LOAEL and NOAEL from Nosek et al. (1992a) were selected as the TRVs. These study endpoints were also the basis for TRVs in the FSS (USEPA 2014); however, the LPR FFS applied a species sensitivity factor of 5 to derive recommended TRVs on the basis that ring-necked pheasants were not among the most sensitive species.

2.3.2.2 Bird Eggs

The selected TRVs were derived in the LPRSA BERA (Windward 2019), which developed an SSD based on five acceptable egg injection studies evaluating 2,3,7,8-TCDD toxicity. These studies reported the embryo survival and hatchability for five bird species with LOAELs that ranged from 0.001 to 0.04 mg/kg ww 2,3,7,8-TCDD. The 5th percentile of the LOAELs was determined to be 0.00025 mg/kg ww, which was accepted as the LOAEL TRV. This SSD-derived LOAEL represents a conservatively extrapolated value that is less than the study LOAELs on which the SSD was based. The highest NOAEL TRV was estimated from the LOAEL using a factor of 10.

The LPR FFS (USEPA 2014) also used the 5th percentile of an SSD as the LOAEL TRV, but it included chickens while the LPRSA SSD did not (USEPA 2003). Given the known high sensitivity of the chicken to dioxins/furans relative to other bird species (Farmahin et al. 2013), it is not surprising that the derived LOAEL TRV of 0.00015 mg/kg ww was lower than the LOAEL TRV derived without chicken data. The NOAEL TRV of 0.000059 mg/kg ww was also derived from USEPA guidance (2003) for SSDs.

2.4 Mammals

2.4.1 Toxicity Profile

As with PCBs (see Section 3.4.1 below), the most comprehensive studies of dioxin/furan toxicity in a non-domesticated mammal have been conducted with mink (*Neovison vison*), which has been shown to be highly sensitive to dioxins. In mink, dioxins and furans have been shown, under controlled exposure conditions, to have adverse effects on reproduction (e.g., fertility, litter size, and offspring survival). These effects are comparable to those caused by PCBs (Hochstein et al. 2001). Similar effects have been reported in less sensitive mammals, such as guinea pigs [*Cavia porcellus*] and rats [Rattus], and there is evidence that dioxins and furans also have adverse impacts on developmental toxicity, hepatotoxicity, endocrine disruption, immunotoxicity, adult mortality, and body weight (Eisler 2000; Hochstein et al. 1998;

Kennedy et al. 1996; Van Birgelen et al. 1994). Studies evaluating the toxicity of 2,3,7,8-TCDD to mammals (i.e., guinea pigs, rats, or mink) have reported adverse effects on growth, reproduction, and survival following exposure to dietary 2,3,7,8-TCDD (Kociba et al. 1978; Murray et al. 1979; DeCaprio et al. 1986; Van Birgelen et al. 1994; Hochstein et al. 2001).

2.4.2 TRVs

Table D-5 summarizes the mammal TRVs used in the assessment, and the sections below describe how they were derived.

Table D-5 Mammal 2,3,7,8-TCDD and TEQ[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.0000026	0.0000088	Hochstein et al. 2001 (mink reproduction)	1	a
		0.00000008	0.0000022	Tillitt et al. 1996 (mink reproduction)	2	a

Notes:
[1] = Total TEQ refers to total dioxin/furan TEQ, total PCB TEQ, and total PCB and dioxin/furan TEQ.
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were derived in the LPRSA BERA (Windward 2019), which reviewed six laboratory toxicity studies testing three species (mink, guinea pig, and rat) with mammals exposed to 2,3,7,8-TCDD incorporated into their diet. The guinea pig was found to have the lowest LOAEL (0.0000049 mg/kg bw/day). The second lowest LOAEL (0.0000088 mg/kg bw/day), however, was selected as the TRV because the test species (mink) was better related to the mammalian receptor of interest (river otter). The mink LOAEL resulted in decreased kit survival at 3 and 6 weeks after birth compared to the control (Hochstein et al. 2001). The selected NOAEL TRV of 0.0000026 mg/kg bw/day came from the same study.

The LPR FFS (USEPA 2014) LOAEL and NOAEL of 0.0000022 and 0.00000008 mg/kg bw/day, respectively, were developed from a study feeding mink field-collected contaminated carp (Tillett et al. 1996). The toxicity study by Tillitt et al. (1996) is preferred for evaluating ecological risks specific to the region where the study was conducted (Saginaw Bay, Michigan); however, it is less preferred than a laboratory study when characterizing the potential for toxicity of 2,3,7,8-TCDD in other systems because of the number of unique aspects of the ecosystem that can affect toxicity: multiple contaminants, heterogeneous genetic composition, contaminant bioavailability, and non-contaminant potential stressors such as disease, weather, and food availability. For the NBSA, site-specific field toxicity studies are not available, and the extent to which the contaminant mixture evaluated by Tillitt et al. (1996) is representative of the contaminant mixture in the NBSA is uncertain. Exposure to dioxins, furans, dioxin-

like PCBs in the NBSA BERA was evaluated using the 2,3,7,8-TCDD TEQ approach, in which concentrations of individual constituents are adjusted based on relative toxicity to a 2,3,7,8-TCDD. Therefore, use of the TRVs based on only 2,3,7,8-TCDD (Hochstein et al. 2001) is more appropriate for use with the TEQ approach used in the NBSA BERA, and the Hochstein et al. (2001) TRVs are considered to produce risk estimates with lower uncertainty than the Tillitt et al. (1996) TRVs. While site-specific field studies such as Tillitt et al. (1996) are preferred over laboratory studies for evaluating toxicity of a particular site, and can provide information useful for bounding risk estimates, they are not generally preferred over laboratory studies at different sites because of the great inherent number of variables that can influence the toxicity between sites.

3 POLYCHLORINATED BIPHENYLS

The PCBs are a group of synthetic organic chemicals that can cause a number of harmful effects. PCBs are either oily liquids or solids and range from colorless to light yellow in appearance, with no known taste or odor. Some PCBs are volatile and may exist as a vapor in air. There are no known natural sources of these persistent bioaccumulative contaminants in the environment. PCBs enter the environment as mixtures containing a variety of individual chlorinated biphenyl components, known as congeners, as well as impurities. PCBs do not burn easily, are good insulating materials, and have been previously widely used as coolants and lubricants in transformers, capacitors, and other electrical equipment. The manufacture of PCBs stopped in the United States in 1977 because of evidence that PCBs persist in the environment and possibly cause harmful effects (ATSDR 2000).

Because the health effects of environmental mixtures of PCBs are difficult to evaluate, most of the available toxicological information pertains to seven types of PCB mixtures (i.e., Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260) that were commercially produced. These mixtures include 35% of all PCBs commercially produced and 98% of all PCBs sold in the United States since 1970 (ATSDR 2000). The potency of PCB mixtures depends on chlorine content. In general, mixtures with higher chlorine content (i.e., Aroclors 1242, 1248, 1254, and 1260) are more toxic than mixtures with lower chlorine content (i.e., Aroclors 1221 and 1232).

Coplanar PCBs have chlorine atoms in non-ortho positions that allow the two benzene rings to lie in the same plane; non-coplanar PCBs have chlorine atoms in the ortho position causing the molecule to twist and the rings are on different planes. The relative toxicities of coplanar PCBs are calculated as TEQ by expressing their TEFs in relation to 2,3,7,8-TCDD, as described in Section 2. Toxicity of PCBs is a factor of both the number of chlorine atoms in the molecule and how close the benzene rings are to being coplanar (USEPA 2008a).

PCB toxicity varies among different species of animals, but in general, reproductive effects tend to be the most sensitive endpoint. PCBs may also act as endocrine disruptors. Toxicity is believed to be related to the ability of the congeners to induce cytochrome P450 dependent activity (ATSDR 2000).

There are limited data regarding toxicity of PCBs to plant species. PCBs incorporated into phytoplankton exert inhibitory effects on photosynthesis and cell motility (Eisler 2000). PCB toxicity to invertebrates is generally less than that observed in vertebrate species due to limited detoxification systems. Crustaceans and younger developmental stages appear to be the most sensitive groups, and lower chlorinated compounds appeared to be more toxic.

In aquatic environments, due to their hydrophobic nature, PCBs ultimately become associated with the organic fraction of suspended and/or bed sediments and the lipid-rich tissues of aquatic organisms (USEPA 2008a; Eisler 2000; Hoffman et al. 1995). PCBs have been shown to bioaccumulate via the ingestion of PCB-laden food items and soil/sediment particles and are primarily eliminated slowly through digestion and egg production.

PCB effects may be associated with the survival, growth, and reproduction of individuals within the local populations of fish and wildlife species, with reproduction broadly defined to include egg maturation, spawning, egg hatchability, and survival of fish larvae. The most sensitive endpoint for effects of PCB on fish is found during early life stage survival and recruitment as a result of PCB transfer from maternal tissue to eggs (Eisler 2000). As a group, birds are more resistant to acutely toxic effects of PCBs than

mammals, based on literature values (Eisler 2000. Signs of PCB poisoning among birds included morbidity, tremors, beak pointed upwards, and muscular incoordination (Eisler 2000). In mammals, long-term neurobehavioral changes were reported in children, monkeys, and rodents exposed to commercial PCB mixtures during fetal and neonatal development (Eisler 2000). Mink is among the most sensitive mammals to PCB toxicity (USEPA 2008a), with documented reproductive failure, fetal death, altered blood chemistry, abnormal liver metabolism and histology, raised cortisol excretion, and altered metabolism of Vitamin A (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

3.1 Benthic Invertebrates

3.1.1 Toxicity Profile

Once in the environment, most PCBs are known to bioaccumulate into the food web in aquatic environments, although lower chlorinated PCBs may not bioaccumulate (Khairy et al. 2014). Adverse ecotoxicological effects of PCBs on various aquatic invertebrates, including eastern oysters, sea urchins (*Arbacia punctulata*), grass shrimp (*Palaemonetes pugio*), pink shrimp (*Penaeus duorarum*), and blue crabs, have been observed and include decreased shell growth (USEPA 1980c; Ernst 1984), reduced fertilization success (Adams 1983), reduced reproductive success (Chu et al. 2000; Chu et al. 2003), and increased mortality (Hansen et al. 1974; Duke et al. 1970; Nimmo et al. 1974).

3.1.2 TRVs

Table D-6 summarizes the benthic invertebrate TRVs used in the assessment, and the sections below describe how they were derived.

Table D-6. Benthic Invertebrate PCB TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.052	0.52	(Windward 2019) (10 species SSD)	1	a, b
		0.0064	0.017	Chu et al. 2000; Chu et al. 2003 (eastern oyster reproduction)	2	c

Notes:
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
c = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)2 = LPR FFS (USEPA 2014)

Nine studies with 10 invertebrate species that examined the growth, reproduction, and mortality endpoints of PCBs were available to derived PCB TRVs for invertebrates. Windward (2019) derived an SSD that plotted 11 chronic and 5 acute-to-chronic ratio (ACR) derived LOAELs ranging from 0.13 to 552 mg/kg ww. The 5th percentile of the SSD (0.52 mg/kg ww) was selected as the LOAEL TRV. This calculated LOAEL is less than the available LOAELs from the individual studies on which the SSD was based; therefore, it represents a conservative estimate of potential toxicity. The NOAEL was estimated from the LOAEL using an extrapolation factor of 10.

Chu et al. (2000) exposed eastern oysters for 30 days to an algal diet contaminated with PCB Aroclors and measured total PCB accumulation within the oysters. The later study, Chu et al. (2003), examined PCB accumulation and adverse reproductive effects measured by the number of spawned oysters after 76 days of exposure to 0.35 microgram per liter (µg/L), and no-adverse-effect on reproduction after 30 days of exposure to 0.10 µg/L PCBs (Chu et al. 2003). An extrapolated LOAEL egg tissue concentration of 52 micrograms per kilogram (µg/kg) ww was derived for the exposure of 0.35 µg/L using a regression based on the exposure concentrations (0.1 and 1 µg/L) and egg tissue concentrations (0.020 and 0.134 mg/kg ww) reported by Chu et al. (2000). The egg tissue LOAEL and NOAEL of 0.052 and 0.02 mg/kg ww, respectively, were converted to an adult tissue LOAEL and NOAEL of 0.017 and 0.0064 mg/kg ww, respectively, using the adult:egg lipid ratio of 0.25:0.08 (Windward 2019). There are three main uncertainties associated with the selected TRVs: 1) a no dose-responsive relationship was observed among the females that had spawned (Chu et al. 2003); 2) no PCB analysis was conducted on eggs, and the authors believed that PCB concentrations in the 2003 study might have exceeded those found in 2000 (Chu et al. 2003); and 3) the two studies used different doses and exposure conditions and assumed a linear relationship between dose and egg tissue.

3.2 Fish

3.2.1 Toxicity Profile

Adverse effects on fish reported in toxicological studies for 14 fish species (i.e., Atlantic croaker [*Micropogonias undulatus*], Atlantic salmon [*Salmo salar*], brook trout [*Salvelinus fontinalis*], channel catfish [*Ictalurus punctatus*], Chinook salmon [*Oncorhynchus tshawytscha*], coho salmon [*Oncorhynchus kisutch*], common barbel [*Barbus barbus*], fathead minnow [*Pimephales promelas*], goldfish [*Carassius auratus*], mummichog, pinfish [*Lagodon rhomboides*], rainbow trout [*Oncorhynchus mykiss*], sheepshead minnow [*Cyprinodon variegatus*], and spot [*Leiostomus xanthurus*]) include reduced body weight; mortality; reduced early life stage or fry growth and survival; and reduced fecundity, hatchability, and spawning success following exposure to PCBs via diet, water, or maternal transfer to eggs (Bengtsson 1980; DeFoe et al. 1978; Fisher et al. 1994; Freeman and Idler 1975; Hansen et al. 1971; 1974a; 1974b; 1975; Hattula and Karlog 1972; Hendricks et al. 1981; Hugla and Thome 1999; Lieb et al. 1974; Matta et al. 2001; Mauck et al. 1978; Mayer et al. 1977; Mayer et al. 1985; McCarthy et al. 2003; Nebeker et al. 1974; Powell et al. 2003; van Wezel et al. 1995). Recently, behavioral effects have also been observed in fish as a result of exposure to PCBs (and dioxins and PAHs) (Weis et al. 2011).

3.2.2 TRVs

Table D-7 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-7 Fish PCB TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	0.38	3.8	Windward 2019 (11 species SSD)	1	a, b
		0.17	0.53	Lerner et al. 2007 (Atlantic salmon smolt behavior)	2	c
Fish egg	mg/kg ww	0.0258	0.258	Hugla and Thome 1999 (common barbel reproduction)	1	c, b

Notes:
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
c = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

3.2.2.1 Fish Whole-Body Tissue

The NOAEL and LOAEL TRVs of 0.38 and 3.8 mg/kg ww, respectively, for total PCB derived in the LPRSA BERA (Windward 2019) were based on an SSD developed from 12 studies and 11 fish species where the LOAELs for the adverse effects on growth or survival ranged from 9.3 to 645 mg/kg ww. The selected LOAEL represents the 5th percentile of the SSD. The NOAEL TRV (0.000012 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

The LPR FFS (USEPA 2014) LOAEL and NOAEL TRVs for fish based on a study of Atlantic salmon smolt aqueously exposed as eggs and an endpoint of behavioral change, a substantial decrease in volitional preference for seawater (Lerner et al. 2007). The LOAEL and NOAEL TRVs are 0.53 and 0.17 mg/kg ww tissue.

3.2.2.2 Fish Eggs

The selected TRVs were derived in the LPRSA BERA (Windward 2019) where a literature search yielded four egg LOAELs for four species (Atlantic croaker, brook trout, rainbow trout, and common barbel), which ranged from 0.258 to 77.9 mg/kg in eggs. The lowest LOAEL of 0.258 mg/kg ww was selected as the TRV and represents reduced hatchability in common barbels fed 12.5 mg/kg PCBs for 75 days. The NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10. Fish egg TRVs for PCBs were not developed in the LPR FFS (USEPA 2014).

3.3 Birds

3.3.1 Toxicity Profile

Effects on birds from exposure to dietary PCBs include disruption of normal patterns of growth, reproduction, metabolism, and behavior. The most sensitive effects are related to reproduction, and include egg production, fertility, and hatching success (Eisler 2000). Of the bird species used to examine reproductive endpoints in laboratory studies, chickens and other galliformes, such as ring-necked pheasant and quail (*Coturnix coturnix*), have been found to be the most sensitive to PCB toxicity (Kennedy et al. 1996). In other studies that evaluated the toxicity of PCBs to various wild bird species (e.g., American kestrels [*Falco sparverius*], Japanese quails [*Coturnix japonica*], mallard ducks [*Anas platyrhynchos*], screech owls [*Megascops asio*], and turtle doves [*Streptopelia turtur*]), adverse effects were observed on reproductive endpoints (e.g., fertility, hatchability, eggshell thickness, egg production, eggshell weight, embryo development, clutch size, and embryo mortality and viability) following dietary exposure to PCBs (Lowe and Stendell 1991; McLane and Hughes 1980; Hill et al. 1976a; Peakall et al. 1972; Peakall and Peakall 1973; Custer and Heinz 1980; Risebrough and Anderson 1975; Fernie et al. 2000; Fernie et al. 2001; Fernie et al. 2003a; Fernie et al. 2003b; Fernie et al. 2003c; Haseltine and Prouty 1980). While causation is difficult to establish because local populations of birds are exposed to mixtures of chemicals, area-specific studies on immunotoxicity and adverse reproductive effects based on exposure to PCBs (and dioxins) have been conducted (Grasman et al. 2012).

3.3.2 TRVs

Table D-8 summarizes the bird TRVs used in the assessment, and the sections below describe how they were derived.

Table D-8 Bird PCB TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.14	1.4	Peakall et al. 1972; Peakall and Peakall 1973 (ringed turtle-dove [*Streptopelia risoria*] reproduction)	1	a
		0.4	0.5	Chapman 2003 (chicken reproduction)	2	b
Bird egg	mg/kg ww	1.6	16	Peakall et al. 1972; Peakall and Peakall 1973 (ringed turtle-dove reproduction)	1	a
		0.7	1.3	Chapman 2003 (chicken reproduction)	2	b

Notes:
KU = Key Uncertainty
a = NOAEL estimated from a LOAEL with an extrapolation factor of 10
b = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

3.3.2.1 Bird Diet

The selected TRVs were derived in the LPRSA BERA (Windward 2019). Although there were 11 bird studies, excluding chickens, on the adverse effects (all reproductive) of dietary PCBs, Windward data were insufficient to develop an SSD because effects were only reported for four bird species. The lowest LOAEL from these studies was 1.4 mg/kg bw/day, based on reduced hatching success in ringed turtle-dove (Peakall et al. 1972; Peakall and Peakall 1973). No NOAEL was reported in the study with ringed turtle-doves, so an uncertainty factor of 10 was applied to the LOAEL for a NOAEL TRV of 0.14 mg/kg bw/day.

The LPR FFS (USEPA 2014) used a chicken study as the basis of the TRVs while the LPRSA BERA (Windward 2019) avoided studies with domestic chickens because they have been shown to be in the most highly sensitive category of all birds tested with dioxin-like compounds including PCBs (Farmahin et al. 2013). In addition, because domesticated species are bred to have high egg-laying rates compared to wild bird species, TRVs based on domestic reproductive endpoints are uncertain. These LPR FFS (USEPA 2014) TRVs, a LOAEL and NOAEL of 0.5 and 0.4 mg/kg bw/day, respectively, were also used in this study to bound the risk estimates. These TRVs were based on an interpolated 10% decrease hatchability relative to control (the NOAEL) and an interpolated 25% hatchability decrease relative to control (the LOAEL) as described by Chapman (2003) and based on data reported by Scott (1977). The study by Scott (1977) examined chicken hatchability effects after 8 weeks of exposure to Aroclor 1248. It is not known whether an effect threshold of 25% reduction in chicken egg hatchability is predictive of potential population-level effects in wild birds.

3.3.2.2 Bird Eggs

The same studies used to derive the bird diet TRVs (Peakall et al. 1972; Peakall and Peakall 1973; Chapman 2003) were also used as the basis for the egg TRVs.

3.4 Mammals

3.4.1 Toxicity Profile

PCBs have been reported to elicit a broad range of toxic effects in laboratory mammals under controlled exposure conditions, including lethality, hepatotoxicity, porphyria, body weight loss, dermal toxicity, thymic atrophy, immunosuppressive effects, reproductive and developmental effects, carcinogenesis, and neurotoxicity (Eisler 2000; Seegal 1996; Battershill 1994; Delzell et al. 1994; Safe 1994; Bolger 1993; WHO 1993; Silberhorn et al. 1990; Kimbrough 1987). In general, the gastrointestinal tract of most mammals readily absorbs PCBs, but the absorption rate may be affected by the dose level and lipophilicity of the compound (Eisler 2000; Van den Berg et al. 1998). There is evidence to support the placental transfer of PCBs in mammals (Eisler 2000), and PCBs can also accumulate in the lipid portion of milk, resulting in exposure of suckling young.

Fertility, litter size, and offspring survival appear to be among the most sensitive in vivo endpoints of PCB toxicity in mammals (Golub et al. 1991; Rice and O'Keefe 1995; Hoffman et al. 1996). Reproductive success can be affected directly by toxic action on the differentiated reproductive tract, or indirectly by toxic action on systems that regulate reproduction (e.g., endocrine and central nervous systems). In laboratory studies, PCBs have been reported to elicit a broad range of direct and indirect effects associated with reproductive functions. Direct effects on the gonads and the female reproductive tract have been reported (Fuller and Hobson 1986). The precise mechanism by which PCBs cause reproductive effects in mammals remains unclear, but reproductive success appears to be a sensitive integrated endpoint of in vivo toxicity.

The most comprehensive studies of PCB toxicity in a non-domesticated mammal have been conducted with mink. Mink also appear to be one of the most sensitive mammalian species tested (Fuller and Hobson 1986), and therefore, are often used as a surrogate for the assessment of risk to other mammals. In studies that evaluated the toxicity to mink of dietary exposure to PCBs, adverse effects on maternal growth, kit growth, kit survival, whelping success, and reproductive success were reported for captive-bred mink (Aulerich and Ringer 1977; Jensen et al. 1977; Ringer 1983; Aulerich et al. 1985; Wren et al. 1987; Brunström et al. 2001; Chapman 2003).

3.4.2 TRVs

Table D-9 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-9 Mammal PCB TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.08	0.096	Chapman 2003 (mink; reproduction)	1	a
		0.069	0.082		2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were derived for the LPRSA BERA (Windward 2019) in which 14 toxicity studies were available and reviewed for the derivation of total PCB TRV for mammals and included 12 studies with mink and two studies conducted with mice (*Mus musculus*). There were not enough species to derive an SSD (Windward 2019). Mink are known to be sensitive to PCBs. Five of the 14 studies reviewed used dietary exposures to field-collected fish that could have other contaminants besides PCBs in their tissues and thus could interfere with the derivation of a TRV specific to PCBs. Chapman (2003) evaluated mink PCB toxicity data to derive TRVs for USEPA Region 5 based on interpolation of laboratory toxicity data

from Aulerich and Ringer (1977), Wren et al. (1987), and Kakela (2002)—none of which used field-collected fish.

The interpolated dietary concentration, resulting in a 25% decrease in endpoint response (1.1 µg/kg ww), was determined to be the low-effect level for Aroclor 1254, and the interpolated dietary concentration associated with a 10% decrease in endpoint response (1.0 mg/kg ww) was determined to be the no-effect level (Chapman 2003). A factor of 0.52 was applied to the LOAEL and NOAEL to account for the lower effect levels observed in several studies that were conducted over 2 years or into the second generation (Brunström et al. 2001, Restum et al.1998), resulting in adjusted interpolated dietary concentrations of 0.6 and 0.5 mg/kg ww, respectively. These concentrations in food were converted to dietary LOAEL and NOAEL doses of 0.096 and 0.080 mg/kg bw/day, respectively, assuming a female food ingestion rate (FIR) of 0.16 mg/kg bw/day from Bleavins and Aulerich (1981).

The LPR FFS (USEPA 2014) LOAEL and NOAEL of 0.082 and 0.069 mg/kg bw/day, respectively, were also selected for total PCBs based on the same interpolated effect levels reported by Chapman (2003) but are slightly different because of the different FIR (0.137 kilogram per day [kg/day]) used to convert these food doses to dietary doses.

Because both of these sets of TRVs were derived from the same study, mammal risk endpoint thresholds from an alternate study (Bursian et al. 2013) were compared; although, these were not used quantitatively as a third set of TRVs in this assessment to remain consistent with the LPRSA mammal risk assessment. As requested by the USEPA, the study evaluated as part of this uncertainty analyses was the mink PCB-feeding study (Bursian et al. 2013), which was included in the risk assessment for the Hudson River (USEPA 2019). In this study, a dietary concentration of 0.34 part per million (ppm) PCBs in food fed to adult mink resulted in 20% mortality (LC20) of 6-week old kits born to those mink. The dietary LC20 (0.34 ppm PCBs) is that concentration in the diet which will result in 20% kit mortality (LC20) at six weeks of age. The LOAEL TRV derived from this study is 0.033 mg/kg-BW/day, approximately three times lower than the TRVs used for the NBSA. From this LOAEL, a factor of three was applied to estimate a NOAEL of 0.11, which is approximately seven times lower than the NOAEL used for the NBSA. A key uncertainty with the use of this assessment for the NBSA is that the fish fed to the mink were from the Hudson River, which means that the fish contain other contaminants and concentrations of these that are specific to the Hudson River and this inherently makes them not appropriate for use for the NBSA. Instead, this assessment could be added to the SSD, which was the basis of the NBSA TRVs because studies that used wild caught fish as food were included. The effect of adding this study would be to lower the 5th percentile of the SSD that was used as the LOAEL, but this LOAEL would not be as low as the Bursian et al. (2013) LOAEL itself.

4 ORGANOCHLORINE PESTICIDES – TOTAL DDX

Dichlorodiphenyltrichloroethane (DDT) is an anthropogenic organochlorine pesticide. Total DDx refers to the sum of all six DDT isomers that are the result of metabolism or degradation of DDT (i.e., 2, 4′-dichlorodiphenyldichloroethane [DDD], 4,4′-DDD, 2,4′-dichlorodiphenyldichloroethylene [DDE], 4,4′-DDE, 2,4′-DDT, and 4,4′-DDT).

The commercial use of DDT began in 1939. It was primarily applied to agricultural crops but was also used in forests and residential properties. The United States banned the use of DDT in 1972, but it is still used in other parts of the world to control disease-bearing vectors, such as mosquitoes (ATSDR 2002b). Prior to 1975, DDT was a widely used pesticide in the United States and primarily entered the environment through its application to agricultural lands. Upon entering the environment, DDT can partition into air, soil/sediment, and water. DDT and its related compounds can be subject to global distillation in air by atmospheric transport from warmer to colder climates. As a result, DDT and its associated derivatives are commonly found in areas far away from the original application.

Following introduction via the gills or through ingestion of prey items, organochlorines including DDT travel through the blood and are then distributed to soft organs and ultimately lipids (USEPA 1999). DDT and its related compounds are persistent and bioaccumulative. Its deposition and subsequent association with soil particles can leave a persistent footprint, but it can also be metabolized by microorganisms within the soil. In aquatic systems, DDT is most often associated with suspended particles and sediment, from where it can enter the aquatic food web and bioaccumulate and biomagnify at higher trophic levels (ATSDR 2002b; Eisler 2000). While toxic to invertebrates and vertebrates alike, the most severe effects of DDx are on higher-order predators such as piscivorous birds and mammals, where eggshell thinning and reproductive failure can occur (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

4.1 Benthic Invertebrates

4.1.1 Toxicity Profile

DDT and its metabolite, DDE, are highly persistent and lipophilic compounds that are subject to pronounced biomagnification. DDE is very persistent in aquatic systems, absorbing strongly to sediments and bioconcentrating in aquatic organisms. DDE tends to bioconcentrate in lower-trophic levels and will accumulate in food webs. DDE will bioconcentrate in freshwater and marine plankton, insects, mollusks, and other invertebrates (Eisler 2000; Oliver and Niimi 1985).

Several studies have examined the adverse effects of DDT on various aquatic invertebrates. These studies observed adverse effects on reproduction, survival, and growth. Increased mortality as a result of DDT exposure was observed in studies of pink shrimp (Nimmo et al. 1970), the amphipod (*Hyallela azteca*) (Landrum et al. 2005), and the water flea (*Daphnia magna*) (Crosby and Tucker 1971). Reduced offspring production was observed in a study of the amphipod (*Leptocheirus plumulosus*) exposed to DDT (Lotufo et al. 2001). Decreased growth was observed in studies of the polychaete worm (*Armandia brevis*) exposed to DDT (Rice et al. 2000).

4.1.2 TRVs

Table D-10 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-10 Benthic Invertebrate Total DDx[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.011	0.11	Windward 2019 (6 species SSD)	1	a, b
Benthic invertebrate whole-body tissue; Alternative TRV	mg/kg ww	0.001	0.01	Windward 2019 (6 species SSD)	1	a, b
Benthic invertebrate whole-body tissue	mg/kg ww	0.06	0.13	Nimmo et al. 1970 (pink shrimp mortality)	2	c

Notes:
[1] = DDx refers to all isomers of DDT (2,2',4, and 4') and well as the isomers of metabolites of DDT (DDE and DDD).
KU = Key Uncertainty
a = NOAEL estimated from a LOAEL with an extrapolation factor of 10
b = TRV based on an SSD
c = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The LPRSA BERA (Windward 2019) developed an SSD based on eight studies examining mortality, growth, and reproductive endpoints. Eleven LOAELs ranging from 0.13 to 266 mg/kg ww were identified for six species. The 5th percentile of the SSD based on a gamma distribution was selected as the LOAEL TRV (0.11 mg/kg ww). The NOAEL TRV (0.011 µg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

The LPRSA BERA also derived an alternative TRV for benthic invertebrate tissue using the same dataset. A 5th percentile of the SSD based on a beta general distribution was selected as a conservative LOAEL (0.01 mg/kg ww) TRV. The NOAEL was estimated using an uncertainty factor of 10.

The LPR FFS (USEPA 2014) developed both the LOAEL and NOAEL TRVs of 0.13 and 0.06 mg/kg ww from a study of pink shrimp exposed to aqueous DDx compounds for 56 days (Nimmo et al. 1970). The LOAEL was based on the body burdens of pink shrimp that had died at day 28 of the experiment, and the NOAEL concentration represents where no mortality occurred. An uncertainty of the study noted by the authors was that "stress related to laboratory confinement was probably responsible for a portion of the

mortalities;" however, the degree to which this impacted the TRV cannot be quantified (Nimmo et al. 1970).

4.2 Fish

4.2.1 Toxicity Profile

Several studies have been conducted to examine the adverse toxicological effects on various fish species (sailfin molly [*Poecilia latipinna*], fathead minnow, goldfish, and several salmonid species) as a result of exposure to DDTs (Allison et al. 1964; Benton et al. 1994; Macek 1968a; Jarvinen et al. 1977; Rhead and Perkins 1984; Buhler et al. 1969). These studies observed adverse effects on reproduction, survival, and growth. Increased mortality as a result of DDT exposure was observed in studies of coho and Chinook salmon, goldfish, and fathead minnow (Allison et al. 1964; Allison et al. 1963; Buhler et al. 1969; Jarvinen et al. 1976). Decreased growth was observed in studies of sailfin molly exposed to DDT (Benton et al. 1994). Embryo mortality of yearling brook trout chronically exposed to DDT was observed by Macek (1968b).

4.2.2 TRVs

Table D-11 summarizes the fish TRVs used in the assessment, and the section below describes how they were derived.

Table D-11 Fish Total DDx[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	0.052	0.52	Windward 2019 (7 species SSD)	1	a, b
		0.078	0.39	Beckvar et al. 2005 (9 species SSD)	2	a

Notes:
[1] = DDx refers to all isomers of DDT (2,2',4, and 4') and well as the isomers of metabolites of DDT (DDE and DDD).
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The NOAEL and LOAEL TRVs of 0.52 and 0.052 mg/kg ww, respectively, for total DDx derived in the LPRSA BERA (Windward 2019) were based on an SSD developed from six studies and seven fish species where the LOAELs for the adverse effects on reproduction or survival ranged from 1.1 to 200 mg/kg ww. The selected LOAEL represents the 5th percentile of the SSD. The NOAEL TRV (0.052 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

The LPR FFS (USEPA 2014) also developed a LOAEL TRV (0.39 mg/kg ww) based on the 5th percentile of an SSD (Beckvar et al. 2005) and the 10 LOAELs for 9 species of fish used in the SSD came from USACE's ERED database. LOAELs ranged from 0.29 to 112.7 mg/kg ww for survival, growth, reproduction, and behavior endpoints. The lowest LOAEL was from Berlin et al. (1981), where lake trout (*Salvelinus namaycush*) survival was adversely affected; however, the test fish came from eggs field-collected from Lake Michigan which also had high concentrations of PCBs, total DDx, and mercury. The next two higher LOAELs: 0.55 mg/kg ww from Butler (1969) and 1.65 mg/kg ww from Davy et al. (1972) also had conditions that make the results unreliable. In Butler (1969), pinfish (*Lagodon rhomboides*) survival was not tissue concentration dependent. The endpoint from Davy et al. (1972) was altered locomotor activity in goldfish and was not correlated to the more relevant endpoints of survival, growth, or reproduction.

4.3 Birds

4.3.1 Toxicity Profile

Historically, the use of DDT resulted in population declines of wild raptors, including bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), and osprey (*Pandion haliaetus*), which highlighted the adverse effects that DDT-related compounds have on bird reproduction. Laboratory studies conducted on barn owl (*Tyto alba*), American kestrel, mallard duck, black duck (*Anas rubripes*), Japanese quail, bobwhite quail (*Colinus virginianus*), and ringed turtle-doves verified field observations of adverse effects, including decreased eggshell thickness and duckling weight, increased mortality, reduced offspring survival, and reduced fertility and hatchability (Eisler 2000; Mendenhall et al. 1983; Peakall et al. 1973; Heath et al. 1969; Longcore et al. 1971; Longcore and Samson 1973; Kolaja 1977; Davison and Sell 1974; Shellenberger 1978).

One hypothesized mechanism of action to explain these effects is that a DDT derivative inhibits the prostaglandin synthesis in the shell glad mucosa, reducing the ability of the glad to deposit calcium carbonate onto the developing eggshell that, in turn, causes a reduction in eggshell thickness and a decline in reproductive success (ATSDR 2002b). Lundholm (1987) described the mode of action of DDE on calcium regulation in birds, which contributes to eggshell thickness. Maternal transfer of DDT to pheasant and ringed turtle-dove chicks is also associated with reduced post-hatch survival as a result of direct toxicity (Haegele and Hudson 1973; Genelly and Rudd 1956).

4.3.2 TRVs

Table D-12 summarizes the bird TRVs used in the assessment, and the sections below describe how they were derived.

Table D-12 Bird Total DDx[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.025	0.25	Windward 2019 (10 species SSD)	1	a, b
		0.009	0.027	Anderson et al. 1975 (brown pelican [*Pelecanus occidentalis*]; reproduction)	2	c, d
Bird egg	mg/kg ww	0.41	4.1	Windward 2019 (seven species SSD)	1	a, b
		0.5	3.0	Blus 1984 (brown pelican; reproduction)	2	c

Notes:
[1] = DDx refers to all isomers of DDT (2,2',4, and 4') and well as the isomers of metabolites of DDT (DDE and DDD).
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
c = TRV based on a single study
d = NOAEL estimated from a LOAEL with an extrapolation factor of 3

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

4.3.2.1 Bird Diet

The NOAEL and LOAEL TRVs of 0.25 and 0.025 mg/kg bw/day, respectively, for total DDx derived in the LPRSA BERA (Windward 2019) were based on an SSD developed from 20 studies on the effects of DDx in bird diets were available and reviewed for the development of a bird dietary TRV for DDx. The LOAELs for 10 species based on eggshell thickness, adult survival, offspring survival, or hatchability, ranged from 0.15 to 71.1 mg/kg bw/day. The LOAEL TRV of 0.25 mg/kg bw/day represents the 5th percentile of the SSD. No NOAEL below the selected LOAEL TRV could be identified, so the NOAEL (0.025 mg/kg bw/day) was derived from the LOAEL TRV by a factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

The LPR FFS (USEPA 2014) developed LOAEL and NOAEL TRVs of 0.027 and 0.0009 mg /kg bw/day, respectively, for total DDx based on brown pelican reproduction data from Anderson et al. (1975). The LOAEL TRV of 0.027 mg/kg bw/day was based on observations about productivity and eggshell thinning compared to standards known to support a stable population (Anderson et al. 1975). An extrapolation factor of three was used to derive the NOAEL TRV from the LOAEL. Uncertainties of this study are: 1) the significance of changes in eggshell thinning and productivity was not analyzed; 2) a critical threshold level was derived by association to the concentration at which productivity had improved but not recovered relative to historical levels; and 3) the impacts may have resulted from exposure to multiple chemicals in the fish diet, although DDE was the only contaminant directly linked to eggshell thinning in birds (Anderson et al. 1975).

4.3.2.2 Bird Eggs

Windward (2019) developed an SSD from eight acceptable toxicity studies on bird egg tissue, DDx effect levels with LOAELs for eggshell thickness, embryo and offspring survival, and hatchability reported for seven bird species. The LOAELs from these studies ranged from 12 to 658 mg/kg ww and the selected LOAEL TRV (4.1 mg/kg ww) represents the 5th percentile of the SSD and was lower than the lowest LOAEL of 12 mg/kg ww for nestling mortality in barn owls (Mendenhall et al. 1983). The NOAEL TRV (0.41 mg /kg ww) was estimated from the LOAEL using an extrapolation factor of 10.

LOAEL and NOAEL TRVs of 3.0 and 0.5 mg/kg ww, respectively, developed in the LPR FFS (USEPA 2014) were selected for total DDx based on the study by Blus (1984). The LOAEL TRV, 3.0 mg/kg ww, represents the concentration at which there was 50% nesting success in the brown pelican. The NOAEL TRV (0.5 mg/kg ww) was derived from the same study and was estimated as the median concentration between non-detected concentrations to 1.0 mg/kg where within this range nesting success was 30%. The fact that these TRVs were based on a field study introduces the uncertainties that other stresses (e.g., chemical or non-chemical) could potentially have also influenced reproductive success.

4.4 Mammals

4.4.1 Toxicity Profile

Adverse effects from total DDx exposure of mammals in toxicological studies have been observed in mice, rats, and hamsters (Cricetinae) (Eisler 2000). Observed adverse effects in rats included reduced litter sizes, offspring weights, survival of young, viable litter size, adult survival, and body weight (Duby et al. 1971; Ottoboni 1972; Fitzhugh 1948; Jonsson et al. 1976; Banerjee et al. 1996). Similarly, studies examining adverse effects on mice from exposure to DDT and related compounds noted reduced litter sizes, adult survival, male growth, lifespan, and survival of young (Cannon and Holcomb 1968; Tomatis et al. 1974; Turusov et al. 1973; Shabad et al. 1973; Ware and Good 1967). In addition, reductions in survival and body weight were observed in hamsters after exposure to DDT, and adverse reproductive effects were observed in dogs (*Canis lupus familiaris*) after exposure to DDT (Rossi et al. 1983; Ottoboni et al. 1977).

4.4.2 TRVs

Table D-13 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-13 Mammal Total DDx[1] TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.13	1.3	Ware and Good 1967 (mouse reproduction)	1,3	a, b
		0.8	4.0	Fitzhugh 1948 (rat reproduction)	2	a

Notes:
[1] = DDx refers to all isomers of DDT (2,2',4, and 4') and well as the isomers of metabolites of DDT (DDE and DDD).
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Sources:
1 = TRV derived for the NBSA BERA
2 = LPR FFS (USEPA 2014)
3 = LPRSA BERA (Windward 2019); Appendix A3-1

Dietary TRVs for DDT were not assessed in the LPRSA BERA (Windward 2019), but were available from Appendix A3-1 the LPR FFS (USEPA 2014). The NBSA LOAEL TRV of 1.3 mg/kg bw/day was based on a study of the effects of DDT on mouse reproduction (Ware and Good 1967) where the specific endpoint of reduced litter size in mice fed a DDT mixture during a critical life stage (gestation) over 120 days. A chronic NOAEL was extrapolated from the chronic LOAEL using an extrapolation factor of 10.

The LPR FFS (USEPA 2014) TRVs were developed from a long-term reproduction study that evaluated multi-generational toxicity and sensitive endpoints in Sprague-Dawley rats (*Rattus norvegicus domesticus*) (Fitzhugh 1948). The selected LOAEL and NOAEL TRVs are 0.8 and 4.0 mg/kg bw/day, respectively, and are based on reproductive success.

There is not another line of evidence to evaluate the magnitude of difference in the TRVs developed by the NBSA BERA and the LPR FFS (USEPA 2014).

5 ORGANOCHLORINE PESTICIDES – DIELDRIN

Dieldrin is a white, powdery substance that was applied to agricultural soils and around residential and commercial buildings as an insecticide beginning in the 1950s. Its application to agricultural crops, such as corn and cotton, was halted in 1970, but the use of dieldrin to kill termites continued from 1972 to 1987. Dieldrin is no longer manufactured or used as an insecticide in an agricultural or commercial setting (ATSDR 2002a). Aldin (an insecticide similar to dieldrin) generally degrades into dieldrin both in the body and in the environment, thus dieldrin can also be found in areas where aldrin was used (ATSDR 2002a).

Dieldrin is nonpolar and lipophilic, so upon entering the environment, it sorbs to soil particles where it remains immobile and will not leach into groundwater. In aquatic environments, dieldrin sorbs to sediment and soil particulates, from where it can be transported in surface waters. It does not readily degrade in water or soil. Dieldrin can be taken up by plant tissues and is known to bioaccumulate in aquatic food webs, where it is stored in lipid tissues (ATSDR 2002a; Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

5.1 Benthic Invertebrates

5.1.1 Toxicity Profile

Dieldrin, like DDT, is on an organochlorine pesticide with a high molecular weight and has been shown to be eliminated from invertebrates slower than other compounds (e.g., endosulfan), as demonstrated in the polychaete (*Nereis virens*) (Haya and Burridge 1988) and clam (*Macoma nasuta*) (Boese et al. 1997). The potential for accumulation of dieldrin and transfer up the food chain is a principle attribute of concern. Beckvar and Lotufo (2011) found lethal critical body residues in the range of 0.08 to 2.1 mg/kg ww based on four species of invertebrates species, including pink shrimp, grass shrimp, midge (*Chironomus riparius*), and ostracod (*Chlamydotheca arcuate*), with pink shrimp being the most sensitive. Adverse effects on growth rates were observed in eastern oyster exposed to dieldrin (Parrish et al. 1973; Parrish et al. 1974) and reduced fecundity was observed in quahog clams (*Mercenaria mercenaria*) and mud snails (*Nassa obsoleta*) exposed to dieldrin (Eisler 1970).

5.1.2 TRVs

Table D-14 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-14 Benthic Invertebrate Dieldrin TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.008	0.08	Parrish et al. 1973 (pink shrimp survival)	1	a,b
		0.0016	0.008		2	b

Notes:
KU = Key Uncertainty
a = NOAEL estimated from a LOAEL with an extrapolation factor of 10
b = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The LPRSA BERA derived TRVs from a study of pink shrimp mortality by Parrish et al. (1973). In this study, the concentration of 0.08 mg/kg ww was associated with 25% mortality after 96 hours of exposure to dieldrin in water. Whole-body tissues of pink shrimp with 0% mortality were below detection limits (< 0.01 mg/kg ww); therefore, a NOAEL of 0.008 mg/kg ww was derived from the LOAEL using an extrapolation factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

The LPR FFS (USEPA 2014) used the same study, Parrish et al. (1973), as the basis of TRVs, but applied an ACR of 10 to the LOAEL because it was an acute exposure and was extrapolated to a chronic effect. Thus, a LOAEL TRV of 0.008 mg/kg ww was developed. The NOAEL TRV of 0.0016 mg/kg ww was based on the tissue residues reported in the control group (0.016 mg/kg ww) divided by an ACR of 10.

5.2 Fish

5.2.1 Toxicity Profile

Adverse effects, including decreased growth and survival, have been reported in toxicological studies for multiple species of fish (Eisler 2000). Gakstatter and Weiss (1967) observed that bluegill (*Lepomis macrochirus*) exposed to dieldrin experienced equilibrium loss and convulsions and reported that goldfish exposed to dieldrin experienced hyper-excitability. Although these effects are not a direct measure of survival, they could impair the organism's ability to avoid predation. Studies examining adverse effects from exposure to dieldrin in largemouth bass (*Micropterus salmoides*) and rainbow trout observed reductions in body weight, length, and survival (Muller et al. 2004; Poels et al. 1980).

5.2.2 TRVs

Table D-15 summarizes the fish TRVs used in the assessment, and the section below describes how they were derived.

Table D-15 Fish Dieldrin TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	0.12	0.2	Shubat and Curtis 1986 (rainbow trout survival)	1	a
		0.008	0.04		2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

Two studies with two species examining effect following dieldrin exposure were available and evaluated to develop the fish tissue TRV for dieldrin. The LOAEL TRV is the lower of the two LOAELs and was obtained from the study by Shubat and Curtis (1986). This study reported reduced growth of rainbow trout following exposure to aqueous dieldrin for 16 weeks with an associated average tissue burden of 0.2 µg/kg ww. The NOAEL TRV comes from the same study, where no adverse effects on growth were observed in fish at the next lower aqueous exposure level associated with a tissue burden of 0.12 µg/kg ww.

The LPR FFS (USEPA 2014) TRVs were also developed from the same study (Shubat and Curtis 1986), but the TRVs derived by the LPR FFS were different for two reasons: 1) they assumed the reported concentrations were expressed on a dry weight basis, and 2) they applied an uncertainty factor of two in the estimation of the NOAEL to estimate chronic effect levels from the subchronic study.

5.3 Birds

5.3.1 Toxicity Profile

Adverse effects, including decreased growth, reproduction, and survival, were reported in toxicological studies for six bird species (Japanese quail, bobwhite quail, ring-necked pheasant, chicken, mallard duck, and American robin [*Turdus migratorius*]) exposed to dieldrin. Observed effects include reductions in egg production, hatchability, eggshell thickness, clutch size fertility, body weight, offspring survival, and adult survival (Eisler 2000; DeWitt 1956).

5.3.2 TRVs

Table D-16 summarizes the bird TRVs used in the assessment, and the sections below describe how they were derived.

Table D-16 Bird Dieldrin TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.08	0.12	De Witt 1956 (quail reproduction and mortality)	1,3	a
		0.054	0.18	Wiese et al. 1968 (helmeted guinea fowl [*Numida meleagris*] survival)	2	a
Bird egg	mg/kg ww	0.3	3	Genelly and Rudd 1956 (pheasant reproduction)	1	a, b
		0.2	8.1	Mendenhall et al. 1983 (barn owl reproduction)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Sources:
1 = TRV derived for the NBSA BERA
2 = LPR FFS (USEPA 2014)
3 = LPRSA BERA (Windward 2019) Appendix A3-1

5.3.2.1 Bird Diet

The LPRSA BERA (Windward 2019) did not evaluate bird dietary TRVs, but they were available from the LPRSA BERA Appendix A3-1. The LOAEL and NOAEL TRVs of 0.12 and 0.08 mg/kg bw/day, respectively, come from a study by DeWitt (1956). In this study, Japanese quail were exposed to dieldrin in the diet for 5 months and a 17% mortality was observed at the LOAEL TRV concentration (0.12 mg.kg bw/day). The LPR FFS-derived LOAEL and NOAEL TRV values selected are the lowest relevant bounded study results presented in the USEPA Ecological Soil Screening Level (Eco SSL) document for avifauna (USEPA 2005c). In this study, Wiese et al. (1968) exposed helmeted guinea fowl to seven levels of dieldrin in the diet of female birds for 21 months and identified significant survival effects at the LOAEL concentration of 0.18 mg/kg bw/day.

5.3.2.2 Bird Eggs

The selected TRVs were derived in the LPRSA BERA (Windward 2019) where of the three studies evaluated, the LOAEL TRV of 3 mg/kg ww for dieldrin was selected based on ring-neck pheasant reproduction (Genelly and Rudd 1956). None of the three acceptable studies reported a NOAEL. The NOAEL TRV was derived from the LOAEL TRV using an extrapolation factor of 10. An uncertainty associated with the TRVs is that another study on pheasant reproduction reported a LOAEL an order of magnitude higher (33.6 mg/kg ww).

LPR FFS (USEPA 2014) LOAEL and NOAEL TRVs of 8.1 and 0.2 mg/kg ww, respectively, were also selected for dieldrin based on values reported by Mendenhall et al. (1983) for barn owl reproductive

success. Eggs with concentrations of 8.1 mg/kg ww were reported to have eggshell thickness reduced by 5.5%; however, there was no reduction in breeding success. Thus, the potential for adverse effects on wildlife populations is uncertain. The NOAEL TRV comes from the NOAEL of 0.2 mg/kg ww from the same study and represents the control concentration.

5.4 Mammals

5.4.1 Toxicity Profile

Studies examining exposure to dieldrin in mammals (mouse and rat) via dietary uptake found adverse effects on reproduction, survival, growth, and behavior (Eisler 2000). Dietary exposures to dieldrin in these studies ranged from 120 days to 3 generations. Effects reported in these studies included a decrease number of conceptions, litter size, body weight, pup survival, tendency, and anti-predator response, and an increased onset of nursing (Bildstein and Forsyth 1979; Harr et al. 1970; Treon and Cleveland 1955; Good and Ware 1969; Virgo and Bellward 1977; Fitzhugh et al. 1964).

5.4.2 TRVs

Table D-17 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-17 Mammal Dieldrin TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.015	0.03	Harr et al. 1970 (rat reproduction)	1, 2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

Eight toxicity studies were available from the literature in which mammals were exposed to dietary dieldrin, but Windward (2019) determined that they were not sufficient to derive an SSD. The LOAEL TRV of 0.03 mg/kg bw/day represents the lowest LOAEL and resulted in adverse reproductive effects in rats (Harr et al. 1970). The NOAEL from this study of 0.015 mg/kg bw/day was also used as the basis for the NOAEL TRV. These are the same TRVs that were used in the LPR FFS (USEPA 2014). This study was also cited in USEPA's Eco SSL document for dieldrin (USEPA 2005c), making the credibility of these data more reliable.

6 ORGANOCHLORINE PESTICIDES – TOTAL CHLORDANE

Chlordane is a chemical belonging to the class of chlorinated pesticides. It was used as a pesticide in the United States from 1948 to 1988 when it was administered to crops, lawns, and gardens primarily as a termite control (ATSDR 1994a). Although it is no longer used in the United States, it is still produced and exported for use in other countries. Technical chlordane was a mixture of several pesticides, including alpha-chlordane, gamma-chlordane, heptachlor epoxide, oxychlordane, heptachlor endo-epoxide, trans-nonachlor, and cis-nonachlor. Total chlordane includes cis- and trans-isomers of chlordane that, once ingested, can be metabolized and form metabolic products, such as heptachlor and heptachlor epoxide, which can be more toxic than the parent compound. The dominant form of chlordane in tissues is trans-nonachlor and cis-chlordane (Eisler 2000). In this BERA, these compounds are summed to establish a total chlordane concentration in sediment and biota tissue samples for evaluation of potential risks. Therefore, the TRVs discussed in this section are applicable to the sum of these compounds.

Chlordane is toxic to freshwater invertebrates and fish. It is also known to bioaccumulate in both marine and freshwater aquatic fish and, subsequently, to be biomagnified up the food web to higher trophic-level consumers (ATSDR 1994a). Reported effects in aquatic organisms include a reduction in survival, immobilization, impaired reproduction, and histopathology (Eisler 2000). Chlordane is reportedly carcinogenic to wildlife, and also can cause adverse effects on the central nervous system and liver (Eisler 2000; ATSDR 1994a). It is also a mutagen in mammalian cell systems and has been shown to cause reproductive effects in animals (ATSDR 1994a). More specific ecotoxicity information is provided below by receptor group.

6.1 Benthic Invertebrates

6.1.1 Toxicity Profile

There is less toxicity data for chlordane than dieldrin, which is similar in structure, also a cyclodiene, but has demonstrated to be lower in molecular weight, residence time, and toxicity. Chlordane toxicity has been evaluated in brown shrimp, grass shrimp, eastern oyster, blue crab, water fleas, amphipods, and polychaetes. Reported effects include decreased shell growth (Mayer 1987; Parrish et al. 1976), overt signs of stress (McLeese et al.1982), increased mortality (Parrish et al. 1976), and immobilization (Mayer 1987; Cardwell et al. 1977; Passino and Smith 1987). Beckvar and Lotufo (2011) indicated that lethal critical body residues in pink and grass shrimp range from 1.7 to 9.1 mg/kg ww, respectively.

6.1.2 TRVs

Table D-18 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-18 Benthic Invertebrate Total Chlordane TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.71	1.7	Parrish et al. 1976 (pink shrimp mortality)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = TRV derived for the NBSA BERA

Total chlordane was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014). TRVs for total chlordane were available in the LPRSA BERA Appendix A3-1. Of the three studies that met acceptability criteria, the study by Parrish et al. (1976) had the lowest LOAEL (1.7 mg/kg ww) and NOAEL (0.71 mg/kg) and were accepted as TRVs. The LOAEL represents 55% mortality of marine pink shrimp (*Penaeus duorarum*) after 96 hours of water exposures and the NOAEL represents 10% mortality. Pink shrimp were the most sensitive invertebrate of those studied by Parrish et al. (1976) where the other species tested were eastern oysters (*Crassostrea virginica*) and grass shrimp (*Palaemonetes pugio*).

6.2 Fish

6.2.1 Toxicity Profile

Chlordane toxicity to fish varies and is dependent on the exposure to and uptake of the component compounds being evaluated in different studies. Adverse effects of chlordane exposure in fish species, including sheepshead minnow, freshwater catfish (*Heteropneustes fossilis*), and goldfish, include reduced hatching rate (Parrish et al. 1978), increased mortality (Parrish et al. 1978; Moore et al. 1977), loss of equilibrium (Parrish et al. 1976), loss in fry (Parrish et al. 1976), and muscle glycogenolysis and hyperglycemia (Mishra and Srivastava 1984). Chlordane lethal critical body residues in fish were reported by Beckvar and Lotufo (2011) for two species: 0.71 mg/kg for mortality in whole-body spot and 11.1 mg/kg for mortality in whole-body sheepshead minnow.

6.2.2 TRVs

Table D-19 summarizes the fish TRVs used in the assessment, and the section below describe how they were derived.

Table D-19 Fish Chlordane TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	1.66	16.6	Parrish et al. 1976 (pinfish mortality)	1,2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Total chlordane was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs for total chlordane were available in the LPRSA BERA Appendix A3-1. This LOAEL TRV of 16.6 mg/kg bw/day is based on a study of juvenile pinfish mortality after a 96-hr exposure to aqueous chlordane by Parrish et al. (1976). The LOAEL represents a 30% mortality. A NOAEL was derived using a factor of 10 applied to the LOAEL. There are several uncertainties with the use of this LOAEL TRV: 1) the study was short-term, and 2) the mortality endpoint is typically not as sensitive as sublethal endpoints. Windward

6.3 Birds

6.3.1 Toxicity Profile

Based on the affinity of chlordane to accumulate in lipids, bird tissues with high lipid content have been shown to accumulate the highest levels of chlordane. In general, older birds and raptors also tend to accumulate higher levels, but chlordane isomers occur frequently in birds collected nationwide (Eisler 2000). Regarding the persistence in bird tissues of various chlordane compounds, Elliott et al. (1988) found oxychlordane to be the most persistent (half-life of 35.4 years), followed by cis-nonachlor (half-life of 19.4 years), and cis-chlordane (half-life of 11.2 years) in northern gannets (*Sula bassana*). Oxychlordane is a metabolite of chlordane that in birds is more toxic and persistent than chlordane (Kawano et al. 1988).

Observed effects of chlordane toxicity in birds included sluggishness, drooped eyelids, fluffed feathers, low crouching on perch, reduced food intake, quivering and panting rapidly, and convulsing (Stickel et al. 1983). Adverse effects could be observed within 5 minutes of exposure, and death usually occurred within 8 days (Eisler 2000). Adverse effects in birds, including blue-winged teals (*Anas discors*), northern shovelers (*Anas clypeata*), American coots (*Fulica americana*), red-winged blackbirds (*Agelaius phoeniceus*), mallard ducks, Japanese quails, ring-necked pheasants, and bobwhite quails include increased mortality (Hill et al. 1975; Heath et al. 1972), reduced growth rates (Ludke 1976), reduced reproduction (National Research Council of Canada [NRCC] 1975) and reduced food consumption (Hill and Camardese 1986). Lundholm (1988) demonstrated with two species of ducks (*Anas* spp.) and the domestic chicken that various organochlorine compounds, including chlordane, interfered (in a dose-dependent manner) with reproduction by reducing the binding of progesterone to its cytoplasmic receptor in the shell gland mucosa of birds, especially ducks. Sensitive species noted by Eisler (2000) included: California quail (*Callipepla californica*), ring-necked pheasant, and European starlings (*Sturnus vulgaris*).

6.3.2 TRVs

Table D-20 summarizes the bird TRV used in the assessment, and the section below describes how it was derived.

Table D-20 Bird Chlordane TRVs

Tissue	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	2	20	Hill et al. 1975 and Heath et al. 1972 (bobwhite mortality)	1,2	a, b

Notes:
KU = Key Uncertainty
a = TRV based on two studies
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Total chlordane was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs for total chlordane were available in the LPRSA BERA Appendix A3-1. The LOAEL TRV of 20 mg/kg bw/day is based on toxicity studies by Hill et al. (1975) and Heath et al. (1972) for mortality in bobwhite quail after 5 days of exposure. The main uncertainties with the use of this LOAEL TRV are that the study was short-term and that the mortality endpoint is typically not as sensitive as sublethal endpoints.

Bird egg residues for total chlordane from which TRVs could be developed were not found during a literature search. Therefore, because it is unknown, chlordane bird egg tissue residues did not have risk quantified.

6.4 Mammals

6.4.1 Toxicity Profile

Evidence of total chlordane biomagnification has been shown in aquatic mammals and, particularly, marine mammals (Eisler 2000). Chlordane concentrations in marine mammals were positively related to lipid content but not to the animal age (Perttila et al. 1986). Many signs and symptoms can accompany acute toxicity of chlordane in mammals, some of which include, in addition to death: irritability, salivation, labored respiration, muscle tremors, incoordination, convulsions, pulmonary congestion, degenerative changes in the central nervous system, and avoidance of food and water (Eisler 2000). Exposure to chlordane induced liver cancer in domestic mice (WHO 1984; Tojo et al. 1986) and thyroid neoplasms and malignant fibrous histocytomas in rats (Ohno et al. 1986). Chlordane exposure through diet adversely affected growth, survival, and fertility of mice, rats, and rabbits (*Oryctolagus cuniculus*) (Talamantes and Jang 1977; International Agency for Research on Cancer 1979; Klaassen et al. 1986; USEPA 1988; Khasawinah and Grutsch 1989; Ambrose et al. 1953; Cassidy et al. 1994).

6.4.2 TRVs

Table D-21 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-21 Mammal Chlordane TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	2.1	21	Narotsky and Kavlock 1995 (rat reproduction and growth)	1	a, b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = TRV derived for the NBSA BERA

The LPRSA BERA (Windward 2019) and the LPR FFS (USEPA 2014) did not develop TRVs for chlordane; therefore, the TRVs used were developed specific to the NBSA site. The NBSA TRV came from a study by Narotsky and Kavlock (1995), where pregnant rats were fed chlordane by gavage over the period of gestation (6 to 19 days). The LOAEL represents the threshold of developmental effects, specifically, there was a reduction in postnatal survival and a weight gain in pups. A NOAEL was not available from the study and was estimated from the LOAEL using an extrapolation factor of 10. While there are uncertainties with these TRVs because they are based on a single study and there are no comparative TRVs from other risk evaluations in the region--the LPRSA BERA (Windward 2019) and the LPR FFS (USEPA 2014). Positive aspects of the Narotsky and Kavlock (1995) study are that the endpoints of reproduction and growth are likely more sensitive than mortality and required a sufficient exposure time to observe these endpoints.

7 ORGANOCHLORINE PESTICIDES – HEXACHLOROBENZENE

Hexachlorobenzene (HCB) is a chlorinated organic compound that was historically used extensively as a seed dressing to prevent fungal disease on grains, as a fungicide for a variety of crops, and in manufacturing processes. The use and manufacture of HCB ceased in the 1970s in the United States, and other countries due to concerns about its toxicological properties, persistence in the environment, and potential to bioaccumulate (Euro Chlor 2002). HCB continues to be released to the environment from a number of sources, including the use of some chlorinated pesticides; incomplete combustion; old dump sites; and inappropriate manufacture and disposal of wastes from the manufacture of chlorinated solvents, chlorinated aromatics, and chlorinated pesticides (ATSDR 2015).

HCB adsorbs readily to sediment or suspended particulate matter and bioaccumulates in food webs. Organisms generally accumulate HCB from water and from food, although benthic organisms may also accumulate HCB directly from sediment (Oliver 1984; Knezovich and Harrison 1988; Gobas et al. 1989). Significant bioaccumulation of HCB in fish, marine mammals, birds, and other animals has been observed. HCB does not degrade in water or sediment either by abiotic means or through biodegradation processes and undergoes limited metabolism due to its high chemical stability, making it very persistent in the environment (ATSDR 2015).

HCB has a variety of toxicological effects on the liver, ovary, skin, bone, and thyroid and causes, neurological, developmental, endocrine, and immunological toxicity in a variety of animals (ATSDR 2015; WHO 1995). Repeated exposure to HCB has also been shown to affect a wide range of organ systems (including the liver, lungs, kidneys, thyroid, skin, and nervous and immune systems (ATSDR 2015). More specific ecotoxicity information is provided below by receptor group.

7.1 Benthic Invertebrates

7.1.1 Toxicity Profile

Plankton, shellfish, and other invertebrates accumulate HCB from water and particles, and therefore, are important sources of HCB in aquatic food webs (Barber et al. 2005). Available data indicate that concentrations near the solubility limit of HCB (6 µg/L) should not cause acute toxicity (USEPA 1988).

Adverse effects of HCB in invertebrates have been reported for crayfish, water fleas, amphipods, and snails (*Lymnaea palustris*). Reported adverse effects include reduced egg production and increased mortality (Baturo et al. 1995; Baturo and Lagadic 1996), damage to the hepatopancreas (Laseter et al., 1976), reduced fertility (Calamari et al., 1983), and significantly increased mortality (Nebeker et al. 1989). In laboratory sediment toxicity studies, no effects on survival, growth or reproduction of the amphipod *Hyallela azteca* or the worm *Lumbriculus variegatus* were reported after exposure to HCB (Nebeker et al. 1989).

7.1.2 TRVs

Table D-22 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-22 Benthic Invertebrate Hexachlorobenzene TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	10.6	15.8	Nebeker et al. 1989 (amphipod mortality)	1,2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Hexachlorobenzene was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs were available in the LPRSA BERA Appendix A3-1. The selected TRVs came from the study by Nebeker et al. (1989) who examined hexachlorobenzene chronic toxicity to a water flea (*Daphnia*), two types of amphipods (*Hyalella*, *Gammarus*), a worm (*Lumbriculus*), and a minnow (*Pimphales*). These tests showed that hexachlorobenzene was largely non-toxic showing an absence of toxicity to the five test species based on no observed effects on growth or reproduction. The LOAEL concentration of 15.8 mg/kg ww was selected as a TRV and in the freshwater amphipod (*Gammarus lacustris*), which showed a 40% mortality after water exposure to hexachlorobenzene for 28 days. The NOAEL concentration from the same study (10.6 mg/kg ww) resulted in 20% mortality and was selected as a TRV (Nebeker et al. 1989).

7.2 Fish

7.2.1 Toxicity Profile

Fish accumulate chemical substances either directly from the surrounding environment or from their diet, with the largest proportion of HCB intake occurring from the diet. Bioaccumulation is affected by factors such as concentrations in prey, food web complexity, and the traits of individual fish such as growth rate and lipid content (ATSDR 2015). There is a strong relationship observed between HCB concentration and lipid content. Thus, fatty fish species accumulate more than lean fish species. HCB accumulates in fish tissues with high lipid content (Niemi 1986) such as liver tissue (Barber et al. 2005).

No adverse effects of HCB on survival, hematocrit, or plasma cortisol levels were found in Gulf killifish (*Fundulus grandis*) (Laska et al. 1978). Adverse effects on the liver were reported for largemouth bass (Laseter et al. 1976). Carlson and Kosian (1987), Schuytema et al. (1990), and Nebeker et al. (1989) found increased mortality and reduced growth in fathead minnows after exposure to HCB.

7.2.2 TRVs

Table D-23 summarizes the fish TRVs used in the assessment, and the section below describes how they were derived.

Table D-23 Fish Hexachlorobenzene TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	468	Not derived	Schuytema et al. 1990 (fathead minnow mortality)	1,2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Hexachlorobenzene was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs were available in the LPRSA BERA Appendix A3-1. The NBSA NOAEL TRV of 468 mg/kg bw/day is based on a study of fathead minnow mortality after a 28-day exposure to aqueous hexachlorobenzene by Schuytema et al. (1990). A LOAEL was not derived from the study, and a LOAEL TRV was not estimated from the NOAEL. There are several uncertainties with the use of this NOAEL TRV: 1) the study failed to find an effect level, so is likely over-protective; and 2) the mortality endpoint is typically not as sensitive as sublethal endpoints.

7.3 Birds

7.3.1 Toxicity Profile

Adverse effects of HCB have been observed in Japanese quails, herring gulls (*Larus argentatus*), ring-necked pheasants, mallard ducks, and Eurasian kestrels (*Falco tinnunculus*). Reported adverse effects include induction of porphyria (Buhler and Carpenter 1986; Lambrecht et al. 1988); reduced embryonic body weight (Boersma et al. 1986); reduced body weight in adults (Schwetz et al. 1974); tremors, liver toxicity and increased mortality (Hill et al. 1975); and decreased egg production (Vos 1971; Vos et al. 1972).

7.3.2 TRVs

Table D-24 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-24 Bird Hexachlorobenzene TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	1.1	5	Vos et al. 1971 (Japanese quail mortality)	1,2	a
Bird egg	mg/kg	70	265	Avrahami and Steele 2012 and Vos et al 1971 (Japanese quail mortality)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Hexachlorobenzene was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs were available in the LPRSA BERA Appendix A3-1. Both the LOAEL and the NOAEL come from a study by Vos et al. (1971). In this study Japanese quail were exposed to hexachlorobenzene in the diet for 90 days and mortality was observed. The NOAEL TRV came from the same study. The primary uncertainty with these TRVs is the general lack of toxicity information on the adverse effects to birds exposed to hexachlorobenzene in their diet.

Bird egg residues for hexachlorobenzene from which TRVs could be developed were not found during a literature search. However, there was an opportunity to develop a regression between food dose and egg concentrations of hexachlorobenzene (linear regression $r^2 = 0.998$). The regression equation applied to the food concentrations of 20 mg/kg and 80 mg/kg, which were the basis of the dietary NOAEL and LOAEL TRVs respectively, resulted in estimated egg concentrations of 70 mg/kg (NOAEL) and 265 mg/kg (LOAEL).

7.4 Mammals

7.4.1 Toxicity Profile

Adverse effects of HCB reported for mammals include liver toxicity, histopathological changes, liver enzyme induction, weight loss, neurological effects, porphyria, reduced litter sizes, and decreased survival and growth in offspring in rats and mink (Grant et al. 1977; Bleavins et al. 1984; WHO 1995; Courtney 1979; USEPA 1985; Strik 1986; Lilienthal et al. 1996; Arnold et al. 1985).

7.4.2 TRVs

Table D-25 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-25 Mammal Hexachlorobenzene TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.013	0.13	Bleavins et al. 1984 (mink reproduction)	1,2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Hexachlorobenzene was not a COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs were available in the LPRSA BERA Appendix A3-1. The LOAEL concentration represents a significant reduction in birth weight in ferrets following 332 days of dietary exposure to hexachlorobenzene (Bleavins et al. 1984). A NOAEL was not available from this study and was extrapolated from the LOAEL using a factor of 10. There are several uncertainties with the use of a single study LOAEL TRV; although, the length of the study and the reproduction endpoint suggest that it is likely protective of the health of other species. In general, there is a lack of information on the adverse effects to mammals exposed to hexachlorobenzene including the fact that there are no comparative TRVs from other risk evaluations in the region – the LPRSA BERA (Windward 2019) and the LPR FFS (USEPA 2014).

8 POLYCYCLIC AROMATIC HYDROCARBONS

Polycyclic aromatic hydrocarbons (PAHs) are a large group of organic chemicals composed of two or more fused benzene rings (USEPA 2003b; ATSDR 1995). PAHs in the environment originate primarily from two sources: petrogenic (i.e., petroleum sources, including different types of oils, coal, and organic shales) and pyrogenic (i.e., combustion), with the majority associated with pyrogenic sources. Petrogenic PAHs are usually associated with local or point sources such as refineries and other petroleum industries, while pyrogenic PAHs tend to occur on a broader scale.

There are more than 100 individual PAHs, which are generally grouped into two categories: low-molecular-weight PAHs (LPAHs) (compounds composed of fewer than four benzene rings) and high-molecular-weight PAHs (HPAHs) (compounds composed of four or more benzene rings). Total PAHs is the sum of 16 individual PAHs that are commonly present in environmental mixtures and are known or suspected to contribute to toxicity. Total PAHs include seven LPAHs (acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, and phenanthrene) and nine HPAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b/j)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and pyrene). In general, LPAHs have a greater tendency to volatilize and a lesser tendency to bind to organic carbon than do HPAHs, resulting in a lower persistence in the aquatic environment. Correspondingly, HPAHs are more likely to bioaccumulate than LPAHs and are more persistent in the environment. Bioaccumulation by upper-trophic-level organisms, including fish, birds, and mammals, is limited, in part because PAHs are known to be metabolized by fish (Khairy et al. 2014; Eisler 2000).

Photo-oxidation and chemical oxidation are important degradation processes for PAHs in water (Eisler 2000; ATSDR 1995). PAHs can also be chemically oxidized by chlorination and ozonation. Photolysis, hydrolysis, and chemical oxidation are generally not considered important degradation processes for PAHs in soils and sediments, especially for HMW PAHs (ATSDR 1995). Data suggest that naphthalene and phenanthrene may biodegrade most readily in water; anthracene, benzo(a)anthracene, chrysene, and fluorene may biodegrade in sediment water/slurries; and benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene, and other PAHs with five or more rings may not biodegrade readily at all (ATSDR 1995).

PAHs are lipophilic and can rapidly bioaccumulate from water, sediments, soil, and food. Less soluble PAHs are typically taken up more readily in the gastrointestinal tracts of animals (Eisler 2000). In general, bioconcentration is higher for HMW than LMW PAHs, but can vary by taxa based on the ability of organisms to metabolize parent PAHs to other compounds (ATSDR 1995). Fish can metabolize PAHs in the liver and excrete the metabolites in feces and urine. Most crustaceans also possess the required enzymes for metabolism. Organisms tend to take up PAHs easily from food, although dietary exposure sometimes contributes a limited amount to body burdens compared to water exposure. Due to metabolic ability, PAH concentrations in fish are typically low. Some data suggest that skin, as well as lipids, may be a temporary site of accumulation and may pose a barrier to the migration of PAHs in tissues. Mollusks and some other invertebrates may be unable to metabolize PAHs efficiently, although they can eliminate them. Studies of marine mollusks have found that while LMW PAHs were bioconcentrated more or less than HMW PAHs, the LMW PAHs were more readily eliminated. Sediment can also be a significant source of body burdens of PAHs for benthic invertebrates and fish. Biomagnification through aquatic food

webs has not been observed, likely due to rapid biotransformation and elimination (USEPA 2003b; Eisler 2000; ATSDR 1995).

The toxicity, carcinogenicity, and mutagenicity of PAHs vary with the molecular weight of the compound, the degree of alkylation, and the mode of accumulation (water, food, or sediment) by the organism (Eisler 2000; Moore and Ramamoorthy 1984; Neff 1979). LPAHs generally have significant acute toxicity, whereas HPAHs do not. However, several HPAHs are known to be carcinogenic and cause chronic toxicity. Thus, effects are highly dependent on the specific PAHs present in the environmental mixture and also upon the feeding behavior and habitat of a particular species. More specific ecotoxicity information is provided below by receptor group.

8.1 Benthic Invertebrates

8.1.1 Toxicity Profile

PAHs can be directly toxic to benthic invertebrates living in sediments, and also accumulated by these organisms because they lack the enzyme systems to metabolize and excrete them. Eisler (2000) reports PAH accumulations in marine organisms and notes that more water soluble, lower molecular weight PAHs are more easily accumulated than high molecular, weightless water-soluble PAHs, and there can be seasonal differences in PAH accumulations related to seasonal changes in lipids (Eisler 2000). For example, PAHs in oysters (Ostreidae) were higher in cooler months, when lipids and glycogen were being stored. Spawning results in a release of lipid-rich tissues and, therefore, a depuration of PAHs. Adverse effects observed in mussels (Mytilidae), like cellular proliferative disorders, look very similar to neoplastic conditions observed in invertebrates (Eisler 2000). Eisler (2000) also noted that age and body size can affect the degree of PAH accumulation, as demonstrated in the lobster (Nephropidae), where larger and older individuals had accumulated more PAHs.

8.1.2 TRVs

Table D-26 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-26 Benthic Invertebrate Total PAH TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Total LPAH						
Benthic invertebrate whole-body tissue	mg/kg ww	11	111	Lee et al. 2002 (amphipod mortality)	1	a,b
		0.078	0.780	Emery and Dillon 1996 (polychaete worm reproduction)	2	a
Total HPAH						
Benthic invertebrate whole-body tissue	mg/kg ww	8.1	22.2	Shuler et al 2007 (amphipod growth and reproduction)	1	a
		0.066	0.66	Blue mussel; reproduction (Eertman et al. 1995)	2	a,b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The LPRSA BERA found two studies evaluating LPAH toxicity to invertebrates, one for fluorene and one for naphthalene. The lowest LOAEL of 111 mg/kg ww (Lee et al. 2002) showed increased mortality in *Hyalella azteca* following 10 days of exposure to aqueous fluorene and was selected as the LOAEL TRV. No NOAEL was identified from this study; therefore, it was extrapolated from the LOAEL using a factor of 10. There is uncertainty associated with the use of an extrapolation factor with the selected TRVs for fluorene due to the limited dataset (only two toxicity studies measuring mortality), and in comparing TRVs based on a single PAH (fluorene) to a concentration based on an LPAH sum.

The LPR FFS (USEPA 2014) selected an LPAH LOAEL TRV of 0.78 mg/kg ww and a NOAEL TRV of 0.078 mg/kg ww for LPAH based on an 8-week chronic toxicity study of the polychaete (*Nereis arenaceodentata*) exposed to phenanthrene (Emery and Dillon 1996). The LOAEL TRV of 0.78 mg/kg ww was associated with a 33% decrease in fecundity and a 36% decrease in juvenile production relative to the carrier control (acetone) group but was not different from the seawater control. Based on variable response in the two controls tested, there is uncertainty associated with whether an adverse effect would be expected. The NOAEL was extrapolated from the LOAEL using a factor of 10.

Eleven studies on seven species were found that examined growth, reproduction, and mortality resulting from exposure to single HPAHs (fluoranthene, benzo(a)pyrene and pyrene); no HPAH mixture studies were found. The lowest LOAEL, 22.2 mg/kg ww, was associated with a reduced length and reduced number of offspring of the amphipod *H. azteca* following a 28-day exposure to aqueous fluoranthene (Schuler et al. 2007). No adverse effects were observed in this study at a tissue burden of 8.1 mg/kg ww;

this value was selected as the NOAEL TRV. There is also uncertainty associated with comparing TRVs based on a single PAH (fluoranthene) to a concentration based on sum total HPAHs.

The LPR FFS derived a LOAEL TRV of 0.660 mg/kg ww and a NOAEL TRV of 0.066 mg/kg ww from this LOAEL using an extrapolation factor of 10 (USEPA 2014) based on a study that observed adverse effects on gametogenesis in blue mussels after a five-week exposure period to fluoranthene in water at a concentration of 2 µg/L (Eertman et al. 1993; Eertman et al. 1995). Eertman et al. (1993) presented data for tissue concentrations after a four-week exposure period to fluoranthene concentrations of 0.5, 1, and 6 µg/L. The LOAEL TRV of 0.66 mg/kg ww was estimated from regression relationships developed for tissue concentrations, water concentrations, and length of exposure. It is unclear what effect the impaired gametogenesis would have on population-level reproductive success. There is also uncertainty associated with estimating the LOAEL tissue concentration from data for different water concentrations and a shorter time period, comparing TRVs based on a single PAH (fluoranthene) to a concentration based on an HPAH sum, and using an extrapolation factor to derive the NOAEL.

8.2 Fish

8.2.1 Toxicity Profile

A wide variety of biological effects have been reported in numerous fish species under laboratory conditions. Exposure to stable, nonpolar organic compounds, such as PAHs, is known to cause narcosis (a generalized toxic effect) and can be involved in mortality (Schultz 1989). Fish embryos exposed to aqueous PAH mixtures have been shown to exhibit syndromes of cardiac dysfunction, edema, spinal curvature, and reduction in the size of the jaw and other craniofacial structures (Incardona et al. 2004). Exposure to PAHs has also been linked to the development of tumors in fish. Biotransformation by the mixed-function oxidases (MFO) system in the fish liver can result in the formation of carcinogenic and mutagenic intermediates (Eisler 2000). Fish exposed to PAH-contaminated sediments through direct contact have been shown to exhibit increased incidence of skin and liver lesions and other deformities (Myers et al. 1994; Pinkney et al. 2000). In addition, reduced lifespan in fish has been linked to cancerous lesions (Johnson et al. 2002; Baumann et al. 1987; Pinkney et al. 2000; Myers et al. 1994).

Observed adverse effects on fish from dietary exposure to PAHs include decreased disease resistance of Chinook salmon (Palm et al. 2003); reduced growth of Chinook salmon, English sole (*Parophrys vetulus*), rainbow trout, and rockfish (Kim et al. 2008; Rice et al. 2000; Hendricks et al. 1985; Hart and Heddle 1991; Meador et al. 2006); and reduced survival of rainbow trout and grouper (Epinephelinae) (Hendricks et al. 1985; Wu et al. 2003). Recently, behavioral effects have also been observed in fish as a result of exposure to PAHs (and dioxins and PCBs) (Weis et al. 2011).

8.2.2 TRVs

Table D-27 summarizes the fish TRVs used in the assessment, and the section below describes how they were derived.

Table D-27 Fish Total PAH TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish diet	mg/kg bw/day	6.2	18	Meador et al. 2006 (Chinook salmon growth)	1,	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were developed in the LPRSA BERA (Windward 2019), which found two acceptable studies examining the effects of dietary PAHs on growth and the immune system (associated with increased mortality) in one species (Chinook salmon). The LOAEL available from Meador et al. (2006), 18 mg/kg bw/day, was selected as the LOAEL TRV and is associated with a 9% reduction in the dry weight of fish after 53 days of exposure to a dietary PAH mixture. A NOAEL of 6.2 mg/kg bw/day was identified and selected from the same study to be the NOAEL TRV (Meador et al. 2006). The PAH mixture tested by Meador et al. (2006) was designed to resemble a field PAH mixture from the Duwamish River in Seattle, Washington, which may not be similar to the PAH chemical mixture in the NBSA. The LPR FFS (USEPA 2014) did not develop fish dietary PAH TRVs.

8.3 Birds

8.3.1 Toxicity Profile

The most likely route of exposure to PAHs for birds is through diet (Malcolm and Shore 2003). Birds tend to metabolize and excrete much of their ingested PAH load (Näf et al. 1992). Metabolism of PAHs also occurs in ovo (Näf et al. 1992). Adverse effects of PAHs on birds observed in laboratory studies include reduced survival of bobwhite quails (Brausch et al. 2010) and mallard ducks (Patton and Dieter 1980), reduced fertility of pigeons (Columbidae) (Hough et al. 1993), reduced growth of chickens (Rigdon and Neal 1963) and mallard ducks (Patton and Dieter 1980), and reduced embryonic growth and an increase in the percent of embryonic anomalies in mallard (Hoffman and Gay 1981).

8.3.2 TRVs

Table D-28 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-28 Bird Total PAH TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Total LPAH						
Bird diet	mg/kg bw/day	0.67	6.7	Schafer et al. 1983 (red-winged blackbird survival)	1	a, b
Total HPAH						
Bird diet	mg/kg bw/day	0.048	0.48	Hough el al. 1993 (pigeon reproduction)	1	a
Total PAH						
Bird diet	mg/kg bw/day	40	Not derived	Patton and Dieter 1980 (mallard duck growth)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Sources:
1 = LPR FFS (USEPA 2014)
2 = LPRSA BERA (Windward 2019)

The selected LOAEL and NOAEL TRVs for total LPAH were derived in the LPR FFS (USEPA 2014) and based on a study by Schafer et al. (1983), which demonstrated that various 2- and 3-ring PAHs (including acenaphthene, fluorene, anthracene, and phenanthrene) were acutely toxic (48-hr Lethal Dose to 50% [LD50]) in red-winged blackbirds at concentrations of approximately 100 mg/kg body weight. An extrapolation factor of five was used to estimate chronic effect levels, and an extrapolation factor of three was applied for interspecies variation to obtain the LOAEL TRV of 6.7 mg/kg ww. The NOAEL TRV of 0.67 mg/kg ww was estimated from the LOAEL TRV using an extrapolation factor of 10. The LPRSA BERA (Windward 2019) did not develop LPAH bird dietary TRVs.

The selected LOAEL and NOAEL TRVs for total HPAH were derived in the LPR FFS (USEPA 2014) and based on a study by Hough et al. (1993) that administered the benzo(a)pyrene dose to pigeons by weekly injection. There were no acceptable studies found that exposed birds to HPAH mixtures in the diet, which is why a single HPAH (benzo(a)pyrene) was selected and used as a surrogate for HPAHs. A LOAEL value of 1.4 mg/kg bw/day was based on observed cessation of egg laying in pigeons exposed for five months to this daily dose (Hough et al. 1993) and then dividing the weekly dose (10 mg/kg bw/day) by seven days to determine the daily dose exposure. This daily dose exposure was then divided by an interspecies extrapolation factor of three under the assumption that pigeons were three times less sensitive than the most sensitive avian species (USEPA 2014). The NOAEL (0.048 mg/kg/day was derived from the LOAEL (0.48 mg/kg/day) based on a factor of 10.The total PAH TRV came from the LPRSA BERA (Windward 2019). The TRV based on Patton and Dieter 1980 was selected by LPRSA BERA and was the only available acceptable study in LPRSA BERA Appendix A3-1 Table 6 that exposed

birds to a PAH mixture in the diet. The NOAEL concentration represents no significant decrease in body weight or survival of mallards fed a mixture of PAHs for seven months (Patton and Dieter 1980). The study did not report a LOAEL concentration. This mixture did not include the HPAH benzo(a)pyrene, which is a specific PAH constituent of concern in the NBSA BERA; therefore, this is an inherent uncertainty in this study.

8.4 Mammals

8.4.1 Toxicity Profile

Various studies have demonstrated the acute toxicity and reproductive toxicity of PAHs to laboratory mammals (WHO 1998), although research on PAH effects on wild mammals is uncommon and is generally associated with oil spills (e.g., Chapter 13 of Douben 2003). In MacKenzie and Angevine (1981), the exposure of mice to benzo(a)pyrene resulted in adverse effects on reproduction (decreased pup body weight and decreased adult male testes weights). Exposure to PAHs, including 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and benzo(a)pyrene, caused decreases in growth, survival and reproduction in laboratory studies of mice and rats (Murata et al. 1993; Hodson 1985; Neal and Rigdon 1967; Navarro et al. 1991; Leighton 1989; Rigdon and Neal 1965).

8.4.2 TRVs

Table D-29 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-29 Mammal Total PAH TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Total LPAH						
Mammal diet	mg/kg bw/day	50	150	Navarro et al. 1991 (rat growth)	1	a
Total HPAH and Total PAH						
Mammal diet	mg/kg bw/day	0.62	3.1	Culp et al. 1998 as cited in USEPA 2007d (mouse survival)	1,2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPR FFS (USEPA 2014)
2 = LPRSA BERA (Windward 2019)

The LPRSA BERA did not develop PAH TRVs (Windward 2019); both the LPAH and HPAH TRVs selected were developed in the LPR FFS (USEPA 2014), and were derived from USEPA's guidance on

Eco SSL for PAHs (USEPA 2007b)., For LPAHs, the selected study was Navarro et al. (1991) in which 8-to-10 week-old female Norway rats (*Rattus norvegicus*) were exposed to naphthalene in food for 9 days. Significant body weight effects were observed at the higher concentrations resulting in LOAEL and NOAEL TRVs are 150 and 50 mg/kg bw/day, respectively. For HPAHs, the selected study was Culp et al. (1998) in which juvenile mice were exposed to benzo(a) pyrene in food for 100 weeks. Significant and dose dependent mortality occurred at the higher concentrations resulting in LOAEL and NOAEL TRVs are 3.1 and 0.62 mg/kg bw/day, respectively. The fact that they are studies that passed the rigorous Eco SSL standards for selection and represent the lowest bounded results from the accepted studies reviewed provides credibility regarding their support. This NBSA BERA used the LPRSA BERA HPAH TRV as a surrogate for total PAH TRVs.

9 ARSENIC

Arsenic is a relatively common element that occurs in air, water, soil, and all living tissues (Eisler 2000). Arsenic is naturally present in rock and soils. Higher concentrations are associated with igneous and sedimentary rocks, particularly with sulfidic ores (USEPA 2005a; American Petroleum Institute 1998). Most arsenic produced domestically is used in manufacturing of agricultural products (e.g., insecticides, herbicides, fungicides, algicides, wood preservatives, and growth stimulants for plants and animals). Exposure to arsenic can occur by way of atmospheric emissions from smelters, coal-fired power plants, and arsenical herbicide sprays; from water contaminated by mine tailings, smelter wastes, and natural mineralization; and from diet, especially from consumption of marine biota (Eisler 2000).

Transport and partitioning of arsenic in water depends on the chemical form (oxidation state and counter ion) and interactions with other materials. Arsenic may be adsorbed from water onto sediments or soils, especially in clays, iron oxides, aluminum hydroxides, manganese compounds, and organic material. Soluble forms move with the water and may be carried long distances through rivers (ATSDR 2007a; USEPA 1979). Arsenic in the water column may be resuspended sediment. Arsenic bioaccumulates in animals and depends on the environmental setting, organism type, trophic status, exposure concentration, and route of uptake. It does not appear to biomagnify between tropic levels (ATSDR 2007a). Arsenic may be elevated in marine biota due to the ability of arsenic to accumulate from seawater or food sources (Maher 1985). The majority of arsenic in marine organisms exists as water-soluble and lipid-soluble organic arsenicals that include arsenolipids, arsenosugars, arsenocholine, arsenobetaine, monomethylarsonate, and demethylarsinate, as well as other forms (Eisler 2000). Toxic and other effects of arsenicals to aquatic life are significantly modified by numerous biological and abiotic factors, including water temperature, pH, redox conditions, organic matter, phosphate concentration, suspended solids, the presence of other substances and toxicants, arsenic speciation, and duration of exposure (Eisler 2000). In general, inorganic arsenicals are more toxic than organic arsenicals to aquatic biota, and trivalent arsenic species are more toxic than pentavalent arsenic species. Early life stages are most sensitive to arsenic, and differences in the ecotoxicological effects of arsenic among species are large, even among those closely related taxonomically (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

9.1 Benthic Invertebrates

9.1.1 Toxicity Profile

Bioconcentration of arsenic occurs in aquatic organisms, primarily in algae and lower invertebrates (ATSDR 2007a). Tissue concentrations of arsenic in marine biota are typically highest in lipids, then liver, and muscle tissues, and vary with organism age (Eisler 2000). Marine biota is able to accumulate arsenic from seawater or food sources, not due to localized pollution. The reason for this ability is not clear but may be related to an anabolic/catabolic pathway concerned with the synthesis and turnover of phosphatidylcholine (Eisler 2000). Most of the arsenic in marine organisms exists as a water-soluble and lipid-soluble organic arsenical form called arsenobetaine, which has little potential risks associated with consumption (Eisler 2000). Exposure to arsenic in invertebrate species including amphipods (*Hyalella azteca*), bay scallop (*Argopecten irradians*), brown shrimp, periwinkle snail (*Littorina littorea*), amphipod (*Corophium volutator*), Baltic clam (*Macoma balthica*), copepod (*Eurytemora affinis*), and oligochaete worm (*Tubifex costatum*) increased mortality (Bryant et al. 1985; Norwood et al. 2007; Klumpp 1980; Madsen 1992; Nelson et al. 1976), reduced juvenile survival (Sanders 1986), and reduced growth (Irving et al. 2008).

9.1.2 TRVs

Table D-30 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-30 Benthic Invertebrate Arsenic TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.064	0.64	SSD (Windward 2019)	1	a,b

Notes:
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = TRV derived for the LPRSA BERA (Windward 2019)

The LPRSA BERA (Windward 2019) developed an SSD from the seven studies found where LOAEL values ranged from 0.63 to 92 mg/kg ww. The 5th percentile of the SSD, 0.64 mg/kg ww, was selected as the LOAEL TRV, just above the lowest measured LOAEL of 0.63 mg/kg ww. The NOAEL TRV of 0.064 mg/kg ww was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor. No TRVs for arsenic were available in the LPR FFS (USEPA 2014).

9.2 Fish

9.2.1 Toxicity Profile

Although some fish and shellfish take in arsenic, which may build up in tissues, most of this arsenic is in an organic form called arsenobetaine (commonly called "fish arsenic") that is much less harmful (ATSDR 2007a). Arsenic is mainly accumulated in the livers of fish. Fish may bioaccumulate metals from water or from feeding on other fish, including bottom-feeders. The major bioaccumulation transfer is between water and algae, at the base of the food web, which has a strong impact on the concentration in fish. Differences in arsenic levels were not found in different species of fish, including herbivorous, insectivorous, and carnivorous species. Williams et al. (2006) found that accumulation in fish is nonlinear with respect to the exposure concentration (ATSDR 2007a).

Adverse effects of exposure to arsenic have been reported in rainbow trout, spottail shiner (*Notropis hudsonius*), fathead minnow, bluegill, pink salmon (*Oncorhynchus gorbuscha*), and grey mullet (*Chelon labrosus*). These include increased mortality (National Academy of Sciences [NAS] 1977; Lima et al. 1984; Taylor et al. 1985), reduced growth rates (Johnson and Finley 1980; NAS 1977), food avoidance (Johnson and Finley 1980; NAS 1977), and reduced food metabolism (Johnson and Finley 1980; NAS 1977).

9.2.2 TRVs

Table D-31 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-31 Fish Arsenic TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	1.3	2.5	Erickson et al. 2011 (rainbow trout growth)	1	a
Fish diet	mg/kg bw/day	0.52	1.9	Blazer et al. 1997 (striped bass growth)	2, 3	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = TRV derived for the NBSA BERA
3 = LPRSA BERA (Windward 2019) Appendix A3-1

9.2.2.1 Fish Whole-Body Tissue

Three studies examining growth, behavior, and mortality for one fish species (rainbow trout) provided three LOAELs that ranged from 2.5 to 8.1 mg/kg ww. The lowest LOAEL, from Erickson et al. (2011), was

selected as the NBSA LOAEL TRV as was used for the LPRSA BERA (Windward 2019). Erickson et al. (2011) exposed juvenile rainbow trout to aqueous arsenic for 28 days and reported a ≥ 25% reduction in growth at the LOAEL of 2.5 mg/kg ww (assuming 80% moisture). The NOAEL of 1.3 mg/kg ww (assuming 80% moisture) from the same study was selected as the NOAEL TRV. Erickson et al. (2011) also reported that surviving fish ranged up to 3.0 mg/kg ww arsenic in whole-body fish (assuming 80% moisture), and that mortality did not correlate well with total arsenic accumulation. Fish mortality appears to be less sensitive than growth and with a response that is not well correlated with arsenic tissue concentrations where critical concentrations ranged up to 12 mg/kg ww (Erickson et al. 2011; McGeachy and Dixon 1992). This suggests that risks are likely overestimated from the selected TRVs. The LPR FFS (USEPA 2014) did not develop fish whole-body TRVs for arsenic.

9.2.2.2 Fish Diet

Arsenic was not a fish dietary COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs were available in the LPRSA BERA Appendix A3-1. Both of the dietary TRVs were based on the study by Blazer et al. (1997), where juvenile striped bass were fed arsenic-contaminated diets for 6 weeks. Adverse growth effects observed at the LOAEL concentration of 1.9 mg/kg bw/day are believed to be associated with food avoidance, which leads to some uncertainty in these TRVs because it is hard to relate dietary exposure concentrations to adverse effects when the fish are reducing their consumption level of food.

9.3 Birds

9.3.1 Toxicity Profile

Inorganic trivalent arsenite poisoning in birds may include muscular incoordination, debility, slowness, jerkiness, falling hyperactivity, fluffed feathers, drooped eyelid, huddled position, unkempt appearance, loss of righting reflex, immobility, and seizures, similar to many other toxicants (Eisler 2000). Nystrom (1984) suggests that lethal effects of acute inorganic arsenic poisoning were caused by destruction of blood vessels lining the gut, which resulted in decreased blood pressure and subsequent shock. Adverse effects of exposure to arsenic in mallard ducks, chukars (*Alectoris chukar*), California quails, bobwhite quails, and chickens include increased mortality (NAS 1977; NRCC 1978; Camardese et al. 1990), reduced growth (Camardese et al. 1990; Stanley et al. 1994), negative effects on reproductive success (NRCC 1978; Stanley et al. 1994), and embryonic developmental abnormalities (Hood 1985).

9.3.2 TRVs

Table D-32 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-32 Bird Arsenic TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	10	40	Stanley et al. 1994 (mallard duck reproduction)	1,2	a

Notes:
KU = Key Uncertainty

a = TRV based on a single study

Source:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019) Appendix A3-1

Arsenic was not a bird dietary COPEC evaluated in either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); however, TRVs were available in the LPRSA BERA Appendix A3-1 (Windward 2019). The LOAEL and NOAEL TRVs of 40 and 10 mg/kg bw/day, respectively, were based on a study of the effects of arsenic on mallard reproduction from a dietary exposure of 115 to 128 days (Stanley et al. 1994). Effects noted were delayed egg laying, depressed egg weight and shell thinning, decreased offspring body weight, and decreased production that were suspected to be the result of insufficient food intake (Stanley et al. 1994). These arsenic TRVs were selected for bird diet in the LPRSA SLERA (Windward 2019; Appendix A).

9.4 Mammals

9.4.1 Toxicity Profile

Mammals are primarily exposed to arsenic by ingestion of naturally contaminated vegetation and water or human activity. Acute arsenic poisoning in most warm-blooded animals is usually revealed by acute or subacute signs. Acute poisoning in mammals by inorganic and organic arsenicals are usually characterized by high mortality and morbidity over a period of 2 to 3 days and may include signs of intense abdominal pain, staggering gait, extreme weakness, trembling, salivation, vomiting, diarrhea, fast and feeble pulse, prostration, collapse, and death (Eisler 2000). Chronic poisoning is not often seen but is associated with weakness, paralysis, conjunctivitis, dermatitis, decreased growth, and liver damage (NRCC 1978).

9.4.2 TRVs

Table D-33 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-33 Mammal Arsenic TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	2.6	5.4	Byron et al. 1967 (rat growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were developed in the LPRSA BERA (Windward 2019), which found only one acceptable study as the basis of the TRVs, Byron et al. (1967). The LOAEL of 5.4 mg/kg bw/day and the NOAEL of 2.6 mg/kg bw/day were based on rat growth and decreased body weight following dietary exposure to arsenic in the form of sodium arsenite(Bryon et al. 1967). There were no mammalian TRVs for arsenic developed for the LPR FFS (USEPA 2014).

10 CADMIUM

Most cadmium used in the United States is extracted as a byproduct during the production of other metals, such as zinc, lead, or copper. Most cadmium (83%) is used for batteries, with other minor uses for pigments (8%) and coatings and platings (7%) (ATSDR 2012a). Cadmium in the environment exists in only one oxidation state (+2) and does not undergo oxidation-reduction reactions. Specifically, cadmium in surface water can exist as soluble or insoluble forms: the hydrated ion, or as ionic complexes with other inorganic or organic substances. In polluted or organic-rich waters, adsorption of cadmium by humic substances and other organic complexing agents plays a dominant role in transport, partitioning, and remobilization of cadmium (ATSDR 2012a). Those forms likely to precipitate and not be remobilized include associations with carbonate minerals, or hydrous iron oxides. Cadmium more likely to be remobilized or bioaccumulated exists adsorbed to mineral surfaces, such as clay or organic materials.

Cadmium bioaccumulates in aquatic food webs, has no biological function, and is considered toxic to aquatic organisms (Eisler 2000). Sublethal effects of cadmium in marine animals include decreased growth, inhibited reproduction, respiratory disruption, altered enzyme levels, and abnormal muscular contractions; effects were usually most obvious at relatively low salinities and high temperatures (Eisler 2000). Sublethal effects of cadmium in birds, which were similar to those in other animals, included growth retardation, anemia, and testicular damage; however, these effects were observed at higher concentrations than in aquatic biota (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

10.1 Benthic Invertebrates

10.1.1 Toxicity Profile

Bioaccumulation data for invertebrates are reported substantially more than studies on toxicity. Adverse effects of exposure to cadmium in water fleas, mysid shrimp (*Mysidopsis* sp.), fiddler crab (*Uca pugilator*), Baltic clam, and the copepod (*Acartia tonsa*) include increased mortality (Duquesne et al. 2004), reduced growth (Smolders et al. 2005), decreased reproductive output (Canton and Slooff 1982; Bertram and Hart 1979; Hook and Fisher 2002), reduced biomass (Marshall 1978), molt inhibition (Gentile et al. 1982), and reduced respiration (Vernberg et al. 1974).

10.1.2 TRVs

Table D-34 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-34 Benthic Invertebrate Cadmium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.024	0.24	SSD (Windward 2019)	1	a,b

Notes:
KU = Key Uncertainty
a = NOAEL estimated from a LOAEL with an extrapolation factor of 10
b = TRV based on an SSD

Source:
1 = LPRSA BERA (Windward 2019)

The LPRSA BERA (Windward 2019) developed an SSD from the 60 studies found where LOAEL values ranged from 0.02 to 3,400 mg/kg ww. The 5th percentile of the SSD, 0.24 mg/kg ww, was selected as the LOAEL TRV, within the range of measured LOAEL values. The NOAEL TRV of 0.024 mg/kg ww was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor. No TRVs for cadmium were available in the LPR FFS (USEPA 2014).

10.2 Fish

10.2.1 Toxicity Profile

In fish, acute cadmium toxicity is dependent in part on exposure period, concentration, water temperature and salinity, although the mechanisms of toxicity are not well understood (Eisler 2000). Under conditions of high cadmium concentration and short exposure, the gill seems to be the primary site of damage and accumulation. Under conditions of prolonged exposure and low cadmium levels, the intestine, kidney, and possibly other tissues were measurably affected. Retention of cadmium by fish depends on tissue biomagnification potential, length of post-exposure recovery period, and other factors (Eisler 2000).

Adverse effects of exposure to cadmium in brook trout, channel catfish, and walleye (*Stizostedion vitreum*) include reductions in growth, survival, and fecundity (Brungs et al. 1978; Eisler 2000). Adverse effects of exposure to cadmium in striped bass, winter flounder, Atlantic salmon, mummichog, and Asian seabass (*Lates calcarifer*) include increased mortality (Eisler 1971; Shazili 1995), reduced growth (Kim et al. 2004; Kang et al. 2005; Lundebye et al. 1999), enzyme disruption and decreased oxygen consumption (Dawson et al. 1977), and increased gill tissue respiration (Calabrese et al. 1975).

10.2.2 TRVs

Table D-35 summarizes the fish TRVs used in the assessment, and the section below describes how they were derived.

Table D-35 Fish Cadmium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish diet	mg/kg bw/day	0.001	0.01	Kim et al. 2004, Kang et al. 2005 (rockfish growth)	1	a, b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)

The NBSA LOAEL and NOAEL TRVs of 0.001 and 0.01 mg/kg bw/day, respectively, were based on a study of the effects of cadmium on rockfish growth from a dietary exposure of 60 days (Kim et al. 2004; Kang et al. 2005) that were developed in the LPRSA BERA (Windward 2019). This LOAEL was the lowest of four other LOAELs from three other studies reviewed in the LPRSA BERA (Windward 2019). The LOAEL represents a dietary concentration of 125 mg/kg dry weight (dw), and the NOAEL represents a dietary concentration of 25 mg/kg dw. The NOAEL was estimated from the LOAEL using an extrapolation factor of 10. There is uncertainty associated with the use of an extrapolation factor to derive the NOAEL. No TRVs for cadmium in the fish diet were available from the LPR FFS (USEPA 2014). Cadmium was not a COPEC for fish tissue.

10.3 Birds

10.3.1 Toxicity Profile

In general, birds are more resistant to adverse effects from cadmium than lower trophic level aquatic organisms (USEPA 1999b). Sparrows fed a diet with radio-labeled cadmium showed that the cadmium goes to the kidney and liver (Eisler 2000). Sublethal effects of cadmium in birds, which were similar to those in other animals, included growth retardation, anemia, and testicular damage. Cadmium has a greater likelihood of causing teratogenic effects than other metals (lead, mercury, copper, indium, and arsenic) (Eisler 2000). In birds, this has been reported as caudal and hindlimb abnormalities observed in chickens that resulted from injection of eggs with 0.1 to 1.0 ppm of cadmium chloride. These adverse effects were reduced in the presence of zinc (Ferm and Layton 1981).

Sublethal effects of exposure to cadmium in birds, including Japanese quails, ringed turtle-doves, chickens, domestic pigeons, and mallard ducklings, include growth retardation and anemia (Hammons et al. 1978); bone marrow hypoplasia, anemia, and heart hypertrophy (Richardson et al. 1974); anemia, an enlarged heart, myocardial infarction, and other cardiovascular abnormalities (Sturkie 1973); testicular damage (Sarkar and Mondal 1973); and altered blood chemistry and kidney lesions (Cain et al. 1983). Altered avoidance behavior in the form of hyperresponsiveness was observed in young American black ducks (*Anas rubripes*) produced from parents fed 4 ppm dietary cadmium for about 4 months before egg laying (Heinz and Haseltine 1983).

10.3.2 TRVs

Table D-36 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-36 Bird Cadmium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.4	4	Richardson et al. 1974 (Japanese quail growth)	1	a, b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were derived in the LPRSA BERA (Windward 2019), which found six studies with three species were acceptable for the derivation of a cadmium TRVs for birds. The lowest LOAEL of 4.0 mg/kg bw/day was selected as the TRV based on a 6-week exposure to cadmium in the diet of Japanese quail (Richardson et al. 1974). This LOAEL represents a 15% reduction in body weights as comparted to the controls. A NOAEL was not available from this study, so it was estimated from the LOAEL TRV using an uncertainty factor of 10. An uncertainty specific to this study is whether a 15% reduction in growth would result in adverse effects on the population; thus, the TRVs are likely overestimates of potential adverse effects. No TRVs for cadmium in the bird diet were available from the LPR FFS (USEPA 2014).

10.4 Mammals

10.4.1 Toxicity Profile

In vertebrates, cadmium accumulates in the liver and kidneys (ATSDR 2012a), and mammals are less sensitive to adverse effects from cadmium than aquatic organisms (USEPA 1999b). There is strong evidence for food web bioaccumulation, but the potential for biomagnification is uncertain. Eisler (2000) reported the potential for teratogenic effects with the examples of rat fetuses with jaw defects, cleft palates, club feet, and pulmonary hyperplasia following exposure to more than 6 mg/kg ww daily during pregnancy and hamsters with embryonic tail defects following cadmium exposure. It was also noted that in the study with hamsters, effects were synergized by salts of lead or mercury and antagonized by selenium (Ferm and Layton 1981).

10.4.2 TRVs

Table D-37 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-37 Mammal Cadmium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	3.5	13	Machemer and Lorke 1981 (rat growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were developed for the LPRSA BERA (Windward 2019), which evaluated three acceptable studies of cadmium toxicity on mammals (rats and shrews). The selected LOAEL, 13 mg/kg bw/day, was the lowest of the studies evaluated and represented decreased maternal body weight of rats exposed to dietary cadmium chloride (Machemer and Lorke 1981). The NOAEL of 3.5 mg/kg bw/day also came from Machemer and Lorke (1981). No TRVs for cadmium in the mammal diet were available from the LPR FFS (USEPA 2014).

11 CHROMIUM

Mining and the combustion of fossil fuels and other materials may cause releases of chromium to air, surface water, and soil. These anthropogenic activities lead to the production of hexavalent chromium, which is very mobile and relatively stable in air and pure water and, therefore, may be subject to long-distance transport. However, upon contact with organic matter or biota, hexavalent chromium is reduced to its trivalent form (WHO 1988). That form clings to particles, which may be deposited onto soil or sediment. Once in soil, chromium tends to be immobile due to the formation of stable organic complexes. Even low pH is not able to leach chromium from soil. Trivalent chromium in water may form polynucleate complexes that are no longer soluble and precipitate out of the water column. As a result, soluble chromium generally accounts for a very small percentage of total chromium. Chromium compounds cannot volatilize from water, so most of the chromium released into water will ultimately be deposited in the sediment. Plants and animals may absorb both the hexavalent and trivalent forms of chromium (WHO 1988); however, the hexavalent form is taken up in preference to the trivalent form. Once absorbed, hexavalent chromium is reduced to the stable, trivalent state. Bioaccumulation from all exposure routes and toxicity of trivalent chromium is low relative to hexavalent chromium, because the latter is more membrane permeable and corrosive (USEPA 1999b). Trivalent chromium in vertebrates is an essential nutrient required for normal energy metabolism (ATSDR 2012b).

There is no indication of biomagnification of chromium in food webs, and chromium concentrations typically are highest at the lowest trophic levels (WHO 1988; Eisler 2000). Reported toxic effects of chromium in aquatic organisms include reduced survival, reproduction, and growth. Under laboratory conditions, chromium has been shown to be mutagenic, carcinogenic, and teratogenic in a wide variety of organisms, with hexavalent chromium being the primary toxic form. These effects are modified by a variety of biological and abiotic factors and sensitivity to chromium varies widely, even among closely related species (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

11.1 Benthic Invertebrates

11.1.1 Toxicity Profile

Chromium in surface waters may remain in a soluble form or it may bind to clay-like or organic-suspended solids. Exposure routes for aquatic organisms include ingestion, gill uptake, and dermal absorption (USEPA 1999b), and bioaccumulation in benthic invertebrates occurs. Measurable accumulations were recorded in oysters and worms (Annelida) at 5.0 µg/L of hexavalent chromium, and reproduction of polychaete annelid worms (Polychaeta) was inhibited at 12.5 µg/L. Hexavalent chromium was associated with adverse effects in invertebrates of widely separated taxa: growth inhibition of the protozoan *Chilomonas paramecium* (Honig et al. 1980); abnormal movement patterns of larvae of the midge *Chironomus tentans* (Catalan 1982); and a temporary decrease in hemolymph glucose levels in the freshwater prawn *Macrobrachium lamarrei* (Murti et al. 1983). A reduction in offspring numbers in the polychaete *Neanthes arenaceodentata* occurred after exposure to chromium (Oshida and Word 1982). In all situations, trivalent chromium was found to be less toxic than hexavalent chromium.

11.1.2 TRVs

Table D-38 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-38 Benthic Invertebrate Chromium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	1.5	3.5	Norwood et al. 2007 (amphipod survival and growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
Source:
1 = LPRSA BERA (Windward 2019)

Two studies were found that reported chromium toxicity to benthic invertebrates and the lowest LOAEL from these studies, 3.5 mg/kg ww, from Norwood et al. (2007) was selected as the LOAEL TRV. This study exposed *H. azteca* to water- and diet-based chromium for four weeks and recorded mortality. The NOAEL of 1.5 mg/kg ww was equivalent to the LC25 and was within the range of control mortality in the same study. There is uncertainty associated with the limited toxicity dataset for chromium (two studies). No TRVs for chromium were available in the LPR FFS (USEPA. 2014).

11.2 Fish

11.2.1 Toxicity Profile

Chromium uptake and effects in fish are modified by many biological and abiotic variables, including water temperature and pH, the presence of other contaminants or compounds, and sex and tissue specificity (Eisler 2000). Reduced growth was observed after dietary exposure to chromium in the tilapia (Magzoub et al. 2010) and grey mullet (Walsh et al. 1994). In the snakehead (*Channa punctatus*), enzyme activities were altered in a wide variety of organs and tissues after exposure to chromium (Sastry and Sunita 1984) and caused increased mortality (Sastry and Sunita 1982, 1983). In the mud skipper (*Boleophthalmus dussumieri*), chromosomal aberrations in the gill increased after exposure to chromium (Krishnaja and Rege 1982). In juvenile coho salmon, disease resistance and serum agglutinin production both decreased after exposure to chromium (Sugatt 1980). In Chinook salmon, exposure to chromium increased mortality (Farag et al. 2006).

11.2.2 TRVs

Table D-39 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-39 Fish Chromium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	1.28	1.3	Farag et al. 2006 (Chinook salmon mortality)	1	a
Fish diet	mg/kg bw/day	0.19	Not derived	Walsh et al. 1994 (grey mullet growth)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPRSA BERA (Windward 2019)

11.2.2.1 Fish Whole-Body Tissue

NBSA TRVs were both derived from Farag et al. (2006), who exposed Chinook salmon to chromium for 134 days. The LOAEL TRV of 1.3 mg/kg ww represents a 27% reduction in survival. The NOAEL of 1.28 mg/kg ww from the same study was associated with a 12% reduction in survival, which was not significantly different from the control.

No TRVs for chromium were available from either the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014); although, Farag et al. (2006) was one of three studies evaluated in the LPRSA BERA and had the lowest reported LOAEL and the LOAEL and NOAEL concentrations as reported in Table D-39. The LPRSA BERA excluded Farag et al. (2006) as the basis of a TRV because of the increase in the exposure concentration on day 105 of the 134 day exposure period. These TRVs were accepted for the NBSA BERA because the increase in exposure was warranted because on day 105 no adverse effects were observed in the fish. The subsequent 29 day exposure at a higher concentration did elicit adverse effects.

11.2.2.2 Fish Diet

The TRVs selected were derived in the LPRSA BERA (Windward 2019), which found two studies available for the derivation of chromium dietary TRVs for fish. Neither study identified a LOAELs, so the study with the highest NOAEL (0.92 mg/kg bw/day) was selected as the NOAEL TRV (Walsh et al. 1994). This study exposed grey mullet to chromium in both sediment and diet. At 0.19 mg/kg bw/day, the chromium-exposed fish showed a significant increase in growth, which is not considered an adverse effect. There is uncertainty associated with the use of an unbounded NOAEL, as it may over-predict the potential for a NOAEL. The LPR FFS (USEPA 2014) did not develop fish dietary TRVs for chromium.

11.3 Birds

11.3.1 Toxicity Profile

Most investigators agree that chromium in biological materials is probably always in the trivalent state (Eisler 2000). Acute and chronic adverse effects to warm-blooded organisms are caused mainly by hexavalent chromium compounds. There is little conclusive evidence of toxic effects caused by di- or trivalent chromium (Langard and Norseth 1979).

For birds, chromium exposure through diet adversely affected young American black ducks (Eisler 2000). Deformities in birds include short and twisted limbs, microphthalmia, exencephaly, everted viscera, growth stunting, and parrot beaks (Ridgeway and Karnofsky 1952; Gilani and Marano 1979). Male domestic chickens, fed diets containing up to 100 ppm of hexavalent chromium for 32 days, showed no adverse effects in survival, growth, or food utilization efficiency (Rosomer et al. 1961), but teratogenic effects were documented in chicken embryos after eggs had been injected with hexavalent chromium. The highest incidence of teratogenic effects was observed at hexavalent chromium concentrations that caused some deaths. American black ducklings that were fed chromium-contaminated diets exhibited altered growth patterns and reduced survival (Eisler 2000). When the administration route was through the chorioallantoic membrane (as opposed to the yolk), no teratogenic effects were observed with trivalent chromium salts (Ridgeway and Karnofsky 1952).

11.3.2 TRVs

Table D-40 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-40 Bird Chromium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	10.5	105	Chung et al. 1985 (chicken survival and growth)	1	a, b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)

The TRVs selected were derived in the LPRSA BERA (Windward 2019), which found four studies, all with chickens, acceptable for derivation of chromium dietary TRVs for birds. None of these studies found adverse effects on bird reproduction. The lowest LOAEL from these studies, 105 mg/kg bw/day, was selected as the TRV and was based on adverse effects on growth and survival (Chung et al. 1985). There was no NOAEL available from this study, so the NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10. One additional study conducted with mallards (Haseltine et al. unpublished) was cited in Sample et al. (1996), but the data are unpublished and unavailable for review. The

unpublished study (Haseltine et al. unpublished) reportedly found reproductive effects on American black duck (*Anas rubripes*) at a dietary dose of 5 mg/kg bw/day. This effect level was the lowest LOAEL among the five chromium studies. However, because the original data could not be reviewed, this value was not selected as the LOAEL TRV for the NBSA BERA.

11.4 Mammals

11.4.1 Toxicity Profile

As stated above for birds, acute and chronic adverse effects to warm-blooded organisms are caused mainly by hexavalent chromium compounds (Eisler 2000). In mammals, hexavalent chromium compounds may cause skin ulceration, irritative dermatitis, ulcerations in mucous membranes, and perforations of the nasal septum (Eisler 2000). Dietary levels of 5.1 mg/kg hexavalent chromium in the food and water of mice was associated with elevated tissue residues. Kidney and liver lesions in rats were observed when the drinking water contained 134 ppm of hexavalent chromium for 2 to 3 months (Steven et al. 1976). Chromium is causally associated with mutations and malignancy (Leonard and Lauwerys 1980; Norseth 1981). Exposure to dietary chromium in rats caused decreased body weight and growth (Hasten et al. 1997; Ivankovic and Preussman 1975), increased mortality (Anderson et al. 1997; Ivankovic and Preussman 1975), and reduced litter size and pregnancy rate and increased pup malformation (Ivankovic and Preussman 1975). Under appropriate conditions, chromium is an animal carcinogen; however, its toxicological effects depend on chemical form, solubility, and valence. In general, hexavalent chromium compounds are hazardous to animals, whereas metallic chromium and trivalent chromium are essentially nontoxic (Gale 1978); however, exposure to water-solubilized trivalent chromium has caused cancers and dermatitis in workers and toxicity in rabbits (Hatherill 1981).

11.4.2 TRVs

Table D-41 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-41 Mammal Chromium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.96	9.62	Zahid et al. 1990, as cited in USEPA 2008b (mouse reproduction)	1	a,b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = TRV derived for the NBSA BERA

The chromium LOAEL TRV of 9.62 mg/kg bw/day was derived from the USEPA (2008b) Chromium Eco SSL report and, specifically, the study by Zahid et al. (1990), which reported reproductive effects in mice. A NOAEL was not available from this study and was extrapolated from the LOAEL using a factor of 10. No chromium dietary TRVs for mammals were available from the LPRSA BERA (Windward 2019) or the LPR FFS (USEPA 2014).

12 COPPER

Copper is a naturally occurring and ubiquitous metal found throughout the Earth's crust. While low levels of copper are important for good health (copper is an essential element for plants and animals, including humans), high levels of copper can be harmful to health or the environment. Copper is extensively mined in the United States to produce various products, including electrical wires, plumbing components, and alloys used in other products. Additionally, copper compounds are used in agricultural settings (e.g., for treating plant diseases, such as mildew); for water treatment; and as a preservative in products, such as wood and fabrics (ATSDR 2004).

Copper can enter the environment through human activities, including mining, smelting, and releases of wastewater, and through natural sources, such as volcanoes or forest fires. Copper found in the environment is usually associated with organic material or other soil/sediment components, such as clay or sand. Once released into the environment, copper does not break down, meaning that once it enters the water, it builds up in the sediments of lakes and rivers. It can be found in high concentrations in animal species (ATSDR 2004).

Copper, at elevated levels of exposure, can exert a wide range of physiological effects in animals, including altered blood chemistry, and is associated with tissue structure and pathology of kidneys, liver, gills, and other hematopoietic tissues (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

12.1 Benthic Invertebrates

12.1.1 Toxicity Profile

In aquatic organisms, exposures to copper are associated with developmental abnormalities. Copper bioconcentrates in aquatic organisms; however, biomagnification does not occur. For many animals, copper is an essential micronutrient (USEPA 1999b). Most of the copper in aquatic environments settles out and adsorbs to sediment, but this is dependent on water pH and temperature and the concentration of other chemical species (USEPA 1999b). In aquatic invertebrates, copper causes gill damage at high concentrations (Eisler 2000).

Copper-stressed blue mussels die more quickly under conditions of anoxia, high temperatures, and low salinities (Weber et al. 1992). Initial effects of copper on mussels (*Mytilus* spp.) include valve closure, a reduction in filtration rates, and cardiac inhibition; these responses all serve to slow the uptake of copper through a reduction in mussel contact with the ambient environment and a reduction in blood flow within the organism (Gainey and Kenyon 1990).

Life-cycle exposures of four daphnid species to copper show reductions in survival, growth, and reproduction (Winner and Farrell 1976). In shore crabs (*Carcinus maenas*), several days of exposure to sublethal concentrations of waterborne copper caused extensive damage to gill epithelium; at lethal concentrations, tissue hypoxia was the major effect of copper (Nonnotte et al. 1993). Increases in mortality have been observed after exposure to copper for shrimp (*Mysis* spp.) (Zyadah and Abdel-Baky

2000), polychaete worm (*Cirriformia spirabrancha*) (Milanovich et al. 1976), and clams (*Mysella anomalia*) (King et al. 2004).

12.1.2 TRVs

Table D-42 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-42 Benthic Invertebrate Copper TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	5	12	Absil et al. 1996 (Baltic clam survival)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPR FFS (USEPA 2014)

The NBSA TRVs of 12 mg/kg ww for the LOAEL and 5 mg/kg ww for the NOAEL were obtained from the ERED and, specifically, the study by Absil et al. (1996) in which the sediment-dwelling bivalve (*Macoma balthica*) exposed to copper for 40 days showed mortality at tissue concentrations of 12 mg/kg ww, but no significant mortality at tissue concentrations of 5 mg/kg ww. These same TRVs were used in the LPR FFS (USEPA 2014).

12.2 Fish

12.2.1 Toxicity Profile

Copper can cause toxicity in fish by interfering with osmoregulation (Eisler 2000). Adverse effects, including reduced growth and survival, were reported in toxicological studies of five fish species (Atlantic salmon, channel catfish, rainbow trout, rockfish, and grey mullet) following dietary exposure to copper. A reduction in growth was reported in a study of rockfish and grey mullet, decreased weight was reported in a study of channel catfish fingerlings, and decreased survival was reported in a study of rainbow trout (Berntssen et al. 1999a, 1999b; Baker et al. 1998; Handy 1992, 1993; Kamunde et al. 2001; Kang et al. 2005; Lanno et al. 1985a, 1985b; Lundebye et al. 1999; Miller et al. 1993; Mount et al. 1994; Murai et al. 1981).

12.2.2 TRVs

Table D-43 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-43 Fish Copper TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	3.92	4.48	Mount et al. 1994 (rainbow trout mortality)	1,3	a
		0.32	1.5	Zyadeh and Abdel-Baky 2000 (striped mullet [*Mugil cephalus*] survival)	2	a
Fish diet	mg/kg bw/day	1	2	Kang et al. 2005 (rockfish growth)	3	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = TRV derived for the NBSA BERA
2 = LPR FFS (USEPA 2014)
3 = LPRSA BERA (Windward 2019)

12.2.2.1 Fish Whole-Body Tissue

NBSA TRVs were derived from Mount et al. (1994), who exposed rainbow trout to copper in the diet for 60 days and found reduced survival associated with a whole-body concentration of 4.48 mg/kg ww, which was selected as the LOAEL. From the same study, a NOAEL tissue concentration of 3.92 mg/kg ww was selected.

The LPRSA BERA concluded no studies reporting tissue body burdens greater than the nutritionally optimal copper body burden of 3.4 mg/kg ww were acceptable for TRV development. Therefore, no TRVs for copper in whole-body fish were used in the LPRSA BERA (Windward 2019). Mount et al. (1994) was one of five studies evaluated in the LPRSA BERA, and had the second lowest reported LOAEL; the lowest LOAEL was for effects observed in Nile tilapia (*Oreochromis niloticus*), which was not considered to be a relevant fish species for the NBSA. The LPRSA identified the same endpoint concentrations as shown in Table D-43, but the study was excluded as the basis of TRVs because at the two points when tissue concentrations were measured, day 35 and day 60, tissue burdens were found to be higher on day 35 by approximately 45 to 55% as compared to the concentrations on day 60, yet no mortality was observed on day 35.

An acute study (24 hours) by Zyadeh and Abdel-Baky (2000) that exposed striped mullet to aqueous copper was the basis of the TRVs used in the LPR FFS (USEPA 2014). The exposure concentration of 10 milligram per liter (mg/L) resulted in a tissue concentration of 7.5 mg/kg ww and was a mortality LOAEL. The tissue concentration was selected as the LOAEL TRV after application of an ACR extrapolation factor of 5, resulting in a LOAEL TRV of 1.5 mg/kg ww. The NOAEL TRV (0.32 mg/kg ww) was derived from the same study based on application of the same ACR to the tissue residue of 1.6 mg/kg ww, resulting from an exposure of 5 mg/L.

12.2.2.2 Fish Diet

The selected TRVs were derived in the LPRSA BERA (Windward 2019) and based on a review of 13 toxicity studies on the effects of dietary copper to four species of fish (Atlantic salmon, grey mullet, rainbow trout, and rockfish). These data were not sufficient to develop an SSD. The seven reported LOAELs ranged from 2.0 to 60 mg/kg bw/day. The lowest LOAEL of 2.0 mg/kg bw/day was selected as the TRV and was associated with a 50% reduction in rockfish growth after 60 days of exposure to copper in the form of a pelletized diet (Kang et al. 2005). The NOAEL of 1.0 mg/kg bw/day from this same study was selected as the NOAEL TRV. The LPR FFS (USEPA 2014) did not develop copper dietary TRVs.

Regarding the potential for uncertainties in these TRVs, Clearwater et al. (2002) indicated that daily doses of copper that caused adverse effects appeared to be fairly consistent within species for a given life stage with the sources of variability attributed to 1) the way the copper was administered in the diet, since copper chelates to organic compounds, thus altering bioavailability; and 2) water quality (especially temperature and possibly salinity).

12.3 Birds

12.3.1 Toxicity Profile

A review of laboratory studies using birds found that adverse effects on growth and survival were observed as a result of dietary exposure to copper. In studies of young chicks exposed to copper, reduced growth was observed during subchronic exposures (25 days), and reduced growth and survival were observed during chronic exposure (10 weeks) (Mehring et al. 1960; Persia et al. 2004; Dozier et al. 2003; Smith 1969; Balevi and Coskun 2004; Lien et al. 2004; Poupoulis and Jensen 1976).

12.3.2 TRVs

Table D-44 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-44 Bird Copper TRVs

Tissue	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	1.9	19	Jensen and Maurice 1978 (chicken growth)	1	a, b
		2.3	4.7	Kashani et al. 1986, as cited in USEPA 2007a (wild turkey [Meleagris gallopavo] growth)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were derived in the LPRSA BERA (Windward 2019) where eight studies, all with chickens, were acceptable for the derivation of TRVs for copper toxicity to birds. The lowest LOAEL,19 mg/kg bw/day, was selected as the TRV based on a 10% reduced growth of chicks as compared to the control following 4 weeks of dietary exposure (Jensen and Maurice 1978). A NOAEL was not available from the study, so the NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10. An uncertainty with this study is that adverse population effects are not anticipated from a 10% reduction in the growth of chicks. Thus, the TRVs are likely to overestimate the potential for adverse effects.

The LPR FFS (USEPA 2014) developed a LOAEL TRV of 4.7 mg/kg ww and a NOAEL TRV of 2.3 mg/kg ww for copper based on USEPA's Eco SSL report for copper USEPA (2007a). The LOAEL TRV was based on a 4% decrease in body weight in wild turkeys compared to the control after 8 weeks of exposure, noting, however, that body weight recovered at 12 weeks and that no further effects on body weight were observed at 16, 20, or 24 weeks (Kashani et al. 1986). An uncertainty with this study is that adverse population effects are not anticipated from a 4% reduction in growth of chicks, particularly since these growth effects recovered by 12 weeks and were not again observed throughout the 24-week study. Thus, the TRVs are likely to overestimate the potential for adverse effects.

12.4 Mammals

12.4.1 Toxicity Profile

The exposure of mammals to copper has been reported to adversely affect reproduction, growth, and survival. Effects of exposure to copper include decreased growth for mice, reduced reproduction (reduced kit survival) for mink, and reduced growth for rats (National Institutes of Health 1993; Aulerich et al. 1982; Dodds-Smith et al. 1992). Of the three species examined in these studies (mink, rats, and mice), mink was determined to be the species that was most sensitive to copper exposure.

12.4.2 TRVs

Table D-45 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-45 Mammal Copper TRVs

Tissue	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	18	26	Aulerich et al. 1982, as cited in USEPA 2007a (mink reproduction)	1	a
		3.4	6.8		2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were developed in the LPRSA BERA (Windward 2019) where four acceptable toxicity studies were available from the literature in which mammals (rats, mice, shrew, and mink) were exposed to dietary copper. The selected TRVs were based on the mink study by Aulerich et al. (1982) and the endpoints of decreased kit survival and litter mass where the LOAEL was 26 mg/kg bw/day and the NOAEL was 18 mg/kg bw/day.

The LPR FFS (USEPA 2014) selected LOAEL and NOAEL TRVs of 6.8 and 3.4 mg/kg bw/day, respectively, which were also based on Aulerich et al. (1982) and on USEPA's Eco SSL report for copper (USEPA 2007a). However, the endpoint was different: the number of kits whelped. Specific uncertainties related to this study were: 1) there were no observations at the LOAEL of statistically identifiable effects on kit mortality, kit growth, or the average number of kits whelped per female; and 2) the number of females whelping per exposure group was not dose responsive (12 out of 12 whelped in the mink fed 50 mg/kg in the diet).

13 LEAD

Lead is a naturally occurring metal found in the Earth's crust. Lead can be found throughout the environment, largely as a result of anthropogenic activities, such as mining, burning of fossil fuels, and various manufacturing processes. Lead is currently mined in the United States for use in products, such as pipes, batteries, and ammunition. The use of lead in other products (e.g., caulking materials and pigments for paints and ceramic glazes) has been greatly reduced due to health concerns associated with exposure to lead. Historically, lead has been used in pesticides in fruit orchards (starting in the early 1900s) and as an additive to gasoline (between 1950 and 2000) to increase engine efficiency; both of these uses occurred worldwide (ATSDR 2007b).

Once lead enters the environment, its particulates in the air are subject to atmospheric transport and deposition, allowing lead to enter sediment, soil, or surface water. Lead strongly sorbs to soil and sediment and generally will not leach into subsurface soil and groundwater. Lead in surface water exists primarily in an undissolved phase (i.e., as lead carbonate, lead oxide, and lead hydroxide) (ATSDR 2007b). In aquatic environments, benthic organisms and algae have the highest lead concentrations. Higher-trophic-level species may experience toxic effects as a result of increased lead concentrations in their diet (ATSDR 2007b; Eisler 2000).

Lead can adversely affect survival, growth, reproduction, development, and metabolism of many species under controlled conditions, but its effects are substantially modified by numerous physical, chemical, and biological variables. Adverse effects on aquatic biota include reduced survival, impaired reproduction, reduced growth, and high bioconcentration from the medium (Eisler 2000). Among sensitive species of birds and mammals, survival and reproduction were impaired, and signs of poisoning were evident at low lead ingestion doses (Eisler 2000). In general, routes of administration other than lead ingestion are unlikely to cause clinical signs of lead poisoning in birds and mammals. In general, organic lead compounds are more toxic than inorganic lead compounds, and food-web biomagnification of lead is negligible (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

13.1 Benthic Invertebrates

13.1.1 Toxicity Profile

Lead bioaccumulation in aquatic species is usually highest in algae and benthic organisms and lowest in upper-trophic-level predators, but lead has been shown to be toxic to all trophic levels (Eisler 2000). Lead exposure increased mortality for Indian prawn shrimp (*Penaeus indicus*) (Chinni et al. 2002), reduced reproductive output and caused immobilization in *Daphnia magna* (USEPA 1985; Berglind et al. 1985; Demayo et al. 1982), reduced hatching success in the snail (*Lymnaea palustris*) (Borgmann et al. 1978), inhibited development in the sea urchin (*Anthocidaris crassispina*) (Kobayashi 1971), and inhibited reproduction in the polychaete *Neanthes arenaceodentata* (USEPA 1985).

13.1.2 TRVs

Table D-46 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-46 Benthic Invertebrate Lead TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	4	40	Spehar et al. 1978 (amphipod survival)	1	a,b
		0.52	2.6	Borgmann and Norwood 1999 (amphipod survival)	2	a

Notes:
[1] = Total TEQ refers to total dioxin/furan TEQ, total PCB TEQ, and total PCB and dioxin/furan TEQ
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

Three studies were found that reported lead toxicity to benthic invertebrates and the lowest LOAEL from these studies, 40 mg/kg ww, from Spehar et al. (1978) was selected as the LOAEL TRV. This study exposed the amphipod *G. psuedolimnaeus* to water-based lead concentrations for 28 days and recorded mortality. A NOAEL was not available from this study and was estimated from the LOAEL using an extrapolation factor of 10. There is uncertainty in using an extrapolation factor to derive a NOAEL.

The LOAEL (2.6 mg/kg ww) and NOAEL (0.52 mg/kg ww) derived in the LPR FFS (USEPA 2014) were also used as TRVs. Both were from the study by Borgmann and Norwood (1999) and based on increased mortality of the amphipod *H. azteca* in a four-week spiked sediment toxicity test. The LOAEL was derived from the LC25 and the NOAEL TRV was derived using an extrapolation factor of five applied to the LOAEL. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

13.2 Fish

13.2.1 Toxicity Profile

Lead exposure in fish has been shown to cause increased mucous formation, which coagulates over the entire body and is particularly prominent over the gills, interfering with respiratory function and resulting in death by anoxia (Aronson 1971; NRCC 1973). Fish, including, brook trout, rainbow trout, rosy barb (*Puntius conchonius*), zebrafish (*Brachydanio rerio*), and coho salmon that are continuously exposed to elevated concentrations of waterborne lead show various signs of lead poisoning, including: spinal curvature; anemia; darkening of the dorsal tail region, producing a black-tail effect due to selective destruction of chromatophores but not of melanophores; degeneration of the caudal fin; destruction of spinal neurons; reduced ability to swim against a current; destruction of the respiratory epithelium; basophilic stippling of erythrocytes; muscular atrophy; paralysis; renal pathology; growth inhibition; retardation of sexual maturity; altered blood chemistry; testicular and ovarian histopathology; and death (Aronson 1971; NRCC 1973; Adams 1975; Davies et al. 1976; Holcombe et al. 1976; Hodson et al. 1977,

1980, 1982; Johansson-Sjobeck and Larsson 1979; Reichert et al. 1979; Ozoh 1980; Demayo et al. 1982; Kumar and Pant 1984; Rai and Qayyum 1984; Hodson and Spry 1985; Haux et al. 1986).

13.2.2 TRVs

Table D-47 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-47 Fish Lead TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	2.5	4.0	Holcombe et al. 1976 (brook trout growth)	1	a
		0.4	4.0	Holcombe et al. 1976 (brook trout reproduction)	2	a, b
Fish diet	mg/kg bw/day	12.6	Not derived	Mount et al. 1994 (rainbow trout growth)	3	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)
3 = TRV derived for the NBSA BERA

13.2.2.1 Fish Whole-Body Tissue

LOAELs were available for two species of fish (fathead minnow and brook trout), ranging from 4.0 to 26.2 mg/kg ww. Holcombe et al. (1976) exposed juvenile brook trout to water-based lead concentrations for 3 generations over 3 years, resulting in the lowest reported LOAEL; this study was selected for TRV derivation. A LOAEL of 4.0 mg/kg ww (assuming 80% moisture) was identified and associated with decreased egg hatchability of the third generation of fish. No effects on survival, growth, or reproduction were observed at this exposure level in the preceding two generations; however, there was a clear dose-response relationship for increased scoliosis that affected spawning behavior. A NOAEL of 2.5 mg/kg ww (assuming 80% moisture) was also identified from the same study. These values were selected as TRVs. The paucity of data increased the uncertainty of the selected TRVs.

The LPR FFS (USEPA 2014) also selected a LOAEL TRV of 4.0 mg/kg ww based on data from Holcombe et al. (1976); however, the endpoint selected was different – reproductive (i.e., deformed spines in third-generation fish). The NOAEL of 0.4 mg/kg ww was extrapolated from the LOAEL using an uncertainty factor of 10. There is uncertainty associated with the use of an extrapolation factor to derive the NOAEL.

13.2.2.2 Fish Diet

The NBSA LOAEL TRV for lead was based on the study by Mount et al. (1994), who exposed rainbow trout to lead in the diet for 60 days and found no reduced survival associated with the highest test concentration of 12.6 mg/kg bw/day, which was selected as the NOAEL TRV. No LOAEL TRV was available from this study, and one was not estimated using extrapolation factors. The LPRSA BERA (Windward 2019) and LPR FFS (USEPA 2014) did not develop fish dietary TRVs for lead. There is uncertainty in estimating the potential for adverse effects from an unbounded NOAEL and that the TRV was based on a single study.

13.3 Birds

13.3.1 Toxicity Profile

Lead accumulated in aquatic vertebrates tends to increase with increasing age of the organism and tends to deposit in hard tissues, such as bone and teeth (Eisler 2000). Adverse effects on birds, as a result of dietary exposure to lead, have been studied for a variety of bird species, including domesticated birds (chicken and Japanese quail) and non-domesticated birds (American kestrel, mallard duck, and ringed turtle-dove) (Kendall and Scanlon 1982; Hoffman et al. 1985; Pattee 1984; Edens et al. 1976). These studies found decreased reproductive success in Japanese quail based on decreases in egg production and hatchability (Morgan et al. 1975; Edens et al. 1976). Numerous laboratory studies found other adverse effects, including damage to the nervous system, muscular paralysis, kidney and liver damage, internal lesions, enlarged gall bladder, anemia, reduced brain weight, and abnormal skeletal development – all of which cause a decrease in survival (Eisler 2000).

13.3.2 TRVs

Table D-48 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-48 Bird Lead TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	5.5	28	Morgan et al. 1975 (Japanese quail growth)	1	a
		0.19	1.9	Edens and Garlich 1983, as cited in USEPA 2005d (Japanese quail reproduction)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were developed in the LPRSA BERA (Windward 2019) where seven studies were found acceptable for the derivation of dietary TRVs, and four of these were prioritized as the basis because they were dietary studies of lead toxicity to birds. The lowest of the four dietary LOAELs, 28 mg/kg bw/day, was selected as the TRV and was based on a 5-week exposure of Japanese quail that noted an adverse effect on growth (Morgan et al. 1975). Specifically, the effect noted was a 10% decrease in body weight compared to the control. The NOAEL from the same study, 5.5 mg/kg bw/day, was selected as the NOAEL TRV. An uncertainty with this study is that there are unknown potential population level impacts from a 10% reduction in growth.

The LPR FFS (USEPA 2014) selected LOAEL and NOAEL TRVs of 1.9 and 0.19 mg/kg bw/day, respectively, based on USEPA's Eco SSL report for lead USEPA (2005d). These TRVs were based on Japanese quail egg production using data from Edens and Garlich (1983). An uncertainty with this study is that Japanese quails, like chickens, are a domesticated species with reproductive rates that are bred to be higher than wildlife; therefore, the implications for wildlife reproduction rates are unknown.

13.4 Mammals

13.4.1 Toxicity Profile

The exposure of mammals to high concentrations of lead in the diet has been reported to cause anemia, weight loss, muscle atrophy, paralysis, brain damage, mortality, and reproductive effects (Eisler 2000). Toxicity studies on dietary exposure to lead in mammal species (mouse and rat) reported adverse effects on reproduction, growth, and behavior. These effects included decreased offspring survival, decreased litter size, decreased offspring weight, decreased adult body weight, and decreased liver and kidney weight (Odenbro and Kihlstrom 1977; Schroeder and Mitchener 1971; Overmann 1977; Azar et al. 1973; Wise 1981; Iavicoli et al. 2006).

13.4.2 TRVs

Table D-49 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-49 Mammal Lead TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	11	90	Azar et al. 1973 (rat; growth)	1	a
		0.71	7.0	Grant et al. 1980, as cited in USEPA 2005d (rat reproduction)	2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
Source:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were developed in the LPRSA BERA (Windward 2019) where three acceptable toxicity studies were available from the literature in which mammals were exposed to dietary lead in the form of lead acetate. Two studies evaluated growth in rats (Azar et al. 1973) and mice (Wise 1981), and one study evaluated reproduction in mice (Iavicoli et al. 2006). Azar et al. (1973) reported the lowest LOAEL, 90 mg/kg bw/day, which resulted in decreased body weight of rat offspring. The NOAEL from this study was 11 mg/kg bw/day (Azar et al. 1973) and was also selected as a TRV. There is uncertainty associated with the limited number of dietary studies identified from the literature review.

The LPR FFS (USEPA 2014) selected a LOAEL TRV and NOAEL TRV of 7.1 and 0.71 mg/kg bw/day, respectively, which was based on USEPA's Eco SSL report for lead (USEPA 2005d). These TRVs were developed from a study of rats exposed to lead in drinking water and noted adverse effects on reproduction (Grant et al. 1980).

14 MERCURY/METHYLMERCURY

Mercury is a naturally occurring metal that is present in various forms, including elemental mercury, inorganic mercury (primarily as mercuric salts), and organic mercury (primarily methylmercury). Elemental and inorganic mercury can enter the environment as by-products of industrial and commercial operations (e.g., mining, emissions from coal-fired power plants, and incineration of waste-containing mercury) as well as through natural processes (e.g., weathering of rocks that contain mercury). In addition, before the 1970s (i.e., when the health effects of methylmercury were unknown), methylmercury was used as a fungicide to protect seed grain (ATSDR 1999).

Recycling of mercury in the environment often involves elemental mercury volatilizing from surface soils and waters, followed by atmospheric transport and deposition back to surface soils and waters. Mercury can also be associated with air particulates, but it is unlikely to be transported long distances (ATSDR 1999).

Mercury and its compounds have no known biological function, and the presence of mercury in the cells of living organisms is undesirable and potentially hazardous (Eisler 2000). Forms of mercury with relatively low toxicity can be transformed into forms of very high toxicity, such as methylmercury, by microorganisms in soil, sediment, and water. Methylmercury is important with regard to ecological risks, because it is soluble and mobile, rapidly bioaccumulates in aquatic organisms, and concentrates in the tissues of carnivorous fish and other organisms. It is also known to be more toxic and bioaccumulative than elemental and inorganic mercury (ATSDR 1999). Mercury is a known mutagen, teratogen, and carcinogen. At comparatively low concentrations in birds and mammals, mercury adversely affects reproduction, growth and development, behavior, blood and serum chemistry, motor coordination, vision, hearing, histology, and metabolism. Signs of acute mercury poisoning in fish include flaring of gill covers, increased frequency of respiratory movements, loss of equilibrium, and sluggishness (Eisler 2000). Signs of chronic mercury poisoning include emaciation (due to appetite loss), brain lesions, cataracts, diminished response to change in light intensity, inability to capture food, abnormal motor coordination, and various erratic behaviors (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

14.1 Benthic Invertebrates

14.1.1 Toxicity Profile

Mercury exposure adversely affects the reproduction, growth, behavior, metabolism, blood chemistry, osmoregulation, and oxygen exchange of marine and freshwater organisms. In general, the accumulation of mercury by aquatic biota is rapid, and depuration is slow. Organomercury compounds, especially methylmercury, were significantly more likely to induce adverse effects than inorganic mercury (Eisler 2000). Mercury exposure caused adverse effects on the reproduction (spawning delay, reduced fecundity, population declines) of sensitive species of aquatic organisms, including slipper limpet (*Crepidula fornicate*) and mysid shrimp (*Mysidopsis bahia*) (Gentile et al. 1983).

Reduced growth of sensitive species of aquatic organisms was found in the marine mollusc (*Crepidula fornicate*) (Thain 1984) and sea urchin larvae (USEPA 1980a). In marine molluscs exposed to mercury, the feeding of adults ceased, and the swimming rate of larval stages declined (Thain 1984).

14.1.2 TRVs

Table D-50 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-50 Benthic Invertebrate Mercury and Methylmercury TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.048	0.095	Hook and Fisher 2002 (copepod reproduction)	1, 2	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The selected TRVs were derived from a study by Hook and Fisher (2002) and were also used in the LPRSA BERA (Windward 2019) and the LPR FFS (USEPA 2014). Three studies on three invertebrate species were available and reviewed for the development of a mercury TRV for invertebrates, including two zooplankton (copepod and cladoceran) studies and one bivalve study (eastern oyster). The copepod study (Hook and Fisher 2002) had the lowest LOAEL (0.095 mg/kg ww) and represented tissue residues associated with a 50% reduction in the number of eggs produced. This LOAEL was selected as the TRV. The selected NOAEL TRV (0.048 µg/kg ww) also came from the same study.

14.2 Fish

14.2.1 Toxicity Profile

Adverse effects on five fish species (i.e., fathead minnow, golden shiner [*Notemigonus crysoleucas]*, walleye, mummichog, and rainbow trout), resulting from exposure to methylmercury in toxicological studies, included effects on growth, survival, and reproduction. Specifically, reduced survival was observed in male mummichog and rainbow trout, and reduction of growth and abnormalities in gonadal development were observed in juvenile walleye (Friedmann et al. 1996; Hammerschmidt et al. 2002; Matta et al. 2001; Rodgers and Beamish 1982; Webber and Haines 2003; Sandheinrich and Miller 2006). The exposure of mummichog, golden shiner, mosquitofish (*Gambusia affinis*), and largemouth bass to methylmercury resulted in increased mortality due to observed behavioral effects (e.g., altered male behavior and altered predator avoidance) that increased predation (Webber and Haines 2003; Kania and O'Hara 1974; Matta et al. 2001).

14.2.2 TRVs

Table D-51 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-51 Fish Methylmercury TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	0.035	0.35	Windward 2019 (12 species SSD)	1	a, b
		0.052	0.26	Beckvar et al. 2005 (seven species; growth, survival, reproduction, and behavior)	2	a, b
Fish egg	mg/kg ww	0.006	0.06	Birge et al. 1979 (channel catfish reproduction)	1, 2	b, c
Fish diet	mg/kg bw/day	0.00056	0.0056	Windward 2019 (10 species SSD)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10 or 5
c = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

14.2.2.1 Fish Whole-Body Tissue

The NOAEL and LOAEL TRVs of 0.035 and 0.35 mg/kg ww, respectively, for methylmercury derived in the LPRSA BERA (Windward 2019) were based on an SSD using 17 LOAELs for 12 species of fish reported in 14 studies based on the adverse effects on behavior, growth reproduction, or survival. Eight of these studies used dietary exposures and the other six used water exposures. LOAELs ranged from 0.47 to 22 mg/kg ww and the 5th percentile of the SSD (0.35 mg/kg ww) was less than the lowest acceptable LOAEL and was the selected LOAEL TRV for the LPRSA BERA (Windward 2019). The NOAEL TRV (0.035 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL based on an extrapolation factor.

The LPR FFS (USEPA 2014) TRVs were derived from an SSD developed by Beckvar et al. (2005) with seven species of fish, where the selected TRV LOAEL of 0.26 µm/kg ww represents the 5th percentile LOAEL using data derived from ERED. The selected TRV NOAEL of 0.052 mg/kg ww was derived from the LOAEL TRV by applying an uncertainty factor of 5.

14.2.2.2 Fish Eggs

The selected TRVs were also used in the LPRSA BERA (Windward 2019) and the draft LPR FFS (Battelle 2007). Three acceptable toxicity studies for three fish species reported the effects of methylmercury on the reproduction, behavior, physiology, and survival of fish eggs. These data, however, were not sufficient to create an SSD. The lowest LOAEL of 0.06 mg/kg ww was selected as the TRV and was the concentration in channel catfish eggs associated with a 48% survival at hatching and 30% survival at 4 days post-hatching (Birge et al. 1979). No NOAEL was reported in this study, so a NOAEL TRV of 0.0006 mg/kg ww was extrapolated from the LOAEL using a factor of 10.

14.2.2.3 Fish Diet

The selected TRVs were derived in the LPRSA BERA (Windward 2019), which Windward developed an SSD for methylmercury based on 15 LOAELs ranging from 0.0015 to 2.5 mg/kg bw/day in 10 species of fish reported in 13 studies. The 5th percentile (0.0056 mg/kg bw/day) was selected as the LOAEL TRV. A NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10. The LPR FFS (USEPA 2014) did not develop methylmercury fish dietary TRVs.

14.3 Birds

14.3.1 Toxicity Profile

In laboratory studies, adverse effects on the reproduction, growth, survival, and behavior were observed in birds as a result of dietary exposure to mercury. Specifically, the effects included reduced egg production, altered behavior of offspring, altered avoidance response, altered motivation to hunt prey, altered thermoregulation, and altered learning response behaviors in mallard ducks, young great egrets (*Ardea alba*), Japanese quails, zebra finches (*Taeniopygia guttata*), bobwhite quails, pigeons, and American kestrels (Heinz 1974, 1975, 1976, 1979; Hill and Soares 1987; Peakall and Lincer 1972). Chronic effects on birds of dietary mercury exposure included adverse effects on growth, development, reproduction, metabolism, and behavior (Eisler 2000).

14.3.2 TRVs

Table D-52 summarizes the bird TRVs used in the assessment, and the sections below describe how they were derived.

Table D-52 Bird Methylmercury TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.0096	0.096	Windward 2019 (six species SSD)	1	a, b
		0.013	0.026	Heinz 1974, 1975, 1979 (mallard duck reproduction)	3	c
Bird egg	mg/kg ww	0.18	1.8	Heinz 1974, 1976, 1979; Heinz and Hoffman 2003; (mallard duck reproduction)	1, 2	b, c

Notes:
KU = Key Uncertainty
a = TRV based on an SSD
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10
c = TRV based on a few studies

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

14.3.2.1 Bird Diet

The selected TRVs were derived in the LPRSA BERA (Windward 2019) where 11 studies on six species of birds that evaluated the effects of growth, reproduction, and mortality from methylmercury exposure were accepted to develop an SSD. LOAELs ranged from 0.064 to 8.78 mg/kg bw/day, and the 5th percentile of the SSD of 0.096 mg/kg bw/day was selected as the LOAEL TRV. The NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10.

The LPR FFS (USEPA 2014) selected LOAEL and NOAEL TRVs of 0.026 and 0.013 mg/kg bw/day, respectively, based on mallard duck reproduction data from Heinz (1974, 1975, 1979). The LOAEL TRV was derived from the reported LOAEL through the application of uncertainty factor of three that was used as an interspecies extrapolation factor, assuming mallards are three times less sensitive than the selected avian species evaluated.

14.3.2.2 Bird Eggs

Effects of mercury exposure measured in bird eggs were available from four studies all conducted on mallard ducks (Heinz 1974, 1976, 1979; Heinz and Hoffman 2003). The selected LOAEL TRV of 1.8 mg/kg ww represents the geometric mean of the five reported reproduction LOAELs where effects included embryo development, offspring survival, hatchability, avoidance response behavior, and egg/young production (Heinz 1974, 1976, 1979; Heinz and Hoffman 2003). The NOAEL TRV was estimated from the LOAEL TRV using a factor of 10. The LPR FFS (USEPA 2014) did not develop egg based TRVs for birds.

14.4 Mammals

14.4.1 Toxicity Profile

Exposure of mammals to mercury has been reported to adversely affect reproduction, growth, development, behavior, blood and serum chemistry, motor coordination, vision, hearing, histology, and metabolism (Eisler 2000). Adverse effects on growth, reproduction, behavior, and survival have been observed in mammals after dietary mercury exposure. These effects included a reduction in growth in lab rats and mink (Verschuuren et al. 1976) and significantly reduced growth and increased mortality in mink (Wobeser et al. 1976b; Aulerich et al. 1974). In addition, various studies have noted other effects, including increased adult mortality, depressed growth, altered offspring behavior, reduced whelping success, reproductive effects, changes to blood and serum chemistry, and decreased motor coordination in mink and rats (Dansereau et al. 1999; Hughes and Annau 1976; Aulerich et al. 1974; Verschuuren et al. 1976; Wobeser et al. 1976a,1976b; Schroeder and Mitchener 1975).

14.4.2 TRVs

Table D-53 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-53 Mammal Methylmercury TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.16	0.25	Wobeser et al. 1976b (mink growth and survival)	1	a
		0.016	0.027	Wobeser et al. 1976a, 1976b (mink growth and reproduction)	2	

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = LPR FFS (USEPA 2014)

The TRVs selected were those derived in the LPRSA BERA (Windward 2019) and were based on the data reported by Wobeser et al. (1976b); although, two other mink studies were also evaluated. The LOAEL of 0.25 mg/kg bw/day was based on the growth and survival of mink following exposure to methylmercury in their diet for 93 days (Wobeser et al. 1976b). These TRVs were calculated using the study endpoints and assuming a body weight of 1.34 kg and a FIR of 0.18 kg/day based on Bleavins and Aulerich (1981). There is uncertainty associated with the limited number of dietary studies identified from the literature review.

The LPR FFS (USEPA 2014) developed LOAEL and NOAEL TRVs of 0.027 and 0.016 mg/kg bw/day, respectively, also based on mink the mink study by Wobeser et al. (1976b) as well as the study by Wobeser et al. (1976a). These TRVs differed from those developed for the LPRSA BERA because: 1)

the endpoints were growth and reproduction, 2) different body weight (1 kilogram) and FIR (0.15 kg/day) from Bleavins and Aulerich (1981) and Hornshaw et al. (1983), respectively, and 3) a subchronic to chronic factor of 10 was applied to the NOAEL and LOAEL. The application of uncertainty factors to TRVs is a primary source of uncertainty in these TRVs.

15 NICKEL

Nickel is a hard, silvery-white, naturally occurring metal that combines well with other metals (e.g., iron, copper, chromium, and zinc) to form mixtures called alloys, which are used in making metal coins, jewelry, and industrial equipment. Most nickel, however, is used to make stainless steel. Nickel is primarily found in the environment combined with oxygen or sulfur as oxides or sulfides. It is released during nickel mining and by industries that make or use nickel, nickel alloys, or nickel compounds, such as oil-burning power plants, coal-burning power plants, and trash incinerators (ATSDR 2005b).

In soil or sediment, nickel strongly attaches to particles containing iron or manganese. Under acidic conditions, nickel is more mobile in soil and might seep into groundwater. Nickel does not appear to concentrate in fish. Studies show that some plants can take up and accumulate nickel. However, it has been shown that nickel does not accumulate in small animals living on land that has been treated with nickel-containing sludge (ATSDR 2005b).

A number of animal studies have assessed the toxicity of nickel following oral exposure. Significant decreases in body and organ weights (liver, kidney, pituitary) were consistently observed in rats exposed to nickel chloride (American Biogenics Corporation 1988; Research Triangle Institute 1988a,1988b), nickel acetate (Whanger 1973), or nickel sulfate (Dieter et al. 1988). Other systemic effects included kidney damage and adverse lung effects at (American Biogenics Corporation 1988; Research Triangle Institute 1988b). However, the primary targets of toxicity appear to be to the respiratory tract following inhalation exposure; the immune system following inhalation, oral, or dermal exposure; and the reproductive system and the fetus following oral exposure. The most consistently reported adverse effects resulting from exposure to nickel are contact dermatitis and respiratory effects, including cancer (ATSDR 2005b; Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

15.1 Benthic Invertebrates

15.1.1 Toxicity Profile

Adverse effects of nickel on aquatic invertebrates observed in laboratory studies include inhibited reproduction of daphnids, reduced growth in northern quahog (*Mercenaria mercenaria*), impaired reproduction and growth in water fleas, and abnormal development of sea urchin embryos (NRCC 1981; WHO 1991; Calabrese et al. 1977; Outridge and Scheuhammer 1993).

15.1.2 TRVs

Table D-54 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-54 Benthic Invertebrate Nickel TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.1	1.1	Borgmann et al. 2001 (amphipodsurvival)	1	a,b

Notes:
[1] = Total TEQ refers to total dioxin/furan TEQ, total PCB TEQ, and total PCB and dioxin/furan TEQ
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)

The nickel TRV for invertebrates was derived from a study by Borgmann et al. (2001) and were also used in the LPRSA BERA (Windward 2019). This study exposed the amphipod *Hyallela azteca* to nickel-spiked field-collected sediments for 28 days and reported mortality. The LOAEL of 1.1 mg/kg ww (assuming 80% moisture) associated with a 75% increase in mortality was selected as the LOAEL TRV. The proposed NOAEL TRV of 0.10 mg/kg ww (assuming 80% moisture) also came from the same study. An uncertainty specifically related to this study was the use of field-collected sediments with pre-spiked sediment chemistry that was not reported. The presence of sediment contaminants other than nickel could have played a role in the observed effects.

15.2 Fish

15.2.1 Toxicity Profile

Nickel accumulates in fish tissues and causes alterations in gill structure, including hypertrophy of respiratory and mucus cells, separation of the epithelial layer from the pillar cell system, cauterization and sloughing, and necrosis of the epithelium (Nath and Kumar 1989; Ellgaard et al. 1995; Ghazaly 1992; Evans et al. 1990). Sublethal effects include altered immunoregulatory mechanisms in tissues of the rainbow trout (Bowser et al. 1994) and reduced growth of rainbow trout (NRCC 1981; WHO 1991; Outridge and Scheuhammer 1993).

15.2.2 TRVs

Table D-55 summarizes the fish TRVs used in the assessment, and the section below describes how they were derived.

Table D-55 Fish Nickel TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish diet	mg/kg bw/day	0.14	1.4	Javed 2013 (Indian carp [*Labeo catla*] growth)	1	a, b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10.

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were derived in the LPRSA BERA (Windward 2019) based on the review of three acceptable studies for nickel dietary toxicity in fish. The lowest LOAEL of 1.4 mg/kg bw/day was selected as the TRV and was associated with decreased growth in Indian carp over 12 weeks (Javed 2013). Because a NOAEL was not reported in this study, it was estimated using an extrapolation factor of 10. The reported food ingestion rate in the study was very low (0.18 to 0.19% bw/day), and to convert to a dietary dose, a FIR was assumed to be 2% bw/day. The LPR FFS (USEPA 2014) did not develop TRVs based on fish diet.

15.3 Birds

15.3.1 Toxicity Profile

Adverse effects of nickel on birds include metabolic upset, altered bone densities, inhibited growth and reduced survival in mallard ducks (Eisler 2000), decreased growth and survival, and increased nickel concentrations in bone and kidney in domestic chickens (Ling and Leach 1979). Chick embryos receiving injected doses of nickel had increased mortality (Ridgway and Karnofsky 1952) and disrupted glucose metabolism (Nielsen 1977).

15.3.2 TRVs

Table D-56 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-56 Bird Nickel TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	15	33	Weber and Reid 1968 (chicken growth)	1	a

Notes:
[1] = Total TEQ refers to total dioxin/furan TEQ, total PCB TEQ, and total PCB and dioxin/furan TEQ
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were derived in the LPRSA BERA (Windward 2019) and based on three acceptable studies for dietary nickel TRV derivation for birds. The lowest LOAEL of 33 mg/kg bw/day was selected as the TRV and was based on a study showing reduced growth in chickens after a 4-week exposure to nickel in the diet (Weber and Reid 1968). This LOAEL resulted in a 31% decrease in body weight compared to the control, and the NOAEL of 15 mg/kg bw/day came from the same study. The LPR FFS (USEPA 2014) did not develop TRVs for nickel.

15.4 Mammals

15.4.1 Toxicity Profile

Nickel-contaminated drinking water has adverse effects on rat reproduction and diets containing nickel carbonate, nickel chloride, or nickel sulfate cause reduced growth, disruptions of food intake and thyroid function, and emphysema and pneumonia in dogs, mice, or rats (Eisler 2000). Adverse effects of dietary exposure to nickel in rat, mouse, and dog laboratory studies include decreased body weight (Ambrose et al. 1976; Nation et al. 1985; Weber and Reid 1969), an increase in the number of stillborn young (Ambrose et al. 1976), and a decrease in the number of pups surviving to weaning (Ambrose et al. 1976; Weber and Reid 1969).

15.4.2 TRVs

Table D-57 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-57 Mammal Nickel TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	40	80	Ambrose et al. 1976 (rat reproduction)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The TRVs selected are the same as those used by LPRSA BERA (Windward 2019). Three acceptable studies were evaluated and the lowest LOAEL of 80 mg/kg bw/day was selected, which was based on reduced body weight of rat offspring over three generations (Ambrose et al. 1976). The NOAEL from this study was 40 mg/kg bw/day and was also selected as a TRV (Ambrose et al. 1976). The LPR FFS (USEPA 2014) did not develop nickel TRVs.

16 SELENIUM

Selenium is a naturally occurring metal found in air, water, sediment and soil. It may be released from natural sources (e.g., leaching and weathering of rocks, volcanic eruptions) or anthropogenic sources (e.g., manufacturing/production of rubber, metal alloys, textiles, fungicides; or burning of coal, oil, and solid waste) (USEPA 2007c). Selenium is essential for growth in plants and is an essential trace element in animals. Selenium toxicity is associated with reproductive and developmental effects in wildlife (USEPA 2007c).

The behavior of selenium in the environment is influenced by its oxidation state, which is dependent on ambient conditions, including pH, oxidation/reduction potential, and biological activity (ATSDR 2003). In surface water and sediments/soil, it is expected to be found as the salts of selenic and selenious acids. It bioaccumulates in aquatic organisms and, in some cases, may biomagnify (ATSDR 2003).

Elevated concentrations of selenium, above nutritional requirements, in diet or water were associated with growth retardation; reproductive failure and reduced hatching; and reproductive abnormalities, including congenital malformations, lowered survival, and histopathologies in liver, kidney, liver, heart, and gills (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

16.1 Benthic Invertebrates

16.1.1 Toxicity Profile

Selenite is more toxic than selenate and is preferentially concentrated over selenate by mussels (*Mytilus galloprovincialis*) (Measures and Burton 1980). Ninety-six-hour toxicity tests found LC50 values of 710 ppb for *Daphnia magna* (Halter et al. 1980) and 24,000 ppb for *Physa* sp. snails (Reading 1979). Waterborne selenium toxicity data revealed a broad range of sensitivity among taxa, with acutely (1- to 4-day test duration) toxic water concentrations spanning more than 3 orders of magnitude. *Hyalella* (Amphipoda) was the most sensitive taxon and *Nephelopsis* (Hirudinea) was the most tolerant (deBruyn and Chapman 2007). Lethal and sublethal toxic effects were observed at somewhat lower water concentrations in laboratory tests of longer duration and at much lower water concentrations in experimental streams for *Hyalella* sp. (deBruyn and Chapman 2007). Exposure to selenium in water impaired the development of *Chironomus* and *Caecidotea* (Isopoda) and reduced abundance in *Tubifex* (Tubificidae) (deBruyn and Chapman 2007). Selenium exposure in water caused reduced growth rates in the midge (*Chironomus decorus*) (Malchow et al. 1995).

16.1.2 TRVs

Table D-58 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-58 Benthic Invertebrate Selenium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.05	0.51	Malchow et al. 1995 (midge; growth)	1	a

Notes:
KU = Key Uncertainty

a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were derived from a study by Malchow et al. (1995) and were also used in the LPRSA BERA (Windward 2019). Malchow et al. (1995) exposed midges to selenate in the diet for 96 hours and reported effects on growth. The LOAEL from this study, a tissue concentration of 0.51 mg/kg ww, represents a 15% decrease in growth, which was statistically significant relative to the control. The NOAEL from the same study was 0.05 mg/kg ww. Both the LOAEL and NOAEL from this study were selected as TRVs. There is uncertainty in the potential for population-level impacts to result from a decreased growth of 15% (Vandermeer and Goldberg 2003) and also uncertainty that the LOAEL tissue concentration is associated with adverse effects given that tissue concentrations measured at 48 hours were up to 0.89 mg/kg ww yet showed no adverse effects on growth, and aquatic invertebrate background tissue concentrations are reported to range from 0.40 to 4.5 mg/kg dw (U.S. Department of the Interior 1998). These uncertainties suggest the selected TRVs may overestimate the potential for adverse effects in invertebrates based on selenium tissue concentrations.

16.2 Fish

16.2.1 Toxicity Profile

All embryos of the zebrafish survived exposure to 3,000 ppb of selenium during development, but more than 90% of the resultant larvae died soon after hatching. At 1,000 ppb, survival was similar to that in controls (Niimi and LaHam 1975). Failed reproduction and population declines were found in green sunfish (*Lepomis cyanellus*) from a lake in North Carolina receiving selenium (as fly ash wastes from a coal-fired power station). The selenium levels were elevated in the liver and other tissues; kidney, heart, liver, and gills showed histopathology; and the blood chemistry was altered. Ovaries of these fish had numerous necrotic and ruptured egg follicles that may have contributed to the population extinction (Sorensen et al. 1984). In laboratory tests, eggs of common carp (*Cyprinus carpio*) hatched normally when incubated in media containing 5,000 ppb of selenium (Huckabee and Griffith 1974), as did eggs of lake trout (*Salvelinus namaycush*) at 10,000 ppb of selenium (Klaverkamp et al. 1983). Exposure to selenium was associated with anemia and reduced hatchlings (Hodson et al. 1980), reduced growth in rainbow trout fry (Adams 1976), increased polyploid cells, and some deaths in the edible goby (*Boleophthalmus dussumieri*) (Krishnaja and Rege 1982).

16.2.2 TRVs

Table D-59 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-59 Fish Selenium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	Not derived	1.6	Coyle et al. 1993; Hermanutz et al. 1992; Ogle and Knight 1989 (Bluegill, sunfish, fathead minnow; reproduction)	1	a
Fish diet	mg/kg bw/day	0.011	0.11	Windward 2019 (7 species SSD)	1	b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = TRV based on an SSD

Source:
1 = LPRSA BERA (Windward 2019)

16.2.2.1 Fish Whole-Body Tissue

The selected TRVs were derived in the LPRSA BERA (Windward 2019); there was a lack of sufficient whole-body LOAEL data to derive an SSD. The LOAEL TRV of 1.6 mg/kg ww was selected, which is the EC10 for maternal whole-body concentrations of the most sensitive species (bluegill sunfish and fathead minnow) evaluated by DeForest and Adams (2011) and associated with larval mortality or edema. Given the LOAEL represented an EC10 below which no adverse effects were expected, a NOAEL TRV was not defined. No TRVs were available in the LPR FFS (USEPA 2014) for selenium in fish tissue.

16.2.2.2 Fish Diet

The selected TRVs were those derived in the LPRSA BERA (Windward 2019) which developed an SSD from eight dietary studies of selenium in fish, examining growth, reproduction, and mortality. These studies reported nine LOAELs for selenium ranging from 0.19 to 1.2 mg/kg bw/day in seven species of fish (Chinook salmon, rainbow trout, bluegill, Sacramento splittail [*Pogonichthys macrolepidotus*], striped bass, white sturgeon, and fathead minnow). The LOAEL TRV (0.11 mg/kg bw/day), represents the 5th percentile, which is less than the lowest measured LOAEL reported in the literature. A NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10. There were not selenium dietary fish TRVs developed in the LPR FFS (USEPA 2014).

16.3 Birds

16.3.1 Toxicity Profile

Embryos of the domestic chicken are extremely sensitive to selenium. Hatchability of domestic chicken eggs was reduced by concentrations of selenium in feeds (6 to 9 ppm) that were too low to produce poisoning in other avian species. Adverse effects of dietary exposure to selenium were associated with decreased egg weight, decreased egg production and hatchability, anemia, elevated kidney selenium residues in chicks, and a high incidence of grossly deformed embryos with missing or distorted eyes, beaks, wings, and feet (Ort and Latshaw 1978; Harr 1978). Selenomethionine was more effective than sodium selenite in raising the selenium content of tissues and eggs (Moksnes 1983).

Ohlendorf and Harrison (1986) reported severe reproductive effects in ducks (*Anas* spp.), American coots, and other species of aquatic birds nesting at irrigation drainwater ponds in the San Joaquin Valley, California, which contained high concentrations of selenium at approximately 300 ppb. Of 347 nests examined from this site, approximately 40% had at least one dead embryo and approximately 20% had at least one embryo or chick with obvious external anomalies, including missing or abnormal beaks, eyes, wings, legs, or feet. In addition, brain, heart, liver, and skeletal anomalies were recorded.

Heinz et al. (1987; 1989) evaluated the effects of dietary selenium on mallard duck reproduction. Ducks given diets containing 100 ppm of inorganic selenite usually died within a month and exhibited reduced food intakes and significant weight loss.

16.3.2 TRVs

Table D-60 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-60 Bird Selenium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	0.42	0.82	Heinz et al. 1989 (mallard duck reproduction)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were derived in the LPRSA BERA (Windward 2019) where six studies were acceptable for the development of TRVs for selenium toxicity in birds. The lowest of these LOAELs, 0.82 mg/kg bw/day, was selected as the LOAEL TRV based on a study that exposed mallard ducks to selenium in the diet for 100 days (Heinz et al. 1989). At this LOAEL, there was a significant effect on offspring growth and survival compared to the control. The NOAEL of 0.42 mg/kg bw/day came from the same study and was selected as the NOAEL TRV. The TRVs derived from this study are the same as

those reported by Sample et al. (1996). Bird selenium TRVs were not developed in the LPR FFS (USEPA 2014).

16.4 Mammals

16.4.1 Toxicity Profile

Selenosis caused congenital malformations, reduced reproduction, and high offspring mortality in rats, mice, swine (*Sus scrofa domesticus*), and cattle (Harr 1978; National Research Council 1983). In rats, selenium did not induce cirrhosis or neoplasia; however, intestinal lesions were observed during lifetime exposure to selenium (Harr 1978; National Research Council 1983). Yonemoto et al. (1983) demonstrated that some selenotoxic effects in mice, including abortion and maternal death, were prevented by prior treatment with vitamin E.

16.4.2 TRVs

Table D-61 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-61 Mammal Selenium TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	0.016	0.16	Behne et al. 1992 (rat growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)

The LPRSA BERA (Windward 2019) developed TRVs based on the review of four accepted studies and selected the lowest LOAEL (0.16 mg/kg bw/day), which was based on a decrease in the body weights of rats exposed to dietary selenomethionine (Behne et al. 1992). Because the study did not have a NOAEL it was estimated from the LOAEL using an uncertainty factor of 10 resulting in a TRV of 0.016 mg/kg bw/day. There is uncertainty associated with the limited number of dietary studies identified from the literature review. There is also uncertainty associated with the use of an extrapolation factor to derive a NOAEL. The LPR FFS did not develop a mammal diet TRV for selenium (USEPA 2014).

17 SILVER

Photographic materials and mining are the major anthropogenic sources of silver released into the environment (ATSDR 1990). It is also released naturally by the breakdown of silver-bearing rocks and soil by wind and rain. Silver may biomagnify in some aquatic invertebrates (Adriano 1986), and it is highly toxic to aquatic organisms (Eisler 2000). Elevated concentrations can cause larval mortality, developmental abnormalities, and reduced larval growth in fish; growth reduction in juvenile mussels (Calabrese et al. 1984); and adverse effects on reproduction in gastropods (Nelson et al. 1983). Silver is toxic to soil microbes, thus inhibiting biotransformation (ATSDR 1990). Effect of silver exposure on aquatic organisms include inhibition of reproduction and histopathologies in major organ systems, and effects on birds and mammals include pulmonary edema, congestion, and mortality (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

17.1 Benthic Invertebrates

17.1.1 Toxicity Profile

Aquatic insects concentrate silver in relative proportion to environmental levels (Nehring 1976). Marine gastropods exposed to silver exhibited inhibited reproduction (Nelson et al. 1983) and juvenile Pacific oysters (*Crassostrea gigas*) had high silver accumulations in tissues and a reduced capacity to store glycogen (Berthet et al. 1990). Grass shrimp incorporate silver dissolved in brackish water but not from planktonic or detrital food sources containing elevated silver burdens (Connell et al. 1991). Variations in the ability of decapod crustaceans to accumulate silver are potentially due to differences in hepatopancreas morphology, with bioconcentration factors ranging from 70 to 4,000 (Pouvreau and Amiard 1974). The hepatopancreas, or digestive gland, is the major repository of silver in decapods (Greig 1979; Greig et al. 1977). Whole-body bioconcentration factors of silver in three species of aquatic insects ranged from 21 to 240 in water during exposure of 3 to15 days. In bluegill sunfish (*Lepomis macrochirus*), this value was less than 1 after exposure for 28 days (USEPA 1980b). The marine gastropod (*Crepidula fornicata*) exposed to silver in water showed histopathology and inhibited reproduction (Nelson et al. 1983). Molt frequency of a mayfly (*Isonychia bicolor*) was a sensitive indicator of silver stress over time (Diamond et al. 1990). Other adverse effects include reduced growth rates in Eastern oysters and mussels (Berthet et al. 1992, Sanders et al. 1990) and inhibition of embryonic development in mussels (Bryan and Langston 1992).

17.1.2 TRVs

Table D-62 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-62 Benthic Invertebrate Silver TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	0.49	0.59	Naddy et al. 2007 (Daphnia growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The only study found acceptable for the derivation of a TRV was Naddy et al. (2007). This study exposed the cladoceran to water-based silver for 7 days and examined the effects of growth and reproduction. This study determined a LOAEL of 0.59 mg/kg ww and a NOAEL of 0.49 mg/kg ww that was associated with reduced growth and reproduction. Both were accepted as TRVs and were also used in the LPRSA BERA (Windward 2019).

17.2 Fish

17.2.1 Toxicity Profile

Silver ion (Ag+) is reportedly the most toxic chemical species of silver to fishes. Silver ion was 300 times more toxic than silver chloride to fathead minnows, 15,000 times more toxic than silver sulfide, and more than 17,500 times more toxic than silver thiosulfate complex. In all cases, toxicity reflected the free silver ion content of tested compounds (LeBlanc et al. 1984). A similar pattern was noted in rainbow trout (Hogstrand et al. 1996). Silver was less toxic to fathead minnows under conditions of increasing water hardness between 50 and 250 milligrams CaCO3/L, which increased the pH between 7.2 and 8.6. Eggs of rainbow trout exposed to silver had increased embryotoxicity and hatched prematurely; resultant fry had a reduced growth rate (Davies et al. 1978). Accumulation of silver in largemouth bass and bluegills increased with increasing concentrations of ionic silver and increasing duration of exposure (Coleman and Cearley 1974). The liver is usually considered the major repository of silver in fish (Garnier et al. 1990).

17.2.2 TRVs

Table D-63 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-63 Fish Silver TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	0.11	0.24	Guadagnolo et al. 2001 (rainbow trout mortality)	1	a
Fish diet	mg/kg bw/day	70	Not derived	Galvez and Wood 1999 (rainbow trout growth)	2, 3	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Sources:
1 = LPRSA BERA (Windward 2019)
2 = TRV derived for the NBSA BERA
3 = LPRSA BERA (Windward 2019) Appendix A3-1

17.2.2.1 Fish Whole-Body Tissue

The selected TRVs were developed in the LPRSA BERA (Windward 2019) where only one study examining effects on survival to meet TRV acceptability criteria was found. Guadagnolo et al. (2001) exposed embryonic rainbow trout to aqueous silver for 32 days and determined a mortality LOAEL of 0.24 mg/kg ww and a NOAEL of 0.11 mg/kg ww. Both were selected as TRVs. An uncertainty in this study was that tissue burdens did not consistently correlate with mortality; therefore, adverse effects were not dependent on tissue concentrations. The LPR FFS (USEPA 2014) did not develop TRVs for silver.

17.2.2.2 Fish Diet

Neither the LPRSA BERA nor the LPR FFS developed dietary TRVs for fish exposed to silver. For the NBSA BERA, the TRV was derived from the study by Galvez and Wood (1999) who exposed rainbow trout to silver in the diet for 58 days and found no adverse effects on growth at 70 mg/kg bw/day, which was accepted as the NOAEL TRV. A LOAEL was not available from this study, which adds to the uncertainty of evaluating risk based on an unbounded NOAEL.

17.3 Birds

17.3.1 Toxicity Profile

Signs of chronic silver ion intoxication in tested birds included cardiac enlargement, vascular hypertension, hepatic necrosis, anemia, lowered immunological activity, altered membrane permeability, kidney pathology, enzyme inhibition, growth retardation, and a shortened life span (Smith and Carson 1977; Freeman 1979; ATSDR 1990).

Turkey poults (*Meleagris gallopavo*) on diets containing silver had enlarged hearts and reduced growth, hemoglobin, and hematocrit (USEPA 1980b). Chicken eggs injected with silver nitrate had a 50% reduction in survival but no developmental abnormalities (Ridgway and Karnofsky 1952). Growth

suppression and liver necrosis were adverse effects of silver on chicks (Smith and Carson 1977). Chicks on copper and vitamin E-deficient diets experienced reduced growth when given drinking water or food containing silver (Smith and Carson 1977).

17.3.2 TRVs

Table D-64 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-64 Bird Silver TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	9.86	98.6	USEPA 2006b (mallard duck mortality)	1	a, b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = LOAEL estimated from a NOAEL with an extrapolation factor of 10.

Source:
1 = TRV derived for the NBSA BERA

Neither the LPRSA BERA (Windward 2019) nor the LPR FFS (USEPA 2014) developed bird dietary TRVs for silver. Therefore, the selected TRVs were derived specifically for the NBSA site based on the study by Van Vleet (1977) as cited in the EcoSSL for silver (USEPA 2006b). The LOAEL of 98.6 mg/kg bw/day was reported as a mortality LOAEL following three weeks of dietary exposure of juvenile mallards (USEPA 2006b). This study did not report a NOAEL thus, the NOAEL TRV was estimated from the LOAEL using an extrapolation factor of 10.

17.4 Mammals

17.4.1 Toxicity Profile

Studies with small laboratory mammals show that long-term exposure to high levels of silver nitrate in drinking water may result in sluggishness and enlarged hearts (ATSDR 1990), kidney damage, impaired conditioned-reflex activities, immunological resistance, and altered brain nucleic acid content (USEPA 1980b). The extent of absorption of an administered dose of silver depends on silver speciation, the presence and extent of silver-binding proteins, and other variables.

Sublethal effects include brain histopathology in rabbits, kidney damage in rats, sluggishness in mice, reduce growth in guinea pigs, and high accumulations in the kidneys and liver and liver necrosis in rats (ATSDR 1990; USEPA 1980b).

17.4.2 TRVs

Table D-65 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-65 Mammal Silver TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	18.8	188	Shavlovski et al. 1995 (rat reproduction); cited in USEPA 2006b	1	a,b

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = TRV derived for the NBSA BERA

The silver LOAEL TRV of 188 mg/kg bw/day was derived from the USEPA (2006b) Silver Eco SSL report and, specifically, the study by Shavlovski et al. (1995), which reported reproductive effects on rats. A NOAEL was estimated using a factor of 10 applied to the LOAEL. This was the only study accepted by USEPA for the reproduction endpoint. There is uncertainty with only having a single TRV, a LOAEL, as the basis of the assessment. Neither the LPRSA BERA (Windward 2019) nor the LPR FFS (USEPA 2014) developed mammal dietary TRVs for silver.

18 ZINC

Zinc is one of the most common elements in the Earth's crust. It is used for a variety of industrial purposes, including as a coating for iron or other metals to prevent rust and corrosion or mixed with other metals to form alloys, such as brass and bronze. Zinc sulfide and zinc oxide are used to make white paints, ceramics, rubber, and other products. Zinc compounds are used to preserve wood, to manufacture and dye fabrics, and by the drug industry in common products, such as vitamin supplements, sun blocks, deodorants, skin preparations, and anti-dandruff shampoos (ATSDR 2005c).

Zinc enters the air, water, and soil as a result of both natural processes and human activities. Zinc is an essential nutrient to animals, but elevated exposure levels can be toxic to many types of plants and animals, where growth, survival, and reproduction can all be adversely affected (Eisler 2000). In aquatic systems, zinc tends to be partitioned into sediment and less frequently dissolved as hydrated zinc ions and organic and inorganic complexes (MacDonald 1993). Elevated zinc levels can cause mortality, pancreatic degradation, reduced growth, and decreased weight gain in birds (Eisler 2000; NAS 1980). Elevated zinc concentrations can cause a wide range of problems in mammals' cardiovascular, developmental, immunological, neurological, hematological, and reproductive systems as well as target organs, including the pancreas, liver, and kidney (Eisler 2000). More specific ecotoxicity information is provided below by receptor group.

18.1 Benthic Invertebrates

18.1.1 Toxicity Profile

Molluscs tend to accumulate zinc far in excess of the organism's immediate needs without negative impacts (Eisler 2000). Eastern oysters, for example, may naturally contain up to 4 g/kg soft parts, which is comparable to accumulations observed in oysters exposed to 0.2 mg/L for 20 weeks (NAS 1979). Zinc tends to accumulate in the molluscan digestive gland and stomach (Eisler 2000; Sprague 1986; Sullivan et al. 1988), the kidneys in mussels and scallops (Pectinidae), and the digestive gland in oysters (Sprague 1986). Zinc in molluscan tissues is usually elevated under conditions of increasing water temperature and pH and decreasing salinity (Eisler 2000) but can vary among species (Chu et al. 1990). Variations in zinc content of clam tissues were associated with seasonal changes in tissue weights (Cain and Luoma 1986). Unlike decapod crustaceans, marine amphipods do not regulate body zinc concentrations, and body burdens of zinc may reflect sediment total zinc levels (Rainbow et al. 1989).

Zinc was most toxic to molluscs at elevated temperatures (Eisler 1977; Sprague 1986; Khangarot and Ray 1987), in comparatively soft water or to marine molluscs in low salinity (Sprague 1986; Khangarot and Ray 1987), at earlier developmental stages (Munzinger and Guarducci 1988), at low dissolved oxygen concentrations (Khangarot and Ray 1987), and with increasing exposure to high zinc concentrations (Amiard et al. 1986). Toxicity was usually greatest to marine crustaceans and larvae (Eisler 1980).

Adverse effects of zinc to crustaceans include gill histopathology in prawns (*Macrobrachium hendersodyanum*) (Patel and Kaliwal 1989); increased tissue total proteins, decreased glycogen, and decreased acid phosphatase activity in crabs (*Portunus pelagicus*) (Hilmy et al. 1988); and reduction in

limb regeneration of fiddler crabs (Weis 1980). Freshwater insects, including many species of mayflies, damselflies, stoneflies, and caddisflies, are relatively tolerant to zinc, with LC50 values usually >1.33 mg/L – although some species were adversely affected at concentrations between 30 and 37 µg/L (USEPA 1987).

18.1.2 TRVs

Table D-66 summarizes the benthic invertebrate TRVs used in the assessment, and the section below describes how they were derived.

Table D-66 Benthic Invertebrate Zinc TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Benthic invertebrate whole-body tissue	mg/kg ww	5.1	51	Muyssen et al. 2006 (crustacean survival)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study
b = NOAEL estimated from a LOAEL with an extrapolation factor of 10

Source:
1 = LPRSA BERA (Windward 2019)

Zinc is an essential nutrient for invertebrates, and thus they have mechanisms to regulate their tissue burdens (Rainbow 2007). A whole-body zinc concentration of 6.9 mg/kg ww is considered to represent a level consistent with nutritional requirement (Rainbow 2007). Muyssen et al. (2006) reported a LOAEL of 51 mg/kg ww associated with reduced *D. magna* survival during a 21-day aqueous zinc exposure. This was the lowest chronic LOAEL for crustaceans that was greater than the zinc nutritional threshold and was selected as a TRV in the LPRSA BERA (Windward 2019). No NOAEL was available from this study; therefore, a NOAEL TRV (5.1 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10. There is uncertainty associated with the derivation of a NOAEL using an extrapolation factor.

18.2 Fish

18.2.1 Toxicity Profile

Freshwater fish are more sensitive to zinc than marine species, and embryos and larvae are the most sensitive developmental stages. Zinc toxicosis affects freshwater fish by destruction of gill epithelium and consequent tissue hypoxia. Signs of acute zinc toxicosis in freshwater fish include osmoregulatory failure, acidosis and low oxygen tensions in arterial blood, and disrupted gas exchange at the gill surface and at internal tissue sites (Spear 1981). Zinc poisoning caused fish to swim at the surface, be lethargic and uncoordinated, hemorrhage at the gills and base of fins, shed scales, and exude extensive body and gill mucous (Bengeri and Patil 1986). Acute zinc poisoning in fish is generally caused by blocking gas exchange across the gills, causing hypoxia at the tissue (Burton et al.1972; NAS 1979; Everall et al. 1989; Grobler et al. 1989). Cardiorespiratory responses to zinc in the spangled perch (*Leiopotherapon*

unicolor) are similar to those induced by hypoxia. Zinc-poisoned perch had damaged gill epithelia, resulting in impaired gas exchange and lowered oxygen tension in arterial blood (Gehrke 1988). Acute exposures to high-lethal concentrations of zinc also caused histopathology of epithelia lining the oral capacity (Eisler 2000).

18.2.2 TRVs

Table D-67 summarizes the fish TRVs used in the assessment, and the sections below describe how they were derived.

Table D-67 Fish Zinc TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Fish whole-body tissue	mg/kg ww	287	403	Pierson 1981 (guppy growth)	1	a
Fish diet	mg/kg bw/day	19	38	Takeda and Shimma 1977 (rainbow trout growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

18.2.2.1 Fish Whole-Body Tissue

The selected TRVs were derived in LPRSA BERA (Windward 2019) where four studies were found to be acceptable to derive fish tissue TRVs for zinc. Zinc is an essential nutrient for fish. Nutritional thresholds for fish in the literature range from 10 – 100 mg/kg ww (Sun and Jeng 1998; Schmitt and Brumbaugh 1990). The lowest LOAEL (403 mg/kg) that is also greater than the nutritional threshold, was selected as the TRV based on the study by Pierson (1981). This study exposed immature guppies to aqueous zinc for 134 days and the LOAEL was associated with reduced growth and reproduction. The NOAEL of 287 mg/kg ww came from the same study and was also selected as the TRV. The LPR FFS (USEPA 2014) did not derive TRVs for zinc in fish.

18.2.2.2 Fish Diet

The selected TRVs were derived in the LPRSA BERA (Windward 2019) and were based on the study by Takeda and Shimma (1977) who reported a 20% reduction of growth in rainbow trout at a dietary concentration of 38 mg/kg bw/day. This was used as the LOAEL TRV. The NOAEL of 19 mg/kg bw/day was identified in the same study and was also selected as the TRV. The food ingestion rate was not reported in this study, so the doses were estimated in the LPRSA BERA assuming an average rainbow trout feeding rate of 1.9% bw/day (Windward 2019). The LPR FFS (USEPA 2014) did not derive TRVs for zinc in fish.

18.3 Birds

18.3.1 Toxicity Profile

Zinc excess in avian species is associated with decreased body weight, gizzard and pancreatic lesions, and biochemical changes (WHO 2001) and can cause mortality, pancreatic degradation, reduced growth, and decreased weight gain in birds (Eisler 2000; NAS 1980). Adverse effects found in laboratory exposure studies include pancreatic degeneration in ducks, reduced growth in domestic chickens, and experienced pancreas histopathology when fed a selenium-deficient but zinc-adequate diet (Eisler 2000).

18.3.2 TRVs

Table D-68 summarizes the bird TRVs used in the assessment, and the section below describes how they were derived.

Table D-68 Bird Zinc TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Bird diet	mg/kg bw/day	82	124	Roberson and Schaible 1960 (chicken growth)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs for zinc were derived in the LPRSA BERA (Windward 2019) based on a review of six toxicity studies conducted with chickens and mallard ducks. A decrease in chick body weight by as much as 21% (compared to the control) was observed after exposure to zinc at a dietary dose of 124 mg/kg bw/day for five weeks (Roberson and Schaible 1960). This dietary dose was accepted as the LOAEL TRV. The next lowest dose of 82 mg/kg bw/day did not have a significant effect on growth and was accepted as the NOAEL TRV.

18.4 Mammals

18.4.1 Toxicity Profile

Zinc is an essential nutrient for regulating a number of metalloenzymes in animals (ATSDR 2005c). Absorption of zinc occurs in the intestine, particularly the duodenum (ATSDR 2005c). Following absorption by the intestine, zinc is rapidly distributed to the liver, kidneys, prostate, muscles, bones, and pancreas. Zinc can have negative effects on tissues; interfere with the metabolism of other ions (such as copper, calcium, and iron); inhibit erythrocyte production and function; and have cardiovascular, developmental, neurological, immunological, liver, and kidney effects (Eisler 2000; Domingo 1994; ATSDR 2005c; WHO 2001; European Chemicals Bureau 2004). Mammalian studies have shown

vomiting, depressed growth rate, purgation, and ataxia after exposure to excess zinc (Clarke et al. 1981; Friberg et al. 1986). Mammals are fairly tolerant of extended periods on diets containing >100 times the minimum daily zinc requirement. But excessive zinc through inhalation or ingestion harms mammalian survival, metabolism, and well-being (Eisler 2000).

18.4.2 TRVs

Table D-69 summarizes the mammal TRVs used in the assessment, and the section below describes how they were derived.

Table D-69 Mammal Zinc TRVs

Assessment	Unit	NOAEL	LOAEL	Study	Source Note	KU
Mammal diet	mg/kg bw/day	160	320	Schlicker and Cox 1968 (rat reproduction)	1	a

Notes:
KU = Key Uncertainty
a = TRV based on a single study

Source:
1 = LPRSA BERA (Windward 2019)

The selected TRVs were the same as those used in the LPRSA BERA (Windward 2019) and were derived from the study by Schlicker and Cox (1968). The LOAEL TRV (320 mg/kg bw/day) reduced fetal growth. The NOAEL from this study, 160 mg/kg bw/day, was also used as the TRV. The LPR FFS (USEPA 2014) did not derive TRVs for zinc in mammals.

19 TRV UNCERTAINTIES

This section discusses some of the key uncertainties regarding TRVs. TRV-related uncertainty is a key factor affecting the magnitude of risk estimates. Two primary means by which this assessment attempted to reduce uncertainty in the TRVs was by 1) using TRVs already accepted by USEPA in other regional assessments, and 2) quantifying the TRV uncertainty by calculating a range of HQs using multiple sets of TRVs. Two sets of TRVs available from regional ecological risk assessment were evaluated in the NBSA BERA:

1. TRVs developed for the LPRSA BERA (Windward 2019).
2. TRVs developed for the LPR FFS (USEPA 2014).

Use of consistent TRVs at these sites allows for comparison of risk estimates presented herein with those in the LPRSA BERA (Windward 2019) and LPR FFS (USEPA 2014). In some cases, TRVs were derived for COPECs unique to the NBSA, or TRVs were revised from values used in the LPR assessments to be more relevant to species in the NBSA (e.g., for marine species). However, the same TRV derivation approach was used herein as in these other assessments; thus, the inherent uncertainty is not expected to be substantially different from the inherent uncertainty associated with the TRVs used in the other assessments. In general, the USEPA acknowledges and GSH concurs that the LPR FFS TRVs are more conservative than comparable TRVs developed by the Cooperating Parties Group. The intent of using both TRV sources, when available, is to understand the potential range of effects within a particular trophic category from more sensitive to less sensitive endpoint receptors.

The potential for TRV uncertainty to affect the magnitude and direction (over- or under-estimation) of risk estimates can generally not be determined with the exception of the quantitative assessment of alternate TRVs, which has been previously discussed in the uncertainty sections for each specific receptor. Additionally, there is uncertainty related to COPECs with lacking or estimated TRVs. These specific sources of TRV uncertainty are discussed below.

19.1 COPECs with Limited Toxicity Data TRVs

Most of the TRVs are based on a single study that met the acceptability criteria for TRV development and, if several studies met these criteria, was the study with the lowest LOAEL and the highest NOAEL below the LOAEL. In most cases, if a study provided the basis for the NOAEL TRV, the NOAEL TRV was obtained from the same study as the LOAEL TRV. The fundamental uncertainty with this approach is the number of studies evaluated. Confidence increases and uncertainty decreases when more toxicological data are available for consideration. For COPECs with limited toxicity data, three things are likely: 1) toxicity information is lacking because those COPECs are comparatively not as toxic or bioaccumulative as COPECs for which large amounts of toxicological information are available (i.e., highly toxic compounds have been prioritized and investigated); 2) these COPECs likely have a smaller footprint at the site compared to the primary COPECs; and 3) the occurrence of the footprint of these COPECs likely overlaps with the presence of other contaminants. Given that this risk assessment determined that many of the COPECs present with known toxicity were found to be present at levels that do not pose adverse risk, it is also likely that the magnitude of risk for COPECs without TRVs is minimal.

19.2 Non-COPEC Pesticides Detected in Sediments and Biota

Additional organochlorine pesticides were detected in NBSA sediment and tissue samples, but were not included as COPECs, as they have limited ecotoxicological information available for them to establish TRVs. These include total BHC [alpha-, beta-, delta-, and gamma-], aldrin, and mirex. The uncertainty related to the potential for adverse effects from these compounds was qualitatively evaluated by examining the mode of action and relative toxicity as compared to pesticide COPECs for which there are TRVs and that were formally evaluated in the BERA, including: total chlordane (alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor), DDx, dieldrin, and hexachlorobenzene. In general, the potential toxicity of these compounds is within the range of the pesticide COPECs evaluated in the BERA, and none are considered as toxic as DDx (ATSDR 2002a, 2005a). As such, the risks from these compounds (based on the risk results for the BERA pesticide COPECs) are considered to be *de minimis*.

19.3 Unbounded TRVs and TRV Estimated with Extrapolation Factors

If possible, LOAEL and NOAEL TRVs were estimated from the same laboratory study. The NOAEL and LOAEL concentrations are an artifact of the exposure concentrations evaluated. The nature and magnitude of the effects, if any, that may occur between the LOAEL and NOAEL is unknown. There were several instances where only a LOAEL could be derived from a study, in which case NOAELs were estimated from these unbounded LOAELs using the well-accepted practice of applying an uncertainty factor of 10 based on USEPA guidance (USEPA 1997). Several of these LOAELs and estimated NOAELs were used in the LPRSA BERA (Windward 2019) and LPR FFS (USEPA 2014) assessments. An extrapolation factor of 10 for some chemicals may not accurately estimate the true factor difference between the LOAEL and NOAEL based on differences of dose response between chemicals. For example, where LOAELs and NOAELs were derived from the same study, the factor difference between these TRVs for mammals ranged from 2 to 499 with a median of 4. For inorganics, specifically, the median difference was 2. Thus, an extrapolation factor of 10 likely puts the estimated NOAEL below the true NOAEL in which case potential risks would be over-estimated.

In a few instances, COPEC TRVs were left unbounded, and the extrapolation factor applied to the known TRV was not used:

- Mammalian dietary NOAELs were not calculated for chromium, silver, and hexachlorobenzene.
- A bird dietary NOAEL was not derived for chlordane.
- A bird egg NOAEL was not derived for DDx.
- Fish dietary LOAELs were not calculated for chromium, lead, and silver.

Unbounded NOAELs are more uncertain than unbounded LOAELs; otherwise, the impact of bounded or unbounded TRVs cannot be determined.

Extrapolation factors were also used to adjust available bird dietary TRVs based on taxonomic differences between the test species and the ecological receptor evaluated. For example, the following are TRVs used in this assessment that were derived in the LPR FFS (USEPA 2014):

- For methylmercury, an interspecies factor of 3 was applied to the toxicity value for mallard ducks, which were assumed to be 3 times less sensitive than the selected avian species evaluated.
- For total LPAH, red-winged blackbirds were assumed to be three times more sensitive than the selected avian species evaluated.
- For total HPAH, pigeons were assumed to be three times less sensitive than selected avian species evaluated.
- For total PCB TEQ, an interspecies extrapolation factor of five was used, because it was assumed that pheasants, the test species, were five times less sensitive than chickens, known to be a highly sensitive species, and the species on which the bird TEFs are based.

The basis for selection of these uncertainty factors and their effect on the risk estimates is described in detail in the LPR FFS (Appendix D, Attachment 6; USEPA 2014). In general, these uncertainty factors are intended to adequately protect virtually all members of the feeding guild represented by the selected receptor species in the conceptual model. The degree to which these TRVs over- or under-estimate risk cannot be quantified.

19.4 Extrapolation of Laboratory-Based TRVs to Wildlife Populations

Laboratory studies are the basis from which TRVs are derived. There are several reasons toxicity tests under laboratory conditions may not represent in-situ toxicity to wildlife populations:

- The adverse effect selected may not occur in all species (i.e., species-specific responses could occur).
- Differences may be present in species sensitivity between test organisms and wildlife.
- Laboratory concentrations and exposure conditions may not be representative of concentrations and conditions to which wildlife in the natural environment are exposed.
    - In laboratory tests, the chemical may be in a more bioavailable form than the form that occurs in the environment.
    - Laboratory tests typically expose the test species to one chemical, while in the natural environment, there is exposure to multiple chemicals at the same time.
    - While lab tests are often short-term exposures, the study design typically employs consistent chemical doses, which may not be representative of wildlife exposures that naturally vary based on foraging behavior and food availability.
- Experimental data are not available for chronic effects on reproduction or growth.
    - Sub-chronic laboratory data often require extrapolation to chronic effect levels using uncertainty factors.
    - Potential population-level effects in the field cannot be inferred from laboratory study effects on individuals other than to presume that the level of protection provided by these TRVs errs on the side of being overly protective.
- Population-level impacts depend on many site-specific factors besides the presence of COPECs (i.e., habitat availability, population age structure, immigration and emigration, reproduction rates, prey availability).

19.5 SSD Tissue TRV Uncertainty

In instances where there were sufficient toxicological data (i.e., five accepted studies or more as determined by the LPRSA BERA), a TRV was developed from an SSD, where the LOAEL TRV was generally selected from the lower tail of the SSD (most often the 5th percentile value). The NOAEL TRV was selected as the highest NOAEL below the LOAEL TRV. This approach is used by USEPA to develop National Ambient Water Quality Criteria and is intended to include the range and distribution of species sensitivities in natural communities, even though these actual sensitivities are unknown and dependent on the communities present. This approach is intended to be less uncertain than TRVs developed from one study by incorporating toxicity data for many species as well as multiple toxicity values for the same species from different studies.

Typically, SSDs are presented as a cumulative distribution function (CDF) of the toxicity of a chemical to a group of laboratory test species. Inherent uncertainties with this approach include: the number of samples and species represented by the SSD and the suitability of the distribution used to fit the SSD (i.e., the best-fit model). The more toxicological data available for the development of the SSD, the more certainty there is in the SSD.

Typically, dose response data are assumed to fit a lognormal distribution, but tools (such as statistical programs that can estimate fit along with a visual examination of the curve and the values at the low end of the distribution) ensure that the most suitable best-fit model available is selected for estimating low-effect thresholds. The use of SSDs as the basis of TRVs was necessarily limited because of the general lack of sufficient toxicological data for most COPECs (e.g., no SSD TRVs could be developed for mammals). The SSD TRVs were obtained from the LPRSA BERA (Windward 2019), which includes further discussion of uncertainties associated with these TRVs; see LPRSA BERA Sections 6.3.3.1 (Methods for Deriving Tissue TRVs), 7.1.3.2 (Selected TRVs for Fish Tissue), 8.1.3.2 (Selected TRVs for Birds), and 8.2.3.2 (Selected TRVs for Bird Eggs).

20 REFERENCES

Abdo, K.M. 1994. Sodium Selenate administered in Drinking Water to f344/n Rats and b6c3fl Mice. National Toxicology Program. Toxicity Report Series 38.

Absil, M.C.P., M. Berntssen, and L. Gerringa. 1996. The influence of sediment, food and organic ligands on the uptake of copper by sediment-dwelling bivalves. *Aquat Toxicol* 34:13-29.

Adams, E.S. 1975. Effects of lead and hydrocarbons from snowmobile exhaust on brook trout (*Salvelinus fontinalis*). *Trans Am Fish Soc* 104:363-373.

Adams, J.A. 1983. Effect of PCB (Aroclor 1254) on early development and mortality in Arbacia eggs. *Water, Air, Soil Pollut* 20:1-5.

Adams, W.J. 1976. The Toxicity and Residue Dynamics of Selenium in Fish and Aquatic Invertebrates. Ph.D. Thesis, Michigan State Univ., East Lansing, Michigan. 109p.

Adriano, D.C. 1986. Trace Elements in the Terrestrial Environment. Springer-Verlag, New York.

Ahsanullah, M. and A.R. Williams. 1991. Sublethal effects and bioaccumulation of cadmium, chromium, copper and zinc in the marine amphipod *Allorchestes compressa*. *Mar Biol* 108:59-65.

Allison, D., B.J. Kallman, O.B. Cope, and C. Van Valin. 1963. Insecticides: effects on cutthroat trout of repeated exposure to DDT. *Science* 142(3594):958-961.

Allison, D.T., B.J. Kallman, O.B. Cope, and C. Van Valin. 1964. Some Chronic Effects of DDT on Cutthroat Trout. Research Report 64. Bureau of Sport Fisheries and Wildlife, U.S. Fish & Wildlife Service, Washington, DC.

Aluru, N., E. Kuo, L.W. Helfrich, S.I. Karchner, E.A. Linney, J.E. Pais, D.G. Franks. 2015. Developmental exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin alters DNA methyltransferase (dnmt) expression in zebrafish (*Danio rerio*). *Toxicol Appl Pharmacol* 284:142-151.

Ambrose, A.M., H.E. Christensen, D.J. Robbins, and L.J. Rather. 1953. Toxicological and pharmacological studies on chlordane. *Arch Indus Hyg Occup Med* 7:197-210.

Ambrose, A.M., P.S. Larson, J.F. Borzelleca, and G.R. Hennigar Jr. 1976. Long term toxicologic assessment of nickel in rats and dogs*. J Food Sci Technol* 13(4):181-187.

American Biogenics Corporation. 1988. Ninety-day Gavage Study in Albino Rats Using Nickel. Final Report submitted to U.S. Environmental Protection Agency, Office of Solid Waste. Research Triangle Institute and American Biogenics Corporation.

American Petroleum Institute. 1998. Arsenic: Chemistry, Fate, Toxicity, and Wastewater Treatment Options. Health and Environmental Sciences Department. Publication 4676.

Amiard, J.C., C. Amiard-Triquet, B. Berthet, and C. Métayer. 1986. Contribution to the ecotoxicological study of cadmium, lead, copper and zinc in the mussel *Mytilus edulis*. I. Field study. *Mar Biol* 90:425-431.

Anderson, D.W., R.W. Risebrough, L.A. Woods Jr, L.R. DeWeese, and W.G. Edgecomb. 1975. Brown pelicans: improved reproduction off the southern California coast. *Science* 190:806-808.

Anderson, R.A., N.A. Bryden, and M.M Polansky. 1997. Lack of toxicity of chromium chloride and chromium picolinate in rats. *J Am Coll Nutr* 16(3):273-279.

Arnold, D.L., C.A. Moodie, S.M. Charbonneau, H.C. Grice, P.F. McGuire, F.R. Bryce, B.T. Collins, Z.Z. Zawidzka, D.R. Krewski, E.A. Nera, and I.C. Munro. 1985. Long-term toxicity of hexachlorobenzene in the rat and the effect of dietary vitamin A. *Food Chem Toxicol* 23(9):779-793.

Aronson, A.L. 1971. Biologic effects of lead in fish. J Wash Acad Sci 61:124-128.

Ashley, C.M., M.G. Simpson, D.M. Holdich, and D.R. Bell. 1996. 2,3,7,8-tetrachloro-dibenzo-*p*-dioxin is a potent toxin and induces cytochrome P450 in the crayfish, *Pacifastacus leniusculus*. *Aquat Toxicol* 35:157-69.

ATSDR. 1990. Toxicological Profile for Silver. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=539&tid=97.

ATSDR. 1994a. Toxicological Profile for Chlorodibenzofurans. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=938&tid=194.

ATSDR. 1994b. Toxicological Profile for Chlordane. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=355&tid=62.

ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs). Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=122&tid=25.

ATSDR. 1998. Toxicological Profile for Chlorinated Dibenzo-p-dioxins (CDDs). Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=366&tid=63.

ATSDR. 1999. Toxicological Profile for Mercury. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=115&tid=24.

ATSDR. 2000. Toxicological Profile for Polychlorinated Biphenyls (PCBs). Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=142&tid=26.

ATSDR. 2002a. Toxicological Profile for Aldrin/Dieldrin. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=317&tid=56.

ATSDR. 2002b. Toxicological Profile for DDT, DDE and DDD. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=81&tid=20.

ATSDR. 2003. Toxicological Profile for Selenium. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=153&tid=28.

ATSDR. 2004. Toxicological Profile for Copper. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=206&tid=37.

ATSDR. 2005a. Toxicological Profile for Alpha-, Beta-, Gamma-, and Delta-Hexachlorocyclohexane. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp43.pdf.

ATSDR. 2005b. Toxicological Profile for Nickel. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=245&tid=44.

ATSDR. 2005c. Toxicological Profile for Zinc. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=302&tid=54.

ATSDR. 2007a. Toxicological Profile for Arsenic. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=22&tid=3.

ATSDR. 2007b. Toxicological Profile for Lead. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=96&tid=22.

ATSDR. 2012a. Toxicological Profile for Cadmium. Available at; https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=48&tid=15.

ATSDR. 2012b. Toxicological Profile for Chromium. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=62&tid=17.

ATSDR. 2015. Toxicological Profile for Hexachlorobenzene. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=627&tid=115.

Aughey, E., L. Grant, B.L. Furman, and W.F. Dryden. 1977. The effects of oral zinc supplementation in the mouse. *J Comp Path* 87:1-14.

Aulerich, R.J. and R.K. Ringer. 1977. Current status of PCB toxicity to mink, and effect on their reproduction. *Arch Environ Contam Toxicol* 6:279-292.

Aulerich, R.J., R.K. Ringer, and S. Iwamoto. 1974. Effects of dietary mercury on mink. *Arch Environ Contam Toxicol* 2(1):43-51.

Aulerich, R.J., R.K. Ringer, M.R. Bleavins, and A. Napolitano. 1982. Effects of supplemental dietary copper on growth, reproductive performance and kit survival of standard dark mink and the acute toxicity of copper to mink. *J Anim Sci* 55(2):337-343.

Aulerich, R.J., S.J. Bursian, W.J. Breslin, B.A. Olson, and R.K. Ringer. 1985. Toxicological manifestations of 2,4,5,2',4',5'-, 2,3,6,2',3',6'-, and 3,4,5,3',4',5'- hexachlorobiphenyl and Aroclor 1254 in mink. *J Toxicol Environ Health* 5:63-79.

Azar, A., H.J. Trochimowicz, and M.E. Maxfield. 1973. Review of Lead Studies in Animals Carried Out at Haskell Laboratory: Two-year Feeding Study and Response to Hemorrhage Study. In: Barth, D., Ed., Environmental Health Aspects of Lead, International Symposium, Amsterdam, the Netherlands. Commission of European Communities. pp 199-210.

Baker, R.T.M., R.D. Handy, S.J. Davies, and J.C. Snook. 1998. Chronic dietary exposure to copper affects growth, tissue lipid peroxidation, and metal composition of the grey mullet, *Chelon labrosus*. *Mar Environ Res* 45(4/5):357-365.

Balevi, T. and B. Coskun. 2004. Effects of dietary copper on production and egg cholesterol content in laying hens. *Brit Poult Sci* 45(4):530-534.

Banerjee, B.D., A. Ray, and S.T. Pasha. 1996. A comparative evaluation of immunotoxicity of DDT and its metabolites in rats. Ind *J Exper Biol* 34:517-522.

Barber, J., A. Sweetman, and K. Jones. 2005. Euro Chlor Science Dossier 9: Hexachlorobenzene – Sources, environmental Fate and Risk Characterization.

Battelle. 2007. Lower Passaic River Restoration Project. Draft Source Control Early Action Focused Feasibility Study (FFS). Prepared for US Environmental Protection Agency, US Army Corps of Engineers, and New Jersey Department of Transportation. Battelle, Duxbury, MA.

Battershill, J.M. 1994. Review of the safety assessment of polychlorinated biphenyls (PCBs) with particular reference to reproductive toxicity. *Human Exp Toxicol* 13(9):581–597.

Baturo, W. and L. Lagadic. 1996. Benzo(a)pyrene hydroxylase and glutathione s-transferase activities as biomarkers in *Lymnaea palustris* (Mollusca, Gastropoda) exposed to atrazine and hexachlorobenzene in freshwater mesocosms. *Environ Toxicol Chem* 15(5):771-781.

Baturo, W, and L. Lagadic, T. Caquet. 1995. Growth, fecundity and glycogen utilization in *Lymnaea palustris* exposed to atrazine and hexachlorobenzene in freshwater mesocosms. *Environ Toxicol Chem* 14(3):503-511.

Baumann, P.C., W.D. Smith, and W.K. Parland. 1987. Tumor frequencies and contaminant concentrations in brown bullheads from an industrialized river and a recreational lake. *Trans Am Fish Soc* 116:79-86.

Beckvar, N. and G.R. Lotufo. 2011. DDT and Other Organohalogen Pesticides in Aquatic Organisms. U.S. Environmental Protection Agency Papers. 248. http://digitalcommons.unl.edu/usepapapers/248

Beckvar, N., T.M. Dillon, and L.B. Read. 2005. Approaches for linking whole-body fish tissue residues of mercury and DDT to biological effects thresholds. *Environ Toxicol Chem* 24(8):2094-2105.

Behne, D., A. Kyriakopoulos, H. Gessner, B. Walzog, H. Meinhold. 1992. Type I iodothyronine deiodinase activity after high selenium intake, and relations between selenium and iodine metabolism in rats. *J Nutr* 122(7):1542-1546.

Bengeri, K.V. and H.S. Patil. 1986. Respiration, liver glycogen and bioaccumulation in *Labeo rohita* exposed to zinc. *Indian J Compar Animal Physiol* 4:79-84.

Bengtsson, B-E. 1980. Long-term effects of PCB (Clophen A50) on growth, reproduction and swimming performance in the minnow, *Phoxinus*. *Wat Res* 14:681-687.

Benton, M.J., A.C. Nimrod, and W.H. Benson. 1994. Evaluation of growth and energy storage as biological markers of DDT exposure in sailfin mollies. *Ecotox Environ Saf* 29:1-12.

Berglind, R., G. Dave, and M.L. Sjobeck. 1985. The effects of lead on aminolevulinic acid dehydratase activity, growth, hemoglobin content, and reproduction in Daphnia magna. *Ecotox Environ Saf* 9: 216-229.

Berlin, W.H., R.J. Hesselberg, and M.J. Mac. 1981. Growth and Mortality of Fry of Lake Michigan Lake Trout During Chronic Exposure to PCBs and DDE. In: Chlorinated Hydrocarbons as a Factor in the Reproduction and Survival of Lake Trout (*Salvelinus namaycus*h) in Lake Michigan. Technical Paper 105. U.S. Fish and Wildlife Service, Washington, DC.

Berntssen, M.H.G., K. Hylland, S.E. Wendelaar Bonga, and A. Maage. 1999a. Toxic levels of dietary copper in Atlantic salmon (*Salmo salar* L.) parr. *Aquat Toxicol* 46:87-99.

Berntssen, M.H.G., A.K. Lundebye, and A. Maage. 1999b. Effects of elevated dietary copper concentrations on growth, feed utilization and nutritional status of Atlantic salmon (*Salmo salar* L.) fry. *Aquaculture* 174:167-181.

Berthet, B., J.C. Amiard, C. Amiard-Triquet, M. Martoja, and A.Y. Jeantet. 1992. Bioaccumulation, toxicity and physico-chemical speciation of silver in bivalve molluscs: ecotoxicological and health consequences. *Sci Total Environ* 125:97-122.

Berthet, B., C. Amiard-Triquet, and R. Martoja. 1990. Effets chimiques et histologiques de la decontamination de l'huitre *Crassostrea gigas* Thurberg prealablement exposee a l'argent. *Water Air Soil Poll* 50:355-369.

Bertram, P.E. and B.A. Hart. 1979. Longevity and reproduction of *Daphnia pulex* (de Geer) exposed to cadmium-contaminated food or water. *Environ Pollut* 19:295-305.

Bildstein, K.L. and D.J. Forsyth. 1979. Effects of dietary dieldrin on behavior of white-footed mice (*Peromyscus leucopus*) towards an avian predator. *Bull Environ Contaminand Toxicol* 21(1-2):93-97.

Birge, W.J, J.A. Black, A.G. Westerman, and J.E. Hudson. 1979. The Effects of Mercury on Reproduction of Fish and Amphibians. In: Nriagu, J.O., Ed., The Biogeochemistry of Mercury in the Environment. Elsevier/North-Holland Biomedical Press, New York, New York, pp. 629-655.

Black, D.E., R. Gutjahr-Gobell, R.J. Pruell, B. Bergen, and A.E. McElroy. 1998. Effects of a mixture of non-ortho and mono-ortho-polychlorinated biphenyls on reproduction in *Fundulus heteroclitus* (Linnaeus). *Environ Toxicol Chem* 17(7):1396-1404.

Blazer, V.S., J.W. Fournie, and B.A. Weeks-Perkins. 1997. Macrophage Aggregates: Biomarker for Immune Function in Fishes? In: Dwyer, F.J., T.R. Doane, and M.L. Hinman, Eds., Environmental Toxicology and Risk Assessment: Modeling and Risk Assessment. Vol 6. STP 1317. American Society for Testing and Materials, Philadelphia, Pennsylvania, pp 360-375.

Bleavins, M.R. and R.J. Aulerich. 1981. Feed consumption and food passage time in mink (*Mustela vison*) and European ferrets (*Mustela putorius furo*). *Lab Anim Sci* 31(3):268-269.

Bleavins, M.R., R.J Aulerich, and R.K Ringer. 1984. Effects of chronic dietary hexachlorobenzene on the reproductive performance and survivability of mink and European ferrets. *Arch Environ Contam Toxicol* 13: 357-365.

Blus, L.J. 1984. DDE in birds' eggs: comparison of two methods for estimating critical levels. *Wilson Bull* 96(2):268-276.

Boersma, D.C., J.L Ellenton, and A. Yagminas. 1986. Investigation of the hepatic mixed-function oxidase system in herring gull embryos in relation to environmental contaminants. *Environ Toxicol Chem*, 5:309-318.

Boese, B.L., Lamberson, J.O., Swartz, R.C., Ozretich, R.J., 1997. Photoinduced toxicity of fluoranthene to seven marine benthic crustaceans. *Arch Environ Contam Toxicol* 32:389–393

Bolger, M. 1993. Overview of PCB Toxicology. Proceedings, U.S. Environmental Protection Agency's National Technical Workshop, PCBs in Fish Tissue. May 10-11, 1993. EPA/823-R-93-003. Office of Water, U.S. Environmental Protection Agency.

Borgmann, U., O. Kramar, and C. Loveridge. 1978. Rates of mortality, growth, and biomass production of *Lymnaea palustris* during chronic exposure to lead. *J Fish Res Board Can* 35:1109-1115.

Borgmann, U., and W.P. Norwood. 1999. Assessing the toxicity of lead in sediments to *Hyalella azteca*: the significance of bioaccumulation and dissolved metal. *Can J Fish Aquat Sci* 56:1494-1503.

Borgmann, U., R. Neron, and W.P. Norwood. 2001. Quantification of bioavailable nickel in sediments and toxic thresholds to *Hyalella azteca*. *Environ Pollut* 111:189-198.

Bowser, D.H., K. Frenkel, and J.T. Zelifokk. 1994. Effects of in vitro nickel exposure on the macrophage-mediated immune functions of rainbow trout (*Oncorhynchus mykiss*). *Bull Environ Contam Toxicol* 52: 367-373.

Brausch, J.M., B.R. Blackwell, B.N. Beall, C. Caudillo, V. Kolli, C. Godard-Codding, S.B. Cox, G.P. Cobb, and P.N. Smith. 2010. Effects of polycyclic aromatic hydrocarbons in northern bobwhite quail (*Colinus virginianus*). *J Toxicol Environ Health* 73:540-551.

Brown, M.M, B.C. Rhyne, and R.A. Goyer. 1976. Intracellular effects of chronic arsenic administration on renal proximal tubule cells. *J Toxicol Environ Health* 1:505-514.

Brunström, B., B.E. Lund, A. Bergman, L. Asplund, I. Athanassiadis, M. Athanasiadou, S. Jensen, and J. Örberg. 2001. Reproductive toxicity in mink (*Mustela vison*) chronically exposed to environmentally relevant polychlorinated biphenyl concentrations. *Environ Toxicol Chem* 20(10):2318-2327.

Brungs, W.A., R.A. Carlson, W.B. Horning II, J.H. McCormick, R.L. Spehar, and J.D. Young. 1978. Effects of pollution on freshwater fish. *J Water Pollut Control Fed* 50:1582-1637.

Bryan, G.W. and W.J. Langston. 1992.Bioavailability, accumulation and effects of heavy metals in sediments with special reference to United Kingdom estuaries: a review. *Environ Pollut* 76:89-131.

Byron, W.R., G.W. Bierbower, J.B. Brouwer, and W.H. Hansen. 1967. Pathologic changes in rats and dogs from two-year feeding of sodium arsenite or sodium arsenate. *Toxicol Appl Pharmacol* 10:132-147.

Bryant, V., D.M. Newbery, D.S. McLusky, and R. Campbell. 1985. Effect of temperature and salinity on the toxicity of arsenic to three estuarine invertebrates (*Corophium volutator, Macoma balthica, Tubifex costatus*). *Mar Ecol Progr Ser* 24:129-137.

Buhler, D.R., M.E. Rasmusson, and W.E. Shanks. 1969. Chronic oral DDT toxicity in juvenile coho and chinook salmon. *Toxicol Appl Pharmacol* 14:535-555.

Buhler, D.R. and H.M Carpenter. 1986. Japanese Quail as a Model for the Study of Hexachlorobenzene-induced Porphyria. In: Morris C.R. and J.R.P Cabral Eds., Hexachlorobenzene: Proceedings of an International Symposium. Lyon, International Agency for Research on Cancer, pp 477-480 (IARC Scientific Publications No. 77).

Burton, D.T., A.H. Jones, and J. Cairns Jr. 1972. Acute zinc toxicity to rainbow trout (*Salmo gairdneri*): confirmation of the hypothesis that death is related to tissue hypoxia. *J Fish Res Board Can* 29(10):1463-1466.

Bursian, S.J., J. Kern, R.E. Remington, J.E. Link, and S.D. Fitzgerald. 2013. Dietary exposure of mink (*Mustela vison*) to fish from the upper Hudson River, New York, USA: Effects on reproduction and offspring growth and mortality. *Environ Toxicol Chem* 32(4): 780-793.

Butler, P.A. 1969. Significance of DDT Residues in Estuarine Fauna. In: Miller M.W. and G.G. Berg, Eds., Chemical Fallout: Current Research on Persistent Pesticides. Charles C. Thomas, Springfield, IL, pp. 205-220.

Cain, D.J. and S.N. Luoma. 1986. Effect of seasonally changing tissue weight on trace metal concentrations in the bivalve *Macoma balthica* in San Francisco Bay. *Mar Ecol Prog Ser* 28:209-217.

Cain, B.W., L. Sileo, J.C. Franson, and J. Moore. 1983. Effects of dietary cadmium on mallard ducklings. *Environ Res* 32:286-297.

Calabrese, A., F.P. Thurberg, M.A. Dawson, and D.R. Wenzloff. 1975. Sublethal Physiological Stress Induced by Cadmium and Mercury in Winter Flounder, *Pseudopleuronectes americanus*. In: J.H. Koeman and J.J.T.W.A. Strick, Eds., Sublethal Effects of Toxic Chemicals on Aquatic Animals. Elsevier Sci. Publ. Co. Amsterdam.

Calabrese, A., J.R. MacInnes, D.A. Nelson, and J.E. Miller. 1977. Survival and growth of bivalve larvae under heavy-metal stress. *Mar Biol* 41:179-184.

Calabrese, A., J.R. MacInnes, D.A. Nelson, R.A. Greig, and P.P. Yevich. 1984. Effects of long-term exposure to silver or copper on growth, bioaccumulation and histopathology in the blue mussel *Mytilus edulis*. *Mar Environ Res* 11:253-274.

Calamari D., S. Galassi, F. Setti, and M. Vighi. 1983. Toxicity of selected chlorobenzenes to aquatic organisms. *Chemosphere* 12:253-262.

Camardese, M.B., D.J. Hoffman, L.J. LeCaptain, and G.W. Pendleton. 1990. Effects of arsenate on growth and physiology in mallard ducklings. *Environ Toxicol Chem* 9:785-795.

Cannon, M.S. and L.C. Holcomb. 1968. The effect of DDT on reproduction in mice. *Ohio J Sci* 68(1):19-24.

Canton, J.H., and W. Slooff. 1982. Toxicity and accumulation studies of cadmium (Cd2+) with freshwater organisms of different trophic levels. *Ecotoxicol Environ* Safety 6:113-128.

Cardwell, R.D., D.G. Foreman, T.R. Payne, and D.J. Wilbur. 1977. Acute and Chronic Toxicity of Chlordane to Fish and Invertebrates. EPA/600/3-77-019. U.S. Environmental Protection Agency, Washington, D.C., February. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/9101XGCJ.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1976+Thru+1980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C76thru80%5CTxt%5C00000035%5C9101XGCJ.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

Carlson, A.R. and P.A. Kosian 1987. Toxicity of chlorinated benzenes to fathead minnows (*Pimephales promelas*). *Arch Environ Contam Toxicol* 16:129-135.

Cassidy, R.A., C.V. Vorhees, D.J. Minnema, and L. Hastings L. 1994. The effects of chlordane exposure during pre- and postnatal periods at environmentally relevant levels on sex steroid-mediated behaviors and functions in the rat. *Toxicol Appl Pharmacol* 126:326-337.

Catalan, Z.B. 1982. Behavioral Responses of *Chironomus tentans* to Stress as Determined by an Optical Fiber Monitoring System. Ph.D. thesis, University of Michigan, Ann Arbor. 94p.

Chapman, J. 2003. Memorandum Dated March 6, 2003: Toxicity Reference Values (TRVs) for Mammals and Birds Based on Selected Aroclors. Ecologist, U.S. Environmental Protection Agency Region 5, Chicago, Illinois.

Chen, J. 2015. Cardiac toxicity by sublethal 2,3,7,8-tetrachlorodibenzo-*p*-dioxin correlates with its anti-proliferation effect on cardiomyocytes in zebrafish embryos. *Environ Toxicol Chem* 34(2):420-428.

Chinni, S., R.N. Khan, and P.R. Yallapragada. 2002. Acute toxicity of lead on tolerance, oxygen consumption, ammonia-N excretion, and metal accumulation in *Penaeus indicus* postlarvae. *Ecotox Environ Safe* 51:79–84.

Chu, F.-L.E., P. Soudant, L.A. Cruz-Rodriguez, and R.C. Hale. 2000. PCB uptake and accumulation by oysters (*Crassostrea virginica*) exposed via a contaminated algal diet. *Mar Environ Res* 50:217-221.

Chu, F.-L.E., P. Soudant, and R.C. Hale. 2003. Relationship between PCB accumulation and reproductive output in conditioned oysters *Crassostrea virginica* fed a contaminated algal diet. *Aquat Toxicol* 65:293-307.

Chu, K.H., W.M. Cheung, and S.K. Lau. 1990. Trace metals in bivalves and sediments from Tolo Harbour, Hong Kong. *Environ Int* 16:31-36.

Chung, K.H., Y.O. Sukgrand, and M.H. Kang. 1985. The toxicity of chromium and its interaction with manganese and molybdenum in chicks. *Kor J Anim Sci* 27(6):391-395.

Clarke, M.L., D.G. Harvey, and D.J. Humphreys. 1981. Veterinary Toxicology. 2nd Edition. Bailliere Tindall. London.

Clearwater, S.J., A.M. Farag, and J.S. Meyer. 2002. Bioavailability and toxicity of dietborne copper and zinc to fish. *Comp Biochem Physiol* 132:269-313.

Cohen-Barnhouse, A.M., M.J. Zwiernik, J.E. Link, S.D. Fitzgerald, S.W. Kennedy, J.C. Herve, J.P. Giesy, S. Wiseman, Y. Yang, P.D. Jones, Y. Wan, B. Collins, J.L. Newsted, D. Kay, and S.J. Bursian. 2011. Sensitivity of Japanese quail (*Coturnix japonica*), common pheasant (*Phasianus colchicus*), and white leghorn chicken (*Gallus domesticus*) embryos to in ovo exposure to TCDD, PeCDF, and TCDF. *Toxicolog Sci* 11(1):93-103.

Coleman, R.L. and J.E. Cearley. 1974. Silver toxicity and accumulation in largemouth bass and bluegill. *Bull Environ Contam Toxicol* 12:53-61.

Connell, D.B., J.G. Sanders, G.F. Riedel, and G.R. Abbe. 1991. Pathways of silver uptake and trophic transfer in estuarine organisms. *Environ Sci Technol* 25:921-924

Cooper, K.R. and M. Wintermyer. 2009. A Critical Review: 2,3,7,8 – tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) effects on gonad development in bivalve mollusks. *J Environ Sci Health Environ Carcinogen Ecotox Rev* 27:226-45.

Couillard, C.M., M. LeBeuf, B. Legare, and S. Trottier. 2008. Effects of diazinon on mummichog (*Fundulus heteroclitus*) larvae produced from eggs differentially treated with PCB126. *Arch Environ Contam Toxicol* 54:283-291.

Couillard, C.M., B. Legare, A. Bernier, and Z. Dionne. 2011. Embryonic exposure to environmentally relevant concentrations of PCB126 affects prey capture ability of *Fundulus heteroclitus* larvae. *Mar Environ Res* 71(4).

Courtney, K.D. 1979. Hexachlorobenzene (HCB): a review. *Environ Res* 20:225-266.

Coyle J.J., D.R. Buckler, C.G. Ingersoll, J.F. Fairchild, T.W. May. 1993. Effect of dietary selenium on the reproductive success of bluegills (*Lepomis macrochirus*). *Environ Toxicol Chem* 12:551-565.

Crosby, D.G. and R.K. Tucker. 1971. Accumulation of DDT by *Daphnia magna*. *Environ Sci Technol* 5(8):714-716

Culp, S.J., D.W. Gaylor, W.G. Sheldon, L.S. Goldstein, and F.A. Beland. 1998. A comparison of the tumors induced by coal tar and benzo(a)pyrene in a 2-year bioassay. *Carcinogenesis* 19(1): 117-124.

Custer, T.W. and G.H. Heinz. 1980. Reproductive success and nest attentiveness of mallard ducks fed Aroclor 1254. *Environ Pollut* 21:313-318.

Dansereau, M., N. Lariviere, D. Du Tremblay, and D. Belanger. 1999. Reproductive performance of two generations of female semidomesticated mink fed diets containing organic mercury contaminated freshwater fish. *Arch Environ Contam Toxicol* 36:221-226.

Davies, P.H., J.P. Goettl, Jr., J.R. Sinley, and N.F. Smith. 1976. Acute and chronic toxicity of lead to rainbow trout *Salmo gairdneri*, in hard and soft water. *Water Res* 10:199-206.

Davies, P. H., J. P. Goettl, Jr., and J.R. Sinley. 1978. Toxicity of silver to rainbow trout. *Water Res* 12:113-117.

Davison, K.L. and J.L. Sell. 1974. DDT thins shells of eggs from mallard ducks maintained on ad libitum or controlled-feeding regimens. *Arch Environ Contam Toxicol* 2(3):222-232.

Davy, F.B., H. Kleerekoper, and P. Gensler. 1972. Effects of exposure to sublethal DDT on the locomotor behavior of the goldfish (*Carassius auratus*). *J Fish Res Bd Can* 29(9):1333-1336.

Dawson, M.A., E. Gould, F.P. Thurberg, and A.J. Calabrese. 1977. Physiological response of juvenile striped bass, *Morone saxatilis*, to low levels of cadmium and mercury. *Chesapeake Sci* 18:353-359.

DeBruyn, A.M.H. and P.M Chapman. 2007. Selenium toxicity to invertebrates: Will proposed thresholds for toxicity to fish and birds also protect their prey? *Environ Sci Technol* 41:1766-1770.

DeCaprio, A.P., D.N. McMartin, P.W. O'Keefe, R. Rej, J.B. Silkworth, and L.S. Kaminsky. 1986. Subchronic oral toxicity of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in the guinea pig: comparisons with a PCB-containing transformer fluid pyrolysate. *Fund Appl Toxicol* 6:454-463.

DeFoe, D.L., G.D. Veith, and R.W. Carlson. 1978. Effects of Aroclor 1248 and 1260 on the fathead minnow (*Pimephales promelas*). *J Fish Res Bd Can* 35:997-1002.

DeForest, D.K. and W. Adams. 2011. Selenium Accumulation and Toxicity in Freshwater Fishes. In: Beyer W.N. and J.P. Meador, Eds., Environmental Contaminants in Biota: Interpreting Tissue Concentrations. 2nd Edition. CRC Press, Boca Raton, FL, pp. 193-229.

Delzell, E., J.P. Giesy, I. Munro J. Doull, D. Mackay, and G. Williams. 1994. Interpretive review of the potential adverse effects of chlorinated organic chemicals on human health and the environment. *Reg Toxicol Pharmacol* 20(1):1-1056.

Demayo, A., M.C. Taylor, K.W. Taylor, and P.V. Hodson. 1982. Toxic effects of lead and lead compounds on human health, aquatic life, wildlife plants, and livestock. *CRC Crit Rev Environ Control* 12:257-305.

DeWitt, J.B. 1956. Chronic toxicity to quail and pheasants of some chlorinated insecticides. *Agric Food Chem* 4(10):863-866.

Diamond, J. M., D.G. Mackler, M. Collins, and D. Gruber. 1990. Derivation of a freshwater silver criteria for the New River, Virginia, using representative species. *Environ Toxicol Chem* 9:1425-1434.

Dieter, M.P, C.W. Jameson, A.N. Tucker, M.I. Luster, J.E. French, H.L. Hong, and G.A. Boorman. 1988. Evaluation of tissue disposition, myelopoietic, and immunologic responses in mice after long-term exposure to nickel sulfate in the drinking water. *J Toxicol Environ Health* 24(3):357-372.

Dodds-Smith, M.E., M.S. Johnson, and D.J. Thompson. 1992. Trace metal accumulation by the shrew *Sorex araneus*. I. Total body burden, growth, and mortality. *Ecotox Environ Saf* 24:102-117.

Domingo, J.L. 1994. Metal-induced developmental toxicity in mammals: a review. *J Toxicol Environ Health* 42:123-141.

Douben, P.E.T, Ed. 2003. PAHs: An Ecotoxicological Perspective. John Wiley & Sons Ltd, Sharnbrook, Bedford, UK.

Dozier, W.A. III, A.J. Davis, M.E. Freeman, and T.L. Ward. 2003. Early growth and environmental implications of dietary zinc and copper concentrations and sources of broiler chicks. *Brit Poult Sci* 44(5):726-731.

Duby, R.T., H.F. Travis, and C.E. Terrill. 1971. Uterotropic activity of DDT in rats and mink and its influence on reproduction in the rat. *Toxicol Appl Pharmacol* 18:348-355.

Duke, T.W., J.L. Lowe, and A.J. Wilson, Jr. 1970. A polychlorinated biphenyl (Aroclor 1254) in the water, sediment, and biota of Escambia Bay, Florida*. Bull Environ Contam Toxicol* 5:171-180.

Duquesne, S.J., M. Liess, and D.J. Bird. 2004. Sub-lethal effects of metal exposure: physiological and behavioural responses of the estuarine bivalve *Macoma balthica*. *Mar Environ Res* 58:245-250.

Edens, F.W., E. Benton, S.J. Bursian, and G.W. Morgan. 1976. Effect of dietary lead on reproductive performance in Japanese quail, *Coturnix japonica*. *Toxicol Appl Pharmacol* 38:307-314.

Edens, F.W. and J.D. Garlich. 1983. Lead-induced egg production decrease in leghorn and Japanese quail hens. *Poult Sci* 62:1757-1763.

Eertman, R.H.M., M. Groenink-van Emstede, and B. Sandee. 1993. The Effects of the Polycyclic Aromatic Hydrocarbons Fluoranthene and Benzo(a)pyrene on the Mussel *Mytilus edulis*, the Amphipod *Bathyporeia sarsi,* and the Larvae of the Oyster *Crassostrea gigas*. Netherlands Institute of Ecology, Centre for Estuarine and Coastal Ecology.

Eertman, R.H.M., C.L. Groenink, B. Sandee, H. Hummel, and A.C. Small. 1995. Response of the blue mussel *Mytilus edulis L*. following exposure to PAHs or contaminated sediment. *Mar Environ Res* 39:169-173.

Eisler, R. 1970. Latent effects of insecticide intoxication to marine molluscs. *Hyrobiologia* 36:345-352.

Eisler R. 1971. Cadmium poisoning in *Fundulus heteroclitus* (Pisces: Cyprinodontidae) and other marine organisms. *J Fish Res Bd Can* 28(9):1225-1234.

Eisler, R. 1977. Acute toxicities of selected heavy metals to the softshell clam, *Mya arenaria*. *Bull Environ Contam Toxicol* 17:137-145.

Eisler, R. 1980. Accumulation of Zinc by Marine Biota. Pages 259-351 In: J.O. Nriagu, Ed., Zinc in the Environment. Part II: Health Effects. John Wiley & Sons, Inc. New York, NY.

Eisler, R. 2000. Handbook of Chemical Risk Assessment: Health Hazards to Humans, Plants, and Animals, Vol. 1-3 (Metals, Organics, Metaloids/Radiation, Index). CRC Press. 4141p.

Ellgaard, E.G., S.E. Ashley, A.E. Langford, and D.C. Harlin. 1995. Kinetic analysis of the swimming behavior of the goldfish, *Carassius auratus*, exposed to nickel; hypoactivity induced by sublethal concentrations. *Bull Environ Contam Toxicol* 55:929-936.

Elliott, J.E., R.J. Norstrom, and J.A. Keith. 1988. Organochlorines and eggshell thinning in northern gannets (*Sula bassanus*) from eastern Canada, 1968-1984. *Environ Pollut* 52:81-102.

Elonen, G.E., R.L. Spehar, G.W. Holcombe, R.D. Johnson, J.D. Fernandez, R.J. Erickson, J.E. Tietge, and P.M. Cook. 1998. Comparative toxicity of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin to seven freshwater fish species during early life-stage development. *Environ Toxicol Chem* 17(3):472-483.

Emery, V.L.J., and T.M. Dillon. 1996. Chronic toxicity of phenanthrene to the marine polychaete worm, *Nereis (Neanthes) arenaceodentata*. *Bull Environ Contam Toxicol* 56:265-270

Erickson, R.J., D.R. Mount, T.L. Highland, J.R. Hockett, and C.T. Jenson. 2011. The relative importance of waterborne and dietborne arsenic exposure on survival and growth of juvenile rainbow trout. *Aquat Toxicol* 104:108-115.

Ernst, W. 1984. Pesticides and Technical Organic Chemicals. Pages 1617-1709 In: O. Kinne, Ed., Marine Ecology, Vol. V, Part 4. John Wiley & Sons, Inc. New York, NY.

European Chemicals Bureau. 2004. EU Risk Assessment Report B Zinc Chloride. 45:40.

Euro Chlor. 2002. Euro Chlor Risk Assessment for the Marine Environment. Osparcom Region: North Sea – Hexachlorobenzene. January.

Evans, D.H., K.E. Weingarten, and J.S. Walton. 1990. The effect of atropine on cadmium- and nickel-induced constriction of vascular smooth muscle of the dogfish shark ventral aorta. *Toxicology* 62:89-94.

Everall, N.C., N.A.A. Macfarlane, and R.W. Sedgwick. 1989. The effects of water hardness upon the uptake, accumulation and excretion of zinc in the brown trout, *Salmo trutta* L. *J Fish Biol* 35:881-892.

Farag, A.M., T. May, G.D. Marty, M.D.L. Easton, D.D. Harper, E.E. Little, and L. Cleveland. 2006. The effect of chronic chromium exposure on the health of Chinook salmon (*Oncorhynchus tsawytscha*). *Aquat Toxicol* 76:246-257.

Farmahin, R., G.E. Manning, D. Crump, D. Wu, L.J. Mundy, S.P. Jones, M.E. Hahn, S.I. Karchner, J.P. Giesy, S.J. Bursian, M.J. Zwiernik, T.B. Fredricks, and S.W. Kennedy. 2013. Amino acid sequence of the ligand-binding domain of the aryl hydrocarbon receptor 1 predicts sensitivity of wild birds to effects of dioxin-like compounds. *Toxicol Sci* 131(1):139-152.

Ferm, V.H. and W. M. Layton Jr. 1981. Teratogenic and Mutagenic Effects of Cadmium. Pages 743-756 In: J.O. Nriagu, Ed., Cadmium in the Environment. Part 2, Health Effects. John Wiley, New York, NY.

Fernie, K.J., G.R. Bortolotti, J.E. Smits, J. Wilson, K.G. Drouillard, and D.M. Bird. 2000. Changes in egg composition of American kestrels exposed to dietary polychlorinated biphenyls. *J Toxicol Environ Health* 60:291-303.

Fernie, K.J., J.E. Smits, G.R. Bortolotti, and D.M. Bird. 2001. In ovo exposure to polychlorinated biphenyls: reproductive effects on second-generation American kestrels. *Arch Environ Contam Toxicol* 40:544-550.

Fernie, K., G. Bortolotti, K. Drouillard, J. Smits, and T. Marchant. 2003a. Developmental toxicity of in ovo exposure to polychlorinated biphenyls: II. Effects of maternal or paternal exposure on second-generation nestling American kestrels (*Falco sparverius*). *Environ Toxicol Chem* 22(11):2688-2694.

Fernie, K., G. Bortolotti, and J. Smits. 2003b. Reproductive abnormalities, teratogenicity, and developmental problems in American kestrels (*Falco sparverius*) exposed to polychlorinated biphenyls. *J Toxicol Environ Health* 66:2089-2103.

Fernie, K., J. Smits, and G. Bortolotti. 2003c. Developmental toxicity of in ovo exposure to polychlorinated biphenyls: I. Immediate and subsequent effects on first-generation nestling American kestrels (*Falco sparverius*). *Environ Toxicol Chem* 22(3):554-560.

Fisher, J.P., J.M. Spitsbergen, B. Bush, and B. Jahan-Parwar. 1994. Effect of Embryonic PCB Exposure on Hatching Success, Survival, Growth and Developmental Behavior in Landlocked Atlantic Salmon, *Salmo salar*. In: Gorsuch, J.W., F.J. Dwyer, C.G. Ingersoll, and T.W. La Point, Eds., Environmental Toxicology and Risk Assessment. Vol. 2. ASTM STP 1216. American Society for Testing and Materials, Philadelphia, Pennsylvania, pp. 298-314.

Fisk, A.T., A.L. Yarechewski, D.A. Metner, R.E. Evans, W.L. Lockhart, and D.C.G. Muir. 1997. Accumulation, depuration and hepatic mixed-function oxidase enzyme induction in juvenile rainbow trout and lake whitefish exposed to dietary 2,3,7,8-tetrachlorodibenzo-*p*-dioxin. *Aquat Toxicol* 37:201-220.

Fitzhugh, O.G. 1948. Use of DDT insecticides on food products. *Ind and Eng Chemistry* 40(4):704-705.

Fitzhugh, O.G., A.A. Nelson, and M.L. Quaife. 1964. Chronic oral toxicity of aldrin and dieldrin in rats and dogs. *Food Chem Toxicol* 2:551-562.

Freeman, R.A. 1979. Ecological Kinetics of Silver in an Alpine Lake Ecosystem. Pages 342-358 In: Marking, L.L. and R.A. Kimerle, Eds., Aquatic Toxicology. Proceedings of the Second Annual Symposium on Aquatic Toxicology. ASTM Special Technical Publication 667. American Society for Testing and Materials, Philadelphia, PA.

Freeman, H.C. and D.R. Idler. 1975. The effect of polychlorinated biphenyl on steroidogenesis and reproduction in the brook trout (*Salvelinus fontinalis*). *Can J Biochem* 53:666-670.

Friedmann, A.S., M.C. Watzin, T. Brinck-Johnson, and J.C. Leiter. 1996. Low levels of dietary methylmercury inhibit growth and gonadal development in juvenile walleye (*Stizostedion vitreum*). *Aquat Toxicol* 35:265-278.

Friberg, L., G.F. Nordberg, E. Kessler, and V.B. Vouk. 1986. Handbook of the Toxicology of Metals. 2nd Edition. Volumes I, II: Amsterdam. Elsevier Science Publishers B.V.

Fuller, G.B. and W.C. Hobson. 1986. Effect of PCBs on Reproduction in Mammals. In: Waid, J.S., Ed., PCBs and the Environment. Vol II. CRC Press, Inc, Boca Raton, Florida.

Gainey, L.F., Jr., and J.R. Kenyon. 1990. The effects of reserpine on copper induced cardiac inhibition in *Mytilus edulis*. *Compar Biochem Physiol* 95C:177-179.

Gakstatter, J.H. and C.M. Weiss. 1967. The elimination of DDT-C14, dieldrin-C14, and lindane-C14 from fish following a single sublethal exposure in aquaria. *Trans Am Fish Soc* 96:301-307.

Gale, T.F. 1978. Embryotoxic effects of chromium trioxide in hamsters. *Environ Res* 16:101-109.

Galvez, F. and C.M. Wood. 1999. Physiological effects of dietary silver sulfide exposure in rainbow trout. *Environ Toxicol Chem* 18(1):84-88.

Garnier, J., J.P. Baudin, and L. Foulquier. 1990. Accumulation from water and depuration of 110mAg by a freshwater fish, *Salmo trutta* L. *Water Res* 24:1407-1414.

Gasaway, W.C. and I.O. Buss. 1972. Zinc toxicity in the mallard duck. *J Wildl Manage* 36:1107-1117.

Gehrke, P.C. 1988. Acute cardio-respiratory responses of spangled perch, *Leiopotherapon unicolor* (Gunther 1859), to sublethal concentrations of zinc, temephos and 2,4-D. *Aust J Mar Fresh Res* 39:767-774

Genelly, R.E., and R.L. Rudd. 1956. Effects of DDT, toxaphene, and dieldrin on pheasant reproduction. *Auk* 73:529-539.

Gentile, S.M., J.H. Gentile, J. Walker, and J. F. Heltshe. 1982. Chronic effects of cadmium on 2 species of mysid shrimp *Mysidopsis bahia* and *Mysidopsis bigelowi*. *Hydrobiologia* 93:195-204.

Gentile, J.H., S.M. Gentile, G. Hoffman, J.F. Heltshe, and N. Hairston, Jr. 1983. The effects of a chronic mercury exposure on survival, reproduction and population dynamics of *Mysidopsis bahia*. *Environ Toxicol Chem* 2:61-68.

Ghazaly, K.S. 1992. Sublethal effects of nickel on carbohydrate metabolism, blood and mineral contents of *Tilapia nilotica*. *Water Air Soil Poll* 64:525-532.

Gilani, S.H. and M. Marano. 1979. Chromium poisoning and chick embryogenesis. *Environ Res* 19:427-431.

Gobas, F.A.P.C., D.C. Bedard, J.J.H. Ciborowski, and G.D. Haffner. 1989. Bioaccumulation of chlorinated hydrocarbons by mayfly (*Hexagenia limbata*) in Lake St. Clair. *J Great Lakes Res* 15: 581-588.

Golub, M.S., J.M. Donald, and J.A. Reyes. 1991. Reproductive toxicity of commercial PCB mixtures: LOAELs and NOAELs from animal studies. *Environ Health Perspect* 94:245-253.

Good, E.E. and G.W. Ware. 1969. Effects of insecticides on reproduction in the laboratory mouse. IV. Endrin and dieldrin. *Toxicol Appl Pharmacol* 14:201-203.

Grant, D.L., W.E.J. Phillips, G.V. Hatina. 1977. Effect of hexachlorobenzene on reproduction in the rat. *Arch Environ Contam Toxico*l 5(2):207-216.

Grant, L.D., C.A. Kimmel, G.L. West, C.M. Martinez-Vargas, and J.L. Howard. 1980. Chronic low level lead toxicity in the rat. 2. Effects on postnatal physical and behavioral development. *Toxicol Appl Pharmacol* 56(1):42-58.

Grasman, K.A., S. Fuhrman, A.M. Moore, W. van den Heuvel, and L.L. Williams. 2012. Population, Reproduction, and Health impairments in Colonial Waterbirds Breeding in Areas of Concern. Calvin College, U.S. Fish & Wildlife Service, and Great Lakes Restoration.

Greig, R.A. 1979. Trace metal uptake by three species of mollusks*. Bull Environ Contam Toxicol* 22:643-647.

Greig, R.A., A. Adams, and D.R. Wenzloff. 1977. Trace metal content of plankton and zooplankton collected from the New York Bight and Long Island Sound. *Bull Environ Contam Toxicol* 18:3-8.

Grobler, E., H.H. Du Preez, and J.H.J. van Vuren. 1989. Toxic effects of zinc and iron on the routine oxygen consumption of *Tilapia sparrmanii* (Cichlidae). *Comp Biochem Physiol* 94C:207-214.

Guadagnolo, C.M., C.J. Brauner, and C.M. Wood. 2001. Chronic effects of silver exposure on ion levels, survival, and silver distribution within developing rainbow trout (*Oncorhynchus mykiss*) embryos. *Environ Toxicol Chem* 20(3):553-560.

Haegele, M.A. and R.H. Hudson. 1973. DDE effects on reproduction of ring doves. *Environ Pollut* 4:53-57.

Halter, M.T., W.J. Adams, and H.E. Johnson. 1980. Selenium toxicity to *Daphnia magna*, *Hyallela azteca*, and the fathead minnow in hard water. *Bull Environ Contam Toxicol* 24:102-107.

Hamilton, S.J., K.J. Buhl, N.L. Faerber, R.H. Wiedmeyer, and F.A. Bullard. 1990. Toxicity of organic selenium in the diet to chinook salmon. *Environ Toxicol Chem* 9:347-358.

Hammerschmidt, C.R., M.B. Sandheinrich, J.G. Wiener, and R.G. Rada. 2002. Effects of dietary methylmercury on reproduction of fathead minnows. *Environ Sci Technol* 36(5):877-883.

Hammons, A.S., J.E. Huff, H.M. Braunstein, J.S. Drury, C.R. Shriner, E.B. Lewis, B.L. Whitfield, and L.E. Towill. 1978. Reviews of the Environmental Effects of Pollutants: IV Cadmium. U.S. Environmental Protection Agency, Cincinnati, OH, EPA/600/1-78-026. June. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/2000QSE0.txt?ZyActionD=ZyDocument&Client=EPA&Index=1976%20Thru%201980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C76THRU80%5CTXT%5C

00000004%5C2000QSE0.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=3.

Handy, R.D. 1992. The assessment of episodic metal pollution. II. The effects of cadmium and copper enriched diets on tissue contaminant analysis in rainbow trout (*Oncorhynchus mykiss*). *Arch Environ Contam Toxicol* 22:82-87.

Handy, R.D. 1993. The effect of acute exposure to dietary Cd and Cu on organ toxicant concentrations in rainbow trout, *Oncorhynchus mykiss*. *Aquat Toxicol* 27:1-14.

Hansen, D.J., P.R. Parrish, J.L. Lowe, A.J. Wilson Jr, and P.D. Wilson. 1971. Chronic toxicity, uptake, and retention of Aroclor 1254 in two estuarine fishes. *Bull Environ Contam Toxicol* 6:113-119.

Hansen, D.J., P.R. Parrish, and J. Forester. 1974a. Aroclor 1016: Toxicity to and uptake by estuarine animals. *Environ Res* 7:363-373.

Hansen, D., S.C. Schimmel, and J. Forester. 1974b. Aroclor 1254 in Eggs of Sheepshead Minnows: Effect on Fertilization Success and Survival of Embryos and Fry. Proceedings of 27th Annual Conference, Southeastern Association of Game and Fish Commissioners, Hot Springs, Arkansas, October 14-17, 1973. pp 420-426.

Hansen, D.J., S.C. Schimmel, and J. Forester. 1975. Effects of Aroclor 1016 on embryos, fry, juveniles, and adults of sheepshead minnows (*Cyprinodon variegates*). *Trans Am Fish Soc* 104:584-588.

Harr, J.R., R.R. Claeys, J.F. Bone, T.W. McCorcle. 1970. Dieldrin toxidosis: rat reproduction. *Am J Vet Res* 31(1):181-189.

Harr, J.R. 1978. Biological Effects of Selenium. Pages 393-426 In: F.W. Oehme Ed., Toxicity of Heavy Metals in the Environment, Part l. Marcel Dekker, New York.

Hart, D.R. and J.A. Heddle. 1991. Micronucleus assays in peripheral blood of rainbow trout: Timing of response and chemical mutagen sensitivity. *Can Tech Rep Fish Aquat Sci* 1774(2):993-1010.

Haseltine S.D., L. Sileo, D.J. Hoffman, and B.D. Mulhern. Unpublished. Effects of Chromium on Reproduction and Growth in Black Ducks. As cited in Sample B.E., D.M. Opresko, and G.W. Suter. 1996. Toxicological Benchmarks for Wildlife. 1996 Revision. ES/ERM-86/R3. Office of Environmental Management, U.S. Department of Energy, Washington, DC.

Haseltine, S.D. and R.M. Prouty. 1980. Aroclor 1242 and reproductive success of adult mallards (*Anas platyrhynchos*). *Environ Res* 23:29-34.

Hasten, D.L., M. Hegsted, M.J. Keenan, G.S. Morris. 1997. Dosage effects of chromium picolinate on growth and body composition in the rat. *Nutr Res* 17(7):1175-1186.

Hatherill, J. R. 1981. A review of the mutagenicity of chromium. *Drug Chem Toxicol* 4:185-195.

Hattula, M.L. and O. Karlog. 1972. Toxicity of polychlorinated biphenyls (PCBs) to goldfish. *Acta Pharmacol Toxicol* 31:238-240.

Haux, C., A. Larsson, G. Lithner, and M.L. Sjobeck. 1986. A field study of physiological effects on fish in lead-contaminated lakes. *Environ Toxicol Chem* 5:283-288.

Haya, K. and L.E. Burridge. 1988. Uptake and excretion of organochlorine pesticides by *Nereis virens* under normoxic and hypoxic conditions. *Bull Environ Contam Toxicol* 40: 170-177

Head, J.A., M.E. Hahn, and S.W. Kennedy. 2008. Key amino acids in the aryl hydrocarbon receptor predict dioxin sensitivity in avian species. *Environ Sci Tech* 42:7535-7541.

Heath, R.G., J.W. Spann, and J.F. Kreitzer. 1969. Marked DDE impairment of mallard reproduction in controlled studies. *Nature* 224:47-48.

Heath, R.G., J.W. Spann, E.F. Hill, and J.F. Kreitzer. 1972. Comparative Dietary Toxicities of Pesticides to Birds. Wildlife No. 152. Patuxent Wildlife Research Center, Bureau of Sport Fisheries and Wildlife. Laurel, Maryland.

Heinz, G.H. 1974. Effects of low dietary levels of methyl mercury on mallard reproduction. *Bull Environ Contam Toxicol* 11(4):386-392.

Heinz, G.H. 1975. Effects of methylmercury on approach and avoidance behavior of mallard ducklings. *Bull Environ Contam Toxicol* 13(5):554-564.

Heinz, G.H. 1976. Methylmercury: second-generation reproductive and behavioral effects on mallard ducks. *J Wildl Manage* 40(4):710-715.

Heinz, G.H. 1979. Methylmercury: reproductive and behavioral effects on three generations of mallard ducks. *J Wildl Manage* 43(2):394-401.

Heinz, G.H., and S.D. Haseltine. 1983. Altered avoidance behavior of young black ducks fed cadmium. *Environ Toxicol Chem* 2:419-421.

Heinz, G.H., and D.J. Hoffman. 2003. Embryotoxic thresholds of mercury: estimates from individual mallard eggs. *Arch Environ Contam Toxicol* 44: 257-264.

Heinz, G.H., D.J. Hoffman, A.J. Krynitsky, and D.M.G. Weller. 1987. Reproduction in mallards fed selenium. *Environ Toxicol Chem* 6:423-433.

Heinz, G.H., D.J. Hoffman, and L.G. Gold. 1989. Impaired reproduction of mallards fed an organic form of selenium. *J Wildl Manag* 53(2):418-428.

Hendricks, J.D., W.T. Scott, T.P. Putnam, and R.O. Sinnhuber. 1981. Enhancement of Aflatoxin B1 Hepatocarcinogenesis in Rainbow Trout (*Salmo gairdneri*) Embryos by Prior Exposure of Gravid Females to Dietary Aroclor 1254. In: Branson, D.R. and K.L. Dickson, Eds., Aquatic Toxicology and Hazard Assessment, Fourth Conference. ASTM STP 737. American Society for Testing and Materials, Philadelphia, PA. pp. 203-214.

Hendricks, J.D., T.R. Meyers, D.W. Shelton, J.L. Casteel, and G.S. Bailey. 1985. Hepatocarcinogenicity of benzo(a)pyrene to rainbow trout by dietary exposure and intraperitoneal injection. *J Nat Cancer Inst* 74:839-851.

Hermanutz R.O., K.N. Allen, T.H. Roush, S.F. Hedtke. 1992. Effects of elevated selenium concentrations on bluegills (*Lepomis macrochirus*) in outdoor experimnetal streams. *Environ Toxicol Chem* 11:217-224.

Hill, E.F. and M.B. Camardese. 1986. Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to Coturnix. U.S. Fish & Wildlife Service, Technical Report 2. 147p.

Hill, E.F. and J.H. Soares Jr. 1987. Oral and intramuscular toxicity of inorganic and organic mercury chloride to growing quail. *J Toxicol Environ Health* 20:105-116.

Hill, E.F., R.G. Heath, J.W. Spann, and J.D. Williams. 1975. Lethal Dietary Toxicities of Environmental Pollutants to Birds. Wildlife No. 191. U.S. Fish and Wildlife Service. Laurel, Maryland.

Hill, E.F., R.G. Heath, and J.D. Williams. 1976. Effect of dieldrin and Aroclor 1242 on Japanese quail eggshell thickness. *Bull Environ Contam Toxicol* 16(4): 445-453.

Hilmy, A.M., N.EA. El-Hamid, and K.S. Ghazaly. 1988. Biochemical and physiological changes in the tissues and serum of both sexes in *Portunus pelagicus* (L.) following acute exposures to zinc and copper. *Folia Morphologica* 36:79-94.

Hochstein, J.R., S.J. Bursian, and R.J. Aulerich. 1998. Effects of dietary exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in adult female mink (*Mustela vison*). *Arch Environ Contam Toxicol* 35:348-353.

Hochstein, J.R., J.A. Render, S.J. Bursian, and R.J. Aulerich. 2001. Chronic toxicity of dietary 2,3,7,8-tetrachlorodibenzo-*p*-dioxin to mink. *Vet Hum Toxicol* 43(3):134-139.

Hodson P.V. 1985. A comparison of the acute toxicity of chemicals to fish, rats and mice. *J Appl Toxicol* 5(4):220-226.

Hodson, P.V., and D.J. Spry. 1985. Effect of sulfite dechlorination on the accumulation of waterborne lead by rainbow trout (*Salmo gairdneri*). *Can J Fish Aquat Sci* 42:841-844.

Hodson, P.V., B.R. Blunt, D.J. Spry, and K. Austen. 1977. Evaluation of erythrocyte amino levulinic acid dehydratase activity as a short-term indicator in fish of a harmful exposure to lead. *J Fish Res Board Can* 34:501-508.

Hodson, P.V., J.W. Hilton, B.R. Blunt, and S.J. Slinger. 1980. Effects of dietary ascorbic acid on chronic lead toxicity to young rainbow trout (*Salmo gairdneri*). *Can J Fish Aquat Sci* 37:170-176.

Hodson, P.V., D.J. Spry, and B.R. Blunt. 1980. Effects on rainbow trout (*Salmo gairdneri*) of a chronic exposure to waterborne selenium. *Can J Fish Aquat Sci* 37:233-240.

Hodson, P.V., D.G. Dixon, D.J. Spry, D.M. Whittle, and J.B. Sprague. 1982. Effect of growth rate and size of fish on rate of intoxication by waterborne lead. *Can J Fish Aquat Sci* 39:1243-1251.

Hoffman, D.J. and M.L. Gay. 1981. Embryotoxic effects of benzo(a)pyrene, chrysene, and 7,12-dimethylbenz(a)anthracene in petroleum hydrocarbon mixtures in mallard ducks. *J Toxicol Environ Health* 7:775-787.

Hoffman, D.J., J.C. Franson, O.H. Pattee, C.M. Bunck, and A.C. Anderson. 1985. Survival, growth, and accumulation of ingested lead in nestling American kestrels (*Falco sparverius*). *Arch Environ Contam Toxicol* 14:89-94.

Hoffman, D.J., B.A. Rattner, G.A. Burton, and J. Cairns. 1995. Handbook of Ecotoxicology. CRC Press, Boca Raton.

Hoffman, D.J., C.P. Rice, T.J. Kubiak. 1996. PCBs and dioxins in birds. In: Beyer, W.N., G.H. Heinz, and A.W. Redmon-Norwood, Eds., Environmental Contaminants in Wildlife. Lewis Publishers, Boca Raton, FL, pp. 165-207.

Hoffman, D.J., M.J. Melancon, P.N. Klein, J.D. Eisemann, and J.W. Spann. 1998. Comparative developmental toxicity of planar polychlorinated biphenyl congeners in chickens, American kestrels, and common terns. *Environ Toxicol Chem* 17(4):747-757.

Hogstrand, C., F. Galvez, and C.M. Wood. 1996. Toxicity, silver accumulation and metallothionein induction in freshwater rainbow trout during exposure to different silver salts. *Environ Toxicol Chem* 15:1102-1108.

Holcombe, G.W., D.A. Benoit, E.N. Leonard, and J.M. McKim. 1976. Long-term effects of lead exposure on three generations of brook trout (*Salvelinus fontinalis*). *J Fish Res Bd Can* 33:1731-1741.

Honig, R.A., M.J. McGinniss, A.L. Buikema, Jr., and J. Cairns, Jr. 1980. Toxicity tests of aquatic pollutants using *Chilomonas paramecium* Ehrenberg (Flagellata) populations. *Bull Environ Contam Toxico*l 5:169-175.

Hood, R.D. 1985. Cacodylic Acid: Agricultural Uses, Biologic Effects, and Environmental Fate. VA Monograph. Available from Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

Hook, S.E. and N.S. Fisher. 2002. Relating the reproductive toxicity of five ingested metals in calanoid copepods with sulfur affinity. *Mar Environ Res* 53:161-174.

Hornshaw, T.C., R.J. Aulerich, and H.E. Johnson. 1983. Feeding Great Lakes fish to mink: effects on mink and accumulation and elimination of PCBs by mink. *J Toxicol Environ Health* 11:933-946.

Hough, J.L., M.B. Baird, G.T. Sfeir, C.S. Pacini, D. Darrow, and C. Wheelock. 1993. Benzo(a)pyrene enhances atherosclerosis in white carneau and show racer pigeons. *Arterioscler Thromb* 13:1721-1727.

Huckabee, J.W. and N.A. Griffith. 1974. Toxicity of mercury and selenium to the eggs of carp (*Cyprinus carpio*). *Trans Am Fish Soc* 103:822-825.

Hughes, J.A. and Z. Annau. 1976. Postnatal behavioral effects in mice after prenatal exposure to methylmercury. *Pharmacol Biochem Behav* 4:385-391.

Hugla, J.L., and J.P. Thome. 1999. Effects of polychlorinated biphenyls on liver ultrastructure, hepatic monooxygenases, and reproductive success in the barbel. *Ecotox Environ Saf* 42:265-273.

Iavicoli, I., G. Carelli, E.J. Stanek, N. Castellino, Z. Li, and A. Calabrese. 2006. Low doses of dietary lead are associated with a profound reduction in the time to onset of puberty in female mice. *Reprod Toxicol* 22:586-590.

Incardona, J.P., T.K. Collier, and N.L. Scholz. 2004. Defects in cardiac function precedemorphological abnormalities in fish embryos exposed to polycyclic aromatic hydrocarbons. *Toxicol Appl Pharmacol* 196(2):191-205.

International Agency for Research on Cancer. 1979. Chlordane. IARC Monographs. *Eval Carcinogen Risk Chem Hum* 20:45- 65.

Irving, E.C., R.B. Lowell, J.M. Culp, K. Liber, Q. Xie, R. Kerrich. 2008. Effects of arsenic speciation and low dissolved oxygen condition on the toxicity of arsenic to a lotic mayfly. *Environ Toxicol Chem* 27(3):583-590.

Isensee, A.R., A.R. Holden, E.A. Woolson, and G.E. Jones. 1976. Soil persistence and aquatic bioaccumulation potential of HCB. *J Agric Food Chem* 24: 1210-17.

Ivankovic, S. and R. Preussman. 1975. Absence of toxic and carcinogenic effects after administration of high doses of chromic oxide pigment in subacute and long-term feeding experiments in rats. *Food Cosmet Toxicol* 13:347-351.

Janz, D.M. and G.D. Bellward. 1996. In ovo 2,3,7,8-tetrachlorodibenzo-*p*-dioxin exposure in three avian species. 1. Effects on thyroid hormones and growth during the perinatal period. *Toxicol Appl Pharmacol* 139:281-291.

Jarvinen, A.W., M.J. Hoffman, and T.W. Thorslund. 1976. Toxicity of DDT Food and Water Exposure to Fathead Minnows. EPA-600/3-76/114. U.S. Environmental Protection Agency. Duluth, Minnesota.

Jarvinen, A.W., M.J. Hoffman, and T.W. Thorslund. 1977. Long-term toxic effects of DDT food and water exposure on fathead minnows (*Pimephales promelas*). *J Fish Res Bd Can* 34:2089-2103.

Javed, M. 2013. Chronic effects of nickel and cobalt on fish growth. *Int J Agric Biol* 15:575-579

Jayaraj, R., P. Megha, S. Puthur. 2016. Review Article. Organochlorine pesticides, their toxic effects on living organisms and their fate in the environment. *Interdisciplinary Toxicol* 9: 90-100.

Jensen, L.S. and D.V. Maurice. 1978. Effect of methionine on copper-induced growth depression and gizzard erosion. *Poult Sci* 57:1530-1532.

Jensen, S., J.E. Kihlstrom, M. Olsson, C. Lundberg, and J. Orberg. 1977. Effects of PCB and DDT on mink (*Mustela vison*) during the reproductive season. *Ambio* 6(4):239.

Johansson-Sjobeck, M.J. and A. Larsson. 1979. Effects of inorganic lead on delta-aminolevulinic acid dehydratase activity and hematological variables in the rainbow trout, *Salmo gairdneri*. *Arch Environ Contam Toxicol* 8:419-431.

Johnson, L.L., T.K. Collier, and J.E. Stein. 2002. An analysis in support of sediment quality thresholds for polycyclic aromatic hydrocarbons (PAHs) to protect estuarine fish. *Aquat Conserv Mar Freshw Ecosys* 12(5):517-538.

Johnson, W.W. and M.T. Finley. 1980. Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates. U.S. Fish & Wildlife Service Resource Publication 137. 98p. Available at: https://pubs.usgs.gov/unnumbered/37236/report.pdf.

Jonsson, J.T. Jr, J.E. Keil, R.G. Gaddy, C.B. Loadholt, G.R. Hennigar, and E.M. Walker Jr. 1976. Prolonged ingestion of commercial DDT and PCB; Effects on progesterone levels and reproduction in the mature female rat. *Arch Environ Contam Toxicol* 3:479-490.

Kakela, A., R. Kakela, H. Jyvarinen, and J. Askikainen. 2002. Vitamins A1 and A2 in hepatic tissue and subcellular fractions in mink feeding on fish-based diets and exposed to Aroclor 1242. *Environ Toxicol Chem* 21(2):397-403.

Kamunde, C.N., M. Grosell, J.N.A. Lott, and C.M. Wood. 2001. Copper metabolism and gut morphology in rainbow trout (*Oncorhynchus mykiss*) during chronic sublethal dietary copper exposure. *Can J Fish Aquat Sci* 58:293-305.

Kang, J-C., S-G. Kim, and S-W. Jang. 2005. Growth and hematological changes of rockfish, *Sebastes schlegeli* (Hilgendorf) exposed to dietary Cu and Cd. *J World Aquacult Soc* 36(2):188-195.

Kania, H.J. and J. O'Hara. 1974. Behavioral alterations in a simple predator-prey system due to sublethal exposure to mercury. *Trans Am Fish Soc* 1:134-136.

Kashani, A.B., H. Samie, R.J. Emerick, and C.W. Carlson. 1986. Effect of copper with three levels of sulfur containing amino acids in diets for turkeys. *Poult Sci* 65(9): 1754-9. Ref ID: 2171

Kawano, M., T. Inoue, T. Wada, H. Hidaka, and R. Tatsukawa. 1988. Bioconcentration and residue patterns of chlordane compounds in invertebrates, fish, mammals, and seabirds. *Environ Sci Technol* 22:792- 797.

Kendall, R.J. and P.F. Scanlon. 1982. The toxicology of ingested lead acetate in ringed turtle doves *Streptopelia risoria*. *Environ Pollut* (Series A) 27:255-262.

Kennedy, S.W., A. Lorenzen, S.P. Jones, M.E. Hahn, and J.J. Stegeman. 1996. Cytochrome P4501A induction in avian hepatocyte cultures: a promising approach for predicting the sensitivity of avian species to toxic effects of halogenated aromatic hydrocarbons. *Toxicol Appl Pharmacol* 141:214-230.

Khairy, M.A., M.P. Weinstein, and R. Lohmann. 2014. Trophodynamic behavior of hydrophobic organic contaminants in the aquatic food web of a tidal river. *Environ Sci Tech* 48(21):12533-12542.

Khangarot, B.S. and P.K. Ray. 1987. Zinc sensitivity of a freshwater snail, *Lymnaea luteola* L., in relation to seasonal variations in temperature. *Bull Environ Contam Toxicol* 39:45-49.

Khasawinah, A.M. and J.F. Grutsch. 1989. Chlordane: 24-month tumorigenicity and chronic toxicity test in mice. *Reg Toxicol Pharmacol* 10:244-254.

Kim, S.G., J.W. Kim, and J.C. Kang. 2004. Effect of dietary cadmium on growth and haematological parameters of juvenile rockfish, *Sebastes schlegeli* (Hilgendorf). *Aquacult Res* 35:80-86.

Kim, S.G., D.K. Park, S.W. Jang, J.S. Lee, S.S. Kim, and M.H. Chung. 2008. Effects of dietary benzo(a)pyrene on growth and hematological parameters in juvenile rockfish, *Sebastes schlegeli* (Hilgendorf). *Bull Environ Contam Toxicol* 81:470-474.

Kimbrough, R.D. 1985. Laboratory and human studies on polychlorinated biphenyls (PCBs) and related compounds. *Environ Health Perspect* 59:99–106.

Kimbrough, R.D. 1987. Human health effects of polychlorinated biphenyls (PCBs) and polybrominated biphenyls (PBBs). *Ann Rev Pharmacol Toxicol* 27:87-111.

King, C.K., M.C. Dowse, S.L. Simpson, and D.F Jolley. 2004. An assessment of five Australian polychaetes and bivalves for use in whole-sediment toxicity tests: toxicity and accumulation of copper and zinc from water and sediment. *Arch Environ Contam Toxicol* 47:314-323.

Klaassen C.D., M.O. Amdur, and J. Doull. 1986. Casarett and Doull's Toxicology. 3rd ed. Macmillan Publishing Company, New York.

Klaverkamp, J.F., W.A. Macdonald, W.R. Lillie, and A. Lutz. 1983. Joint toxicity of mercury and selenium in salmonid eggs. *Arch Environ Contam Toxicol* 12:415-419.

Klumpp, D.W. 1980. Accumulation of arsenic from water and food by *Littorina littoralis* and *Nucella lapillus*. *Mar Biol* 58:265-274.

Knezovich, J.P. and F.L. Harrison. 1988. The bioavailability of sediment- sorbed chlorobenzenes to larvae of the midge, *Chironomus decorus*. *Ecotoxicol Environ Saf* 15: 226-241.

Knight, R., V.L. Marlatt, J.A. Baker, B.P. Lo, A.M.H. deBruyn, J.R. Elphick, and C.J. Martyniuk. 2016. Dietary selenium disrupts hepatic triglyceride stores and transcriptional networks associated with growth and Notch signaling in juvenile rainbow trout. *Aquatic Toxicol* 180:103-114.

Kobayashi, N. 1971. Fertilized sea urchin eggs as an indicatory material for marine pollution bioassay, preliminary experiments. *Publ Seto Mar Biol Lab (Japan*) 18:379-406.

Kociba, R.J., D.G. Keyes, J.E. Beyer, R.M. Carreon, C.E. Wade, D.A. Dittenber, R.P. Kalnins, L.E. Frauson, C.N. Park, S.D. Barnard, R.A. Hummel, and C.G. Humiston. 1978. Results of a two-year chronic toxicity and oncogenicity study of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in rats. *Toxicol Appl Pharmacol* 46:279-303.

Kolaja, G.J. 1977. The effects of DDT, DDE and their sulfonated derivatives on eggshell formation in the mallard duck. *Bull Environ Contam Toxicol* 17:697-701.

Krishnaja, A.P. and M.S. Rege. 1982. Induction of chromosomal aberrations in fish *Boleophthalmus dussumieri* after exposure in vivo to mitomycin C and heavy metals mercury, selenium and chromium. *Mutat Res* 102:71-82.

Kumar, S. and S.C. Pant. 1984. Comparative effects of the sublethal poisoning of zinc, copper and lead on the gonads of the teleost *Puntius conchonius* Ham. *Toxicol Lett* 23:189-194.

Lambrecht, R.W., P.R Sinclair, W.J. Bement, J.F. Sinclair, H.M Carpenter, D.R. Buhler, A.J. Urquhart, and G.H. Elder. 1988. Hepatic uroporphyrin accumulation and uroporphyrinogen decarboxylase activity in cultured chick-embryo hepatocytes and in Japanese quail (*Coturnix japonica*) and mice treated with polyhalogenated aromatic hydrocarbons. *J Biochem* 253:131-138.

Landrum, P.F., J.A. Steevens, M. McElroy, D.C. Gossiaux, J.S. Lewis, and S.D. Robinson. 2005. Time-dependent toxicity of dichlorodiphenyldichloroethylene to *Hyalella azteca*. *Environ Toxicol Chem* 24(1):211-218.

Langard, S., and T. Norseth. 1979. Chromium. Pages 383-397 In: Friberg, L., G.F. Nordberg, and V.B. Vouk Eds., Handbook on the Toxicology of Metals. Elsevier/North Holland Biomedical Press.

Lanno, R.P., S.J. Slinger, and J.W. Hilton. 1985a. Effect of ascorbic acid on dietary copper toxicity in rainbow trout (*Salmo gairdneri* Richardson). *Aquaculture* 49:269-287.

Lanno, R.P., S.J. Slinger, and J.W. Hilton. 1985b. Maximum tolerable and toxicity levels of dietary copper in rainbow trout (*Salmo gairdneri* Richardson). *Aquaculture* 49:257-268.

Laseter, J.L., C.K. Bartell, A.L. Laska, D.G. Holmquist, D.B. Condie, J.W. Brown, and R.L. Evans. 1976. An Ecological Study of Hexachlorobenzene (HCB). University of New Orleans, Department of Biological Sciences. Prepared for the U.S. Environmental Protection Agency, Office of Toxic Substances, Washington. EPA 560/6-76-009.

Laska, A. L., C. K. Bartell, D.B. Condie, J. W. Brown, R. L. Evans, and J.L Laseter. 1978. Acute and chronic effects of hexachlorobenzene and hexachlorobutadiene in red swamp crayfish (*Procambarus clarki*) and selected fish species. *Toxicol Appl Pharm* 43:1-12.

LeBlanc, G.A., J.D. Mastone, A.P. Paradice, B.F. Wilson, H.B. Lockhart Jr., and K.A. Robillard. 1984. The influence of speciation on the toxicity of silver to fathead minnow (*Pimephales promelas*). *Environ Toxicol Chem* 3:37-46.

Lee J-H, Landrum PF, Koh C-H. 2002. Toxicokinetics and time-dependent PAH toxicity in the amphipod *Hyalella azteca*. *Environ Sci Technol* 36:3124-3130.

Leighton, F.A. 1989. Acute oral toxicity of dibenzothiophene for male CD-1 mice: LD50, lesions, and the effect of preinduction of mixed-function oxidases. *Fund Appl Toxicol* 12:787-792.

Leonard, A., and R. R. Lauwerys. 1980. Carcinogenicity and mutagenicity of chromium. *Mutat Res* 76:227-239.

Lerner, D.T., B.T. Bjornsson, and S.D. McCormick. 2007. Effects of aqueous exposure to polychlorinated biphenyls (Aroclor 1254) on physiology and behavior of smolt development of Atlantic salmon. *Aquat Tox* 81:329-336.

Lieb, A.J., D.D. Bills, and R.O. Sinnhuber. 1974. Accumulation of dietary polychlorinated biphenyls (Aroclor 1254) by rainbow trout (*Salmo gairdneri*). *J Agr Food Chem* 22:638-642.

Lien, T.F., K.L. Chen, C.P. Wu, and J.J. Lu. 2004. Effects of supplemental copper and chromium on the serum and egg traits of laying hens. *Brit Poult Sci* 45(4):535-539.

Lilienthal, H., C. Benthe, B. Heinzow, and G. Winneke. 1996. Impairment of schedule-controlled behavior by pre- and postnatal exposure to hexachlorobenzene in rats. *Arch Toxicol* 70:174-181.

Lillie, R.J., H.C. Cecil, J. Bitman, G.F. Fries, J. Verrett. 1975. Toxicity of certain polychlorinated and polybrominated biphenyls on reproductive efficiency of caged chickens. *Poult Sci* 54:1550-1555.

Lima, A.R., C. Curtis, D.E. Hammermeister, T.P. Markee, C.E. Northcott, and L.T. Brooke. 1984. Acute and chronic toxicities of arsenic (III) to fathead minnows, flagfish, daphnids, and an amphipod. *Arch Environ Contam Toxicol* 13:595-601.

Ling, J. R. and R. M. Leach Jr. 1979. Studies on nickel metabolism: interaction with other mineral elements. *Poult Sci* 58:591-596.

Longcore, J.R. and F.B. Samson. 1973. Eggshell breakage by incubating black ducks fed DDE. *J Wildl Manag* 37(3):390-394.

Longcore, J.R., F.B. Samson, and T.W. Whittendale Jr. 1971. DDE thins eggshells and lowers reproductive success of captive black ducks. *Bull Environ Contam Toxicol* 6(6):485-490.

Lotufo, G.R., J.D. Farrar, B.M. Duke, and T.S. Bridges. 2001. DDT toxicity and critical body residue in the amphipod *Leptocheirus plumulosus* in exposures to spiked sediment. *Arch Environ Contam Toxicol* 41:142-150

Lowe, T.P. and R.C. Stendell. 1991. Eggshell modifications in captive American kestrels resulting from Aroclor 1248 in the diet. *Arch Environ Contam Toxicol* 20:519-522.

Lundebye, A.K., M.H.G. Berntssen, S.E. Wendelaar Bonga, and A. Maage. 1999. Biochemical and physiological responses in Atlantic salmon (*Salmo salar*) following dietary exposure to copper and cadmium. *Mar Pollut Bull* 39:137-144.

Lundholm, E. 1987. Thinning of eggshells in birds by DDE: model of action on the eggshell gland. *Comp Biochem Physiol* Part C 88(1):1-22.

Lundholm, C.E. 1988. The effects of DDE, PCB and chlordane on the binding of progesterone to its cytoplasmic receptor in the eggshell gland mucosa of birds and the endometrium of mammalian uterus. *Comp Biochem Physiol* 89C:361- 368.

MacDonald, A. 1993. Development of an Approach to the Assessment of Sediment Quality in Florida Coastal Waters. Florida Department of Environmental Regulation, Tallahassee, FL. By MacDonald Environmental Sciences, Ltd., Ladysmith, British Columbia.

Macek, K.J. 1968a. Growth and resistance to stress in brook trout fed sublethal levels of DDT. *J Fish Res Bd Can* 25(11):2443-2451.

Macek, K.J. 1968b. Reproduction in brook trout (*Salvelinus fontinalis*) fed sublethal concentrations of DDT. *J Fish Res Bd Can* 25(9):1787-1796.

MacKenzie, K.M. and D.M. Angevine. 1981. Infertility in mice exposed in utero to benzo(a)pyrene. *Biol Reprod* 24:183-191.

Machemer L. and D. Lorke. 1981. Embryotoxic effect of cadmium on rats upon oral administration. *Toxicol Appl Pharmacol* 58:438-443.

Madsen, K.N. 1992. Effects of arsenic on survival and metabolism of *Crangon crangon*. *Mar Biol* 113:37-44.

Magzoub, M.B., H.A. Al-Batshan, M.F Hussein, S.I. Al-Mufarrej, and M.Y. Al-Saiady. 2010. The effect of source and level of dietary chromium supplementation on performance, chemical composition and some metabolic aspects in hybrid tilapia fish (*Oreochromis niloticus x O. Aureus*). *Res J Biol Sci* 5(2):164-170.

Maher, W.A. 1985. The presence of arsenobetaine in marine animals. *Biochem. Physiol* 80C:199-201.

Malchow, D.E., A.W. Knight, and K.J. Maier. 1995. Bioaccumulation and toxicity of selenium in *Chironomus decorus* larvae fed a diet of seleniferous *Selenastrum capricornutum*. *Arch Environ Contam Toxicol* 29:104-109.

Malcolm, H.M. and R.F. Shore. 2003. Effects of PAHs on Terrestrial and Freshwater Birds, Mammals and Amphibians. In: Douben P.E.T., Ed., PAHs: An Ecotoxicological Perspective. John Wiley & Sons Ltd, Sharnbrook, Bedford, UK, pp. 225-241.

Marshall, J.S. 1978. Population dynamics of *Daphnia galeata mendotae* as modified by chronic cadmium stress. *J Fish Res Board Can* 35:461-469.

Matta, M.B., J. Linse, C. Cairncross, L. Francendese, and R.M. Kocan. 2001. Reproductive and transgenerational effects of methylmercury or Aroclor 1268 on *Fundulus heteroclitus*. *Environ Toxicol Chem* 20(2):327-335.

Mauck, W.L., P.M. Mehrle, and F.L. Mayer. 1978. Effects of the polychlorinated biphenyl Aroclor 1254 on growth, survival, and bone development in brook trout (*Salvelinus fontinalis*). *J Fish Res Bd Can* 35:1084-1088.

Mayer, F.L., P.M. Mehrle, and H.O. Sanders. 1977. Residue dynamics and biological effects of polychlorinated biphenyls in aquatic organisms. *Arch Environ Contam Toxicol* 5:501-511.

Mayer, K.S., F.L. Mayer, and A. Witt Jr. 1985. Waste transformer oil and PCB toxicity to rainbow trout. *Trans Am Fish Soc* 114(6):869-886.

Mayer, F.L., Jr. 1987. Acute Toxicity Handbook of Chemicals to Estuarine Organisms. U.S. Environmental Protection Agency, Gulf Breeze, FL, EPA/600/8- 87/017. April. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/2000AYHD.txt?ZyActionD=ZyDocument&Client=EPA&Index=1986%20Thru%201990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C86THRU90%5CTXT%5C00000001%5C2000AYHD.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1.

McCarthy, I.D., L.A. Fuiman, and M.C. Alvarez. 2003. Aroclor 1254 affects growth and survival skills of Atlantic croaker *Micropogonias undulatus* larvae. *Mar Ecol Prog Ser* 252:295-301.

McGeachy, S.M. and D.G. Dixon. 1992. Whole-body arsenic concentrations in rainbow trout during acute exposure to arsenate. *Ecotox Environ Saf* 24:301-308.

McLane, M.A.R. and D.L. Hughes. 1980. Reproductive success of screech owls fed Aroclor 1248. *Arch Environ Contam Toxicol* 9:661-665.

McLeese, D.W., L.E. Burridge, and J.V. Dinter. 1982. Toxicities of five organochlorine compounds in water and sediments to *Nereis virens*. *Bull Environ Contam Toxicol* 28:216-220.

Meador, J.P., F.C. Sommers, G.M. Ylitalo, and C.A. Sloan. 2006. Altered growth and related physiological responses in juvenile chinook salmon (*Oncorhynchus tshawytscha*) from dietary exposure to polycyclic aromatic hydrocarbons (PAHs). *Can J Fish Aquat Sci* 63:2364-2376.

Measures, C.I. and J.D. Burton. 1980. The vertical distribution and oxidation states of dissolved selenium in the northeast Atlantic Ocean and their relationship to biological processes. *Earth Plan Sci Lett* 46:385-396.

Mehring, A.L., J.H. Brumbaugh, A.J. Sutherland, and H.W. Titus. 1960. The tolerance of growing chickens for dietary copper. *Poult Sci* 39:713-719.

Mendenhall, V.M., E.E. Klaas, and M.A.R. McLane. 1983. Breeding success of barn owls (*Tyto alba*) fed low levels of DDE and dieldrin. *Arch Environ Contam Toxicol* 12:235-240.

Micheletti, C., T. Lovato, A. Critto, R. Pastres, and A. Marcomini. 2008. Spatially distributed ecological risk for fish of a coastal food web exposed to dioxins. *Environ Toxicol Chem* 27(5):1217-1225.

Milanovich, F.P., R. Spies, M.S. Guram, and E.E Sykes. 1976. Uptake of copper by the polychaete *Cirriformia spirabrancha* in the presence of dissolved yellow organic matter of natural origin. *Estuar Coast Mar Sci 4*:585-588.

Miller, P.A., R.P. Lanno, M.E. McMaster, and D.G. Dixon. 1993. Relative contributions of dietary and waterborne copper to tissue copper burdens and waterborne-copper tolerance in rainbow trout (*Oncorhynchus mykiss*). *Can J Fish Aquat Sci* 5(8):1683-1689.

Mishra J. and A.K. Srivastava. 1984. Effects of chlordane on the blood and tissue chemistry of a teleost fish, *Heteropneustes fossilis*. *Cell Mol Biol* 30:519- 523.

Moksnes, K. 1983. Selenium deposition in tissues and eggs of laying hens given surplus of selenium as selenomethionine. *Acta Vet. Scand* 24:34-44.

Moore, J.W., and S. Ramamoorthy. 1984. Organic Chemicals in Natural Water. Springer-Verlag, New York, NY.

Moore, R., E. Toro, M. Stanton, and M.A.Q. Khan. 1977. Absorption and elimination of 14C-alpha- and gamma-chlordane by a freshwater alga, daphnid, and goldfish. *Arch Environ Contam Toxicol* 6:411-420.

Morgan, G.W., F.W. Edens, P. Thaxton, and C.R. Parkhurst. 1975. Toxicity of dietary lead in Japanese quail. *Poult Sci* 54:1636-1642.

Mount, D.R., A.K. Barth, T.D. Garrison, K.A. Barten, and J.R. Hockett. 1994. Dietary and waterborne exposure of rainbow trout (*Oncorhynchus mykiss*) to copper, cadmium, lead and zinc using a live diet. *Environ Toxicol Chem* 13(12):2031-41.

Muller, J.K., K.G. Johnson, M.S. Sepulveda, C.J. Borgert, and T.S. Gross. 2004. Accumulation of dietary DDE and dieldrin by largemouth bass, *Micropterus salmoides* floridanus. *Bull Environ Contam Toxicol* 73:1078-1085.

Munzinger, A., and M. L. Guarducci. 1988. The effect of low zinc concentrations on some demographic parameters of *Biomphalaria glabrata* (Say), Mollusca: Gastropoda. *Aquat Toxicol* 12:51-61.

Murai, T., J.W. Andrews, and R.G. Smith Jr. 1981. Effects of dietary copper on channel catfish. *Aquaculture* 22:353-357.

Murata Y., A. Denda, H. Maruyama, and Y. Konishi. 1993. Chronic toxicity and carcinogenicity studies of 1-methylnaphthalene in B6C3F1 mice. *Fund Appl Toxicol* 21:44-51.

Murray, F.J., F.A. Smith, K.D. Nitschke, C.G. Humiston, R.J. Kociba, and B.A. Schwetz. 1979. Three-generation reproduction study of rats given 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) in the diet. *Toxicol Appl Pharmacol* 50:241-252.

Murti, R., O. Omkar, and G.S. Shukla. 1983. Chromium toxicity to a freshwater prawn *Macrobrachium lamarrei* (H. M. Edwards). *Toxicol Lett* 18:257-261.

Muyssen, B.T.A., K.A.C. De Schamphelaere, C.R. Janssen. 2006. Mechanisms of chronic waterborne Zn toxicity in *Daphnia magna*. *Aquat Toxicol* 77:393-401

Myers, M.S., C.M. Stehr, O.P. Olson, L.L. Johnson, B.B. McCain, S.L. Chan, and U. Varanasi. 1994. Relationships between toxicopathic hepatic lesions and exposure to chemical contaminants in English sole (*Pleuronectes vetulus*), starry flounder (*Platichthys stellatus*), and white croaker (*Genyonemus lineatus*) from selected marine sites on the Pacific coast, USA. *Environ Health Perspect* 102:200-215.

Naddy, R.B., J.W. Gorsuch, A.B. Rehner, G.R. McNerney, R.A. Bell, and J.R. Kramer. 2007. Chronic toxicity of silver nitrate to Ceriodaphnia dubia and Daphnia magna, and potential mitigating factors. *Aquatic Toxicol* 84(2):I-X.

Näf, C., D. Broman, and B. Brunström. 1992. Distribution and metabolism of polycyclic aromatic hydrocarbons (PAHs) injected into eggs of chicken (*Gallus domesticus*) and common eider duck (*Somateria mollissima*). *Environ Toxicol Chem* 11:1653-1660.

Narotsky, M.G. and R.J. Kavlock. 1995. A multidisciplinary approach to toxicological screening. II. Developmental toxicity. *J Toxicol Environ Health* 45:145–171.

NAS. 1977. Arsenic. National Academy of Sciences, Washington, D.C. 332p.

NAS. 1979. Zinc. United States National Academy of Sciences, National search Council, Subcommittee on Zinc. University Park Press, Baltimore, Maryland. 471p.

NAS. 1980. Mineral Tolerances of Domestic Animals. National Academy of Sciences, National Research Council, Washington, D.C.

Nassos, P.A., J.R. Coats, R.L. Metcalf, D.D. Brown, and L.G. Hansen. 1980. Model ecosystem, toxicity, and uptake evaluation of 75Se-selenite. *Bull Environ Contam Toxicol* 24:752-758.

Nath, K. and N. Kumar. 1990. Gonadal histopathology following nickel intoxication in the giant gourami *Colisa fasciatus* (Bloch and Schneider), a freshwater tropical perch. *Bull Environ Contam Toxicol* 45:299-304.

Nation, J.R., M.F. Hare, D.M. Baker, D.E. Clark, A.E. Bourgeois. 1985. Dietary administration of nickel: effects on behavior and metallothionein levels. *Physiol Behav* 34:349-353.

National Institutes of Health. 1993. NTP Technical Report on Toxicity Studies of Cupric Sulfate (CAS no. 7758-99-8) Administered in Drinking Water and Feed to F344/N Rats and B6C3F$_1$ Mice. NIH Publication 93-3352. National Toxicology Program Toxicity Report Series No. 29. July. Available at: https://ntp.niehs.nih.gov/ntp/htdocs/st_rpts/tox029.pdf.

National Research Council. 1983. Selenium in Nutrition, Revised Edition. U.S. Subcommittee on Selenium, Committee on Animal Nutrition, Board on Agriculture, National Research Council. National Academy Press, Washington, DC. 174 pp.

Navarro, H.A., C.J. Price, M.C. Marr, and C.B. Myers, 1991. Final Report on the Developmental Toxicity of Naphthalene (Cas No. 91-20-3) in Sprague-Dawley Cd Rats on Gestational Days 6 Through 15. Laboratory Supplement. Report.

Navarro, H.A., C.J. Price, M.C Marr, C.B Myers, J.J Heindel, B.A. Schwetz. 1991. Developmental toxicity evaluation of naphthalene in rats (abstract). *Teratology Society Abstracts* 475.

Neal J., and R.H. Rigdon. 1967. Gastric tumors in mice fed benzo(a)pyrene: a quantitative study. *Tex Rep Biol Med* 25(4):553-557.

Nebeker, A.V., F.A. Puglisi, and D.L. DeFoe. 1974. Effect of polychlorinated biphenyl compounds on survival and reproduction of the fathead minnow and flagfish. *Trans Am Fish Soc* 103:562-568.

Nebeker, A.V., W.L. Griffis, C.M. Wise, E. Hopkins, and J.A. Barbitta. 1989. Survival, reproduction and bioconcentration in invertebrates and fish exposed to hexachlorobenzene. *Environ Toxicol Chem* 8:601-11.

Neff, J.M. 1979. Polycyclic Aromatic Hydrocarbons in the Aquatic Environment. Sources, Fates, and Biological Effects. Applied Science Publishers, London.

Neff, J. M., R. S. Foster, and J. F. Slowey. 1978. Availability of Sediment-Adsorbed Heavy Metals to Benthos with Particular Emphasis on Deposit-Feeding Infauna.Technical Report D-78-42, U.S. Army Engineer Waterways Expiment Station, Vicksburg, Mississippi. 286p.

Nehring, R.B. 1976. Aquatic insects as biological monitors of heavy metal pollution. *Bull Environ Contam Toxicol* 15:147-154.

Nelson, D.A., A. Calabrese, B.A. Nelson, J.R. MacInnes, D.R. Wenzloff. 1976. Biological effects of heavy metals on juvenile bay scallops, *Argopecten irradiens*, in short-term exposures. *Bull Environ Contam Toxicol* 36(3):275-281.

Nelson, D.A., A. Calabrese, R.A. Greig, P.P. Yevich, and S. Chang. 1983. Long-term silver effects on the marine gastropod *Crepidula fornicata*. *Mar Ecol Prog Ser* 12:155-165.

Nielsen, F.H. 1977. Nickel toxicity. Pages 129-146 In: Goyer, R.A., and M. A. Mehlman, Eds., Advances in Modern Toxicology. Vol. 2. Toxicology of Trace Elements. Hemisphere Publishing Corporation, London.

Niemi, G.J., T.E. Davis, G.D Veith, B. Vieux. 1986. Organochlorine chemical residues in herring gulls, ring-billed gulls, and common terns of Western Lake Superior. *Arch Environ Contam Toxicol* 15:313-320.

Niimi, A.J., and Q.N. LaHam. 1975. Selenium toxicity on the early life stages of zebrafish (*Brachydanio rerio*). *J Fish Res Board Canada* 32:803-806.

Nimmo, D.R., A.J. Wilson Jr, and R.R. Blackman. 1970. Localization of DDT in the body organs of pink and white shrimp. *Bull Environ Contam Toxicol* 5(4):333-341.

Nimmo D.R., J. Forester, P.T. Heitmuller, G.H. Cook. 1974. Accumulation of Aroclor 1254 in grass shrimp (*Palaemonetes pugio*) in laboratory and field exposures. *Bull Environ Contam Toxicol* 11(4):303-308.

Nonnotte, L., F. Boitel, and J.P. Truchot. 1993. Waterborne copper causes gill damage and hemolymph hypoxia in the shore crab *Carcinus maenas*. *Can J Zool* 71:1569-1576.

Norseth, T. 1981. The carcinogenicity of chromium. *Environ Health Perspect* 40:121-130.

Norwood W.P., U. Borgmann, D.G. Dixon. 2007. Chronic toxicity of arsenic, cobalt, chromium and manganese to *Hyalella azteca* in relation to exposure and bioaccumulation. *Environ Pollut* 147:262-272.

Nosek, J.A., S.R. Craven, J.R. Sullivan, S.S. Hurley, and R.E. Peterson. 1992a. Toxicity and reproductive effects of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in ring-necked pheasant hens. *J Toxicol Environ Health* 35:187-198.

Nosek, J.A., S.R. Craven, J.R. Sullivan, J.R. Olson, and R.E. Peterson. 1992b. Metabolism and disposition of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in ring-necked pheasant hens, chicks, and eggs. *J Toxicol Environ Health* 35:153-164.

NRCC. 1973. Lead in the Canadian Environment. Publication BY73-7 (ES). 116p. Available from Publications, NRCC/CNRC, Ottawa, Canada KIA OR6.

NRCC. 1975. Chlordane: Its Effects on Ecosystems and its Chemistry. Publication NRCC No. 14094. 189p.

NRCC. 1978. Effects of Arsenic in the Canadian Environment. Publication NRCC No.15391. 349p.

NRCC. 1981. Effects of Nickel in the Canadian Environment. Publication NRCC No.18568. 352p.

Nystrom, R.R. 1984. Cytological changes occurring in the liver of coturnix quail with an acute arsenic exposure. *Drug Chem Toxicol.* 7:587-594.

Odenbro, A. and J.E. Kihlstrom. 1977. Frequency of pregnancy and ova implantation in triethyl lead-treated mice. *Toxicol Appl Pharmacol* 39:359-363.

Ogle, R.S. A.W. Knight. 1989. Effects of elevated foodborne selenium on growth and reproduction of the fathead minnow (*Pimephales promelas*). *Arch Environ Contam Toxicol* 18:795-803.

Ohlendorf, H.M. and C.S. Harrison. 1986. Mercury, selenium, cadmium, and organochlorines in eggs of three Hawaiian seabird species. *Environ Pollut* 11B:169-191.

Ohno, Y., T. Kawanishi, A. Takahashi, S. Nakaura, K. Kawashima S. Tanaka, A.Y. Omori, H. Sekita, and M. Uchiyama. 1986. Comparisons of the toxicokinetic parameters in rats determined for low and high dose of chlordane. *J Toxicol Sci* 11:111-123.

Oliver, B.G. 1984. Uptake of chlorinated organics from anthropogenically contaminated sediments by oligochaete worms. *Can J. Fish Aquat Sci*, 41: 878-883.

Oliver, B.G. and A.J. Niimi. 1985. Bioconcentration factors of some halogenated organics for rainbow trout: Limitations in their use for prediction of environmental residues. *Environ Sci Technol* 19: 842-849.

Oliver, B.G. and A.J. Niimi. 1988. Trophodynamic analysis of polychlorinated biphenyl congeners and other chlorinated hydrocarbons in the Lake Ontario ecosystem. *Environ Sci Technol* 22:388-397.

Ort, J.F. and J.D. Latshaw. 1978. The toxic level of sodium selenite in the diet of laying chickens. *J Nutr* 108:1114-1120.

Oshida, P.S. and L.S. Word. 1982. Bioaccumulation of chromium and its effects on reproduction in *Neanthes arenaceodentata* (Polychaeta). *Mar Environ Res* 7:167-174.

Ottoboni, A. 1972. Effect of DDT on the reproductive life-span in the female rat. *Toxicol Appl Pharmacol* 22:497-502.

Ottoboni, A., G.D. Bissell, and A.C. Hexter. 1977. Effects of DDT on reproduction in multiple generations of beagle dogs. *Arch Environ Contam Toxicol* 6:83-101.

Outridge, P.M. and A.M. Scheuhammer. 1993. Bioaccumulation and toxicology of nickel: implications for wild mammals and birds. *Environ Rev* 1:172-197.

Overmann, S.R. 1977. Behavioral effects of asymptomatic lead exposure during neonatal development in rats. *Toxicol Appl Pharmacol* 41:459-471.

Ozoh, P.T.E. 1980. Effect of lead on pigment pattern formation in zebrafish (*Brachydanio rerio*). *Bull Environ Contam Toxicol* 24:276-282.

Palm, R.C. Jr, D.G. Powell, A. Skillman, and K. Godtfredsen. 2003. Immunocompetence of juvenile chinook salmon against *Listonella anquillarum* following dietary exposure to polycyclic aromatic hydrocarbons. *Environ Toxicol Chem* 22(12):2986-2994.

Park, Y.J., M.J. Lee, H.R. Kim, K.H. Chung, S.M. Oh. 2014. Developmental toxicity of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in artificially fertilized crucian carp (*Carassius auratus*) embryo. *Sci Tot Environ* 491-492:271-278.

Parrish, P.R., J.A. Couch, and J. Forester. 1973. Dieldrin: Effects on Several Estuarine Organisms. Proceedings of the 27th Annual Conference of the Southeastern Association of Game and Fish Commissioners. pp 427-434.

Parrish, P.R., J.A. Couch, J. Forester, J.M. Patrick, and G.H. Cook. 1974. Dieldrin: Effects on Several Estuarine Organisms. Pmc. 28th Ann. Conf. Southeast Assoc. Game Fish Comm. 427—434.

Parrish, P.R., S.C. Schimmel, D.J. Hansen, J.M. Patrick, Jr., and J. Forester. 1976. Chlordane: effects on several estuarine organisms. *J Toxicol Environ Health* 1:485-494.

Parrish, P.R., E.E. Dyar, J.M. Enos, and W.G. Wilson. 1978. Chronic Toxicity of Chlordane, Trifluralin, and Pentachlorophenol to Sheepshead Minnows (*Cyprinodon variegatus*). U.S. Environmental Protection Agency, Gulf Breeze, FL. EPA/600/3-78-010. January. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/9101B3R1.txt?ZyActionD=ZyDocument&Client=EPA&Index=1976%20Thru%201980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C76THRU80%5CTXT%5C00000027%5C9101B3R1.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=

hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1.

Passino, D.R.M. and S.B. Smith. 1987. Acute bioassays and hazard evaluation of representative contaminants detected in Great Lakes fish. *Environ Toxicol Chem* 6:901-907.

Patel, H.S. and M.B. Kaliwal. 1989. Histopathological effects of zinc on the gills of prawn *Macrobrachium hendersodyanum*. *Zeitschrift fün Angewandte Zoologie* 76:505-509.

Pattee, O.H. 1984. Eggshell thickness and reproduction in American kestrels exposed to chronic dietary lead. *Arch Environ Contam Toxicol* 13:29-34.

Patton, J.F. and M.P. Dieter. 1980. Effects of petroleum hydrocarbons on hepatic function in the duck. *Comp Biochem Physiol* 65C:33-36.

Patrick, R. 1978. Effects of trace metals in the aquatic ecosystem. *Am Sci* 66:185-191.

Peakall, D.B., and J.L. Lincer. 1972. Methyl mercury: its effect on eggshell thickness. *Bull Environ Contam Toxicol* 3(2):89-90.

Peakall, D.B. and M.L. Peakall. 1973. Effect of a polychlorinated biphenyl on the reproduction of artificially and naturally incubated dove eggs. *J Appl Ecol* 10:863-868.

Peakall, D.B., J.L. Lincer, and S.E. Bloom. 1972. Embryonic mortality and chromosomal alterations caused by Aroclor 1254 in ring doves. *Environ Health Perspect* 1:103-104.

Peakall, D.B., J.L. Lincer, R.W. Risebrough, J.B. Pritchard, and W.B. Kinter. 1973. DDE-induced eggshell thinning; structural and physiological effects in three species. *Comp Gen Pharmac* 4:305-313.

Persia, M.E., D.H. Baker, and C.M. Parsons. 2004. Tolerance for excess basic zinc chloride and basic copper chloride in chicks. *Brit Poult Sci* 45(5):672-676.

Perttila, M., O. Stenman, H. Pyysalo, and K. Wickstrom. 1986. Heavy metals and organochlorine compounds in seals in the Gulf of Finland. *Mar Environ Res* 18:43- 59.

Pierson, K.B. 1981. Effects of chronic zinc exposure on the growth, sexual maturity, reproduction, and bioaccumulation of the guppy, *Poecilia reticulata*. *Can J Fish Aquat Sci* 38:23-31.

Pinkney, A.E., J.C. Harshbarger, E.B. May, and M.J. Melancon. 2000. Tumor Prevalence and Biomarkers in Brown Bullheads (*Ameiurus nebulosus*) from the tidal Potomac River Watershed. CBFO-C99-04. U.S. Fish and Wildlife Service, Annapolis, Maryland.

Poels, C.L.M., M.A. van der Gaag, and J.F.J. van de Kerkhoff. 1980. An investigation into the long-term effects of Rhine water on rainbow trout. *Wat Res* 14:1029-1035.

Podowski, A.A., B.C. Banerjee, M. Feroz, M.A. Dudek, R.L. Willey, and M.A.Q. Khan. 1979. Photolysis of heptachlor and cis-chlordane and toxicity of their photoisomers to animals. *Arch Environ Contam Toxicol* 8:509- 518.

Poupoulis, C., and L.S. Jensen. 1976. Effect of high dietary copper on gizzard integrity of the chick. *Poult Sci* 55:113-121.

Pouvreau, B., and J.C. Amiard. 1974. Etude Experimentale de l'accumulation de l'argent 110m Chez Divers Organismes Marine. Commission Energie Atomique France, Report CEA-R-4571. 19p.

Powell, D.B., R.C. Palm Jr, A. Skillman, and K. Godtfredsen. 2003. Immunocompetence of juvenile chinook salmon against *Listonella anguillarum* following dietary exposure to Aroclor 1254. *Environ Toxicol Chem* 22(2):285-295.

Powell, D.C., R.J. Aulerich, J.C. Meadows, D.E. Tillitt, J.F. Powell, J.C. Restum, K.L. Stromborg, J.P. Giesy, and S.J. Bursian. 1997. Effects of 3,3',4,4',5-pentachlorobiphenyl (PCB 126), 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD), or an extract derived from field-collected cormorant eggs injected into double-crested cormorant (*Phalacrocorax auritus*) eggs*. Environ Toxicol Chem* 16(7):1450-1455.

Powell, D.C., R,J. Aulerich, J.C. Meadows, D.E. Tillitt, M.E. Kelly, K.L. Stromborg, M.J. Melancon, S.D. Fitzgerald, and S.J. Bursian. 1998. Effects of 3,3',4,4',5-pentachlorobiphenyl and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin injected into the yolks of double-crested cormorant (*Phalacrocorax auritus*) eggs prior to incubation. *Environ Toxicol Chem* 17(10):2035-2040.

Rai, R. and M.A. Qayyum. 1984. Haematological responses in a freshwater fish to lead poisoning. *J Environ Biol* 5:53-56.

Rainbow, R.S., P.G. Moore, and D. Watson. 1989. Talitrid amphipods (Crustacea) as biomonitors for copper and zinc. *Estuar Coast Shelf Sci* 28:567-582.

Rainbow, R.S. 2007. Trace metal bioaccumulation: models, metabolic availability and toxicity. *Environ Internat* 33:576-582.

Ray, L.F., H.E. Murray, and C.S. Giam. 1983. Organic pollutants in marine samples from Portland, Maine*. Chemosphere* 12:1031-1038.

Reading, J.T. 1979. Acute and Chronic Effects of Selenium on *Daphnia pulex*. Thesis. Virginia Polytechnic Institute, Blacksburg. 91p.

Reichert, W.L., D.A. Federighi, and D.C. Malins. 1979. Uptake and metabolism of lead and cadmium in coho salmon (*Oncorhynchus kisutch*). *Comp Biochem Physiol* 63C:229-234.

Reichmuth, J.M., P. Weis, and J.S. Weis. 2010. Bioaccumulation and depuration of metals in blue crabs (*Callinectes sapidus* Rathbun) from a contaminated and clean estuary. *Environ Pollut* 158(2):361-368.

Research Triangle Institute. 1988a. Two-generation Reproduction and Fertility Study of Nickel Chloride Administered to CD Rats in the Drinking Water: Fertility and Reproductive Performance of the Po Generation. Final Study Report (II of III). Research Triangle Park, North Carolina: Office of Solid Waste Management, U.S. Environmental Protection Agency.

Research Triangle Institute. 1988b. Two-generation Reproduction and Fertility Study of Nickel Chloride Administered to CD Rats in the Drinking Water: Fertility and Reproductive Performance of the F1 Generation. Final Study Report (III of III). Research Triangle Park, North Carolina: Office of Solid Waste Management, U.S. Environmental Protection Agency.

Restum, J.C., S.J. Bursian, J.P. Giesy, J.A. Render, W.G. Helferich, E.B. Shipp, and D.A. Verbrugge. 1998. Multigenerational study of the effects of consumption of PCB-contaminated carp from Saginaw Bay, Lake Huron, on mink. 1. Effects on mink reproduction, kit growth and survival, and selected biological parameters. *J Toxicol Environ Health* 54(A):343-375.

Rhead, M.M. and J.M. Perkins. 1984. An evaluation of the relative importance of food and water as sources of p,p´-DDT to the goldfish, *Carassius auratus* (L.). *Wat Res* 18(6):719-725.

Rice, C.A., M.S. Myers, M.L. Willis, B.L. French, and E. Casillas. 2000. From sediment bioassay to fish biomarker – connecting the dots using simple trophic relationships. *Mar Environ Res* 50:527-533.

Rice, C.P., and P. O'Keefe. 1995. Sources, Pathways, and Effects of PCBs, Dioxins, and Dibenzofurans. In: Hoffman, D.J., B.A. Rattner, G. Burton Jr, and J. Cairns Jr, Eds., Handbook of Ecotoxicology. Lewis Publishers, Boca Raton, FL. pp. 424-468.

Richardson, M.E., M.R.S. Fox, and B.E. Bry Jr. 1974. Pathological changes produced in Japanese quail by ingestion of cadmium*. J Nutr* 104:323-338.

Ridgway, L.P. and D.A. Karnofsky. 1952. The effects of metals on the chick embryo: toxicity and production of abnormalities in development. *Ann NY Acad Sci* 55:203-215.

Rigdon, R.H. and J. Neal. 1963. Fluorescence of chickens and eggs following the feeding of benzpyrene crystals. *Tex Rep Biol Med* 21(4):558-566.

Rigdon R.H. and J. Neal. 1965. Effects of feeding benzo[a]pyrene on fertility, embryos, and young mice. *J Nat Cancer Inst* 34(2):297-305.

Ringer, R.K. 1983. Toxicology of PCBs in mink and ferrets. In: D'Itri, F.M. and M.A. Kamrin, Eds., PCBs: Human and Environmental Hazards. Butterworth Publishers, Boston, MA. pp. 227-240.

Riva, M.C., R. Flos, M. Crespi, and J. Balasch. 1981. Lethal potassium dichromate and whitening (blankophor) exposure of goldfish (*Carassius auratus*): chromium levels in gills. *Comp Biochem Physiol* 68C:161-165.

Risebrough, R.W. and D.W. Anderson. 1975. Some effects of DDE and PCB on mallards and their eggs. *J Wildl Manag* 39(3):508-513.

Rodgers, D.W. and F.W.H. Beamish. 1982. Dynamics of dietary methylmercury in rainbow trout, *Salmo gairdneri*. *Aquat Toxicol* 2(1982):271-290.

Rosomer, G. L., W. A. Dudley, L. J. Machlin, and L. Loveless. 1961. Toxicity of vanadium and chromium for the growing chick. *Poult Sci* 40:1171-1173.

Rossi, L., O. Barbieri, M. Sanguineti, J.R.P. Cabral, P. Bruzzi, and L. Santi. 1983. Carcinogenicity study with technical-grade dichlorodiphenyltrichloroethane and 1,1-Dichloro-2,2bis(p-chlorophenyl)ehtylene in hamsters. *Cancer Res* 43:776-781.

Safe, S. 1984. Polychlorinated biphenyls (PCBs) and polybrominated biphenyls (PBBs): biochemistry, toxicology, and mechanism of action. *Crit Rev Toxicol* 13.

Safe, S. 1990. Polychlorinated biphenyls (PCBs), dibenzo-*p*-dioxins (PCDDs), dibenzofurans (PCDFs), and related compounds: environmental and mechanistic considerations which support the development of toxic equivalency factors (TEFs). *Crit Rev Toxicol* 21(1):51-88.

Safe, S. 1991. Polychlorinated dibenzo-*p*-dioxins and related compounds: sources, environmental distribution and risk assessment. *Environ Carcin Ecotoxicol Rev* C9 (2):261-302.

Safe, S. 1992. Toxicology, structure—function relationship, and human and environmental health impacts of polychlorinated biphenyls: progress and problems. *Environ Health Perspect* 100:259-268.

Safe, S. 1994. Polychlorinated biphenyls (PCBs): environmental impact, biochemical and toxic responses, and implications for risk management. *Crit Rev Toxicol* 24(2):87-149.

Salomon, K. 1994. Dietary Uptake of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin And Its Effects on Reproduction in the Common Mummichog (*Fundulus heteroclitus*). Master's Thesis. University of Rhode Island.

Saloranta, T.M., T. Andersen, and K. Naes. 2006. Flows of dioxins and furans in coastal food webs: inverse modeling, sensitivity analysis, and applications of linear system theory. *Environ Toxicol Chem* 25(1):253-264.

Sample, B.E., D.M. Opresko, and G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision, ES/ER/TM-86/R3, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Sandheinrich, M.B., and K.M. Miller. 2006. Effects of dietary methylmercury on reproductive behavior of fathead minnows (*Pimephales promelas*). *Environ Toxicol Chem* 25(11):3053-3057.

Sanders, J.G. 1986. Direct and indirect effects of arsenic on the survival and fecundity of estuarine zooplankton. *Can J Fish Aquat Sci* 43:694-699.

Sanders, J.G., G.R. Abbe, and G.F. Riedel. 1990. Silver uptake and subsequent effects on growth and species composition in an estuarine community. *Sci Total Environ* 97/98:761-769.

Sarkar, A.K. and R. Mondal. 1973. Injurious effect of cadmium on testis of domestic pigeon and its prevention by zinc. *Indian J Exp Biol* 11:108-109.

Sastry, K.V. and K. Sunita. 1982. Effect of cadmium and chromium on the intestinal absorption of glucose in the snakehead fish, *Channa punctatus*. *Toxicol Lett* 10:293-296.

Sastry, K.V. and K. Sunita. 1983. Enzymological and biochemical changes produced by chronic chromium exposure in a teleost fish, *Channa punctatus*. *Toxicol Lett* 16:9-15.

Sastry, K.V. and K. Sunita. 1984. Chronic toxic effects of chromium in *Channa punctatus*. *J Environ Biol* 5:47-52.

Sawicka-Kapusta, K., M. Zakrzewska, and A. Zuber. 1994. effect of orally administered cadmium on postnatal development of laboratory mice. *Polish Ecolog Stud* 20(1-2): 33-42.

Schafer, E.W. Jr., W.A. Bowles Jr., and J. Hurlbut, 1983. The acute oral toxicity, repellency, and hazard potential of 998 chemicals to one or more species of wild and domestic birds. *Arch Environ Contam Toxicol* 12:355-382.

Schlicker, S.A. and D.H. Cox. 1968. Maternal dietary zinc and development: Zinc, iron, and copper content of the rat fetus. *J Nutr* 95 (2):287-294.

Schmitt, C.J. and W.G. Brumbaugh. 1990. National Contaminant Biomonitoring Program: Concentrations of arsenic, cadmium, copper, lead, mercury, selenium, and zinc in U.S. freshwater fish, 1976-1984. *Arch Environ Contam Toxicol* 19:731-747.

Schroeder, H.A., and M. Mitchener. 1971. Toxic effects of trace elements on the reproduction of mice and rats. *Arch Environ Health* 23:102-106.

Schroeder, H.A. and M. Mitchener. 1975. Life-term studies in rats: effects of aluminum, barium, beryllium, and tungsten. *J Nutr* 105:421-427.

Schroeder, H.A., M. Kanisawa, D.V. Frost, and M. Mitchener. 1968. Germanium, tin, and arsenic in rats: Effects on growth, survival, pathological lesions and life span. *J Nutr* 96:37-45.

Schuler L.J., P.F. Landrum, and M.J. Lydy. 2007. Response spectrum of pentachlorobenzene and fluoranthene for *Chironomus tentans* and *Hyalella azteca*. *Environ Toxicol Chem* 26(6):1248-1257.

Schultz, T.W. 1989. Nonpolar narcosis: A review of the mechnism of action for baseline aquatic toxicity. *Aquat Toxicol Haz Assess* 12(ASTM STP 1027):6.

Schuytema, G.S., D.F. Krawczyk, W.L. Griffis, A.V. Nebeker, and M.L. Robideaux. 1990. Hexachlorobenzene uptake by fathead minnows and macroinvertebrates in recirculating sediment/water systems. *Arch Environ Contam Toxicol* 19:1-9.

Schwetz, B.A., J.M. Norris, G.L. Sparschu, V.K. Rowe, P.J. Gehring, J.L. Emerson, and C.G. Gerbig. 1973. Toxicology of chlorinated dibenzo-*p*-dioxins. *Environ Health Perspect* 5:87-99.

Schwetz B.A., J.M. Norris, R.J. Kociba, P.A. Keeler, R.F. Cornier, P.J. Gehring. 1974. Reproduction study in Japanese quail fed hexachlorobutadiene for 90 days. *Toxicol Appl Pharm* 30:255-265.

Scott, M.L. 1977. Effects of PCBs, DDT, and mercury compounds in chickens and Japanese quail. *Federation Proc* 36:1888-1893.

Seegal, R.F. 1996. Epidemiological and laboratory evidence of PCB-induced neurotoxicity. *Crit Rev Toxicol* 26(6):709-737.

Shabad, L.M., T.S. Kolesnichenko, and T.V. Nikonova. 1973. Transplacental and combined long-term effect of DDT in five generations of A-strain mice. *Int J Cancer* 11:688-693.

Shavlovski, M.M., N.A. Chebotar, L.A. Konopistseva, E.T. Zakharova, A.M. Kachourin, V.B. Vassiliev, and V.S. Gaitskhoki. 1995. Embryotoxicity of Silver Ions is Diminished by Ceruloplasmin-further Evidence for its Role in the Transport of Copper. *Biometals* 8(2):122-8.

Shazili, N.A.M. 1995. Effects of salinity and pre-exposure on acute cadmium toxicity to seabass, *Lates calcarifer. Bull Environ Contam Toxicol* 54:22-28.

Shellenberger, T.E. 1978. A multi-generation toxicity evaluation of p,p'-DDT and dieldrin with Japanese quail. I. Effects of growth and reproduction. *Drug Chem Toxicol* 1(2):137-146.

Shubat, P.J. and L.R. Curtis. 1986. Ration and toxicant preexposure influence dieldrin accumulation by rainbow trout (*Salmo gairdneri*). *Environ Toxicol Chem* 5:69-77.

Silberhorn, E.M., H.P. Glauert, and L.W. Robertson. 1990. Carcinogenicity of polyhalogenated biphenyls: PCBs and PBBs. *Crit Rev Toxicol* 20(6):397-426.

Smith, I.C. and B. L. Carson. 1977. Trace Metals in the Environment. Vol. 2: Silver. Ann Arbor Science Publishers, Ann Arbor, Michigan. 469 pp.

Smith, M.K., E.L. George, J.A. Stober, H.A. Feng, and G.L. Kimmel. 1993. Perinatal toxicity associated with nickel chloride exposure. *Env Res* 61:200-211.

Smith, M.S. 1969. Responses of chicks to dietary supplements of copper sulphate. *Brit Poult Sci* 10:97-108.

Smolders, R., M. Baillieul, and R. Blust. 2005. Relationship between the energy status of *Daphnia magna* and its sensitivity to environmental stress. *Aquat Toxicol* 73:155-170.

Sorensen, E.M.B., P.M. Cumbie, T.L. Bauer, J.S. Bell, and C.W. Harlan. 1984. Histopathological, hematological, condition-factor, and organ weight changes associated with selenium accumulation in fish from Belews Lake, North Carolina. *Arch Environ Contam Toxicol* 13:153-162.

Spear, P.A. 1981. Zinc in the Aquatic Environment: Chemistry, Distribution, and Toxicology. National Research Council of Canada Publication NRCC 17589. 145p.

Spehar, R.L., P.M. Cook, G.E. Elonen, G.W. Holcombe, R.D. Johnson, J.D. Fernandez, and J.E. Tietge. 1997. Comparison of Early-life-stage Sensitivity of Freshwater Fish Exposed as Eggs to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). Submitted to Dioxin 97: 17th Symposium on Chlorinated Dioxins and Related Compounds, August 25-29, 1997, Indianapolis, Indiana. U.S. Environmental Protection Agency, Duluth, Minnesota.

Sprague, J.B. 1986. Toxicity and Tissue Concentrations of Lead, Zinc, and Cadmium for Marine Mollusks and Crustaceans. International Lead Zinc Research Organization, Research Triangle Park, North Carolina. 215p.

Stanley, T.R. Jr, J.W. Spann, G.J. Smith, and R. Rosscoe. 1994. Main and interactive effects of arsenic and selenium on mallard reproduction and duckling growth and survival. *Arch Environ Contam Toxicol* 26:441-451.

Steevens, J.A., M.R. Reiss, and A.V. Pawlisz. 2005. A methodology for deriving tissue residue benchmarks for aquatic biota: a case study for fish exposed to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin and equivalents. *Integr Environ Assess Manage* 1(2):142-151.

Steven, J.D., L.J. Davies, E.K. Stanley, R.A. Abbott, M. Ihnat, L. Bidstrup, and J.F. Jaworski. 1976. Effects of Chromium in the Canadian Environment. Nat. Res. Coun. Canada, NRCC No. 15017. 168 pp. Avail. from Publications, NRCC/CNRC, Ottawa, Canada, K1A OR6.

Stickel, L.F., W.H. Stickel, R.A. Dyrland, and D.L. Hughes. 1983. Oxychlordane, HCS-3260, and nonachlor in birds: lethal residues and loss rates. *J Toxicol Environ Health* 12:611-622.

Strik J.J.T.W.A. 1986. Subacute Toxicity of Hexachlorobenzene. In: C.R. Morris and J.R.P. Cabral, Eds., Hexachlorobenzene: Proceedings of an International Symposium. Lyon, International Agency for Research on Cancer, pp 335-342, IARC Scientific Publications No. 77.

Sturkie, P.D. 1973. Effects of cadmium on electrocardiogram, blood pressure, and hematocrit of chickens. *Avian Dis* 17:106-110.

Sudershan, P. and M.A.Q. Khan. 1980. Metabolism of cis-[14C] chlordane and cis-[14C] photochlordane in bluegill fish. *J Agric Food Chem* 28:291-296.

Sugatt, R.H. 1980. Effects of sodium dichromate exposure on the immune responses of juvenile coho salmon Oncorhynchus kisutch, against *Vibrio anguillarum*. *Arch Environ Contam Toxicol* 9:207-216.

Sullivan, R.A., W.E. Robinson, and M.R Morse. 1988. Isolation and characterization of granules from the kidney of the bivalve *Mercenaria*. *Mar Biol* 99:359-368.

Sun L-T and S-S Jeng. 1998. Comparative zinc concentrations in tissues of common carp and other aquatic organisms. *Zool Stud* 37(3):184-190.

Takeda, H. and Y. Shimma. 1977. Effects of toxic amounts of dietary zinc on the growth and body components of rainbow trout at two levels of calcium. *Bull Fresh Fish Res* 27:103-109.

Talamantes, F and H. Jang. 1977. Effects of chlordane isomers administered to female mice during the neonatal period. *J Toxicol Environ Health* 3:713-720.

Taylor, D., B.G. Maddock, and G. Mance. 1985. The acute toxicity of nine 'grey list' metals (arsenic, boron, chromium, copper, lead, nickel, tin, vanadium and zinc) to two marine fish species: dab (*Limanda limanda*) and grey mullet (*Chelon labrosus*). *Aquat Toxicol* 7:135-144.

Thain, J.E. 1984. Effects of mercury on the prosobranch mollusc *Crepidula fornicata*: acute lethal toxicity and effects on growth and reproduction of chronic exposure. *Mar Environ Res* 12:285-309.

Tietge, J.E., R.D. Johnson, K.M. Jensen, P.M. Cook, G.E. Elonen, J.D. Fernandez, G.W. Holcombe, D.B. Lothenbach, and J.W. Nichols. 1998. Reproductive toxicity and disposition of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in adult brook trout (*Salvelinus fontinalis*) following a dietary exposure. *Environ Toxicol Chem* 17(12):2395-2407.

Tillitt, D.E., R.W. Gale, J.C. Meadows, J.L. Zajicek, P.H. Peterman, S.N. Heaton, P.D. Jones, S.J. Bursian, T.J. Kubiak, J.P. Giesy, and R.J. Aulerich. 1996. Dietary exposure of mink to carp from Saginaw Bay. 3. Characterization of dietary exposure to planar halogenated hydrocarbons, dioxin equivalents, and biomagnification. *Environ Sci Technol* 30:283-291.

Tojo, Y., M. Wariishi, Y. Suzuki, and K. Nishiyama. 1986. Quantitation of chlordane residues in mothers' milk. *Arch Environ Contam Toxicol* 15:327-332.

Tomatis, L., V. Turusov, R.T. Charles, and M. Boicchi. 1974. Effect of long-term exposure to 1,1-dichloro-2,2-bis (p-chlorophenyl) ethylene, to 1,1-dichloro-2,2-bis (p-chloropohenyl) ethane, and to the two chemicals combined on CF-1 mice. *J Nat Cancer Inst* 52(3):883-891.

Treon, J.F. and F.P. Cleveland. 1955. Toxicity of certain chlorinated hydrocarbon insecticides for laboratory animals, with special reference to aldrin and dieldrin. *Agric Food Chem* 3:402-408.

Turusov, V.S., N.E. Day, L. Tomatis, E. Gati, and R.T. Charles. 1973. Tumors in CF-1 mice exposed for six consecutive generations to DDT. *J Nat Cancer Inst* 51(983-998).

U.S. Department of the Interior. 1998. Guidelines for Interpretation of the Biological Effects of Selected Constituents in Biota, Water, and Sediment. Bureau of Reclamation, Fish and Wildlife Service, Geological Survey, Bureau of Indian Affairs. National Irrigation Water Quality Program Information Report No. 3. November. Available at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/records/region_7/2008/ref2433.pdf.

USEPA. 1979. Water-related Environmental Fate of 129 Priority Pollutants: Vol. 1. Introduction and Technical Background, Metals and Inorganics, Pesticides, and PCBs. Office of Water Planning and Standard. Washington, DC. EPA/440-47-9029a.

USEPA. 1980a. Ambient Water Quality Criteria for Mercury. U.S. EPA 440/5-80-058. October. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/2000LMXR.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1976+Thru+1980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C76thru80%5CTxt%5C00000003%5C2000LMXR.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

USEPA. 1980b. Ambient Water Quality Criteria for Silver. EPA 440/5-80-071. October. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/2000M4AD.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1976+Thru+1980&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C76thru80%5CTxt%5C00000003%5C2000M4AD.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

USEPA. 1980c. Ambient Water Quality Criteria for Polychlorinated Biphenyls. EPA 440/5-80-068. October. Available at: https://semspub.epa.gov/work/10/500015460.pdf.

USEPA. 1985. Health Assessment Document for Chlorinated Benzenes. Final Report. EPA 600/8-84-015F. January. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/300054NP.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1981+Thru+1985&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C81thru85%5CTxt%5C00000002%5C300054NP.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

USEPA. 1987. Ambient Water Quality Criteria for Zinc. EPA 440/5-87-003. February. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/2000M5KN.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1986+Thru+1990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C86thru90%5CTxt%5C00000008%5C2000M5KN.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

USEPA. 1988. Ambient Aquatic Life Water Quality Criteria for Hexachlorobenzene. Draft. August 31. Available at: https://nepis.epa.gov/Exe/ZyNET.exe/00001OGW.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1986+Thru+1990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C86thru90%5CTxt%5C00000001%5C00001OGW.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

USEPA. 1997. Aquatic Toxicity Information Retrieval Database (AQUIRE). Office of Research and Development, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division. January.

USEPA. 1999a. Screening Level Ecological Risk Assessment Protocol. Appendix E Toxicity Reference Values. August.

USEPA. 1999b. Screening Level Ecological Risk Assessment Protocol. Appendix H Toxicological Profiles. August.

USEPA. 2002. USEPA Region 9 Biological Technical Assistance Group (BTAG) Recommended Toxicity Reference Values for Mammals. Region 9, San Francisco, CA. Updated 11/21/02. Available at: http://www.dtsc.ca.gov/assessingrisk/upload/eco_btag-mammal-bird-trv-table.pdf.

USEPA. 2003a. Analyses of Laboratory and Field Studies of Reproductive Toxicity in Birds Exposed to Dioxin-like Compounds for Use in Ecological Risk Assessment. EPA/600/R-03/114F. April. Available at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=56937.

USEPA. 2003b. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Office of Research and Development. November.

USEPA. 2005a. Ecological Soil Screening Levels For Arsenic. Interim Final. OSWER Directive 9285.7-62. March. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_arsenic.pdf.

USEPA. 2005b. Ecological Soil Screening Levels for Cadmium. Interim Final. OSWER Directive 9285.7-65. March. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_cadmium.pdf.

USEPA. 2005c. Ecological Soil Screening Levels for Dieldrin. Interim Final. OSWER Directive 9285.7-56. March. Revised April 2007. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_dieldrin.pdf.

USEPA. 2005d. Ecological Soil Screening Levels for Lead. Interim Final. OSWER Directive 9285.7-70. March. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_lead.pdf.

USEPA. 2006a. An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the U.S. for the Years 1987, 1995, and 2000. Final. EPA/600/P-03/002F. Available at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=159286.

USEPA. 2006b. Ecological Soil Screening Levels for Silver. Interim Final. OSWER Directive 9285.7-77. September. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_silver.pdf.

USEPA. 2007a. Ecological Soil Screening Levels for Copper. Interim Final. OSWER Directive 9285.7-68. February. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_copper.pdf.

USEPA. 2007b. Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons, Interim Final. OSWER Directive 9285.7-78. June. Available at: https://rais.ornl.gov/documents/eco-ssl_pah.pdf.

USEPA. 2007c. Ecological Soil Screening Levels for Selenium. Interim Final. OSWER Directive 9285.7-72. July. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_selenium.pdf.

USEPA. 2008a. Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment. EPA/100/R-08-004. June.

USEPA. 2008b. Ecological Soil Screening Levels for Chromium. Interim final. OSWER Directive 9285.7-66. Available online at: https://rais.ornl.gov/documents/eco-ssl_chromium.pdf.

USEPA. 2014. Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River. Prepared by The Louis Berger Group, Inc. in conjunction with Battelle and HDR|HydroQual.

USEPA. 2019. Final Second Five-Year Review Report for the Hudson River PCBs Superfund Site. U.S. Environmental Protection Agency, Region 2. April 11.

van Birgelen, A.P.J.M., J. van der Kolk, K.M. Fase, I. Bol, H. Poiger, M. van den Berg, and A. Brouwer. 1994. Toxic potency of 2,3,3',4,4',5-hexachlorobiphenyl relative to and in combination with 2,3,7,8-tetrachlorodibenzo-*p*-dioxin in a subchronic feeding study in the rat. *Toxicol Appl Pharmacol* 126:202-213.

Van den Berg, M., L. Birnbaum, A.T.C. Bosveld, B. Brunström, P. Cook, M. Feeley, J.P. Giesy, A. Hanberg, R. Hasegawa, S. Kennedy, T. Kubiak, J.C. Larsen, F.X.R. van Leeuwen, A.K. Djien Liem, C. Nolt, R.E. Peterson, L. Poellinger, S. Safe, D. Schrenk, D. Tillitt, M. Tysklind, M. Younes, F. Waern, and T. Zacharewski. 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. *Environ Health Perspect* 106(12):775-792.

Van der Putte, I., M.A. Brinkhorst, and J.H. Koeman. 1981. Effect of pH on the acute toxicity of hexavalent chromium to rainbow trout (*Salmo gairdneri*). *Aquat Toxicol* 1:129-142.

Van Vleet, John F. 1977. Protection by Various Nutritional Supplements Against Lesions of Selenium-vitamin E Deficiency Induced in Ducklings Fed Tellurium or Silver. *Am. J Vet Res* 38(9): 1393-8.

van Wezel, A.P., D.T.H.M. Sijm, W. Seinen, and A. Opperhuizen. 1995. Use of lethal body burdens to indicate species differences in susceptibility to narcotic toxicants. *Chemosphere* 31(5):3201-3209.

Vandermeer, J.H. and D.E. Goldberg. 2003. Population Ecology: First Principles. Princeton University Press. Princeton, New Jersey.

Vernberg, W.B., P.J. DeCoursey, and J. O'Hara. 1974. Multiple Environmental Factor Effects on Physiology and Behavior of the Fiddler Crab, *Uca pugilator*. In: Vernberg, F.J. and W.B. Vernberg, Eds., Pollution and Physiology of Marine Organisms. Academic Press. New York, NY.

Verschuuren, H.G., R. Kroes, E.M. Den Tonkelaar, J.M. Berkvens, P.W. Helleman, A.G. Rauws, P.L. Schuller, and G.J. Van Esch. 1976. Toxicity of methylmercury chloride in rats. II. Reproduction study. *Toxicology* 6:97-106.

Virgo, B.B., and G.D. Bellward. 1977. Effects of dietary dieldrin on offspring viability, maternal behaviour, and milk production in the mouse. *Chem Pathol Pharmacol* 17(3):399-409.

Vos, J.G., H.L. Van der Maas, A. Musch, and E. Pam. 1971. Toxicity of hexachlorobenzene in Japanese quail with special reference to porphyria, liver damage, reproduction, and tissue residues. *Toxicol Appl Pharm* 18:944-957.

Vos, J.G., P.F. Botterweg, J.J.T.W.A. Strik, and J.H. Koeman. 1972. Experimental studies with HCB in birds. *TNO-Nieuws* 27:599-603.

Walker, M.K. and R.E. Peterson. 1994. Toxicity of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin to brook trout (*Salvelinus fontinalis*) during early development. *Environ Toxicol Chem* 13(5):817-820.

Walsh, A.R., J. O'Halloran, and A.M. Gower. 1994. Some effects of elevated levels of chromium (III) in sediments to the mullet *Chelon labrosus* (R). *Ecotox Environ Saf* 27:168-176.

Ware, G.W. and E.E. Good. 1967. Effects of insecticides on reproduction in the laboratory mouse. II. Mirex, telodrin, and DDT. *Toxicol Appl Pharmacol* 10:54-61.

Webber, H.M., and T.A. Haines. 2003. Mercury effects on predator avoidance behavior of a forage fish, golden shiner (*Notemigonus crysoleucas*). *Environ Toxicol Chem* 22(7):1556-1561.

Weber, C.W. and B.L. Reid. 1968. Nickel toxicity in growing chicks. *J Anim Sci* 95:612-616.

Weber C.W. and B.L. Reid. 1969. Nickel toxicity in young growing mice. *J Anim Sci* 20:620-623.

Weber, R.E., A. de Zwaan, and A. Bang. 1992. Interactive effects of ambient copper and anoxic, temperature and salinity stress on survival and hemolymph and muscle tissue osmotic effectors in *Mytilus edulis*. *J Exp Mar Biol Ecol* 159:135-156.

Weis, J.S. 1980. Effect of zinc on regeneration in the fiddler crab *Uca pugilator* and its interactions with methylmercury and cadmium. *Mar Environ Res* 3:249-255.

Weis, J.S., L. Bergey, J. Reichmuth, and A. Candelmo. 2011. Living in a contaminated estuary: behavioral changes and ecological consequences for five species. *BioScience* 61:375-385.

Wenning, R.J., L. Martello, and A. Prusak-Daniel. 2011. Dioxins, PCBs, and PBDEs in Aquatic Organisms. In: Beyer, W.N. and J.P. Meador, Eds., Environmental Contaminants in Biota: Interpreting Tissue Concentrations. 2nd ed. CRC Press, Boca Raton, FL. pp. 103-166.

Whanger, P.D. 1973. Effects of dietary nickel on enzyme activities and mineral content in rats. *Toxicol Appl Pharmacol* 25:323-331.

WHO. 1984. Chlordane. Environmental Health Criteria 34. World Health Organization, Geneva, Switzerland. 82 pp.

WHO. 1988. IPCS International Programme on Chemical Safety. Chromium – Environmental Health Criteria Document 61. World Health Organization, Geneva.

WHO. 2001. Environmental Health Criteria. 221: Zinc. 179p.

WHO. 1991. NEnvironmental Health Criteria. 108. Nickel. 383p.

WHO. 1993. Polychlorinated Biphenyls and Terphenyls. In: Dobson, S., and G.J. van Esch, Eds., Environmental Health Criteria 140. 2nd. World Health Organization, Geneva, Switzerland.

WHO. 1998. Environmental Health Criteria. 202. Selected Non-heterocyclic Policyclic Aromatic Hydrocarbons. World Health Organization. Available at: http://www.inchem.org/documents/ehc/ehc/ehc202.htm.

Williams, L., R.A. Schoof, J.W. Yager, and J.W. Goodrich-Mahoney. 2006. Arsenic bioaccumulation in freshwater fishes. *Hum Ecol Risk Assess* 12:904-923.

Windward. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment. Final. June 17.

Winner, R.W. and M.P. Farrell. 1976. Acute and chronic toxicity of copper to four species of *Daphnia*. *J Fish Res Board Can* 33:1685-1691.

Wintermyer, M.L. and K.R. Cooper. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica Gmelin*) tissues and the effects on egg fertilization and development. *J Shellfish Res* 22(3):737-746.

Wise A. 1981. Protective action of calcium phytate against acute lead toxicity in mice. *Bull Environ Contam Toxicol* 27:630-633.

Wobeser, G., N.O. Nielsen, and B. Schiefer. 1976a. Mercury and mink I. The use of mercury contaminated fish as a food for ranch mink. *Can J Comp Med* 40:30-33.

Wobeser, G., N.O. Nielsen, and B. Schiefer. 1976b. Mercury and mink II. Experimental methyl mercury intoxication. *Can J Comp Med* 40:34-45.

Wren, C.D., D.B. Hunter, J.F. Leatherland, and P.M. Stokes. 1987. The effects of polychlorinated biphenyls and methylmercury, singly and in combination on mink. II: Reproduction and kit development. *Arch Environ Contam Toxicol* 16:449-454.

Wu, R.S.S., C.A. Pollino, D.W.T. Au, G.J. Zheng, B.B.H. Yuen, and P.K.S. Lam. 2003. Evaluation of biomarkers of exposure and effect in juvenile areolated grouper (*Epinephelus areolatus*) on foodborne exposure to benzo(a)pyrene. *Environ Toxicol Chem* 22(7):1568-1573.

Yonemoto, J., H. Satoh, S. Himeno, and T. Suzuki. 1983. Toxic effects of sodium selenite on pregnant mice and modification of the effects by Vitamin E or reduced glutathione. *Teratology* 28:333-340.

Yue, M.S., R.E. Peterson, and W. Heideman. 2015. Dioxin inhibition of swim bladder development in zebrafish: Is it secondary to heart failure? *Aquat Toxicol* 162:10-17.

Zahid, Z.R., Z.S. Al Hakkak, A.H.H. Kadhim, E.A. Elias, and I.S. Al Jumaily. 1990. comparative effects of trivalent and hexavalent chromium on spermatogenesis of the mouse. *Toxicol Environ Chem* 25(2-3): 131-136.

Zyadah, M.A. and T.E. Abdel-Baky, 2000. Toxicity and bioaccumulation of copper, zinc, and cadmium in some aquatic organisms. *Bull Environ Contam Toxicol* 64:740-747.

APPENDIX E

Hazard Quotient Calculations

ARCADIS Design & Consultancy for natural and built assets

Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

BASELINE ECOLOGICAL RISK ASSESSMENT

APPENDIX E – HAZARD QUOTIENT CALCULATIONS

Newark Bay Study Area

Newark Bay, New Jersey

July 2020

Appendix E-1 Dietary HQ Calculations - NBSA-Wide

Table E-1-1 NBSA-wide Dietary HQ Calculations for 2,3,7,8-TCDD
Table E-1-2 NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird
Table E-1-3 NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal
Table E-1-4 NBSA-wide Dietary HQ Calculations for Total PCBs
Table E-1-5 NBSA-wide Dietary HQ Calculations for Total PCB TEQ Bird
Table E-1-6 NBSA-wide Dietary HQ Calculations for Total PCB TEQ Mammal
Table E-1-7 NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird
Table E-1-8 NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal
Table E-1-9 NBSA-wide Dietary HQ Calculations for Total DDx (2,4 & 4,4)
Table E-1-10 NBSA-wide Dietary HQ Calculations for Dieldrin
Table E-1-11 NBSA-wide Dietary HQ Calculations for Total Chlordane
Table E-1-12 NBSA-wide Dietary HQ Calculations for Hexachlorobenzene
Table E-1-13 NBSA-wide Dietary HQ Calculations for Total HMW PAH
Table E-1-14 NBSA-wide Dietary HQ Calculations for Total LMW PAH
Table E-1-15 NBSA-wide Dietary HQ Calculations for Total PAH
Table E-1-16 NBSA-wide Dietary HQ Calculations for Arsenic
Table E-1-17 NBSA-wide Dietary HQ Calculations for Cadmium
Table E-1-18 NBSA-wide Dietary HQ Calculations for Chromium
Table E-1-19 NBSA-wide Dietary HQ Calculations for Copper
Table E-1-20 NBSA-wide Dietary HQ Calculations for Lead
Table E-1-21 NBSA-wide Dietary HQ Calculations for Mercury
Table E-1-22 NBSA-wide Dietary HQ Calculations for Methylmercury
Table E-1-23 NBSA-wide Dietary HQ Calculations for Nickel
Table E-1-24 NBSA-wide Dietary HQ Calculations for Selenium
Table E-1-25 NBSA-wide Dietary HQ Calculations for Silver
Table E-1-26 NBSA-wide Dietary HQ Calculations for Zinc

Appendix E-2 Dietary HQ Calculations - North Zone

Table E-2-1 North Zone Dietary HQ Calculations for 2,3,7,8-TCDD
Table E-2-2 North Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird

Table E-2-3 North Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal

Table E-2-4 North Zone Dietary HQ Calculations for Total PCBs

Table E-2-5 North Zone Dietary HQ Calculations for Total PCB TEQ Bird

Table E-2-6 North Zone Dietary HQ Calculations for Total PCB TEQ Mammal

Table E-2-7 North Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird

Table E-2-8 North Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal

Table E-2-9 North Zone Dietary HQ Calculations for Total DDx (2,4 & 4,4)

Table E-2-10 North Zone Dietary HQ Calculations for Dieldrin

Table E-2-11 North Zone Dietary HQ Calculations for Total Chlordane

Table E-2-12 North Zone Dietary HQ Calculations for Hexachlorobenzene

Table E-2-13 North Zone Dietary HQ Calculations for Total HMW PAH

Table E-2-14 North Zone Dietary HQ Calculations for Total LMW PAH

Table E-2-15 North Zone Dietary HQ Calculations for Total PAH

Table E-2-16 North Zone Dietary HQ Calculations for Arsenic

Table E-2-17 North Zone Dietary HQ Calculations for Cadmium

Table E-2-18 North Zone Dietary HQ Calculations for Chromium

Table E-2-19 North Zone Dietary HQ Calculations for Copper

Table E-2-20 North Zone Dietary HQ Calculations for Lead

Table E-2-21 North Zone Dietary HQ Calculations for Mercury

Table E-2-22 North Zone Dietary HQ Calculations for Methylmercury

Table E-2-23 North Zone Dietary HQ Calculations for Nickel

Table E-2-24 North Zone Dietary HQ Calculations for Selenium

Table E-2-25 North Zone Dietary HQ Calculations for Silver

Table E-2-26 North Zone Dietary HQ Calculations for Zinc

Appendix E-3 Dietary HQ Calculations - Southeast Zone

Table E-3-1 Southeast Zone Dietary HQ Calculations for 2,3,7,8-TCDD

Table E-3-2 Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird

Table E-3-3 Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal

Table E-3-4 Southeast Zone Dietary HQ Calculations for Total PCBs

Table E-3-5 Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird
Table E-3-6 Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal
Table E-3-7 Southeast Zone Dietary HQ Calculations for Total PCB TEQ Bird
Table E-3-8 Southeast Zone Dietary HQ Calculations for Total PCB TEQ Mammal
Table E-3-9 Southeast Zone Dietary HQ Calculations for Total DDx (2,4 & 4,4)
Table E-3-10 Southeast Zone Dietary HQ Calculations for Dieldrin
Table E-3-11 Southeast Zone Dietary HQ Calculations for Total Chlordane
Table E-3-12 Southeast Zone Dietary HQ Calculations for Hexachlorobenzene
Table E-3-13 Southeast Zone Dietary HQ Calculations for Total HMW PAH
Table E-3-14 Southeast Zone Dietary HQ Calculations for Total LMW PAH
Table E-3-15 Southeast Zone Dietary HQ Calculations for Total PAH
Table E-3-16 Southeast Zone Dietary HQ Calculations for Arsenic
Table E-3-17 Southeast Zone Dietary HQ Calculations for Cadmium
Table E-3-18 Southeast Zone Dietary HQ Calculations for Chromium
Table E-3-19 Southeast Zone Dietary HQ Calculations for Copper
Table E-3-20 Southeast Zone Dietary HQ Calculations for Lead
Table E-3-21 Southeast Zone Dietary HQ Calculations for Mercury
Table E-3-22 Southeast Zone Dietary HQ Calculations for Methylmercury
Table E-3-23 Southeast Zone Dietary HQ Calculations for Nickel
Table E-3-24 Southeast Zone Dietary HQ Calculations for Selenium
Table E-3-25 Southeast Zone Dietary HQ Calculations for Silver
Table E-3-26 Southeast Zone Dietary HQ Calculations for Zinc

Appendix E-4 Dietary HQ Calculations - Southwest Zone

Table E-4-1 Southwest Zone Dietary HQ Calculations for 2,3,7,8-TCDD
Table E-4-2 Southwest Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird
Table E-4-3 Southwest Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal
Table E-4-4 Southwest Zone Dietary HQ Calculations for Total PCBs
Table E-4-5 Southwest Zone Dietary HQ Calculations for Total PCB TEQ Bird
Table E-4-6 Southwest Zone Dietary HQ Calculations for Total PCB TEQ Mammal
Table E-4-7 Southwest Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird

Table E-4-8 Southwest Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal
Table E-4-9 Southwest Zone Dietary HQ Calculations for Total DDx (2,4 & 4,4)
Table E-4-10 Southwest Zone Dietary HQ Calculations for Dieldrin
Table E-4-11 Southwest Zone Dietary HQ Calculations for Total Chlordane
Table E-4-12 Southwest Zone Dietary HQ Calculations for Hexachlorobenzene
Table E-4-13 Southwest Zone Dietary HQ Calculations for Total HMW PAH
Table E-4-14 Southwest Zone Dietary HQ Calculations for Total LMW PAH
Table E-4-15 Southwest Zone Dietary HQ Calculations for Total PAH
Table E-4-16 Southwest Zone Dietary HQ Calculations for Arsenic
Table E-4-17 Southwest Zone Dietary HQ Calculations for Cadmium
Table E-4-18 Southwest Zone Dietary HQ Calculations for Chromium
Table E-4-19 Southwest Zone Dietary HQ Calculations for Copper
Table E-4-20 Southwest Zone Dietary HQ Calculations for Lead
Table E-4-21 Southwest Zone Dietary HQ Calculations for Mercury
Table E-4-22 Southwest Zone Dietary HQ Calculations for Methylmercury
Table E-4-23 Southwest Zone Dietary HQ Calculations for Nickel
Table E-4-24 Southwest Zone Dietary HQ Calculations for Selenium
Table E-4-25 Southwest Zone Dietary HQ Calculations for Silver
Table E-4-26 Southwest Zone Dietary HQ Calculations for Zinc

ACRONYMS AND ABBREVIATIONS

-- = not available

ADD_{total} = total average daily dose (mg/kg bw-day)

BAF = bioaccumulation factor

BERA = baseline ecological risk assessment

bw = body weight

cm = centimeter

DF = dietary fraction (range 0 to 1)

DF_k = dietary fraction of intake of the kth food type (range 0 to 1)

DF_s = dietary fraction of sediment ingested (range 0 to 1)

dw = dry weight

EPC = exposure point concentration

EPC_k = EPC for the kth food type (mg/kg, ww)

EPC_s = EPC in sediment (mg/kg, dw)

FFS = focused feasibility study (USEPA 2014)

HQ = hazard quotient (unitless)

IR_k = ingestion rate for the kth food type (kg/kg bw-day, ww)

IR_s = ingestion rate for sediment (kg/kg bw-day, dw)

kg = kilograms

kg/kg bw-day = kilograms per kilogram of body weight per day

LOAEL = lowest observed adverse effect level

LPR = Lower Passaic River

mg/kg = milligrams per kilogram

mg/kg bw-day = milligrams per kilogram of body weight per day

NBSA = Newark Bay Study Area

NC = diet item not contributing to total dose

NOAEL = no observed adverse effect level

SUF = site use factor

Σ = sum

TRV = toxicity reference value (mg/kg bw-day)

UCL = upper confidence limit

ww = wet weight

Notes:

The muskrat diet was assumed to consist of 85% aquatic/emergent plants. However, plants were not collected in the NBSA. Instead, soil to plant BAFs derived from USEPA (2007b) were applied to sediment data to estimate concentrations in aquatic/emergent plant diet (Table 9-2). Soil to plant BAFs were not available for methylmercury and a BAF equal to 1.0 was assumed for this COPEC.

Sediment data is in dry weight while all tissue data is in wet weight. In order to convert from sediment concentration (dw) to plant tissue concentration using the BAF, 80% moisture was assumed in order to adjust the plant tissue to wet weight.

$HQ \geq 1$

Equation 1 - Dose Equation:

$$ADD_{total} = [(EPC_s * IR_s * DF_s) + \Sigma(EPC_k * DF_k * IR_k) * SUF]$$

Equation 2 - HQ Equation:

$$HQ = ADD_{total} / TRV$$

REFERENCES

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table E-1-1
NBSA-wide Dietary HQ Calculations for 2,3,7,8-TCDD

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, ww	Appendix C	8.44E-05	8.44E-05	1.37E-04	1.37E-04	1.37E-04	6.61E-05	1.37E-04
	Plant EPC	mg/kg, ww	Appendix C	9.45E-08	9.45E-08	1.53E-07	1.53E-07	1.53E-07	7.40E-08	1.53E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	6.56E-06	6.56E-06	6.56E-06	6.56E-06	6.56E-06	6.56E-06	6.56E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.67E-05	3.67E-05	3.67E-05	3.67E-05	3.67E-05	3.67E-05	3.67E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	4.40E-07	2.97E-10	NC	1.04E-08	1.07E-09	2.38E-09	2.43E-10
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	1.45E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	9.11E-06	NC	NC	4.86E-07	5.55E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	4.41E-07	NC	1.08E-06	1.23E-07	NC	2.77E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.15E-07	NC	2.82E-07	6.43E-08	7.53E-08	7.27E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	3.50E-06	5.64E-06	1.07E-06	NC	5.70E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	2.88E-06	NC	7.32E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.78E-06	4.05E-06	5.64E-06	1.46E-06	1.56E-06	6.63E-07	3.84E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.3	0.3	0.4	0.1	0.6	0.3	0.1
	LOAEL HQ - NBSA	unitless	Calculated	0.03	0.03	0.04	0.01	0.2	0.08	0.04
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	2	1	2	0.5	20	8	5
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.1	0.2	0.05	0.7	0.3	0.2

Table E-1-2
NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird

Parameter		Units	Table Reference	NBSA-wide Mudflats	NBSA-wide Mudflats	NBSA-wide	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.40E-04	1.40E-04	1.89E-04	1.89E-04
	Plant EPC	mg/kg, ww	Appendix C	1.57E-07	1.57E-07	2.11E-07	2.11E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.39E-05	1.39E-05	1.39E-05	1.39E-05
	Blue crab EPC	mg/kg, ww	Appendix C	4.00E-05	4.00E-05	4.00E-05	4.00E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.01E-05	1.01E-05	1.01E-05	1.01E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.30E-05	3.30E-05	3.30E-05	3.30E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.88E-05	4.88E-05	4.88E-05	4.88E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	7.31E-07	4.94E-10	NC	1.43E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.12E-05	NC	NC	5.97E-07
	Dose from blue crab	mg/kg bw-day	Calculated	NC	7.04E-07	NC	1.72E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.77E-07	NC	4.33E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	4.65E-06	7.50E-06	1.42E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.96E-06	5.53E-06	7.50E-06	2.09E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.4	0.4	0.5	0.1
	LOAEL HQ - NBSA	unitless	Calculated	0.04	0.04	0.05	0.01
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	2	2	3	0.7
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.2	0.3	0.07

Table E-1-3
NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal

Parameter		Units	Table Reference	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.70E-04	9.25E-05	1.70E-04
	Plant EPC	mg/kg, ww	Appendix C	1.90E-07	1.04E-07	1.90E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.17E-05	1.17E-05	1.17E-05
	Blue crab EPC	mg/kg, ww	Appendix C	2.87E-05	2.87E-05	2.87E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	7.53E-06	7.53E-06	7.53E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.86E-05	2.86E-05	2.86E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.02E-05	4.02E-05	4.02E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.33E-09	3.33E-09	3.01E-10
	Dose from plants	mg/kg bw-day	Calculated	NC	2.02E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.75E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	1.41E-07	NC	3.18E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	7.38E-08	8.65E-08	8.34E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	6.57E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	3.15E-06	NC	8.03E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.71E-06	7.67E-07	4.22E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.7	0.3	0.2
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.09	0.05
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	21	10	5
	LOAEL HQ - FFS	unitless	Calculated	0.8	0.3	0.2

Table E-1-4
NBSA-wide Dietary HQ Calculations for Total PCBs

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.08	0.08	0.08
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	0.096	0.096	0.096
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.4	0.4	0.4	0.4	0.069	0.069	0.069
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.5	0.5	0.5	0.5	0.082	0.082	0.082
EPCs	Sediment EPC	mg/kg, ww	Appendix C	7.01E-01	7.01E-01	6.69E-01	6.69E-01	6.69E-01	6.23E-01	6.69E-01
	Plant EPC	mg/kg, ww	Appendix C	1.40E-03	1.40E-03	1.34E-03	1.34E-03	1.34E-03	1.25E-03	1.34E-03
	Polychaete EPC	mg/kg, ww	Appendix C	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
	Blue crab EPC	mg/kg, ww	Appendix C	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.65E-03	2.47E-06	NC	5.08E-05	5.24E-06	2.24E-05	1.19E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	2.43E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.99E-02	NC	NC	2.66E-03	3.04E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	6.40E-03	NC	1.56E-02	1.78E-03	NC	4.03E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.52E-03	NC	6.15E-03	1.40E-03	1.65E-03	1.59E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.56E-01	2.52E-01	4.76E-02	NC	2.55E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	9.16E-02	NC	2.33E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	2.68E-02	1.65E-01	2.52E-01	3.60E-02	4.75E-02	2.74E-02	1.19E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.2	1	2	0.3	0.6	0.3	0.1
	LOAEL HQ - NBSA	unitless	Calculated	0.02	0.1	0.2	0.03	0.5	0.3	0.1
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.07	0.4	0.6	0.09	0.7	0.4	0.2
	LOAEL HQ - FFS	unitless	Calculated	0.05	0.3	0.5	0.07	0.6	0.3	0.1

Table E-1-5
NBSA-wide Dietary HQ Calculations for Total PCB TEQ Bird

Parameter		Units	Table Reference	NBSA-wide Mudflats	NBSA-wide Mudflats	NBSA-wide	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.78E-04	1.78E-04	1.75E-04	1.75E-04
	Plant EPC	mg/kg, ww	Appendix C	3.56E-07	3.56E-07	3.50E-07	3.50E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.13E-05	2.13E-05	2.13E-05	2.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	7.22E-05	7.22E-05	7.22E-05	7.22E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.63E-05	1.63E-05	1.63E-05	1.63E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.02E-04	1.02E-04	1.02E-04	1.02E-04
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.24E-04	1.24E-04	1.24E-04	1.24E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated	9.29E-07	6.27E-10	NC	1.33E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.72E-05	NC	NC	9.17E-07
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.27E-06	NC	3.10E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.87E-07	NC	7.01E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.44E-05	2.32E-05	4.38E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	9.05E-06	1.59E-05	2.32E-05	4.56E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.6	1	2	0.3
	LOAEL HQ - NBSA	unitless	Calculated	0.06	0.1	0.2	0.03
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	3	6	8	2
	LOAEL HQ - FFS	unitless	Calculated	0.3	0.6	0.8	0.2

Table E-1-6
NBSA-wide Dietary HQ Calculations for Total PCB TEQ Mammal

Parameter		Units	Table Reference	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.000392	0.001287	0.000089
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, ww	Appendix C	9.00E-06	1.88E-05	9.00E-06
	Plant EPC	mg/kg, ww	Appendix C	1.80E-08	3.77E-08	1.80E-08
	Polychaete EPC	mg/kg, ww	Appendix C	9.57E-07	9.57E-07	9.57E-07
	Blue crab EPC	mg/kg, ww	Appendix C	1.11E-05	1.11E-05	1.11E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	2.00E-06	2.00E-06	2.00E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.90E-05	1.90E-05	1.90E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.14E-05	1.14E-05	1.14E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	7.06E-11	6.79E-10	1.60E-11
	Dose from plants	mg/kg bw-day	Calculated	NC	7.36E-09	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.69E-09	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	5.41E-08	NC	1.22E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	1.96E-08	2.30E-08	2.22E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	4.37E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	8.95E-07	NC	2.28E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.87E-07	4.68E-07	1.21E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.2	0.2	0.05
	LOAEL HQ - NBSA	unitless	Calculated	0.06	0.05	0.01
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	6	6	2
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.2	0.06

Table E-1-7
NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird

Parameter		Units	Table Reference	NBSA-wide Mudflats	NBSA-wide Mudflats	NBSA-wide	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, ww	Appendix C	3.31E-04	3.31E-04	3.87E-04	3.87E-04
	Plant EPC	mg/kg, ww	Appendix C	6.62E-07	6.62E-07	7.74E-07	7.74E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.70E-05	2.70E-05	2.70E-05	2.70E-05
	Blue crab EPC	mg/kg, ww	Appendix C	1.10E-04	1.10E-04	1.10E-04	1.10E-04
	Softshell clam EPC	mg/kg, ww	Appendix C	2.33E-05	2.33E-05	2.33E-05	2.33E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.36E-04	1.36E-04	1.36E-04	1.36E-04
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.77E-04	1.77E-04	1.77E-04	1.77E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.73E-06	1.17E-09	NC	2.94E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	2.17E-05	NC	NC	1.16E-06
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.93E-06	NC	4.71E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.10E-07	NC	1.00E-06
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.91E-05	3.08E-05	5.82E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.17E-05	2.14E-05	3.08E-05	6.36E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.8	2	2	0.5
	LOAEL HQ - NBSA	unitless	Calculated	0.08	0.2	0.2	0.05
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	4	8	11	2
	LOAEL HQ - FFS	unitless	Calculated	0.4	0.8	1	0.2

Table E-1-8
NBSA-wide Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal

Parameter		Units	Table Reference	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.77E-04	1.03E-04	1.77E-04
	Plant EPC	mg/kg, ww	Appendix C	3.54E-07	2.05E-07	3.54E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.00E-05	1.00E-05	1.00E-05
	Blue crab EPC	mg/kg, ww	Appendix C	3.95E-05	3.95E-05	3.95E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	8.90E-06	8.90E-06	8.90E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.89E-05	3.89E-05	3.89E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.66E-05	4.66E-05	4.66E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.39E-09	3.69E-09	3.14E-10
	Dose from plants	mg/kg bw-day	Calculated	NC	4.00E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.90E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	1.94E-07	NC	4.38E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	8.72E-08	1.02E-07	9.87E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	8.94E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	3.65E-06	NC	9.29E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.99E-06	1.04E-06	4.92E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.8	0.4	0.2
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.1	0.06
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	25	13	6
	LOAEL HQ - FFS	unitless	Calculated	0.9	0.5	0.2

Table E-1-9
NBSA-wide Dietary HQ Calculations for Total DDx (2,4 & 4,4)

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.025	0.025	0.025	0.025	0.13	0.13	0.13
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.25	0.25	0.25	0.25	1.3	1.3	1.3
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.009	0.009	0.009	0.009	0.8	0.8	0.8
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.027	0.027	0.027	0.027	4	4	4
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.85E-01	1.85E-01	2.13E-01	2.13E-01	2.13E-01	1.65E-01	2.13E-01
	Plant EPC	mg/kg, ww	Appendix C	4.55E-03	4.55E-03	5.07E-03	5.07E-03	5.07E-03	4.17E-03	5.07E-03
	Polychaete EPC	mg/kg, ww	Appendix C	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03
	Blue crab EPC	mg/kg, ww	Appendix C	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.60E-02	2.60E-02	2.60E-02	2.60E-02	2.60E-02	2.60E-02	2.60E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.43E-01	2.43E-01	2.43E-01	2.43E-01	2.43E-01	2.43E-01	2.43E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.11E-01	3.11E-01	3.11E-01	3.11E-01	3.11E-01	3.11E-01	3.11E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	9.64E-04	6.51E-07	NC	1.62E-05	1.67E-06	5.93E-06	3.78E-07
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	8.15E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.39E-03	NC	NC	1.81E-04	2.07E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.05E-03	NC	5.01E-03	5.71E-04	NC	1.29E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.57E-04	NC	1.12E-03	2.55E-04	2.99E-04	2.88E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	3.43E-02	5.53E-02	1.05E-02	NC	5.60E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	2.44E-02	NC	6.21E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	2.18E-03	3.68E-02	5.53E-02	8.39E-03	1.26E-02	6.72E-03	3.18E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.09	1	2	0.3	0.1	0.05	0.02
	LOAEL HQ - NBSA	unitless	Calculated	0.009	0.1	0.2	0.03	0.01	0.005	0.002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.2	4	6	0.9	0.02	0.008	0.004
	LOAEL HQ - FFS	unitless	Calculated	0.08	1	2	0.3	0.003	0.002	0.0008

Table E-1-10
NBSA-wide Dietary HQ Calculations for Dieldrin

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.08	0.08	0.08	0.08	0.015	0.015	0.015
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.12	0.12	0.12	0.12	0.03	0.03	0.03
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.054	0.054	0.054	0.054	0.015	0.015	0.015
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.18	0.18	0.18	0.18	0.03	0.03	0.03
EPCs	Sediment EPC	mg/kg, ww	Appendix C	7.81E-03	7.81E-03	2.70E-03	2.70E-03	2.70E-03	2.67E-03	2.70E-03
	Plant EPC	mg/kg, ww	Appendix C	6.40E-04	6.40E-04	2.22E-04	2.22E-04	2.22E-04	2.19E-04	2.22E-04
	Polychaete EPC	mg/kg, ww	Appendix C	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03
	Blue crab EPC	mg/kg, ww	Appendix C	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03
	Softshell clam EPC	mg/kg, ww	Appendix C	6.23E-04	6.23E-04	6.23E-04	6.23E-04	6.23E-04	6.23E-04	6.23E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.77E-03	8.77E-03	8.77E-03	8.77E-03	8.77E-03	8.77E-03	8.77E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	4.07E-05	2.75E-08	NC	2.05E-07	2.12E-08	9.60E-08	4.79E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	4.27E-05	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.78E-03	NC	NC	9.49E-05	1.08E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.03E-04	NC	2.52E-04	2.87E-05	NC	6.50E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.10E-05	NC	2.68E-05	6.11E-06	7.16E-06	6.91E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.23E-03	1.99E-03	3.77E-04	NC	2.01E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	8.02E-04	NC	2.04E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	9.09E-04	1.35E-03	1.99E-03	3.75E-04	4.24E-04	2.51E-04	1.06E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.01	0.02	0.02	0.005	0.03	0.02	0.007
	LOAEL HQ - NBSA	unitless	Calculated	0.008	0.01	0.02	0.003	0.01	0.008	0.004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.02	0.02	0.04	0.007	0.03	0.02	0.007
	LOAEL HQ - FFS	unitless	Calculated	0.005	0.007	0.01	0.002	0.01	0.008	0.004

Table E-1-11
NBSA-wide Dietary HQ Calculations for Total Chlordane

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2.1	2.1	2.1
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	20	20	20	20	21	21	21
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.32E-02	1.32E-02	9.24E-03	9.24E-03	9.24E-03	1.11E-02	9.24E-03
	Plant EPC	mg/kg, ww	Appendix C	2.81E-05	2.81E-05	1.97E-05	1.97E-05	1.97E-05	2.36E-05	1.97E-05
	Polychaete EPC	mg/kg, ww	Appendix C	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03
	Blue crab EPC	mg/kg, ww	Appendix C	3.60E-02	3.60E-02	3.60E-02	3.60E-02	3.60E-02	3.60E-02	3.60E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	3.48E-03	3.48E-03	3.48E-03	3.48E-03	3.48E-03	3.48E-03	3.48E-03
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.67E-02	5.67E-02	5.67E-02	5.67E-02	5.67E-02	5.67E-02	5.67E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	9.02E-02	9.02E-02	9.02E-02	9.02E-02	9.02E-02	9.02E-02	9.02E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	6.88E-05	4.65E-08	NC	7.01E-07	7.24E-08	3.99E-07	1.64E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	4.60E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.95E-03	NC	NC	1.04E-04	1.18E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	6.34E-04	NC	1.55E-03	1.76E-04	NC	3.99E-05
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	6.12E-05	NC	1.49E-04	3.41E-05	4.00E-05	3.86E-06
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	7.99E-03	1.29E-02	2.44E-03	NC	1.30E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	7.07E-03	NC	1.80E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.01E-03	8.69E-03	1.29E-02	2.12E-03	3.65E-03	1.35E-03	9.22E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.0005	0.004	0.006	0.001	0.002	0.0006	0.0004
	LOAEL HQ - NBSA	unitless	Calculated	0.00005	0.0004	0.0006	0.0001	0.0002	0.00006	0.00004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--

Table E-1-12
NBSA-wide Dietary HQ Calculations for Hexachlorobenzene

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.1	1.1	1.1	1.1	0.013	0.013	0.013
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	5	5	5	5	0.13	0.13	0.13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	7.66E-03	7.66E-03	4.58E-03	4.58E-03	4.58E-03	2.32E-03	4.58E-03
	Plant EPC	mg/kg, ww	Appendix C	3.91E-05	3.91E-05	2.34E-05	2.34E-05	2.34E-05	1.19E-05	2.34E-05
	Polychaete EPC	mg/kg, ww	Appendix C	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04
	Blue crab EPC	mg/kg, ww	Appendix C	1.07E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03
	Softshell clam EPC	mg/kg, ww	Appendix C	2.79E-04	2.79E-04	2.79E-04	2.79E-04	2.79E-04	2.79E-04	2.79E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03
Doses	Dose from sediment	mg/kg bw-day	Calculated	4.00E-05	2.70E-08	NC	3.48E-07	3.59E-08	8.37E-08	8.13E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	2.32E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.11E-04	NC	NC	1.66E-05	1.89E-06	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.88E-05	NC	4.58E-05	5.22E-06	NC	1.18E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.91E-06	NC	1.20E-05	2.73E-06	3.21E-06	3.09E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.56E-04	2.51E-04	4.74E-05	NC	2.54E-05	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	1.21E-04	NC	3.08E-05
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.75E-04	1.79E-04	2.51E-04	6.10E-05	6.54E-05	3.10E-05	1.61E-05
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.0002	0.0002	0.0002	0.00006	0.005	0.002	0.001
	LOAEL HQ - NBSA	unitless	Calculated	0.00004	0.00004	0.00005	0.00001	0.0005	0.0002	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--

Table E-1-13
NBSA-wide Dietary HQ Calculations for Total HMW PAH

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.048	0.048	0.048	0.048	0.62	0.62	0.62
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.48	0.48	0.48	0.48	3.1	3.1	3.1
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.34E+01	2.34E+01	1.43E+01	1.43E+01	1.43E+01	1.48E+01	1.43E+01
	Plant EPC	mg/kg, ww	Appendix C	7.23E-01	7.23E-01	4.52E-01	4.52E-01	4.52E-01	4.69E-01	4.52E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	3.83E-01	3.83E-01	3.83E-01	3.83E-01	3.83E-01	3.83E-01	3.83E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.02E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.22E-01	8.26E-05	NC	1.08E-03	1.12E-04	5.35E-04	2.53E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	9.15E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	7.21E-04	NC	1.76E-03	2.01E-04	NC	4.54E-05
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	6.74E-03	NC	1.64E-02	3.75E-03	4.40E-03	4.24E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	2.85E-03	4.60E-03	8.69E-04	NC	4.65E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	1.17E-03	NC	2.98E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	8.20E-02	1.04E-02	4.60E-03	1.12E-02	2.75E-03	9.69E-02	3.97E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	2	0.2	0.1	0.2	0.004	0.2	0.0006
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.02	0.01	0.02	0.0009	0.03	0.0001

Table E-1-14
NBSA-wide Dietary HQ Calculations for Total LMW PAH

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.67	0.67	0.67	0.67	50	50	50
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.7	6.7	6.7	6.7	150	150	150
EPCs	Sediment EPC	mg/kg, ww	Appendix C	5.55E+00	5.55E+00	1.94E+00	1.94E+00	1.94E+00	2.32E+00	1.94E+00
	Plant EPC	mg/kg, ww	Appendix C	1.16E-01	1.16E-01	7.21E-02	7.21E-02	7.21E-02	7.82E-02	7.21E-02
	Polychaete EPC	mg/kg, ww	Appendix C	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
	Blue crab EPC	mg/kg, ww	Appendix C	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	5.88E-02	5.88E-02	5.88E-02	5.88E-02	5.88E-02	5.88E-02	5.88E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.07E-02	6.07E-02	6.07E-02	6.07E-02	6.07E-02	6.07E-02	6.07E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	2.89E-02	1.95E-05	NC	1.47E-04	1.52E-05	8.35E-05	3.43E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	1.53E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.05E-02	NC	NC	5.58E-04	6.37E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.23E-03	NC	3.01E-03	3.43E-04	NC	7.75E-05
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.04E-03	NC	2.53E-03	5.76E-04	6.76E-04	6.52E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	5.49E-03	8.86E-03	1.67E-03	NC	8.96E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	4.76E-03	NC	1.21E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.97E-02	7.78E-03	8.86E-03	3.96E-03	2.88E-03	1.69E-02	6.79E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.03	0.01	0.01	0.006	0.00006	0.0003	0.00001
	LOAEL HQ - FFS	unitless	Calculated	0.003	0.001	0.001	0.0006	0.00002	0.0001	0.000005

Table E-1-15
NBSA-wide Dietary HQ Calculations for Total PAH

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.000	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.2	6.2	6.2	6.2	6.2	40	40	40	40	0.615	0.615	0.615
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	18	18	18	18	18	Not derived	Not derived	Not derived	Not derived	3.07	3.07	3.07
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.90E+01	1.61E+01	1.61E+01	1.61E+01	1.61E+01	2.90E+01	2.90E+01	1.61E+01	1.61E+01	1.61E+01	1.78E+01	1.61E+01
	Plant EPC	mg/kg, ww	Appendix C	6.79E-01	3.83E-01	3.83E-01	3.83E-01	3.83E-01	6.79E-01	6.79E-01	3.83E-01	3.83E-01	3.83E-01	4.21E-01	3.83E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02	7.60E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01	4.34E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02	5.19E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02	6.85E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	8.34E-03	5.17E-03	6.72E-04	6.78E-04	5.65E-04	1.51E-01	1.02E-04	NC	1.22E-03	1.26E-04	6.41E-04	2.86E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	8.23E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	7.45E-03	9.24E-04	1.73E-03	1.75E-03	7.27E-04	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.36E-03	1.27E-03	1.28E-03	1.07E-03	NC	1.34E-03	NC	3.27E-03	3.72E-04	NC	8.43E-05
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	7.74E-03	7.23E-03	7.31E-03	6.08E-03	NC	7.64E-03	NC	1.86E-02	4.25E-03	4.99E-03	4.81E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	8.65E-04	8.74E-04	NC	NC	7.31E-03	1.18E-02	2.23E-03	NC	1.19E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.22E-03	NC	NC	1.92E-03	NC	NC	NC	NC	5.37E-03	NC	1.37E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.58E-02	1.10E-02	7.88E-03	1.19E-02	1.04E-02	9.65E-02	1.64E-02	1.18E-02	1.38E-02	5.19E-03	8.91E-02	9.80E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.003	0.002	0.001	0.002	0.002	0.002	0.0004	0.0003	0.0003	0.008	0.1	0.002
	LOAEL HQ - NBSA	unitless	Calculated	0.0009	0.0006	0.0004	0.0007	0.0006	--	--	--	--	0.002	0.03	0.0003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-16
NBSA-wide Dietary HQ Calculations for Arsenic

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.52	0.52	0.52	0.52	0.52	10	10	10	10	2.6	2.6	2.6
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.9	1.9	1.9	1.9	1.9	40	40	40	40	5.4	5.4	5.4
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.90E+01	2.29E+01	2.29E+01	2.29E+01	2.29E+01	2.90E+01	2.90E+01	2.29E+01	2.29E+01	2.29E+01	1.75E+01	2.29E+01
	Plant EPC	mg/kg, ww	Appendix C	2.18E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	2.18E-01	2.18E-01	1.72E-01	1.72E-01	1.72E-01	1.31E-01	1.72E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00
	Blue crab EPC	mg/kg, ww	Appendix C	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00	5.87E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated	8.35E-03	7.34E-03	9.53E-04	9.62E-04	8.01E-04	1.51E-01	1.02E-04	NC	1.74E-03	1.79E-04	6.30E-04	4.05E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.56E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.99E-01	4.94E-02	9.24E-02	9.34E-02	3.89E-02	2.23E+00	NC	NC	1.19E-01	1.36E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	4.71E-02	4.41E-02	4.45E-02	3.71E-02	NC	4.66E-02	NC	1.14E-01	1.30E-02	NC	2.93E-03
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.05E-01	9.78E-02	9.88E-02	8.23E-02	NC	1.03E-01	NC	2.52E-01	5.75E-02	6.75E-02	6.51E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.81E-02	1.83E-02	NC	NC	1.53E-01	2.47E-01	4.67E-02	NC	2.50E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	2.08E-02	NC	NC	3.28E-02	NC	NC	NC	NC	9.17E-02	NC	2.33E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.07E-01	1.54E-01	1.70E-01	2.56E-01	1.92E-01	1.19E+00	3.03E-01	2.47E-01	2.67E-01	8.80E-02	1.19E-01	1.64E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.8	0.3	0.3	0.5	0.4	0.1	0.03	0.02	0.03	0.03	0.05	0.006
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.08	0.09	0.1	0.1	0.03	0.008	0.006	0.007	0.02	0.02	0.003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-17
NBSA-wide Dietary HQ Calculations for Cadmium

	Parameter	Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.001	0.001	0.001	0.001	0.001	0.4	0.4	0.4	0.4	3.5	3.5	3.5
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.01	0.01	0.01	0.01	0.01	4	4	4	4	13	13	13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.87E+00	2.96E+00	2.96E+00	2.96E+00	2.96E+00	2.87E+00	2.87E+00	2.96E+00	2.96E+00	2.96E+00	1.84E+00	2.96E+00
	Plant EPC	mg/kg, ww	Appendix C	2.21E-01	2.25E-01	2.25E-01	2.25E-01	2.25E-01	2.21E-01	2.21E-01	2.25E-01	2.25E-01	2.25E-01	1.73E-01	2.25E-01
	Polychaete EPC	mg/kg, ww	Appendix C	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02
	Blue crab EPC	mg/kg, ww	Appendix C	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01	2.27E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	8.25E-04	9.50E-04	1.23E-04	1.25E-04	1.04E-04	1.50E-02	1.01E-05	NC	2.25E-04	2.32E-05	6.62E-05	5.25E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.39E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.33E-02	1.65E-03	3.08E-03	3.11E-03	1.29E-03	7.43E-02	NC	NC	3.97E-03	4.52E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	6.31E-03	5.90E-03	5.96E-03	4.96E-03	NC	6.23E-03	NC	1.52E-02	1.73E-03	NC	3.92E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.05E-03	3.78E-03	3.82E-03	3.18E-03	NC	4.00E-03	NC	9.75E-03	2.22E-03	2.61E-03	2.52E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.67E-03	1.68E-03	NC	NC	1.41E-02	2.27E-02	4.30E-03	NC	2.30E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.78E-03	NC	NC	2.80E-03	NC	NC	NC	NC	7.84E-03	NC	2.00E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.41E-02	9.88E-03	9.75E-03	1.47E-02	1.23E-02	4.46E-02	2.43E-02	2.27E-02	1.67E-02	6.14E-03	3.88E-02	1.32E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	14	10	10	15	12	0.1	0.06	0.06	0.04	0.002	0.01	0.0004
	LOAEL HQ - NBSA	unitless	Calculated	1	1	1	1	1	0.01	0.006	0.006	0.004	0.0005	0.003	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-18
NBSA-wide Dietary HQ Calculations for Chromium

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.92	0.92	0.92	0.92	0.92	10.5	10.5	10.5	10.5	0.962	0.962	0.962
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	105	105	105	105	9.62	9.62	9.62
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.15E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.15E+02	1.15E+02	1.39E+02	1.39E+02	1.39E+02	1.04E+02	1.39E+02
	Plant EPC	mg/kg, ww	Appendix C	9.43E-01	1.14E+00	1.14E+00	1.14E+00	1.14E+00	9.43E-01	9.43E-01	1.14E+00	1.14E+00	1.14E+00	8.55E-01	1.14E+00
	Polychaete EPC	mg/kg, ww	Appendix C	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01
	Blue crab EPC	mg/kg, ww	Appendix C	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01	4.18E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01	4.04E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.31E-02	4.47E-02	5.80E-03	5.86E-03	4.88E-03	6.00E-01	4.05E-04	NC	1.06E-02	1.09E-03	3.76E-03	2.47E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.67E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	9.06E-02	1.12E-02	2.10E-02	2.12E-02	8.83E-03	5.07E-01	NC	NC	2.71E-02	3.09E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	5.17E-03	4.83E-03	4.88E-03	4.06E-03	NC	5.11E-03	NC	1.25E-02	1.42E-03	NC	3.21E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	7.48E-02	6.99E-02	7.06E-02	5.88E-02	NC	7.38E-02	NC	1.80E-01	4.11E-02	4.82E-02	4.65E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	6.97E-03	7.04E-03	NC	NC	5.89E-02	9.50E-02	1.80E-02	NC	9.61E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	7.20E-03	NC	NC	1.13E-02	NC	NC	NC	NC	3.17E-02	NC	8.06E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.24E-01	9.59E-02	7.27E-02	1.10E-01	8.79E-02	5.54E-01	1.38E-01	9.50E-02	1.24E-01	3.92E-02	2.29E-01	6.64E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.1	0.1	0.08	0.1	0.1	0.05	0.01	0.009	0.01	0.04	0.2	0.007
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	0.005	0.001	0.0009	0.001	0.004	0.02	0.0007
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-19
NBSA-wide Dietary HQ Calculations for Copper

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1	1	1	1	1	1.9	1.9	1.9	1.9	18	18	18
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2	19	19	19	19	26	26	26
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	2.3	2.3	2.3	2.3	3.4	3.4	3.4
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	4.7	4.7	4.7	4.7	6.8	6.8	6.8
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.96E+02	1.91E+02	1.91E+02	1.91E+02	1.91E+02	2E+02	1.96E+02	1.91E+02	1.91E+02	1.91E+02	1.73E+02	1.91E+02
	Plant EPC	mg/kg, ww	Appendix C	3.12E+00	3.09E+00	3.09E+00	3.09E+00	3.09E+00	3.12E+00	3.12E+00	3.09E+00	3.09E+00	3.09E+00	2.97E+00	3.09E+00
	Polychaete EPC	mg/kg, ww	Appendix C	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00
	Blue crab EPC	mg/kg, ww	Appendix C	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.29E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01
Doses	Dose from sediment	mg/kg bw-day	Calculated	5.65E-02	6.11E-02	7.94E-03	8.02E-03	6.67E-03	1.02E+00	6.92E-04	NC	1.45E-02	1.49E-03	6.22E-03	3.38E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.80E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.12E-01	3.86E-02	7.22E-02	7.30E-02	3.04E-02	1.74E+00	NC	NC	9.31E-02	1.06E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	5.48E-01	5.12E-01	5.17E-01	4.31E-01	NC	5.41E-01	NC	1.32E+00	1.51E-01	NC	3.41E-02
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.30E-01	2.15E-01	2.17E-01	1.81E-01	NC	2.27E-01	NC	5.54E-01	1.26E-01	1.48E-01	1.43E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	5.95E-02	6.01E-02	NC	NC	5.03E-01	8.11E-01	1.53E-01	NC	8.21E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.87E-01	NC	NC	2.94E-01	NC	NC	NC	NC	8.22E-01	NC	2.09E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	3.68E-01	7.13E-01	5.81E-01	8.75E-01	9.42E-01	1.38E+00	1.27E+00	8.11E-01	1.07E+00	5.56E-01	8.16E-01	1.29E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.4	0.7	0.6	0.9	0.9	0.7	0.7	0.4	0.6	0.03	0.05	0.007
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.4	0.3	0.4	0.5	0.07	0.07	0.04	0.06	0.02	0.03	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.6	0.6	0.4	0.5	0.2	0.2	0.04
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.3	0.3	0.2	0.2	0.08	0.1	0.02

Table E-1-20
NBSA-wide Dietary HQ Calculations for Lead

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	12.6	12.6	12.6	12.6	12.6	5.5	5.5	5.5	5.5	11	11	11
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	28	28	28	28	90	90	90
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.19	0.19	0.19	0.19	0.71	0.71	0.71
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	1.9	1.9	1.9	1.9	7	7	7
EPCs	Sediment EPC	mg/kg, ww	Appendix C	7.41E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02	7.41E+02	7.41E+02	1.93E+02	1.93E+02	1.93E+02	2.37E+02	1.93E+02
	Plant EPC	mg/kg, ww	Appendix C	2.16E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	2.16E+00	2.16E+00	1.02E+00	1.02E+00	1.02E+00	1.14E+00	1.02E+00
	Polychaete EPC	mg/kg, ww	Appendix C	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01
	Blue crab EPC	mg/kg, ww	Appendix C	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00	1.23E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01	2.90E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01	5.92E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	2.13E-01	6.19E-02	8.04E-03	8.12E-03	6.76E-03	3.87E+00	2.61E-03	NC	1.47E-02	1.51E-03	8.54E-03	3.42E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.23E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	9.69E-02	1.20E-02	2.25E-02	2.27E-02	9.45E-03	5.43E-01	NC	NC	2.90E-02	3.30E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.19E-02	2.04E-02	2.06E-02	1.72E-02	NC	2.16E-02	NC	5.27E-02	6.01E-03	NC	1.36E-03
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	5.16E-01	4.83E-01	4.88E-01	4.06E-01	NC	5.10E-01	NC	1.24E+00	2.84E-01	3.33E-01	3.21E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	9.87E-03	9.97E-03	NC	NC	8.34E-02	1.34E-01	2.54E-02	NC	1.36E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	7.60E-03	NC	NC	1.19E-02	NC	NC	NC	NC	3.34E-02	NC	8.50E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	3.10E-01	4.15E-01	3.64E-01	5.49E-01	4.51E-01	2.20E+00	6.18E-01	1.34E-01	6.83E-01	1.64E-01	5.77E-01	2.12E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.02	0.03	0.03	0.04	0.04	0.4	0.1	0.02	0.1	0.01	0.05	0.002
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	0.08	0.02	0.005	0.02	0.002	0.006	0.0002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	12	3	0.7	4	0.2	0.8	0.03
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	1	0.3	0.07	0.4	0.02	0.08	0.003

Table E-1-21
NBSA-wide Dietary HQ Calculations for Mercury

	Parameter	Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.30E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	2.30E+00	2.30E+00	3.13E+00	3.13E+00	3.13E+00	1.88E+00	3.13E+00
	Plant EPC	mg/kg, ww	Appendix C	1.16E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.16E-01	1.16E-01	1.37E-01	1.37E-01	1.37E-01	1.04E-01	1.37E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02
	Blue crab EPC	mg/kg, ww	Appendix C	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02	6.70E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	6.61E-04	1.00E-03	1.30E-04	1.32E-04	1.10E-04	1.20E-02	8.10E-06	NC	2.38E-04	2.45E-05	6.79E-05	5.55E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.04E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.28E-03	5.31E-04	9.93E-04	1.00E-03	4.17E-04	2.40E-02	NC	NC	1.28E-03	1.46E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.22E-03	2.07E-03	2.09E-03	1.74E-03	NC	2.19E-03	NC	5.34E-03	6.09E-04	NC	1.38E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	3.33E-03	3.11E-03	3.14E-03	2.62E-03	NC	3.29E-03	NC	8.02E-03	1.83E-03	2.15E-03	2.07E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.12E-03	1.13E-03	NC	NC	9.43E-03	1.52E-02	2.88E-03	NC	1.54E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.68E-03	NC	NC	2.64E-03	NC	NC	NC	NC	7.40E-03	NC	1.88E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.94E-03	5.87E-03	4.97E-03	7.50E-03	7.53E-03	1.80E-02	1.49E-02	1.52E-02	8.88E-03	5.00E-03	2.41E-02	1.12E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	9	10	9	13	13	2	2	2	0.9	0.03	0.2	0.007
	LOAEL HQ - NBSA	unitless	Calculated	0.9	1	0.9	1	1	0.2	0.2	0.2	0.09	0.02	0.1	0.004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	1	1	1	0.7	0.3	2	0.07
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.7	0.6	0.6	0.3	0.2	0.9	0.04

Table E-1-22
NBSA-wide Dietary HQ Calculations for Methylmercury

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.99E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	2.99E-03	2.99E-03	1.21E-03	1.21E-03	1.21E-03	1.97E-03	1.21E-03
	Plant EPC	mg/kg, ww	Appendix C	5.99E-04	2.41E-04	2.41E-04	2.41E-04	2.41E-04	5.99E-04	5.99E-04	2.41E-04	2.41E-04	2.41E-04	3.93E-04	2.41E-04
	Polychaete EPC	mg/kg, ww	Appendix C	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03
	Blue crab EPC	mg/kg, ww	Appendix C	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02	8.83E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	8.61E-07	3.87E-07	5.02E-08	5.07E-08	4.22E-08	1.56E-05	1.05E-08	NC	9.15E-08	9.45E-09	7.09E-08	2.14E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	7.68E-05	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.32E-04	6.60E-05	1.23E-04	1.25E-04	5.19E-05	2.98E-03	NC	NC	1.59E-04	1.81E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.42E-03	2.26E-03	2.28E-03	1.90E-03	NC	2.39E-03	NC	5.82E-03	6.64E-04	NC	1.50E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	7.36E-04	6.88E-04	6.95E-04	5.79E-04	NC	7.27E-04	NC	1.77E-03	4.05E-04	4.74E-04	4.58E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.47E-03	1.49E-03	NC	NC	1.24E-02	2.00E-02	3.79E-03	NC	2.03E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	2.01E-03	NC	NC	3.16E-03	NC	NC	NC	NC	8.84E-03	NC	2.25E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.33E-04	3.50E-03	3.04E-03	4.59E-03	5.69E-03	1.50E-03	1.55E-02	2.00E-02	5.77E-03	4.96E-03	2.58E-03	1.22E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	1	6	5	8	10	0.2	2	2	0.6	0.03	0.02	0.008
	LOAEL HQ - NBSA	unitless	Calculated	0.1	0.6	0.5	0.8	1	0.02	0.2	0.2	0.06	0.02	0.01	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.1	1	2	0.4	0.3	0.2	0.08
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.06	0.6	0.8	0.2	0.2	0.1	0.05

Table E-1-23
NBSA-wide Dietary HQ Calculations for Nickel

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.14	15	15	15	15	40	40	40
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	1.4	33	33	33	33	80	80	80
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	4.90E+01	4.88E+01	4.88E+01	4.88E+01	4.88E+01	4.90E+01	4.90E+01	4.88E+01	4.88E+01	4.88E+01	5.33E+01	4.88E+01
	Plant EPC	mg/kg, ww	Appendix C	3.98E-01	3.97E-01	3.97E-01	3.97E-01	3.97E-01	3.98E-01	3.98E-01	3.97E-01	3.97E-01	3.97E-01	4.24E-01	3.97E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01
	Blue crab EPC	mg/kg, ww	Appendix C	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01	3.40E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00	2.76E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.41E-02	1.57E-02	2.03E-03	2.05E-03	1.71E-03	2.55E-01	1.72E-04	NC	3.70E-03	3.82E-04	1.92E-03	8.65E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	8.28E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	7.45E-02	9.24E-03	1.73E-02	1.74E-02	7.26E-03	4.17E-01	NC	NC	2.23E-02	2.54E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	6.06E-03	5.67E-03	5.72E-03	4.77E-03	NC	5.99E-03	NC	1.46E-02	1.67E-03	NC	3.77E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.91E-02	4.59E-02	4.64E-02	3.86E-02	NC	4.85E-02	NC	1.18E-01	2.70E-02	3.17E-02	3.05E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	5.73E-03	5.79E-03	NC	NC	4.85E-02	7.81E-02	1.48E-02	NC	7.91E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	5.67E-03	NC	NC	8.91E-03	NC	NC	NC	NC	2.49E-02	NC	6.34E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	8.85E-02	5.75E-02	5.13E-02	7.74E-02	6.13E-02	3.36E-01	1.03E-01	7.81E-02	8.68E-02	2.83E-02	1.24E-01	4.93E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.6	0.4	0.4	0.6	0.4	0.02	0.007	0.005	0.006	0.0007	0.003	0.0001
	LOAEL HQ - NBSA	unitless	Calculated	0.06	0.04	0.04	0.06	0.04	0.01	0.003	0.002	0.003	0.0004	0.002	0.00006
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-24
NBSA-wide Dietary HQ Calculations for Selenium

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.011	0.011	0.011	0.011	0.011	0.42	0.42	0.42	0.42	0.016	0.016	0.016
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.11	0.11	0.11	0.11	0.11	0.82	0.82	0.82	0.82	0.16	0.16	0.16
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.12E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.12E+00	1.12E+00	1.32E+00	1.32E+00	1.32E+00	9.69E-01	1.32E+00
	Plant EPC	mg/kg, ww	Appendix C	1.15E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.15E-01	1.15E-01	1.39E-01	1.39E-01	1.39E-01	9.82E-02	1.39E-01
	Polychaete EPC	mg/kg, ww	Appendix C	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01
	Blue crab EPC	mg/kg, ww	Appendix C	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.21E-04	4.25E-04	5.52E-05	5.57E-05	4.64E-05	5.82E-03	3.93E-06	NC	1.01E-04	1.04E-05	3.49E-05	2.35E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.92E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.16E-02	6.40E-03	1.20E-02	1.21E-02	5.03E-03	2.89E-01	NC	NC	1.54E-02	1.76E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.98E-02	1.85E-02	1.87E-02	1.56E-02	NC	1.96E-02	NC	4.77E-02	5.44E-03	NC	1.23E-03
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.69E-02	1.58E-02	1.60E-02	1.33E-02	NC	1.67E-02	NC	4.08E-02	9.31E-03	1.09E-02	1.05E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.19E-02	1.20E-02	NC	NC	1.00E-01	1.62E-01	3.06E-02	NC	1.64E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.63E-02	NC	NC	2.56E-02	NC	NC	NC	NC	7.17E-02	NC	1.82E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.19E-02	4.01E-02	3.90E-02	5.88E-02	5.96E-02	1.47E-01	1.37E-01	1.62E-01	6.73E-02	4.41E-02	4.65E-02	1.03E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	5	4	4	5	5	0.4	0.3	0.4	0.2	3	3	0.6
	LOAEL HQ - NBSA	unitless	Calculated	0.5	0.4	0.4	0.5	0.5	0.2	0.2	0.2	0.08	0.3	0.3	0.06
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-25
NBSA-wide Dietary HQ Calculations for Silver

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	70	70	70	70	70	9.86	9.86	9.86	9.86	18.8	18.8	18.8
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	98.6	98.6	98.6	98.6	188	188	188
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	1.84E+00	2.26E+00	2.26E+00	2.26E+00	2.26E+00	1.84E+00	1.84E+00	2.26E+00	2.26E+00	2.26E+00	1.70E+00	2.26E+00
	Plant EPC	mg/kg, ww	Appendix C	5.16E-03	6.34E-03	6.34E-03	6.34E-03	6.34E-03	5.16E-03	5.16E-03	6.34E-03	6.34E-03	6.34E-03	4.77E-03	6.34E-03
	Polychaete EPC	mg/kg, ww	Appendix C	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
	Blue crab EPC	mg/kg, ww	Appendix C	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01	8.45E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01	4.40E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02	7.90E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.87E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	5.30E-04	7.26E-04	9.43E-05	9.52E-05	7.93E-05	9.61E-03	6.49E-06	NC	1.72E-04	1.77E-05	6.13E-05	4.01E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	9.31E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.35E-03	6.63E-04	1.24E-03	1.25E-03	5.21E-04	2.99E-02	NC	NC	1.60E-03	1.82E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.51E-02	1.41E-02	1.42E-02	1.18E-02	NC	1.49E-02	NC	3.63E-02	4.14E-03	NC	9.37E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	7.85E-03	7.33E-03	7.41E-03	6.17E-03	NC	7.75E-03	NC	1.89E-02	4.31E-03	5.06E-03	4.88E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.32E-03	1.33E-03	NC	NC	1.11E-02	1.79E-02	3.39E-03	NC	1.82E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	3.33E-03	NC	NC	5.24E-03	NC	NC	NC	NC	1.47E-02	NC	3.73E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.88E-03	1.85E-02	1.61E-02	2.43E-02	2.39E-02	1.98E-02	3.38E-02	1.79E-02	3.02E-02	1.17E-02	7.86E-03	2.58E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.00008	0.0003	0.0002	0.0003	0.0003	0.002	0.003	0.002	0.003	0.0006	0.0004	0.0001
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	0.0002	0.0003	0.0002	0.0003	0.00006	0.00004	0.00001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-1-26
NBSA-wide Dietary HQ Calculations for Zinc

Parameter		Units	Table Reference	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide Mudflat	NBSA-wide Mudflat	NBSA-wide	NBSA-wide	NBSA-wide	NBSA-wide All Shorelines	NBSA-wide
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	19	19	19	19	19	82	82	82	82	160	160	160
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	38	38	38	38	38	124	124	124	124	320	320	320
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, ww	Appendix C	2.07E+03	3.20E+02	3.20E+02	3.20E+02	3.20E+02	2.07E+03	2.07E+03	3.20E+02	3.20E+02	3.20E+02	1.06E+03	3.20E+02
	Plant EPC	mg/kg, ww	Appendix C	6.64E+01	2.36E+01	2.36E+01	2.36E+01	2.36E+01	6.64E+01	6.64E+01	2.36E+01	2.36E+01	2.36E+01	4.59E+01	2.36E+01
	Polychaete EPC	mg/kg, ww	Appendix C	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01
	Blue crab EPC	mg/kg, ww	Appendix C	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01	4.75E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01	3.42E+01
Doses	Dose from sediment	mg/kg bw-day	Calculated	5.95E-01	1.03E-01	1.33E-02	1.34E-02	1.12E-02	1.08E+01	7.29E-03	NC	2.43E-02	2.50E-03	3.83E-02	5.67E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	8.97E+00	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.07E+00	6.29E-01	1.18E+00	1.19E+00	4.95E-01	2.84E+01	NC	NC	1.52E+00	1.73E-01	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	7.52E-01	7.03E-01	7.10E-01	5.91E-01	NC	7.43E-01	NC	1.81E+00	2.07E-01	NC	4.68E-02
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	8.47E-01	7.91E-01	7.99E-01	6.65E-01	NC	8.36E-01	NC	2.04E+00	4.65E-01	5.46E-01	5.26E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	6.90E-01	6.97E-01	NC	NC	5.83E+00	9.40E+00	1.78E+00	NC	9.51E-01	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	6.09E-01	NC	NC	9.58E-01	NC	NC	NC	NC	2.68E+00	NC	6.82E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.67E+00	1.97E+00	2.26E+00	3.41E+00	2.72E+00	1.96E+01	7.42E+00	9.40E+00	3.59E+00	1.76E+00	1.05E+01	3.91E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.3	0.1	0.1	0.2	0.1	0.2	0.09	0.1	0.04	0.01	0.07	0.002
	LOAEL HQ - NBSA	unitless	Calculated	0.1	0.05	0.06	0.09	0.07	0.2	0.06	0.08	0.03	0.006	0.03	0.001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-1
North Zone Dietary HQ Calculations for 2,3,7,8-TCDD

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	8.02E-05	8.02E-05	2.26E-04	2.26E-04	2.26E-04	7.38E-05	2.26E-04
	Plant EPC	mg/kg, ww	Appendix C	8.98E-08	8.98E-08	2.53E-07	2.53E-07	2.53E-07	8.26E-08	2.53E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	3.48E-05	3.48E-05	3.48E-05	3.48E-05	3.48E-05	3.48E-05	3.48E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	9.19E-06	9.19E-06	9.19E-06	9.19E-06	9.19E-06	9.19E-06	9.19E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.95E-05	3.95E-05	3.95E-05	3.95E-05	3.95E-05	3.95E-05	3.95E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.33E-05	6.33E-05	6.33E-05	6.33E-05	6.33E-05	6.33E-05	6.33E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	4.18E-07	2.82E-10	NC	1.71E-08	1.77E-09	2.66E-09	4.00E-10
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	1.61E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	9.11E-06	NC	NC	4.86E-07	5.55E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	6.12E-07	NC	1.49E-06	1.70E-07	NC	3.85E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.62E-07	NC	3.95E-07	9.00E-08	1.06E-07	1.02E-08
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	5.57E-06	8.98E-06	1.70E-06	NC	9.08E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	4.96E-06	NC	1.26E-06
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	4.77E-06	6.34E-06	8.98E-06	2.04E-06	2.64E-06	1.03E-06	6.56E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.3	0.5	0.6	0.1	1	0.4	0.3
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.03	0.05	0.06	0.01	0.3	0.1	0.07
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	2	2	3	0.7	33	13	8
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.2	0.2	0.3	0.07	1	0.5	0.3

Table E-2-2
North Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.34E-04	1.34E-04	2.88E-04	2.88E-04
	Plant EPC	mg/kg, ww	Appendix C	1.51E-07	1.51E-07	3.22E-07	3.22E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.39E-05	1.39E-05	1.39E-05	1.39E-05
	Blue crab EPC	mg/kg, ww	Appendix C	5.24E-05	5.24E-05	5.24E-05	5.24E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.33E-05	1.33E-05	1.33E-05	1.33E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.89E-05	4.89E-05	4.89E-05	4.89E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	7.68E-05	7.68E-05	7.68E-05	7.68E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	7.01E-07	4.73E-10	NC	2.19E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.12E-05	NC	NC	5.97E-07
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	9.23E-07	NC	2.25E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	2.34E-07	NC	5.70E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	6.89E-06	1.11E-05	2.10E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.94E-06	8.05E-06	1.11E-05	2.77E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.4	0.6	0.8	0.2
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.04	0.06	0.08	0.02
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	2	3	4	1
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.2	0.3	0.4	0.1

Table E-2-3
North Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal

Parameter		Units	Table Reference	North Zone	North Zone All Shorelines	North Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.67E-04	1.06E-04	2.67E-04
	Plant EPC	mg/kg, ww	Appendix C	2.99E-07	1.18E-07	2.99E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.17E-05	1.17E-05	1.17E-05
	Blue crab EPC	mg/kg, ww	Appendix C	3.95E-05	3.95E-05	3.95E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.07E-05	1.07E-05	1.07E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.26E-05	4.26E-05	4.26E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.73E-05	6.73E-05	6.73E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.09E-09	3.81E-09	4.73E-10
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	2.31E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.75E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	1.94E-07	NC	4.38E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	1.04E-07	1.22E-07	1.18E-08
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	9.78E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	5.28E-06	NC	1.34E-06
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	2.82E-06	1.13E-06	7.00E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	0.4	0.3
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.3	0.1	0.08
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	35	14	9
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	1	0.5	0.3

Table E-2-4
North Zone Dietary HQ Calculations for Total PCBs

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.08	0.08	0.08
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	0.096	0.096	0.096
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.4	0.4	0.4	0.4	0.069	0.069	0.069
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.5	0.5	0.5	0.5	0.082	0.082	0.082
EPCs	Sediment EPC	mg/kg, dw	Appendix C	6.24E-01	6.24E-01	6.54E-01	6.54E-01	6.54E-01	4.47E-01	6.54E-01
	Plant EPC	mg/kg, ww	Appendix C	1.25E-03	1.25E-03	1.31E-03	1.31E-03	1.31E-03	8.94E-04	1.31E-03
	Polychaete EPC	mg/kg, ww	Appendix C	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
	Blue crab EPC	mg/kg, ww	Appendix C	4.84E-01	4.84E-01	4.84E-01	4.84E-01	4.84E-01	4.84E-01	4.84E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	9.82E-02	9.82E-02	9.82E-02	9.82E-02	9.82E-02	9.82E-02	9.82E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.25E-03	2.20E-06	NC	4.96E-05	5.13E-06	1.61E-05	1.16E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	1.75E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.99E-02	NC	NC	2.66E-03	3.04E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	8.52E-03	NC	2.08E-02	2.37E-03	NC	5.36E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.73E-03	NC	4.22E-03	9.63E-04	1.13E-03	1.09E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.71E-01	2.76E-01	5.22E-02	NC	2.79E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	1.20E-01	NC	3.05E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	2.66E-02	1.81E-01	2.76E-01	3.99E-02	6.17E-02	2.92E-02	1.56E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	1	2	0.3	0.8	0.4	0.2
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.02	0.1	0.2	0.03	0.6	0.3	0.2
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.07	0.5	0.7	0.1	0.9	0.4	0.2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.05	0.4	0.6	0.08	0.8	0.4	0.2

Table E-2-5
North Zone Dietary HQ Calculations for Total PCB TEQ Bird

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.20E-04	1.20E-04	2.01E-04	2.01E-04
	Plant EPC	mg/kg, ww	Appendix C	2.39E-07	2.39E-07	4.02E-07	4.02E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.13E-05	2.13E-05	2.13E-05	2.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	1.15E-04	1.15E-04	1.15E-04	1.15E-04
	Softshell clam EPC	mg/kg, ww	Appendix C	1.48E-05	1.48E-05	1.48E-05	1.48E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.09E-04	1.09E-04	1.09E-04	1.09E-04
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.52E-04	2.52E-04	2.52E-04	2.52E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	6.24E-07	4.22E-10	NC	1.53E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.72E-05	NC	NC	9.17E-07
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.02E-06	NC	4.93E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	2.60E-07	NC	6.35E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.53E-05	2.47E-05	4.67E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	8.90E-06	1.76E-05	2.47E-05	5.58E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.6	1	2	0.4
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.06	0.1	0.2	0.04
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	3	6	9	2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.3	0.6	0.9	0.2

Table E-2-6
North Zone Dietary HQ Calculations for Total PCB TEQ Mammal

Parameter		Units	Table Reference	North Zone	North Zone All Shorelines	North Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	9.09E-06	9.23E-06	9.09E-06
	Plant EPC	mg/kg, ww	Appendix C	1.82E-08	1.85E-08	1.82E-08
	Polychaete EPC	mg/kg, ww	Appendix C	9.57E-07	9.57E-07	9.57E-07
	Blue crab EPC	mg/kg, ww	Appendix C	1.48E-05	1.48E-05	1.48E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	8.68E-07	8.68E-07	8.68E-07
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.26E-05	1.26E-05	1.26E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.37E-05	1.37E-05	1.37E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	7.13E-11	3.33E-10	1.61E-11
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	3.61E-09	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.69E-09	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	7.27E-08	NC	1.64E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	8.51E-09	9.97E-09	9.62E-10
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	2.90E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	1.07E-06	NC	2.73E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.78E-07	3.03E-07	1.45E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.1	0.06
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.07	0.03	0.02
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	7	4	2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.3	0.1	0.07

Table E-2-7
North Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.38E-04	2.38E-04	4.52E-04	4.52E-04
	Plant EPC	mg/kg, ww	Appendix C	4.75E-07	4.75E-07	9.04E-07	9.04E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.70E-05	2.70E-05	2.70E-05	2.70E-05
	Blue crab EPC	mg/kg, ww	Appendix C	1.48E-04	1.48E-04	1.48E-04	1.48E-04
	Softshell clam EPC	mg/kg, ww	Appendix C	1.74E-05	1.74E-05	1.74E-05	1.74E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.36E-04	1.36E-04	1.36E-04	1.36E-04
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.19E-04	2.19E-04	2.19E-04	2.19E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.24E-06	8.37E-10	NC	3.43E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	2.17E-05	NC	NC	1.16E-06
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.60E-06	NC	6.35E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	3.07E-07	NC	7.49E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.91E-05	3.08E-05	5.83E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.15E-05	2.20E-05	3.08E-05	7.06E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.8	2	2	0.5
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.08	0.2	0.2	0.05
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	4	8	11	3
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.4	0.8	1	0.3

Table E-2-8
North Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal

Parameter		Units	Table Reference	North Zone	North Zone All Shorelines	North Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.75E-04	1.10E-04	2.75E-04
	Plant EPC	mg/kg, ww	Appendix C	5.50E-07	2.20E-07	5.50E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.00E-05	1.00E-05	1.00E-05
	Blue crab EPC	mg/kg, ww	Appendix C	5.37E-05	5.37E-05	5.37E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.14E-05	1.14E-05	1.14E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.25E-05	5.25E-05	5.25E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	7.73E-05	7.73E-05	7.73E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.15E-09	3.97E-09	4.87E-10
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	4.31E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.90E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	2.63E-07	NC	5.95E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	1.12E-07	1.31E-07	1.27E-08
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.21E-06	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	6.06E-06	NC	1.54E-06
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	3.24E-06	1.38E-06	8.07E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	0.5	0.3
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.4	0.2	0.09
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	41	17	10
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	1	0.6	0.4

Table E-2-9
North Zone Dietary HQ Calculations for Total DDx (2,4 & 4,4)

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.025	0.025	0.025	0.025	0.13	0.13	0.13
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.25	0.25	0.25	0.25	1.3	1.3	1.3
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.009	0.009	0.009	0.009	0.8	0.8	0.8
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.027	0.027	0.027	0.027	4	4	4
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.27E-01	1.27E-01	4.68E-02	4.68E-02	4.68E-02	1.23E-01	4.68E-02
	Plant EPC	mg/kg, ww	Appendix C	3.43E-03	3.43E-03	1.62E-03	1.62E-03	1.62E-03	3.35E-03	1.62E-03
	Polychaete EPC	mg/kg, ww	Appendix C	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03
	Blue crab EPC	mg/kg, ww	Appendix C	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	9.78E-03	9.78E-03	9.78E-03	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.70E-01	2.70E-01	2.70E-01	2.70E-01	2.70E-01	2.70E-01	2.70E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	6.62E-04	4.47E-07	NC	3.55E-06	3.67E-07	4.43E-06	8.29E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	6.55E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	3.39E-03	NC	NC	1.81E-04	2.07E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.02E-03	NC	4.92E-03	5.61E-04	NC	1.27E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.72E-04	NC	4.20E-04	9.58E-05	1.12E-04	1.08E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	3.80E-02	6.13E-02	1.16E-02	NC	6.20E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	2.05E-02	NC	5.21E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	2.03E-03	4.02E-02	6.13E-02	8.55E-03	1.06E-02	6.97E-03	2.67E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.08	2	2	0.3	0.08	0.05	0.02
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.008	0.2	0.2	0.03	0.008	0.005	0.002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.2	4	7	1	0.01	0.009	0.003
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.08	1	2	0.3	0.003	0.002	0.0007

Table E-2-10
North Zone Dietary HQ Calculations for Dieldrin

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.08	0.08	0.08	0.08	0.015	0.015	0.015
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.12	0.12	0.12	0.12	0.03	0.03	0.03
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.054	0.054	0.054	0.054	0.015	0.015	0.015
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.18	0.18	0.18	0.18	0.03	0.03	0.03
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.15E-03	1.15E-03	1.92E-03	1.92E-03	1.92E-03	1.16E-03	1.92E-03
	Plant EPC	mg/kg, ww	Appendix C	9.43E-05	9.43E-05	1.58E-04	1.58E-04	1.58E-04	9.51E-05	1.58E-04
	Polychaete EPC	mg/kg, ww	Appendix C	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03
	Blue crab EPC	mg/kg, ww	Appendix C	8.30E-03	8.30E-03	8.30E-03	8.30E-03	8.30E-03	8.30E-03	8.30E-03
	Softshell clam EPC	mg/kg, ww	Appendix C	5.60E-04	5.60E-04	5.60E-04	5.60E-04	5.60E-04	5.60E-04	5.60E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	9.71E-03	9.71E-03	9.71E-03	9.71E-03	9.71E-03	9.71E-03	9.71E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	6.00E-06	4.05E-09	NC	1.46E-07	1.51E-08	4.18E-08	3.41E-09
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	1.86E-05	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.78E-03	NC	NC	9.49E-05	1.08E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.46E-04	NC	3.57E-04	4.07E-05	NC	9.20E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	9.86E-06	NC	2.41E-05	5.49E-06	6.43E-06	6.21E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.37E-03	2.21E-03	4.17E-04	NC	2.23E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	8.43E-04	NC	2.14E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	8.92E-04	1.52E-03	2.21E-03	4.47E-04	4.50E-04	2.48E-04	1.12E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.01	0.02	0.03	0.006	0.03	0.02	0.007
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.007	0.01	0.02	0.004	0.01	0.008	0.004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.02	0.03	0.04	0.008	0.03	0.02	0.007
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.005	0.008	0.01	0.002	0.01	0.008	0.004

Table E-2-11
North Zone Dietary HQ Calculations for Total Chlordane

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2.1	2.1	2.1
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	20	20	20	20	21	21	21
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.08E-02	1.08E-02	8.37E-03	8.37E-03	8.37E-03	1.03E-02	8.37E-03
	Plant EPC	mg/kg, ww	Appendix C	2.30E-05	2.30E-05	1.78E-05	1.78E-05	1.78E-05	2.20E-05	1.78E-05
	Polychaete EPC	mg/kg, ww	Appendix C	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03
	Blue crab EPC	mg/kg, ww	Appendix C	5.54E-02	5.54E-02	5.54E-02	5.54E-02	5.54E-02	5.54E-02	5.54E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	3.46E-03	3.46E-03	3.46E-03	3.46E-03	3.46E-03	3.46E-03	3.46E-03
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	6.19E-02	6.19E-02	6.19E-02	6.19E-02	6.19E-02	6.19E-02	6.19E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	5.64E-05	3.81E-08	NC	6.35E-07	6.56E-08	3.72E-07	1.48E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	4.29E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.95E-03	NC	NC	1.04E-04	1.18E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	9.76E-04	NC	2.38E-03	2.71E-04	NC	6.14E-05
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	6.09E-05	NC	1.48E-04	3.39E-05	3.97E-05	3.83E-06
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	8.72E-03	1.41E-02	2.66E-03	NC	1.42E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	7.90E-03	NC	2.01E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.00E-03	9.76E-03	1.41E-02	2.65E-03	4.11E-03	1.47E-03	1.04E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.0005	0.005	0.007	0.001	0.002	0.0007	0.0005
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.00005	0.0005	0.0007	0.0001	0.0002	0.00007	0.00005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--

Table E-2-12
North Zone Dietary HQ Calculations for Hexachlorobenzene

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.1	1.1	1.1	1.1	0.013	0.013	0.013
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	5	5	5	5	0.13	0.13	0.13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.50E-03	1.50E-03	2.66E-03	2.66E-03	2.66E-03	1.31E-03	2.66E-03
	Plant EPC	mg/kg, ww	Appendix C	7.67E-06	7.67E-06	1.36E-05	1.36E-05	1.36E-05	6.69E-06	1.36E-05
	Polychaete EPC	mg/kg, ww	Appendix C	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04
	Blue crab EPC	mg/kg, ww	Appendix C	1.55E-03	1.55E-03	1.55E-03	1.55E-03	1.55E-03	1.55E-03	1.55E-03
	Softshell clam EPC	mg/kg, ww	Appendix C	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.62E-03	2.62E-03	2.62E-03	2.62E-03	2.62E-03	2.62E-03	2.62E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.67E-03	2.67E-03	2.67E-03	2.67E-03	2.67E-03	2.67E-03	2.67E-03
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	7.83E-06	5.29E-09	NC	2.02E-07	2.09E-08	4.72E-08	4.72E-09
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	1.31E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	3.11E-04	NC	NC	1.66E-05	1.89E-06	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.74E-05	NC	6.68E-05	7.61E-06	NC	1.72E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	4.06E-06	NC	9.91E-06	2.26E-06	2.65E-06	2.56E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	3.69E-04	5.95E-04	1.13E-04	NC	6.02E-05	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	2.09E-04	NC	5.32E-05
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.59E-04	4.00E-04	5.95E-04	1.03E-04	1.10E-04	6.42E-05	2.76E-05
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.0001	0.0004	0.0005	0.00009	0.008	0.005	0.002
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.00003	0.00008	0.0001	0.00002	0.0008	0.0005	0.0002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--

Table E-2-13
North Zone Dietary HQ Calculations for Total HMW PAH

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.048	0.048	0.048	0.048	0.62	0.62	0.62
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.48	0.48	0.48	0.48	3.1	3.1	3.1
EPCs	Sediment EPC	mg/kg, dw	Appendix C	6.56E+00	6.56E+00	1.38E+01	1.38E+01	1.38E+01	6.40E+00	1.38E+01
	Plant EPC	mg/kg, ww	Appendix C	2.16E-01	2.16E-01	4.38E-01	4.38E-01	4.38E-01	2.11E-01	4.38E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	4.12E-01	4.12E-01	4.12E-01	4.12E-01	4.12E-01	4.12E-01	4.12E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.45E-02	2.45E-02	2.45E-02	2.45E-02	2.45E-02	2.45E-02	2.45E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.42E-02	2.31E-05	NC	1.05E-03	1.08E-04	2.31E-04	2.45E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	4.13E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.61E-03	NC	3.93E-03	4.49E-04	NC	1.01E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	7.25E-03	NC	1.77E-02	4.04E-03	4.73E-03	4.57E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	3.45E-03	5.57E-03	1.05E-03	NC	5.63E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	1.76E-03	NC	4.48E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	3.80E-02	1.23E-02	5.57E-03	1.30E-02	3.30E-03	4.68E-02	5.15E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.8	0.3	0.1	0.3	0.005	0.08	0.0008
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.08	0.03	0.01	0.03	0.001	0.02	0.0002

Table E-2-14
North Zone Dietary HQ Calculations for Total LMW PAH

Parameter		Units	Table Reference	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.67	0.67	0.67	0.67	50	50	50
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.7	6.7	6.7	6.7	150	150	150
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.09E+00	1.09E+00	1.35E+00	1.35E+00	1.35E+00	7.77E-01	1.35E+00
	Plant EPC	mg/kg, ww	Appendix C	5.55E-02	5.55E-02	6.13E-02	6.13E-02	6.13E-02	4.76E-02	6.13E-02
	Polychaete EPC	mg/kg, ww	Appendix C	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
	Blue crab EPC	mg/kg, ww	Appendix C	3.25E-02	3.25E-02	3.25E-02	3.25E-02	3.25E-02	3.25E-02	3.25E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	4.07E-02	4.07E-02	4.07E-02	4.07E-02	4.07E-02	4.07E-02	4.07E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.48E-02	8.48E-02	8.48E-02	8.48E-02	8.48E-02	8.48E-02	8.48E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	5.69E-03	3.84E-06	NC	1.03E-04	1.06E-05	2.80E-05	2.40E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	9.30E-03	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.05E-02	NC	NC	5.58E-04	6.37E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.71E-04	NC	1.39E-03	1.59E-04	NC	3.60E-05
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	7.16E-04	NC	1.75E-03	3.99E-04	4.68E-04	4.51E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.19E-02	1.93E-02	3.64E-03	NC	1.95E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	1.15E-02	NC	2.92E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	8.08E-03	1.32E-02	1.93E-02	3.72E-03	6.05E-03	1.17E-02	1.50E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.01	0.02	0.03	0.006	0.0001	0.0002	0.00003
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.001	0.002	0.003	0.0006	0.00004	0.00008	0.00001

Table E-2-15
North Zone Dietary HQ Calculations for Total PAH

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.2	6.2	6.2	6.2	6.2	40	40	40	40	0.615	0.615	0.615
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	18	18	18	18	18	Not derived	Not derived	Not derived	Not derived	3.07	3.07	3.07
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	7.31E+00	1.52E+01	1.52E+01	1.52E+01	1.52E+01	7.31E+00	7.31E+00	1.52E+01	1.52E+01	1.52E+01	7.13E+00	1.52E+01
	Plant EPC	mg/kg, ww	Appendix C	1.77E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	1.77E-01	1.77E-01	3.61E-01	3.61E-01	3.61E-01	1.73E-01	3.61E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02	9.52E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01	4.49E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02	8.06E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.10E-03	4.87E-03	6.32E-04	6.38E-04	5.32E-04	3.81E-02	2.57E-05	NC	1.15E-03	1.19E-04	2.57E-04	2.69E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.37E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	7.45E-03	9.24E-04	1.73E-03	1.75E-03	7.27E-04	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.70E-03	1.59E-03	1.60E-03	1.33E-03	NC	1.68E-03	NC	4.09E-03	4.66E-04	NC	1.05E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	8.00E-03	7.48E-03	7.56E-03	6.29E-03	NC	7.90E-03	NC	1.93E-02	4.40E-03	5.16E-03	4.97E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.34E-03	1.36E-03	NC	NC	1.13E-02	1.83E-02	3.46E-03	NC	1.85E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	2.77E-03	NC	NC	4.35E-03	NC	NC	NC	NC	1.22E-02	NC	3.10E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	9.55E-03	1.22E-02	8.56E-03	1.29E-02	1.32E-02	3.99E-02	2.10E-02	1.83E-02	1.51E-02	8.71E-03	4.10E-02	1.86E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.002	0.002	0.001	0.002	0.002	0.001	0.0005	0.0005	0.0004	0.01	0.07	0.003
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.0005	0.0007	0.0005	0.0007	0.0007	--	--	--	--	0.003	0.01	0.0006
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-16
North Zone Dietary HQ Calculations for Arsenic

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.52	0.52	0.52	0.52	0.52	10	10	10	10	2.6	2.6	2.6
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.9	1.9	1.9	1.9	1.9	40	40	40	40	5.4	5.4	5.4
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.09E+01	1.58E+01	1.58E+01	1.58E+01	1.58E+01	1.09E+01	1.09E+01	1.58E+01	1.58E+01	1.58E+01	1.02E+01	1.58E+01
	Plant EPC	mg/kg, ww	Appendix C	8.20E-02	1.18E-01	1.18E-01	1.18E-01	1.18E-01	8.20E-02	8.20E-02	1.18E-01	1.18E-01	1.18E-01	7.63E-02	1.18E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00
	Blue crab EPC	mg/kg, ww	Appendix C	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00	6.57E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.14E-03	5.07E-03	6.58E-04	6.65E-04	5.53E-04	5.70E-02	3.85E-05	NC	1.20E-03	1.24E-04	3.66E-04	2.80E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.49E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	3.99E-01	4.94E-02	9.24E-02	9.34E-02	3.89E-02	2.23E+00	NC	NC	1.19E-01	1.36E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	3.92E-02	3.66E-02	3.70E-02	3.08E-02	NC	3.87E-02	NC	9.44E-02	1.08E-02	NC	2.44E-03
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.17E-01	1.10E-01	1.11E-01	9.21E-02	NC	1.16E-01	NC	2.82E-01	6.44E-02	7.55E-02	7.29E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	2.09E-02	2.11E-02	NC	NC	1.76E-01	2.84E-01	5.37E-02	NC	2.87E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.85E-02	NC	NC	2.90E-02	NC	NC	NC	NC	8.11E-02	NC	2.06E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	4.02E-01	1.54E-01	1.74E-01	2.63E-01	1.91E-01	1.14E+00	3.31E-01	2.84E-01	2.75E-01	8.50E-02	1.20E-01	1.52E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.8	0.3	0.3	0.5	0.4	0.1	0.03	0.03	0.03	0.03	0.05	0.006
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.08	0.09	0.1	0.1	0.03	0.008	0.007	0.007	0.02	0.02	0.003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-17
North Zone Dietary HQ Calculations for Cadmium

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.001	0.001	0.001	0.001	0.001	0.4	0.4	0.4	0.4	3.5	3.5	3.5
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.01	0.01	0.01	0.01	0.01	4	4	4	4	13	13	13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.26E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.26E+00	1.26E+00	1.47E+00	1.47E+00	1.47E+00	1.11E+00	1.47E+00
	Plant EPC	mg/kg, ww	Appendix C	1.41E-01	1.54E-01	1.54E-01	1.54E-01	1.54E-01	1.41E-01	1.41E-01	1.54E-01	1.54E-01	1.54E-01	1.31E-01	1.54E-01
	Polychaete EPC	mg/kg, ww	Appendix C	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02
	Blue crab EPC	mg/kg, ww	Appendix C	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.63E-04	4.72E-04	6.13E-05	6.19E-05	5.15E-05	6.59E-03	4.45E-06	NC	1.12E-04	1.15E-05	3.99E-05	2.61E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.57E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.33E-02	1.65E-03	3.08E-03	3.11E-03	1.29E-03	7.43E-02	NC	NC	3.97E-03	4.52E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	6.01E-03	5.62E-03	5.67E-03	4.72E-03	NC	5.93E-03	NC	1.45E-02	1.65E-03	NC	3.74E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	4.03E-03	3.77E-03	3.80E-03	3.17E-03	NC	3.98E-03	NC	9.71E-03	2.21E-03	2.60E-03	2.51E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.67E-03	1.68E-03	NC	NC	1.41E-02	2.27E-02	4.30E-03	NC	2.30E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.78E-03	NC	NC	2.80E-03	NC	NC	NC	NC	7.84E-03	NC	2.00E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.36E-02	9.34E-03	9.51E-03	1.43E-02	1.20E-02	4.04E-02	2.40E-02	2.27E-02	1.63E-02	6.09E-03	3.06E-02	1.31E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	14	9	10	14	12	0.1	0.06	0.06	0.04	0.002	0.009	0.0004
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	0.9	1	1	1	0.01	0.006	0.006	0.004	0.0005	0.002	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-18
North Zone Dietary HQ Calculations for Chromium

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.92	0.92	0.92	0.92	0.92	10.5	10.5	10.5	10.5	0.962	0.962	0.962
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	105	105	105	105	9.62	9.62	9.62
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	8.74E+01	1.37E+02	1.37E+02	1.37E+02	1.37E+02	8.74E+01	8.74E+01	1.37E+02	1.37E+02	1.37E+02	9.33E+01	1.37E+02
	Plant EPC	mg/kg, ww	Appendix C	7.16E-01	1.13E+00	1.13E+00	1.13E+00	1.13E+00	7.16E-01	7.16E-01	1.13E+00	1.13E+00	1.13E+00	7.65E-01	1.13E+00
	Polychaete EPC	mg/kg, ww	Appendix C	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01
	Blue crab EPC	mg/kg, ww	Appendix C	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01	3.81E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00	4.42E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01	6.22E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.51E-02	4.41E-02	5.72E-03	5.78E-03	4.81E-03	4.56E-01	3.08E-04	NC	1.04E-02	1.08E-03	3.36E-03	2.43E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.49E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	9.06E-02	1.12E-02	2.10E-02	2.12E-02	8.83E-03	5.07E-01	NC	NC	2.71E-02	3.09E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	6.79E-03	6.35E-03	6.41E-03	5.34E-03	NC	6.71E-03	NC	1.64E-02	1.87E-03	NC	4.22E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	7.88E-02	7.37E-02	7.44E-02	6.20E-02	NC	7.79E-02	NC	1.90E-01	4.33E-02	5.08E-02	4.90E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.05E-02	1.06E-02	NC	NC	8.83E-02	1.42E-01	2.69E-02	NC	1.44E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.11E-02	NC	NC	1.74E-02	NC	NC	NC	NC	4.88E-02	NC	1.24E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.16E-01	1.02E-01	7.85E-02	1.18E-01	9.84E-02	4.81E-01	1.73E-01	1.42E-01	1.35E-01	4.91E-02	2.18E-01	8.99E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	0.1	0.09	0.1	0.1	0.05	0.02	0.01	0.01	0.05	0.2	0.009
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	0.005	0.002	0.001	0.001	0.005	0.02	0.0009
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-19
North Zone Dietary HQ Calculations for Copper

Parameter		Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1	1	1	1	1	1.9	1.9	1.9	1.9	18	18	18
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2	19	19	19	19	26	26	26
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	2.3	2.3	2.3	2.3	3.4	3.4	3.4
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	4.7	4.7	4.7	4.7	6.8	6.8	6.8
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.15E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.15E+02	1.15E+02	1.10E+02	1.10E+02	1.10E+02	1.05E+02	1.10E+02
	Plant EPC	mg/kg, ww	Appendix C	2.53E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.53E+00	2.53E+00	2.48E+00	2.48E+00	2.48E+00	2.44E+00	2.48E+00
	Polychaete EPC	mg/kg, ww	Appendix C	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00
	Blue crab EPC	mg/kg, ww	Appendix C	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01	3.34E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00	5.36E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00	9.15E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.31E-02	3.53E-02	4.58E-03	4.63E-03	3.85E-03	6.00E-01	4.05E-04	NC	8.34E-03	8.62E-04	3.77E-03	1.95E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	4.76E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	3.12E-01	3.86E-02	7.22E-02	7.30E-02	3.04E-02	1.74E+00	NC	NC	9.31E-02	1.06E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.95E-01	5.56E-01	5.62E-01	4.68E-01	NC	5.88E-01	NC	1.43E+00	1.64E-01	NC	3.70E-02
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.74E-01	1.63E-01	1.64E-01	1.37E-01	NC	1.72E-01	NC	4.19E-01	9.56E-02	1.12E-01	1.08E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	8.93E-02	9.02E-02	NC	NC	7.54E-01	1.22E+00	2.30E-01	NC	1.23E-01	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.63E-01	NC	NC	2.57E-01	NC	NC	NC	NC	7.18E-01	NC	1.83E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	3.45E-01	6.74E-01	5.93E-01	8.94E-01	8.95E-01	1.17E+00	1.51E+00	1.22E+00	1.09E+00	4.94E-01	7.15E-01	1.15E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.3	0.7	0.6	0.9	0.9	0.6	0.8	0.6	0.6	0.03	0.04	0.006
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.3	0.3	0.4	0.4	0.06	0.08	0.06	0.06	0.02	0.03	0.004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.5	0.7	0.5	0.5	0.1	0.2	0.03
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.2	0.3	0.3	0.2	0.07	0.1	0.02

Table E-2-20
North Zone Dietary HQ Calculations for Lead

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	12.6	12.6	12.6	12.6	12.6	5.5	5.5	5.5	5.5	11	11	11
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	28	28	28	28	90	90	90
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.19	0.19	0.19	0.19	0.71	0.71	0.71
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	1.9	1.9	1.9	1.9	7	7	7
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.36E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.36E+02	1.36E+02	1.37E+02	1.37E+02	1.37E+02	1.20E+02	1.37E+02
	Plant EPC	mg/kg, ww	Appendix C	8.35E-01	8.38E-01	8.38E-01	8.38E-01	8.38E-01	8.35E-01	8.35E-01	8.38E-01	8.38E-01	8.38E-01	7.78E-01	8.38E-01
	Polychaete EPC	mg/kg, ww	Appendix C	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01
	Blue crab EPC	mg/kg, ww	Appendix C	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01	2.09E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01	6.59E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.92E-02	4.40E-02	5.72E-03	5.77E-03	4.81E-03	7.11E-01	4.80E-04	NC	1.04E-02	1.08E-03	4.32E-03	2.43E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.52E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	9.69E-02	1.20E-02	2.25E-02	2.27E-02	9.45E-03	5.43E-01	NC	NC	2.90E-02	3.30E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.43E-02	1.33E-02	1.35E-02	1.12E-02	NC	1.41E-02	NC	3.44E-02	3.92E-03	NC	8.87E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	3.72E-01	3.48E-01	3.51E-01	2.93E-01	NC	3.67E-01	NC	8.97E-01	2.05E-01	2.40E-01	2.31E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.35E-02	1.36E-02	NC	NC	1.14E-01	1.83E-01	3.47E-02	NC	1.85E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.18E-02	NC	NC	1.85E-02	NC	NC	NC	NC	5.17E-02	NC	1.31E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.36E-01	3.04E-01	2.70E-01	4.07E-01	3.36E-01	6.27E-01	4.96E-01	1.83E-01	5.02E-01	1.32E-01	4.15E-01	1.87E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.01	0.02	0.02	0.03	0.03	0.1	0.09	0.03	0.09	0.01	0.04	0.002
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	0.02	0.02	0.007	0.02	0.001	0.005	0.0002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	3	3	1	3	0.2	0.6	0.03
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.3	0.3	0.1	0.3	0.02	0.06	0.003

Table E-2-21
North Zone Dietary HQ Calculations for Mercury

Parameter		Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.82E+00	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.82E+00	1.82E+00	1.87E+00	1.87E+00	1.87E+00	1.82E+00	1.87E+00
	Plant EPC	mg/kg, ww	Appendix C	1.02E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.02E-01	1.02E-01	1.04E-01	1.04E-01	1.04E-01	1.02E-01	1.04E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02
	Blue crab EPC	mg/kg, ww	Appendix C	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02	6.88E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	5.24E-04	6.01E-04	7.81E-05	7.88E-05	6.56E-05	9.51E-03	6.42E-06	NC	1.42E-04	1.47E-05	6.54E-05	3.32E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.00E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.28E-03	5.31E-04	9.93E-04	1.00E-03	4.17E-04	2.40E-02	NC	NC	1.28E-03	1.46E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.71E-03	2.53E-03	2.56E-03	2.13E-03	NC	2.67E-03	NC	6.52E-03	7.44E-04	NC	1.68E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	4.27E-03	3.99E-03	4.03E-03	3.35E-03	NC	4.21E-03	NC	1.03E-02	2.34E-03	2.75E-03	2.65E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.15E-03	1.16E-03	NC	NC	9.69E-03	1.56E-02	2.96E-03	NC	1.58E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.77E-03	NC	NC	2.79E-03	NC	NC	NC	NC	7.80E-03	NC	1.99E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	4.81E-03	6.62E-03	5.85E-03	8.82E-03	8.75E-03	1.67E-02	1.66E-02	1.56E-02	1.06E-02	5.53E-03	2.44E-02	1.21E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	9	12	10	16	16	2	2	2	1	0.03	0.2	0.008
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.9	1	1	2	2	0.2	0.2	0.2	0.1	0.02	0.1	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	1	1	1	0.8	0.3	2	0.08
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.6	0.6	0.6	0.4	0.2	0.9	0.04

Table E-2-22
North Zone Dietary HQ Calculations for Methylmercury

Parameter		Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.27E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	2.27E-03	2.27E-03	1.05E-03	1.05E-03	1.05E-03	2.24E-03	1.05E-03
	Plant EPC	mg/kg, ww	Appendix C	4.54E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	4.54E-04	4.54E-04	2.11E-04	2.11E-04	2.11E-04	4.49E-04	2.11E-04
	Polychaete EPC	mg/kg, ww	Appendix C	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03
	Blue crab EPC	mg/kg, ww	Appendix C	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02	4.55E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	6.53E-07	3.38E-07	4.39E-08	4.44E-08	3.69E-08	1.18E-05	7.99E-09	NC	8.00E-08	8.26E-09	8.08E-08	1.87E-09
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	8.76E-05	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.32E-04	6.60E-05	1.23E-04	1.25E-04	5.19E-05	2.98E-03	NC	NC	1.59E-04	1.81E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.67E-03	2.49E-03	2.52E-03	2.10E-03	NC	2.63E-03	NC	6.43E-03	7.33E-04	NC	1.66E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	8.11E-04	7.58E-04	7.66E-04	6.38E-04	NC	8.01E-04	NC	1.95E-03	4.46E-04	5.23E-04	5.04E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.77E-03	1.79E-03	NC	NC	1.50E-02	2.41E-02	4.57E-03	NC	2.44E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	2.45E-03	NC	NC	3.85E-03	NC	NC	NC	NC	1.08E-02	NC	2.74E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.33E-04	4.02E-03	3.45E-03	5.20E-03	6.64E-03	1.50E-03	1.84E-02	2.41E-02	6.55E-03	5.98E-03	3.05E-03	1.48E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	7	6	9	12	0.2	2	3	0.7	0.04	0.02	0.009
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	0.7	0.6	0.9	1	0.02	0.2	0.3	0.07	0.02	0.01	0.006
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.1	1	2	0.5	0.4	0.2	0.09
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.06	0.7	0.9	0.3	0.2	0.1	0.05

Table E-2-23
North Zone Dietary HQ Calculations for Nickel

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.14	15	15	15	15	40	40	40
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	1.4	33	33	33	33	80	80	80
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	3.56E+01	3.61E+01	3.61E+01	3.61E+01	3.61E+01	3.56E+01	3.56E+01	3.61E+01	3.61E+01	3.61E+01	3.37E+01	3.61E+01
	Plant EPC	mg/kg, ww	Appendix C	3.14E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.14E-01	3.14E-01	3.17E-01	3.17E-01	3.17E-01	3.01E-01	3.17E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01
	Blue crab EPC	mg/kg, ww	Appendix C	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00	3.06E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01	4.25E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.02E-02	1.16E-02	1.50E-03	1.52E-03	1.27E-03	1.86E-01	1.26E-04	NC	2.74E-03	2.83E-04	1.22E-03	6.40E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.88E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	7.45E-02	9.24E-03	1.73E-02	1.74E-02	7.26E-03	4.17E-01	NC	NC	2.23E-02	2.54E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	8.97E-03	8.38E-03	8.47E-03	7.05E-03	NC	8.86E-03	NC	2.16E-02	2.46E-03	NC	5.58E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	5.45E-02	5.10E-02	5.15E-02	4.29E-02	NC	5.39E-02	NC	1.31E-01	3.00E-02	3.52E-02	3.39E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	7.08E-03	7.15E-03	NC	NC	5.99E-02	9.65E-02	1.83E-02	NC	9.77E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	5.92E-03	NC	NC	9.31E-03	NC	NC	NC	NC	2.60E-02	NC	6.62E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	8.47E-02	6.05E-02	5.71E-02	8.61E-02	6.78E-02	3.01E-01	1.23E-01	9.65E-02	9.81E-02	3.06E-02	1.05E-01	5.32E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.6	0.4	0.4	0.6	0.5	0.02	0.008	0.006	0.007	0.0008	0.003	0.0001
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.06	0.04	0.04	0.06	0.05	0.009	0.004	0.003	0.003	0.0004	0.001	0.00007
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-24
North Zone Dietary HQ Calculations for Selenium

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.011	0.011	0.011	0.011	0.011	0.42	0.42	0.42	0.42	0.016	0.016	0.016
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.11	0.11	0.11	0.11	0.11	0.82	0.82	0.82	0.82	0.16	0.16	0.16
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	6.67E-01	7.17E-01	7.17E-01	7.17E-01	7.17E-01	6.67E-01	6.67E-01	7.17E-01	7.17E-01	7.17E-01	6.88E-01	7.17E-01
	Plant EPC	mg/kg, ww	Appendix C	6.50E-02	7.04E-02	7.04E-02	7.04E-02	7.04E-02	6.50E-02	6.50E-02	7.04E-02	7.04E-02	7.04E-02	6.73E-02	7.04E-02
	Polychaete EPC	mg/kg, ww	Appendix C	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01
	Blue crab EPC	mg/kg, ww	Appendix C	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01	7.58E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01	8.82E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.92E-04	2.30E-04	2.99E-05	3.02E-05	2.51E-05	3.48E-03	2.35E-06	NC	5.44E-05	5.62E-06	2.48E-05	1.27E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.31E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.16E-02	6.40E-03	1.20E-02	1.21E-02	5.03E-03	2.89E-01	NC	NC	1.54E-02	1.76E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.88E-02	1.76E-02	1.78E-02	1.48E-02	NC	1.86E-02	NC	4.53E-02	5.17E-03	NC	1.17E-03
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.85E-02	1.73E-02	1.75E-02	1.46E-02	NC	1.83E-02	NC	4.47E-02	1.02E-02	1.20E-02	1.15E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.26E-02	1.28E-02	NC	NC	1.07E-01	1.72E-01	3.26E-02	NC	1.74E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.57E-02	NC	NC	2.47E-02	NC	NC	NC	NC	6.92E-02	NC	1.76E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.18E-02	4.00E-02	3.99E-02	6.01E-02	5.91E-02	1.46E-01	1.44E-01	1.72E-01	6.90E-02	4.31E-02	4.25E-02	9.96E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	5	4	4	5	5	0.3	0.3	0.4	0.2	3	3	0.6
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.5	0.4	0.4	0.5	0.5	0.2	0.2	0.2	0.08	0.3	0.3	0.06
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-25
North Zone Dietary HQ Calculations for Silver

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	70	70	70	70	70	9.86	9.86	9.86	9.86	18.8	18.8	18.8
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	98.6	98.6	98.6	98.6	188	188	188
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.47E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.47E+00	1.47E+00	1.59E+00	1.59E+00	1.59E+00	1.45E+00	1.59E+00
	Plant EPC	mg/kg, ww	Appendix C	4.12E-03	4.46E-03	4.46E-03	4.46E-03	4.46E-03	4.12E-03	4.12E-03	4.46E-03	4.46E-03	4.46E-03	4.06E-03	4.46E-03
	Polychaete EPC	mg/kg, ww	Appendix C	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
	Blue crab EPC	mg/kg, ww	Appendix C	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01	9.80E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01	4.53E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	4.23E-04	5.11E-04	6.64E-05	6.70E-05	5.58E-05	7.67E-03	5.18E-06	NC	1.21E-04	1.25E-05	5.23E-05	2.83E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	7.94E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.35E-03	6.63E-04	1.24E-03	1.25E-03	5.21E-04	2.99E-02	NC	NC	1.60E-03	1.82E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.75E-02	1.63E-02	1.65E-02	1.37E-02	NC	1.73E-02	NC	4.21E-02	4.80E-03	NC	1.09E-03
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	8.08E-03	7.55E-03	7.63E-03	6.35E-03	NC	7.98E-03	NC	1.95E-02	4.44E-03	5.21E-03	5.02E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.92E-03	1.94E-03	NC	NC	1.62E-02	2.61E-02	4.94E-03	NC	2.64E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	3.07E-03	NC	NC	4.82E-03	NC	NC	NC	NC	1.35E-02	NC	3.43E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.77E-03	2.00E-02	1.82E-02	2.74E-02	2.55E-02	1.88E-02	4.14E-02	2.61E-02	3.41E-02	1.15E-02	8.69E-03	2.51E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.00008	0.0003	0.0003	0.0004	0.0004	0.002	0.004	0.003	0.003	0.0006	0.0005	0.0001
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	0.0002	0.0004	0.0003	0.0003	0.00006	0.00005	0.00001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-2-26
North Zone Dietary HQ Calculations for Zinc

	Parameter	Units	Table Reference	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone	North Zone Mudflat	North Zone Mudflat	North Zone	North Zone	North Zone	North Zone All Shorelines	North Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	19	19	19	19	19	82	82	82	82	160	160	160
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	38	38	38	38	38	124	124	124	124	320	320	320
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.38E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.38E+02	2.38E+02	2.30E+02	2.30E+02	2.30E+02	2.25E+02	2.30E+02
	Plant EPC	mg/kg, ww	Appendix C	2.00E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	2.00E+01	2.00E+01	1.96E+01	1.96E+01	1.96E+01	1.94E+01	1.96E+01
	Polychaete EPC	mg/kg, ww	Appendix C	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01
	Blue crab EPC	mg/kg, ww	Appendix C	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01	4.62E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01	3.06E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01	4.37E+01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	6.83E-02	7.37E-02	9.56E-03	9.66E-03	8.04E-03	1.24E+00	8.37E-04	NC	1.74E-02	1.80E-03	8.09E-03	4.07E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.79E+00	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.07E+00	6.29E-01	1.18E+00	1.19E+00	4.95E-01	2.84E+01	NC	NC	1.52E+00	1.73E-01	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	8.23E-01	7.70E-01	7.77E-01	6.47E-01	NC	8.13E-01	NC	1.98E+00	2.26E-01	NC	5.12E-02
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	5.46E-01	5.10E-01	5.15E-01	4.29E-01	NC	5.39E-01	NC	1.32E+00	3.00E-01	3.52E-01	3.39E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	7.29E-01	7.36E-01	NC	NC	6.16E+00	9.93E+00	1.88E+00	NC	1.00E+00	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	6.78E-01	NC	NC	1.07E+00	NC	NC	NC	NC	2.98E+00	NC	7.58E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.14E+00	1.84E+00	2.14E+00	3.23E+00	2.64E+00	1.48E+01	7.51E+00	9.93E+00	3.36E+00	1.84E+00	5.15E+00	4.22E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.3	0.1	0.1	0.2	0.1	0.2	0.09	0.1	0.04	0.01	0.03	0.003
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	0.05	0.06	0.08	0.07	0.1	0.06	0.08	0.03	0.006	0.02	0.001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-1
Southeast Zone Dietary HQ Calculations for 2,3,7,8-TCDD

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	9.07E-05	9.07E-05	8.44E-05	8.44E-05	8.44E-05	1.03E-04	8.44E-05
	Plant EPC	mg/kg, ww	Appendix C	1.02E-07	1.02E-07	9.45E-08	9.45E-08	9.45E-08	1.16E-07	9.45E-08
	Polychaete EPC	mg/kg, ww	Appendix C	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	2.55E-05	2.55E-05	2.55E-05	2.55E-05	2.55E-05	2.55E-05	2.55E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	9.59E-06	9.59E-06	9.59E-06	9.59E-06	9.59E-06	9.59E-06	9.59E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.26E-05	2.26E-05	2.26E-05	2.26E-05	2.26E-05	2.26E-05	2.26E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.61E-05	3.61E-05	3.61E-05	3.61E-05	3.61E-05	3.61E-05	3.61E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	4.73E-07	3.19E-10	NC	6.41E-09	6.62E-10	3.72E-09	1.50E-10
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	2.26E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	9.11E-06	NC	NC	4.86E-07	5.55E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	4.50E-07	NC	1.10E-06	1.25E-07	NC	2.83E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.69E-07	NC	4.12E-07	9.40E-08	1.10E-07	1.06E-08
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	3.18E-06	5.12E-06	9.69E-07	NC	5.18E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	2.83E-06	NC	7.19E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.79E-06	3.80E-06	5.12E-06	1.49E-06	1.55E-06	6.55E-07	3.79E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.3	0.3	0.4	0.1	0.6	0.3	0.1
	LOAEL HQ - NBSA	unitless	Calculated	0.03	0.03	0.04	0.01	0.2	0.07	0.04
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	2	1	2	0.5	19	8	5
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.1	0.2	0.05	0.7	0.3	0.2

Table E-3-2
Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.28E-04	1.28E-04	1.06E-04	1.06E-04
	Plant EPC	mg/kg, ww	Appendix C	1.43E-07	1.43E-07	1.19E-07	1.19E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.39E-05	1.39E-05	1.39E-05	1.39E-05
	Blue crab EPC	mg/kg, ww	Appendix C	4.07E-05	4.07E-05	4.07E-05	4.07E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.29E-05	1.29E-05	1.29E-05	1.29E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.85E-05	2.85E-05	2.85E-05	2.85E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.88E-05	4.88E-05	4.88E-05	4.88E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	6.68E-07	4.51E-10	NC	8.05E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.12E-05	NC	NC	5.97E-07
	Dose from blue crab	mg/kg bw-day	Calculated	NC	7.17E-07	NC	1.75E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.27E-07	NC	5.54E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	4.01E-06	6.46E-06	1.22E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.92E-06	4.95E-06	6.46E-06	2.06E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.4	0.4	0.5	0.1
	LOAEL HQ - NBSA	unitless	Calculated	0.04	0.04	0.05	0.01
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	2	2	2	0.7
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.2	0.2	0.07

Table E-3-3
Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal

Parameter		Units	Table Reference	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	8.94E-05	1.24E-04	8.94E-05
	Plant EPC	mg/kg, ww	Appendix C	1.00E-07	1.39E-07	1.00E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.17E-05	1.17E-05	1.17E-05
	Blue crab EPC	mg/kg, ww	Appendix C	2.91E-05	2.91E-05	2.91E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.05E-05	1.05E-05	1.05E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.51E-05	2.51E-05	2.51E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.02E-05	4.02E-05	4.02E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	7.01E-10	4.46E-09	1.59E-10
	Dose from plants	mg/kg bw-day	Calculated	NC	2.71E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.75E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	1.43E-07	NC	3.23E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	1.03E-07	1.21E-07	1.16E-08
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	5.78E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	3.15E-06	NC	8.02E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.73E-06	7.30E-07	4.23E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.7	0.3	0.2
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.08	0.05
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	22	9	5
	LOAEL HQ - FFS	unitless	Calculated	0.8	0.3	0.2

Table E-3-4
Southeast Zone Dietary HQ Calculations for Total PCBs

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.08	0.08	0.08
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	0.096	0.096	0.096
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.4	0.4	0.4	0.4	0.069	0.069	0.069
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.5	0.5	0.5	0.5	0.082	0.082	0.082
EPCs	Sediment EPC	mg/kg, dw	Appendix C	9.68E-01	9.68E-01	4.23E-01	4.23E-01	4.23E-01	7.25E-01	4.23E-01
	Plant EPC	mg/kg, ww	Appendix C	1.94E-03	1.94E-03	8.46E-04	8.46E-04	8.46E-04	1.45E-03	8.46E-04
	Polychaete EPC	mg/kg, ww	Appendix C	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
	Blue crab EPC	mg/kg, ww	Appendix C	3.47E-01	3.47E-01	3.47E-01	3.47E-01	3.47E-01	3.47E-01	3.47E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	8.50E-02	8.50E-02	8.50E-02	8.50E-02	8.50E-02	8.50E-02	8.50E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.98E-01	7.98E-01	7.98E-01	7.98E-01	7.98E-01	7.98E-01	7.98E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	5.05E-03	3.41E-06	NC	3.21E-05	3.32E-06	2.61E-05	7.50E-07
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	2.83E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.99E-02	NC	NC	2.66E-03	3.04E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	6.10E-03	NC	1.49E-02	1.70E-03	NC	3.84E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.50E-03	NC	3.65E-03	8.33E-04	9.77E-04	9.42E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.12E-01	1.81E-01	3.43E-02	NC	1.83E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	7.03E-02	NC	1.79E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	2.75E-02	1.20E-01	1.81E-01	2.78E-02	3.66E-02	1.96E-02	9.18E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.2	0.9	1	0.2	0.5	0.2	0.1
	LOAEL HQ - NBSA	unitless	Calculated	0.02	0.09	0.1	0.02	0.4	0.2	0.1
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.07	0.3	0.5	0.07	0.5	0.3	0.1
	LOAEL HQ - FFS	unitless	Calculated	0.05	0.2	0.4	0.06	0.4	0.2	0.1

Table E-3-5
Southeast Zone Dietary HQ Calculations for Total PCB TEQ Bird

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.82E-04	2.82E-04	2.43E-04	2.43E-04
	Plant EPC	mg/kg, ww	Appendix C	5.64E-07	5.64E-07	4.85E-07	4.85E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.13E-05	2.13E-05	2.13E-05	2.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	9.14E-05	9.14E-05	9.14E-05	9.14E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	2.58E-06	2.58E-06	2.58E-06	2.58E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.50E-05	8.50E-05	8.50E-05	8.50E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.14E-04	1.14E-04	1.14E-04	1.14E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.47E-06	9.93E-10	NC	1.84E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.72E-05	NC	NC	9.17E-07
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.61E-06	NC	3.92E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.54E-08	NC	1.11E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.20E-05	1.93E-05	3.65E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	9.32E-06	1.36E-05	1.93E-05	4.31E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.7	1	1	0.3
	LOAEL HQ - NBSA	unitless	Calculated	0.07	0.1	0.1	0.03
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	3	5	7	2
	LOAEL HQ - FFS	unitless	Calculated	0.3	0.5	0.7	0.2

Table E-3-6
Southeast Zone Dietary HQ Calculations for Total PCB TEQ Mammal

Parameter		Units	Table Reference	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.23E-05	1.37E-05	1.23E-05
	Plant EPC	mg/kg, ww	Appendix C	2.46E-08	2.73E-08	2.46E-08
	Polychaete EPC	mg/kg, ww	Appendix C	9.57E-07	9.57E-07	9.57E-07
	Blue crab EPC	mg/kg, ww	Appendix C	9.84E-06	9.84E-06	9.84E-06
	Softshell clam EPC	mg/kg, ww	Appendix C	1.34E-06	1.34E-06	1.34E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.03E-05	1.03E-05	1.03E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	8.73E-06	8.73E-06	8.73E-06
Doses	Dose from sediment	mg/kg bw-day	Calculated	9.63E-11	4.92E-10	2.18E-11
	Dose from plants	mg/kg bw-day	Calculated	NC	5.33E-09	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.69E-09	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	4.82E-08	NC	1.09E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	1.31E-08	1.54E-08	1.49E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	2.37E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	6.84E-07	NC	1.74E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	3.75E-07	2.58E-07	9.33E-08
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.1	0.1	0.04
	LOAEL HQ - NBSA	unitless	Calculated	0.04	0.03	0.01
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	5	3	1
	LOAEL HQ - FFS	unitless	Calculated	0.2	0.1	0.04

Table E-3-7
Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	4.10E-04	4.10E-04	2.55E-04	2.55E-04
	Plant EPC	mg/kg, ww	Appendix C	8.20E-07	8.20E-07	5.10E-07	5.10E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.70E-05	2.70E-05	2.70E-05	2.70E-05
	Blue crab EPC	mg/kg, ww	Appendix C	1.25E-04	1.25E-04	1.25E-04	1.25E-04
	Softshell clam EPC	mg/kg, ww	Appendix C	1.55E-05	1.55E-05	1.55E-05	1.55E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.23E-04	1.23E-04	1.23E-04	1.23E-04
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.73E-04	1.73E-04	1.73E-04	1.73E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated	2.14E-06	1.44E-09	NC	1.94E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	2.17E-05	NC	NC	1.16E-06
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.21E-06	NC	5.39E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.73E-07	NC	6.66E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.74E-05	2.80E-05	5.30E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.19E-05	1.99E-05	2.80E-05	6.26E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.9	1	2	0.4
	LOAEL HQ - NBSA	unitless	Calculated	0.09	0.1	0.2	0.04
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	4	7	10	2
	LOAEL HQ - FFS	unitless	Calculated	0.4	0.7	1	0.2

Table E-3-8
Southeast Zone Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal

Parameter		Units	Table Reference	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	9.66E-05	1.09E-04	9.66E-05
	Plant EPC	mg/kg, ww	Appendix C	1.93E-07	2.18E-07	1.93E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.00E-05	1.00E-05	1.00E-05
	Blue crab EPC	mg/kg, ww	Appendix C	3.86E-05	3.86E-05	3.86E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.19E-05	1.19E-05	1.19E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.87E-05	2.87E-05	2.87E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.51E-05	4.51E-05	4.51E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated	7.57E-10	3.94E-09	1.71E-10
	Dose from plants	mg/kg bw-day	Calculated	NC	4.27E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.90E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	1.89E-07	NC	4.28E-08
	Dose from softshell clam	mg/kg bw-day	Calculated	1.17E-07	1.37E-07	1.32E-08
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	6.60E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	3.54E-06	NC	9.01E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.95E-06	8.44E-07	4.78E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.7	0.3	0.2
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.1	0.05
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	24	11	6
	LOAEL HQ - FFS	unitless	Calculated	0.9	0.4	0.2

Table E-3-9
Southeast Zone Dietary HQ Calculations for Total DDx (2,4 & 4,4)

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.025	0.025	0.025	0.025	0.13	0.13	0.13
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.25	0.25	0.25	0.25	1.3	1.3	1.3
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.009	0.009	0.009	0.009	0.8	0.8	0.8
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.027	0.027	0.027	0.027	4	4	4
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.50E-01	1.50E-01	9.08E-02	9.08E-02	9.08E-02	1.87E-01	9.08E-02
	Plant EPC	mg/kg, ww	Appendix C	3.89E-03	3.89E-03	2.67E-03	2.67E-03	2.67E-03	4.59E-03	2.67E-03
	Polychaete EPC	mg/kg, ww	Appendix C	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03
	Blue crab EPC	mg/kg, ww	Appendix C	9.71E-02	9.71E-02	9.71E-02	9.71E-02	9.71E-02	9.71E-02	9.71E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	1.20E-02	1.20E-02	1.20E-02	1.20E-02	1.20E-02	1.20E-02	1.20E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.75E-01	1.75E-01	1.75E-01	1.75E-01	1.75E-01	1.75E-01	1.75E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.24E-01	2.24E-01	2.24E-01	2.24E-01	2.24E-01	2.24E-01	2.24E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	7.82E-04	5.28E-07	NC	6.90E-06	7.12E-07	6.72E-06	1.61E-07
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	8.96E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.39E-03	NC	NC	1.81E-04	2.07E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.71E-03	NC	4.17E-03	4.76E-04	NC	1.08E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.11E-04	NC	5.16E-04	1.18E-04	1.38E-04	1.33E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	2.46E-02	3.97E-02	7.50E-03	NC	4.01E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	1.76E-02	NC	4.47E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	2.09E-03	2.65E-02	3.97E-02	6.19E-03	9.09E-03	5.05E-03	2.30E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.08	1	2	0.2	0.07	0.04	0.02
	LOAEL HQ - NBSA	unitless	Calculated	0.008	0.1	0.2	0.02	0.007	0.004	0.002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.2	3	4	0.7	0.01	0.006	0.003
	LOAEL HQ - FFS	unitless	Calculated	0.08	1	1	0.2	0.002	0.001	0.0006

Table E-3-10
Southeast Zone Dietary HQ Calculations for Dieldrin

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.08	0.08	0.08	0.08	0.015	0.015	0.015
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.12	0.12	0.12	0.12	0.03	0.03	0.03
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.054	0.054	0.054	0.054	0.015	0.015	0.015
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.18	0.18	0.18	0.18	0.03	0.03	0.03
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.54E-02	1.54E-02	2.71E-03	2.71E-03	2.71E-03	6.98E-03	2.71E-03
	Plant EPC	mg/kg, ww	Appendix C	1.26E-03	1.26E-03	2.22E-04	2.22E-04	2.22E-04	5.72E-04	2.22E-04
	Polychaete EPC	mg/kg, ww	Appendix C	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03
	Blue crab EPC	mg/kg, ww	Appendix C	6.17E-03	6.17E-03	6.17E-03	6.17E-03	6.17E-03	6.17E-03	6.17E-03
	Softshell clam EPC	mg/kg, ww	Appendix C	7.53E-04	7.53E-04	7.53E-04	7.53E-04	7.53E-04	7.53E-04	7.53E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	8.40E-03	8.40E-03	8.40E-03	8.40E-03	8.40E-03	8.40E-03	8.40E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	7.98E-03	7.98E-03	7.98E-03	7.98E-03	7.98E-03	7.98E-03	7.98E-03
Doses	Dose from sediment	mg/kg bw-day	Calculated	8.03E-05	5.42E-08	NC	2.06E-07	2.13E-08	2.52E-07	4.81E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	1.12E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.78E-03	NC	NC	9.49E-05	1.08E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.09E-04	NC	2.65E-04	3.02E-05	NC	6.84E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.33E-05	NC	3.23E-05	7.38E-06	8.65E-06	8.35E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.18E-03	1.91E-03	3.61E-04	NC	1.93E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	6.26E-04	NC	1.59E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	9.29E-04	1.31E-03	1.91E-03	3.77E-04	3.37E-04	3.14E-04	8.34E-05
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.01	0.02	0.02	0.005	0.02	0.02	0.006
	LOAEL HQ - NBSA	unitless	Calculated	0.008	0.01	0.02	0.003	0.01	0.01	0.003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.02	0.02	0.04	0.007	0.02	0.02	0.006
	LOAEL HQ - FFS	unitless	Calculated	0.005	0.007	0.01	0.002	0.01	0.01	0.003

Table E-3-11
Southeast Zone Dietary HQ Calculations for Total Chlordane

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2.1	2.1	2.1
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	20	20	20	20	21	21	21
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.85E-02	1.85E-02	8.63E-03	8.63E-03	8.63E-03	1.32E-02	8.63E-03
	Plant EPC	mg/kg, ww	Appendix C	3.93E-05	3.93E-05	1.84E-05	1.84E-05	1.84E-05	2.81E-05	1.84E-05
	Polychaete EPC	mg/kg, ww	Appendix C	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03
	Blue crab EPC	mg/kg, ww	Appendix C	3.17E-02	3.17E-02	3.17E-02	3.17E-02	3.17E-02	3.17E-02	3.17E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	3.77E-03	3.77E-03	3.77E-03	3.77E-03	3.77E-03	3.77E-03	3.77E-03
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.00E-02	5.00E-02	5.00E-02	5.00E-02	5.00E-02	5.00E-02	5.00E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	6.96E-02	6.96E-02	6.96E-02	6.96E-02	6.96E-02	6.96E-02	6.96E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	9.62E-05	6.50E-08	NC	6.55E-07	6.77E-08	4.76E-07	1.53E-08
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	5.49E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.95E-03	NC	NC	1.04E-04	1.18E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	5.57E-04	NC	1.36E-03	1.55E-04	NC	3.51E-05
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	6.63E-05	NC	1.62E-04	3.69E-05	4.33E-05	4.17E-06
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	7.04E-03	1.14E-02	2.15E-03	NC	1.15E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	5.46E-03	NC	1.39E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.02E-03	7.67E-03	1.14E-02	1.89E-03	2.83E-03	1.20E-03	7.14E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.0005	0.004	0.006	0.0009	0.001	0.0006	0.0003
	LOAEL HQ - NBSA	unitless	Calculated	0.00005	0.0004	0.0006	0.00009	0.0001	0.00006	0.00003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--

Table E-3-12
Southeast Zone Dietary HQ Calculations for Hexachlorobenzene

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.1	1.1	1.1	1.1	0.013	0.013	0.013
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	5	5	5	5	0.13	0.13	0.13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	6.65E-03	6.65E-03	1.71E-03	1.71E-03	1.71E-03	2.84E-03	1.71E-03
	Plant EPC	mg/kg, ww	Appendix C	3.40E-05	3.40E-05	8.74E-06	8.74E-06	8.74E-06	1.45E-05	8.74E-06
	Polychaete EPC	mg/kg, ww	Appendix C	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04	3.86E-04
	Blue crab EPC	mg/kg, ww	Appendix C	9.24E-04	9.24E-04	9.24E-04	9.24E-04	9.24E-04	9.24E-04	9.24E-04
	Softshell clam EPC	mg/kg, ww	Appendix C	2.65E-04	2.65E-04	2.65E-04	2.65E-04	2.65E-04	2.65E-04	2.65E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.47E-05	2.34E-08	NC	1.30E-07	1.34E-08	1.02E-07	3.04E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	2.83E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.11E-04	NC	NC	1.66E-05	1.89E-06	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.63E-05	NC	3.97E-05	4.53E-06	NC	1.02E-06
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.67E-06	NC	1.14E-05	2.60E-06	3.05E-06	2.94E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.52E-04	2.45E-04	4.63E-05	NC	2.48E-05	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	1.43E-04	NC	3.64E-05
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.73E-04	1.73E-04	2.45E-04	5.70E-05	7.60E-05	3.07E-05	1.88E-05
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.0002	0.0002	0.0002	0.00005	0.006	0.002	0.001
	LOAEL HQ - NBSA	unitless	Calculated	0.00003	0.00003	0.00005	0.00001	0.0006	0.0002	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--

Table E-3-13
Southeast Zone Dietary HQ Calculations for Total HMW PAH

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.048	0.048	0.048	0.048	0.62	0.62	0.62
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.48	0.48	0.48	0.48	3.1	3.1	3.1
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.00E+01	1.00E+01	1.32E+01	1.32E+01	1.32E+01	7.43E+00	1.32E+01
	Plant EPC	mg/kg, ww	Appendix C	3.22E-01	3.22E-01	4.19E-01	4.19E-01	4.19E-01	2.43E-01	4.19E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	1.03E-01	1.03E-01	1.03E-01	1.03E-01	1.03E-01	1.03E-01	1.03E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	5.22E-02	3.52E-05	NC	1.00E-03	1.03E-04	2.68E-04	2.34E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	4.75E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.81E-03	NC	4.42E-03	5.05E-04	NC	1.14E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.58E-03	NC	1.12E-02	2.55E-03	2.99E-03	2.88E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	2.82E-03	4.54E-03	8.59E-04	NC	4.60E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	1.57E-03	NC	3.99E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.69E-02	9.24E-03	4.54E-03	9.84E-03	2.49E-03	5.12E-02	4.12E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	1	0.2	0.09	0.2	0.004	0.08	0.0007
	LOAEL HQ - FFS	unitless	Calculated	0.1	0.02	0.009	0.02	0.0008	0.02	0.0001

Table E-3-14
Southeast Zone Dietary HQ Calculations for Total LMW PAH

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.67	0.67	0.67	0.67	50	50	50
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.7	6.7	6.7	6.7	150	150	150
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.90E+00	2.90E+00	2.33E+00	2.33E+00	2.33E+00	1.50E+00	2.33E+00
	Plant EPC	mg/kg, ww	Appendix C	8.66E-02	8.66E-02	7.84E-02	7.84E-02	7.84E-02	6.43E-02	7.84E-02
	Polychaete EPC	mg/kg, ww	Appendix C	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
	Blue crab EPC	mg/kg, ww	Appendix C	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.51E-02	1.02E-05	NC	1.77E-04	1.82E-05	5.42E-05	4.12E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	1.26E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.05E-02	NC	NC	5.58E-04	6.37E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.93E-03	NC	7.15E-03	8.16E-04	NC	1.85E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	6.16E-04	NC	1.50E-03	3.43E-04	4.02E-04	3.88E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	1.97E-03	3.18E-03	6.01E-04	NC	3.22E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	NC	NC	NC	1.96E-03	NC	4.99E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.28E-02	5.53E-03	3.18E-03	5.00E-03	1.60E-03	1.33E-02	3.63E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	0.02	0.008	0.005	0.007	0.00003	0.0003	0.000007
	LOAEL HQ - FFS	unitless	Calculated	0.002	0.0008	0.0005	0.0007	0.00001	0.00009	0.000002

Table E-3-15
Southeast Zone Dietary HQ Calculations for Total PAH

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.2	6.2	6.2	6.2	6.2	40	40	40	40	0.615	0.615	0.615
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	18	18	18	18	18	Not derived	Not derived	Not derived	Not derived	3.07	3.07	3.07
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.30E+01	1.54E+01	1.54E+01	1.54E+01	1.54E+01	1.30E+01	1.30E+01	1.54E+01	1.54E+01	1.54E+01	8.61E+00	1.54E+01
	Plant EPC	mg/kg, ww	Appendix C	3.10E-01	3.65E-01	3.65E-01	3.65E-01	3.65E-01	3.10E-01	3.10E-01	3.65E-01	3.65E-01	3.65E-01	2.08E-01	3.65E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.74E-03	4.93E-03	6.40E-04	6.46E-04	5.38E-04	6.78E-02	4.58E-05	NC	1.17E-03	1.20E-04	3.10E-04	2.72E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	4.05E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	7.45E-03	9.24E-04	1.73E-03	1.75E-03	7.27E-04	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	3.80E-03	3.55E-03	3.59E-03	2.99E-03	NC	3.75E-03	NC	9.15E-03	1.04E-03	NC	2.36E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.99E-03	4.67E-03	4.71E-03	3.92E-03	NC	4.93E-03	NC	1.20E-02	2.74E-03	3.22E-03	3.10E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	3.33E-04	3.37E-04	NC	NC	2.82E-03	4.54E-03	8.59E-04	NC	4.60E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	2.55E-04	NC	NC	4.01E-04	NC	NC	NC	NC	1.12E-03	NC	2.85E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.12E-02	9.98E-03	7.32E-03	1.10E-02	8.58E-03	5.48E-02	1.15E-02	4.54E-03	1.27E-02	2.64E-03	4.45E-02	4.29E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.002	0.002	0.001	0.002	0.001	0.001	0.0003	0.0001	0.0003	0.004	0.07	0.0007
	LOAEL HQ - NBSA	unitless	Calculated	0.0006	0.0006	0.0004	0.0006	0.0005	--	--	--	--	0.0009	0.01	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-16
Southeast Zone Dietary HQ Calculations for Arsenic

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.52	0.52	0.52	0.52	0.52	10	10	10	10	2.6	2.6	2.6
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.9	1.9	1.9	1.9	1.9	40	40	40	40	5.4	5.4	5.4
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.33E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	1.33E+01	1.33E+01	2.71E+01	2.71E+01	2.71E+01	2.27E+01	2.71E+01
	Plant EPC	mg/kg, ww	Appendix C	9.98E-02	2.04E-01	2.04E-01	2.04E-01	2.04E-01	9.98E-02	9.98E-02	2.04E-01	2.04E-01	2.04E-01	1.71E-01	2.04E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00
	Blue crab EPC	mg/kg, ww	Appendix C	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.82E-03	8.70E-03	1.13E-03	1.14E-03	9.50E-04	6.94E-02	4.68E-05	NC	2.06E-03	2.13E-04	8.19E-04	4.81E-05
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.33E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.99E-01	4.94E-02	9.24E-02	9.34E-02	3.89E-02	2.23E+00	NC	NC	1.19E-01	1.36E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	4.90E-02	4.58E-02	4.63E-02	3.85E-02	NC	4.84E-02	NC	1.18E-01	1.35E-02	NC	3.05E-03
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	5.10E-02	4.77E-02	4.81E-02	4.01E-02	NC	5.04E-02	NC	1.23E-01	2.80E-02	3.29E-02	3.17E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	2.25E-02	2.27E-02	NC	NC	1.90E-01	3.06E-01	5.80E-02	NC	3.10E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	2.06E-02	NC	NC	3.24E-02	NC	NC	NC	NC	9.06E-02	NC	2.31E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.02E-01	1.20E-01	1.40E-01	2.12E-01	1.51E-01	1.15E+00	2.89E-01	3.06E-01	2.10E-01	7.30E-02	9.80E-02	1.47E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.8	0.2	0.3	0.4	0.3	0.1	0.03	0.03	0.02	0.03	0.04	0.006
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.06	0.07	0.1	0.08	0.03	0.007	0.008	0.005	0.01	0.02	0.003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-17
Southeast Zone Dietary HQ Calculations for Cadmium

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.001	0.001	0.001	0.001	0.001	0.4	0.4	0.4	0.4	3.5	3.5	3.5
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.01	0.01	0.01	0.01	0.01	4	4	4	4	13	13	13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.19E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	2.19E+00	2.19E+00	1.36E+00	1.36E+00	1.36E+00	1.77E+00	1.36E+00
	Plant EPC	mg/kg, ww	Appendix C	1.91E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.91E-01	1.91E-01	1.47E-01	1.47E-01	1.47E-01	1.70E-01	1.47E-01
	Polychaete EPC	mg/kg, ww	Appendix C	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02
	Blue crab EPC	mg/kg, ww	Appendix C	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	6.30E-04	4.37E-04	5.68E-05	5.73E-05	4.77E-05	1.14E-02	7.71E-06	NC	1.03E-04	1.07E-05	6.37E-05	2.42E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.32E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	1.33E-02	1.65E-03	3.08E-03	3.11E-03	1.29E-03	7.43E-02	NC	NC	3.97E-03	4.52E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	7.44E-03	6.95E-03	7.02E-03	5.84E-03	NC	7.34E-03	NC	1.79E-02	2.04E-03	NC	4.62E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.71E-03	4.40E-03	4.44E-03	3.70E-03	NC	4.65E-03	NC	1.13E-02	2.59E-03	3.03E-03	2.93E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.67E-03	1.68E-03	NC	NC	1.41E-02	2.27E-02	4.30E-03	NC	2.30E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.78E-03	NC	NC	2.80E-03	NC	NC	NC	NC	7.84E-03	NC	2.00E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.39E-02	1.07E-02	1.08E-02	1.63E-02	1.37E-02	4.29E-02	2.61E-02	2.27E-02	1.88E-02	6.47E-03	3.86E-02	1.38E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	14	11	11	16	14	0.1	0.07	0.06	0.05	0.002	0.01	0.0004
	LOAEL HQ - NBSA	unitless	Calculated	1	1	1	2	1	0.01	0.007	0.006	0.005	0.0005	0.003	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-18
Southeast Zone Dietary HQ Calculations for Chromium

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.92	0.92	0.92	0.92	0.92	10.5	10.5	10.5	10.5	0.962	0.962	0.962
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	105	105	105	105	9.62	9.62	9.62
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.65E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.65E+02	1.65E+02	1.37E+02	1.37E+02	1.37E+02	1.41E+02	1.37E+02
	Plant EPC	mg/kg, ww	Appendix C	1.35E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.35E+00	1.35E+00	1.13E+00	1.13E+00	1.13E+00	1.16E+00	1.13E+00
	Polychaete EPC	mg/kg, ww	Appendix C	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01
	Blue crab EPC	mg/kg, ww	Appendix C	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00	7.47E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01	3.32E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	4.74E-02	4.40E-02	5.72E-03	5.77E-03	4.81E-03	8.61E-01	5.81E-04	NC	1.04E-02	1.08E-03	5.08E-03	2.43E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.26E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	9.06E-02	1.12E-02	2.10E-02	2.12E-02	8.83E-03	5.07E-01	NC	NC	2.71E-02	3.09E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	4.65E-03	4.35E-03	4.39E-03	3.66E-03	NC	4.60E-03	NC	1.12E-02	1.28E-03	NC	2.89E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.33E-01	1.25E-01	1.26E-01	1.05E-01	NC	1.32E-01	NC	3.21E-01	7.32E-02	8.58E-02	8.28E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	5.53E-03	5.59E-03	NC	NC	4.68E-02	7.54E-02	1.43E-02	NC	7.63E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	6.65E-03	NC	NC	1.05E-02	NC	NC	NC	NC	2.92E-02	NC	7.44E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.38E-01	1.34E-01	1.08E-01	1.63E-01	1.32E-01	6.84E-01	1.83E-01	7.54E-02	1.92E-01	5.39E-02	3.24E-01	8.13E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.2	0.1	0.1	0.2	0.1	0.07	0.02	0.007	0.02	0.06	0.3	0.008
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	0.007	0.002	0.0007	0.002	0.006	0.03	0.0008
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-19
Southeast Zone Dietary HQ Calculations for Copper

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1	1	1	1	1	1.9	1.9	1.9	1.9	18	18	18
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2	19	19	19	19	26	26	26
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	2.3	2.3	2.3	2.3	3.4	3.4	3.4
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	4.7	4.7	4.7	4.7	6.8	6.8	6.8
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.02E+02	1.56E+02	1.56E+02	1.56E+02	1.56E+02	1.02E+02	1.02E+02	1.56E+02	1.56E+02	1.56E+02	1.93E+02	1.56E+02
	Plant EPC	mg/kg, ww	Appendix C	2.41E+00	2.85E+00	2.85E+00	2.85E+00	2.85E+00	2.41E+00	2.41E+00	2.85E+00	2.85E+00	2.85E+00	3.10E+00	2.85E+00
	Polychaete EPC	mg/kg, ww	Appendix C	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00
	Blue crab EPC	mg/kg, ww	Appendix C	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00	7.37E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated	2.93E-02	5.02E-02	6.51E-03	6.58E-03	5.48E-03	5.32E-01	3.59E-04	NC	1.19E-02	1.23E-03	6.96E-03	2.77E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	6.06E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	3.12E-01	3.86E-02	7.22E-02	7.30E-02	3.04E-02	1.74E+00	NC	NC	9.31E-02	1.06E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	5.42E-01	5.06E-01	5.11E-01	4.26E-01	NC	5.35E-01	NC	1.31E+00	1.49E-01	NC	3.37E-02
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	2.46E-01	2.30E-01	2.32E-01	1.93E-01	NC	2.43E-01	NC	5.93E-01	1.35E-01	1.59E-01	1.53E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	4.80E-02	4.85E-02	NC	NC	4.06E-01	6.54E-01	1.24E-01	NC	6.62E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.31E-01	NC	NC	2.07E-01	NC	NC	NC	NC	5.78E-01	NC	1.47E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	3.41E-01	6.75E-01	5.78E-01	8.72E-01	8.62E-01	1.14E+00	1.18E+00	6.54E-01	1.06E+00	4.37E-01	8.38E-01	9.82E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.3	0.7	0.6	0.9	0.9	0.6	0.6	0.3	0.6	0.02	0.05	0.005
	LOAEL HQ - NBSA	unitless	Calculated	0.2	0.3	0.3	0.4	0.4	0.06	0.06	0.03	0.06	0.02	0.03	0.004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.5	0.5	0.3	0.5	0.1	0.2	0.03
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.2	0.3	0.1	0.2	0.06	0.1	0.01

Table E-3-20
Southeast Zone Dietary HQ Calculations for Lead

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	12.6	12.6	12.6	12.6	12.6	5.5	5.5	5.5	5.5	11	11	11
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	28	28	28	28	90	90	90
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.19	0.19	0.19	0.19	0.71	0.71	0.71
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	1.9	1.9	1.9	1.9	7	7	7
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.10E+02	1.70E+02	1.70E+02	1.70E+02	1.70E+02	1.10E+02	1.10E+02	1.70E+02	1.70E+02	1.70E+02	2.09E+02	1.70E+02
	Plant EPC	mg/kg, ww	Appendix C	7.40E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	7.40E-01	7.40E-01	9.47E-01	9.47E-01	9.47E-01	1.06E+00	9.47E-01
	Polychaete EPC	mg/kg, ww	Appendix C	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01
	Blue crab EPC	mg/kg, ww	Appendix C	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01	6.27E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01	3.28E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	3.16E-02	5.47E-02	7.10E-03	7.17E-03	5.97E-03	5.74E-01	3.87E-04	NC	1.29E-02	1.34E-03	7.53E-03	3.02E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.07E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	9.69E-02	1.20E-02	2.25E-02	2.27E-02	9.45E-03	5.43E-01	NC	NC	2.90E-02	3.30E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.12E-02	1.05E-02	1.06E-02	8.79E-03	NC	1.10E-02	NC	2.69E-02	3.07E-03	NC	6.95E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.96E-01	1.83E-01	1.85E-01	1.54E-01	NC	1.94E-01	NC	4.73E-01	1.08E-01	1.26E-01	1.22E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	6.57E-03	6.63E-03	NC	NC	5.55E-02	8.95E-02	1.69E-02	NC	9.05E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	5.85E-03	NC	NC	9.19E-03	NC	NC	NC	NC	2.57E-02	NC	6.54E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	1.29E-01	1.88E-01	1.54E-01	2.32E-01	1.88E-01	5.58E-01	2.61E-01	8.95E-02	2.79E-01	7.06E-02	3.50E-01	9.87E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.01	0.01	0.01	0.02	0.01	0.1	0.05	0.02	0.05	0.006	0.03	0.0009
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	0.02	0.009	0.003	0.01	0.0008	0.004	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	3	1	0.5	1	0.1	0.5	0.01
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.3	0.1	0.05	0.1	0.01	0.05	0.001

Table E-3-21
Southeast Zone Dietary HQ Calculations for Mercury

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.98E+00	2.79E+00	2.79E+00	2.79E+00	2.79E+00	1.98E+00	1.98E+00	2.79E+00	2.79E+00	2.79E+00	1.94E+00	2.79E+00
	Plant EPC	mg/kg, ww	Appendix C	1.07E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.07E-01	1.07E-01	1.29E-01	1.29E-01	1.29E-01	1.06E-01	1.29E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02
	Blue crab EPC	mg/kg, ww	Appendix C	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02	9.38E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	5.69E-04	8.96E-04	1.16E-04	1.17E-04	9.78E-05	1.03E-02	6.97E-06	NC	2.12E-04	2.19E-05	6.97E-05	4.95E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.07E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	4.28E-03	5.31E-04	9.93E-04	1.00E-03	4.17E-04	2.40E-02	NC	NC	1.28E-03	1.46E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.28E-03	2.13E-03	2.15E-03	1.79E-03	NC	2.25E-03	NC	5.49E-03	6.26E-04	NC	1.42E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.80E-03	1.68E-03	1.70E-03	1.42E-03	NC	1.78E-03	NC	4.34E-03	9.90E-04	1.16E-03	1.12E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.56E-03	1.58E-03	NC	NC	1.32E-02	2.13E-02	4.03E-03	NC	2.15E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.90E-03	NC	NC	2.99E-03	NC	NC	NC	NC	8.37E-03	NC	2.13E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	4.85E-03	4.96E-03	4.35E-03	6.55E-03	6.71E-03	1.72E-02	1.72E-02	2.13E-02	7.67E-03	5.07E-03	2.40E-02	1.19E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	9	9	8	12	12	2	2	2	0.8	0.03	0.2	0.007
	LOAEL HQ - NBSA	unitless	Calculated	0.9	0.9	0.8	1	1	0.2	0.2	0.2	0.08	0.02	0.1	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	1	1	2	0.6	0.3	2	0.07
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.7	0.7	0.8	0.3	0.2	0.9	0.04

Table E-3-22
Southeast Zone Dietary HQ Calculations for Methylmercury

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, dw	Appendix C	5.03E-04	1.25E-03	1.25E-03	1.25E-03	1.25E-03	5.03E-04	5.03E-04	1.25E-03	1.25E-03	1.25E-03	1.48E-03	1.25E-03
	Plant EPC	mg/kg, ww	Appendix C	1.01E-04	2.49E-04	2.49E-04	2.49E-04	2.49E-04	1.01E-04	1.01E-04	2.49E-04	2.49E-04	2.49E-04	2.96E-04	2.49E-04
	Polychaete EPC	mg/kg, ww	Appendix C	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03
	Blue crab EPC	mg/kg, ww	Appendix C	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02	4.66E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01	1.14E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.20E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.45E-07	4.00E-07	5.20E-08	5.25E-08	4.37E-08	2.62E-06	1.77E-09	NC	9.47E-08	9.78E-09	5.33E-08	2.21E-09
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.77E-05	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.32E-04	6.60E-05	1.23E-04	1.25E-04	5.19E-05	2.98E-03	NC	NC	1.59E-04	1.81E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.69E-03	2.52E-03	2.54E-03	2.11E-03	NC	2.66E-03	NC	6.48E-03	7.39E-04	NC	1.67E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	8.31E-04	7.77E-04	7.84E-04	6.53E-04	NC	8.21E-04	NC	2.00E-03	4.57E-04	5.35E-04	5.17E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.89E-03	1.91E-03	NC	NC	1.60E-02	2.58E-02	4.88E-03	NC	2.61E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	2.14E-03	NC	NC	3.36E-03	NC	NC	NC	NC	9.39E-03	NC	2.39E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.32E-04	3.84E-03	3.56E-03	5.36E-03	6.18E-03	1.49E-03	1.95E-02	2.58E-02	6.76E-03	5.30E-03	3.20E-03	1.30E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	1	7	6	10	11	0.2	2	3	0.7	0.03	0.02	0.008
	LOAEL HQ - NBSA	unitless	Calculated	0.1	0.7	0.6	1	1	0.02	0.2	0.3	0.07	0.02	0.01	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.1	1	2	0.5	0.3	0.2	0.08
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	0.06	0.7	1	0.3	0.2	0.1	0.05

Table E-3-23
Southeast Zone Dietary HQ Calculations for Nickel

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.14	15	15	15	15	40	40	40
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	1.4	33	33	33	33	80	80	80
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	3.39E+01	6.18E+01	6.18E+01	6.18E+01	6.18E+01	3.39E+01	3.39E+01	6.18E+01	6.18E+01	6.18E+01	8.04E+01	6.18E+01
	Plant EPC	mg/kg, ww	Appendix C	3.02E-01	4.74E-01	4.74E-01	4.74E-01	4.74E-01	3.02E-01	3.02E-01	4.74E-01	4.74E-01	4.74E-01	5.77E-01	4.74E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01
	Blue crab EPC	mg/kg, ww	Appendix C	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01	3.13E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01	4.20E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	9.75E-03	1.98E-02	2.58E-03	2.60E-03	2.17E-03	1.77E-01	1.19E-04	NC	4.69E-03	4.85E-04	2.90E-03	1.10E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.13E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	7.45E-02	9.24E-03	1.73E-02	1.74E-02	7.26E-03	4.17E-01	NC	NC	2.23E-02	2.54E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	5.58E-03	5.22E-03	5.27E-03	4.39E-03	NC	5.51E-03	NC	1.34E-02	1.53E-03	NC	3.47E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	4.56E-02	4.27E-02	4.31E-02	3.59E-02	NC	4.51E-02	NC	1.10E-01	2.51E-02	2.94E-02	2.84E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	7.00E-03	7.07E-03	NC	NC	5.92E-02	9.54E-02	1.80E-02	NC	9.65E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	5.63E-03	NC	NC	8.86E-03	NC	NC	NC	NC	2.48E-02	NC	6.30E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	8.42E-02	5.76E-02	5.01E-02	7.55E-02	5.86E-02	2.97E-01	1.10E-01	9.54E-02	8.42E-02	2.72E-02	1.55E-01	4.80E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.6	0.4	0.4	0.5	0.4	0.02	0.007	0.006	0.006	0.002	0.004	0.0001
	LOAEL HQ - NBSA	unitless	Calculated	0.06	0.04	0.04	0.05	0.04	0.009	0.003	0.003	0.003	0.0008	0.002	0.00006
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-24
Southeast Zone Dietary HQ Calculations for Selenium

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.011	0.011	0.011	0.011	0.011	0.42	0.42	0.42	0.42	0.016	0.016	0.016
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.11	0.11	0.11	0.11	0.11	0.82	0.82	0.82	0.82	0.16	0.16	0.16
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	6.41E-01	1.10E+00	1.10E+00	1.10E+00	1.10E+00	6.41E-01	6.41E-01	1.10E+00	1.10E+00	1.10E+00	1.36E+00	1.10E+00
	Plant EPC	mg/kg, ww	Appendix C	6.22E-02	1.13E-01	1.13E-01	1.13E-01	1.13E-01	6.22E-02	6.22E-02	1.13E-01	1.13E-01	1.13E-01	1.42E-01	1.13E-01
	Polychaete EPC	mg/kg, ww	Appendix C	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01
	Blue crab EPC	mg/kg, ww	Appendix C	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01	8.78E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01	7.16E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01	8.09E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	1.84E-04	3.53E-04	4.58E-05	4.63E-05	3.85E-05	3.34E-03	2.26E-06	NC	8.34E-05	8.62E-06	4.89E-05	1.95E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.78E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.16E-02	6.40E-03	1.20E-02	1.21E-02	5.03E-03	2.89E-01	NC	NC	1.54E-02	1.76E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	2.16E-02	2.02E-02	2.04E-02	1.70E-02	NC	2.13E-02	NC	5.21E-02	5.94E-03	NC	1.34E-03
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.57E-02	1.46E-02	1.48E-02	1.23E-02	NC	1.55E-02	NC	3.77E-02	8.60E-03	1.01E-02	9.73E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.19E-02	1.21E-02	NC	NC	1.01E-01	1.63E-01	3.08E-02	NC	1.65E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	1.44E-02	NC	NC	2.27E-02	NC	NC	NC	NC	6.34E-02	NC	1.61E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.18E-02	3.92E-02	3.94E-02	5.94E-02	5.70E-02	1.46E-01	1.38E-01	1.63E-01	6.80E-02	3.99E-02	5.44E-02	9.23E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	5	4	4	5	5	0.3	0.3	0.4	0.2	2	3	0.6
	LOAEL HQ - NBSA	unitless	Calculated	0.5	0.4	0.4	0.5	0.5	0.2	0.2	0.2	0.08	0.2	0.3	0.06
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-25
Southeast Zone Dietary HQ Calculations for Silver

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	70	70	70	70	70	9.86	9.86	9.86	9.86	18.8	18.8	18.8
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	98.6	98.6	98.6	98.6	188	188	188
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.57E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.57E+00	1.57E+00	1.99E+00	1.99E+00	1.99E+00	2.16E+00	1.99E+00
	Plant EPC	mg/kg, ww	Appendix C	4.40E-03	5.57E-03	5.57E-03	5.57E-03	5.57E-03	4.40E-03	4.40E-03	5.57E-03	5.57E-03	5.57E-03	6.05E-03	5.57E-03
	Polychaete EPC	mg/kg, ww	Appendix C	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
	Blue crab EPC	mg/kg, ww	Appendix C	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01	8.89E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02	7.15E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated	4.51E-04	6.39E-04	8.29E-05	8.38E-05	6.97E-05	8.19E-03	5.53E-06	NC	1.51E-04	1.56E-05	7.78E-05	3.53E-06
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.18E-03	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.35E-03	6.63E-04	1.24E-03	1.25E-03	5.21E-04	2.99E-02	NC	NC	1.60E-03	1.82E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	1.59E-02	1.48E-02	1.50E-02	1.25E-02	NC	1.57E-02	NC	3.82E-02	4.36E-03	NC	9.85E-04
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	1.46E-02	1.36E-02	1.37E-02	1.14E-02	NC	1.44E-02	NC	3.51E-02	8.00E-03	9.38E-03	9.04E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	1.19E-03	1.20E-03	NC	NC	1.01E-02	1.62E-02	3.07E-03	NC	1.64E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	2.41E-03	NC	NC	3.78E-03	NC	NC	NC	NC	1.06E-02	NC	2.69E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.80E-03	2.29E-02	2.07E-02	3.12E-02	2.83E-02	1.91E-02	4.01E-02	1.62E-02	3.90E-02	1.16E-02	1.23E-02	2.29E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.00008	0.0003	0.0003	0.0004	0.0004	0.002	0.004	0.002	0.004	0.0006	0.0007	0.0001
	LOAEL HQ - NBSA	unitless	Calculated	--	--	--	--	--	0.0002	0.0004	0.0002	0.0004	0.00006	0.00007	0.00001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-3-26
Southeast Zone Dietary HQ Calculations for Zinc

Parameter		Units	Table Reference	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone Mudflat	Southeast Zone Mudflat	Southeast Zone	Southeast Zone	Southeast Zone	Southeast Zone All Shorelines	Southeast Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	19	19	19	19	19	82	82	82	82	160	160	160
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	38	38	38	38	38	124	124	124	124	320	320	320
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.31E+02	2.84E+02	2.84E+02	2.84E+02	2.84E+02	2.31E+02	2.31E+02	2.84E+02	2.84E+02	2.84E+02	3.10E+02	2.84E+02
	Plant EPC	mg/kg, ww	Appendix C	1.97E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	1.97E+01	1.97E+01	2.21E+01	2.21E+01	2.21E+01	2.32E+01	2.21E+01
	Polychaete EPC	mg/kg, ww	Appendix C	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01
	Blue crab EPC	mg/kg, ww	Appendix C	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01	3.19E+01
Doses	Dose from sediment	mg/kg bw-day	Calculated	6.64E-02	9.10E-02	1.18E-02	1.19E-02	9.93E-03	1.20E+00	8.13E-04	NC	2.15E-02	2.22E-03	1.12E-02	5.03E-04
	Dose from plants	mg/kg bw-day	Calculated	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	4.53E+00	NC
	Dose from polychaetes	mg/kg bw-day	Calculated	5.07E+00	6.29E-01	1.18E+00	1.19E+00	4.95E-01	2.84E+01	NC	NC	1.52E+00	1.73E-01	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated	NC	7.50E-01	7.01E-01	7.08E-01	5.90E-01	NC	7.41E-01	NC	1.81E+00	2.06E-01	NC	4.66E-02
	Dose from softshell clam	mg/kg bw-day	Calculated	NC	5.58E-01	5.22E-01	5.27E-01	4.39E-01	NC	5.51E-01	NC	1.34E+00	3.07E-01	3.60E-01	3.47E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated	NC	NC	5.89E-01	5.95E-01	NC	NC	4.98E+00	8.03E+00	1.52E+00	NC	8.12E-01	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated	NC	5.70E-01	NC	NC	8.95E-01	NC	NC	NC	NC	2.50E+00	NC	6.37E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated	5.14E+00	1.74E+00	2.01E+00	3.03E+00	2.43E+00	1.48E+01	6.27E+00	8.03E+00	3.10E+00	1.60E+00	5.71E+00	3.60E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated	0.3	0.09	0.1	0.2	0.1	0.2	0.08	0.1	0.04	0.01	0.04	0.002
	LOAEL HQ - NBSA	unitless	Calculated	0.1	0.05	0.05	0.08	0.06	0.1	0.05	0.06	0.03	0.005	0.02	0.001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-1
Southwest Dietary HQ Calculations for 2,3,7,8-TCDD

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.71E-04	2.71E-04	9.91E-05	9.91E-05	9.91E-05	8.30E-05	9.91E-05
	Plant EPC	mg/kg, ww	Appendix C	3.04E-07	3.04E-07	1.11E-07	1.11E-07	1.11E-07	9.29E-08	1.11E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	5.63E-06	5.63E-06	5.63E-06	5.63E-06	5.63E-06	5.63E-06	5.63E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.40E-05	1.40E-05	1.40E-05	1.40E-05	1.40E-05	1.40E-05	1.40E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.80E-05	1.80E-05	1.80E-05	1.80E-05	1.80E-05	1.80E-05	1.80E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.41E-06	9.54E-10	NC	7.52E-09	7.77E-10	2.99E-09	1.76E-10
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	1.82E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	9.11E-06	NC	NC	4.86E-07	5.55E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.88E-07	NC	7.02E-07	8.01E-08	NC	1.81E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	9.92E-08	NC	2.42E-07	5.52E-08	6.47E-08	6.24E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.97E-06	3.17E-06	5.99E-07	NC	3.21E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	1.41E-06	NC	3.60E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.26E-06	2.35E-06	3.17E-06	1.02E-06	8.03E-07	4.06E-07	1.92E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.4	0.2	0.2	0.07	0.3	0.2	0.07
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.04	0.02	0.02	0.007	0.09	0.05	0.02
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	2	0.8	1	0.4	10	5	2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.2	0.08	0.1	0.04	0.4	0.2	0.09

Table E-4-2
Southwest Dietary HQ Calculations for Total Dioxin/Furan TEQ Bird

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	4.17E-04	4.17E-04	1.50E-04	1.50E-04
	Plant EPC	mg/kg, ww	Appendix C	4.67E-07	4.67E-07	1.68E-07	1.68E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.39E-05	1.39E-05	1.39E-05	1.39E-05
	Blue crab EPC	mg/kg, ww	Appendix C	2.90E-05	2.90E-05	2.90E-05	2.90E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	1.07E-05	1.07E-05	1.07E-05	1.07E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.55E-05	1.55E-05	1.55E-05	1.55E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.02E-05	3.02E-05	3.02E-05	3.02E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.18E-06	1.47E-09	NC	1.14E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.12E-05	NC	NC	5.97E-07
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.11E-07	NC	1.25E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.88E-07	NC	4.58E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	2.18E-06	3.52E-06	6.65E-07
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	6.68E-06	2.88E-06	3.52E-06	1.49E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.5	0.2	0.3	0.1
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.05	0.02	0.03	0.01
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	2	1	1	0.5
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.2	0.1	0.1	0.05

Table E-4-3
Southwest Dietary HQ Calculations for Total Dioxin/Furan TEQ Mammal

Parameter		Units	Table Reference	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.30E-04	1.20E-04	1.30E-04
	Plant EPC	mg/kg, ww	Appendix C	1.46E-07	1.35E-07	1.46E-07
	Polychaete EPC	mg/kg, ww	Appendix C	1.17E-05	1.17E-05	1.17E-05
	Blue crab EPC	mg/kg, ww	Appendix C	1.90E-05	1.90E-05	1.90E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	6.98E-06	6.98E-06	6.98E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.49E-05	1.49E-05	1.49E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.12E-05	2.12E-05	2.12E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.02E-09	4.34E-09	2.31E-10
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	2.63E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.75E-08	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	9.29E-08	NC	2.10E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	6.84E-08	8.02E-08	7.74E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	3.42E-07	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	1.66E-06	NC	4.23E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	9.42E-07	4.53E-07	2.26E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.4	0.2	0.09
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	0.05	0.03
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	12	6	3
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.4	0.2	0.1

Table E-4-4
Southwest Dietary HQ Calculations for Total PCBs

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.08	0.08	0.08
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	0.096	0.096	0.096
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.4	0.4	0.4	0.4	0.069	0.069	0.069
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.5	0.5	0.5	0.5	0.082	0.082	0.082
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.38E+00	2.38E+00	7.87E-01	7.87E-01	7.87E-01	1.58E+00	7.87E-01
	Plant EPC	mg/kg, ww	Appendix C	4.76E-03	4.76E-03	1.57E-03	1.57E-03	1.57E-03	3.16E-03	1.57E-03
	Polychaete EPC	mg/kg, ww	Appendix C	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
	Blue crab EPC	mg/kg, ww	Appendix C	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.24E-02	8.38E-06	NC	5.98E-05	6.17E-06	5.70E-05	1.40E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	6.18E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.99E-02	NC	NC	2.66E-03	3.04E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	4.99E-03	NC	1.22E-02	1.39E-03	NC	3.14E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	4.96E-03	NC	1.21E-02	2.76E-03	3.24E-03	3.13E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	2.87E-01	4.64E-01	8.77E-02	NC	4.69E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	1.21E-01	NC	3.08E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	3.12E-02	2.97E-01	4.64E-01	5.73E-02	6.28E-02	5.08E-02	1.57E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	2	3	0.4	0.8	0.6	0.2
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.02	0.2	0.3	0.04	0.7	0.5	0.2
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.08	0.7	1	0.1	0.9	0.7	0.2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.06	0.6	0.9	0.1	0.8	0.6	0.2

Table E-4-5
Southwest Dietary HQ Calculations for Total PCB TEQ Bird

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	5.97E-04	5.97E-04	2.55E-04	2.55E-04
	Plant EPC	mg/kg, ww	Appendix C	1.19E-06	1.19E-06	5.10E-07	5.10E-07
	Polychaete EPC	mg/kg, ww	Appendix C	2.13E-05	2.13E-05	2.13E-05	2.13E-05
	Blue crab EPC	mg/kg, ww	Appendix C	6.18E-05	6.18E-05	6.18E-05	6.18E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	3.26E-05	3.26E-05	3.26E-05	3.26E-05
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.56E-04	1.56E-04	1.56E-04	1.56E-04
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.19E-04	1.19E-04	1.19E-04	1.19E-04
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.11E-06	2.10E-09	NC	1.94E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.72E-05	NC	NC	9.17E-07
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.09E-06	NC	2.65E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	5.74E-07	NC	1.40E-06
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	2.20E-05	3.55E-05	6.72E-06
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.01E-05	2.37E-05	3.55E-05	5.85E-06
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.7	2	3	0.4
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.07	0.2	0.3	0.04
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	4	8	13	2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.4	0.8	1	0.2

Table E-4-6
Southwest Dietary HQ Calculations for Total PCB TEQ Mammal

Parameter		Units	Table Reference	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.40E-05	9.20E-05	1.40E-05
	Plant EPC	mg/kg, ww	Appendix C	2.79E-08	1.84E-07	2.79E-08
	Polychaete EPC	mg/kg, ww	Appendix C	9.57E-07	9.57E-07	9.57E-07
	Blue crab EPC	mg/kg, ww	Appendix C	1.01E-05	1.01E-05	1.01E-05
	Softshell clam EPC	mg/kg, ww	Appendix C	6.59E-06	6.59E-06	6.59E-06
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.61E-05	4.61E-05	4.61E-05
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.92E-05	1.92E-05	1.92E-05
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.09E-10	3.31E-09	2.48E-11
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	3.59E-08	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.69E-09	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	4.92E-08	NC	1.11E-08
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	6.46E-08	7.57E-08	7.30E-09
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	1.06E-06	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	1.50E-06	NC	3.82E-07
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	8.10E-07	1.17E-06	2.00E-07
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.3	0.5	0.08
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.09	0.1	0.02
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	10	15	3
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.4	0.5	0.09

Table E-4-7
Southwest Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Bird

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000014	0.000014	0.000014	0.000014
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00014	0.00014	0.00014	0.00014
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000028	0.0000028	0.0000028	0.0000028
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.000028	0.000028	0.000028	0.000028
EPCs	Sediment EPC	mg/kg, dw	Appendix C	00000	00000	00000	00000
	Plant EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000
	Polychaete EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000
	Blue crab EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000
	Softshell clam EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	00000	00000	NC	00000
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	00000	NC	NC	00000
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	00000	00000	00000
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000	00000
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	2	3	0.5
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	0.2	0.3	0.05
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	5	9	13	2
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.5	0.9	1	0.2

Table E-4-8
Southwest Dietary HQ Calculations for Total Dioxin/Furan/PCB TEQ Mammal

Parameter		Units	Table Reference	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000026	0.0000026	0.0000026
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000088	0.0000088	0.0000088
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00000008	0.00000008	0.00000008
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0000022	0.0000022	0.0000022
EPCs	Sediment EPC	mg/kg, dw	Appendix C	00000	00000	00000
	Plant EPC	mg/kg, ww	Appendix C	00000	00000	00000
	Polychaete EPC	mg/kg, ww	Appendix C	00000	00000	00000
	Blue crab EPC	mg/kg, ww	Appendix C	00000	00000	00000
	Softshell clam EPC	mg/kg, ww	Appendix C	00000	00000	00000
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	00000	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	00000	NC	00000
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	00000	NC	00000
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.6	0.4	0.2
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.1	0.04
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	20	14	5
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.7	0.5	0.2

Table E-4-9
Southwest Dietary HQ Calculations for Total DDx (2,4 & 4,4)

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.025	0.025	0.025	0.025	0.13	0.13	0.13
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.25	0.25	0.25	0.25	1.3	1.3	1.3
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.009	0.009	0.009	0.009	0.8	0.8	0.8
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.027	0.027	0.027	0.027	4	4	4
EPCs	Sediment EPC	mg/kg, dw	Appendix C	00001	00001	00001	00001	00001	00000	00001
	Plant EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Polychaete EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Blue crab EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Softshell clam EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	00001	00001	00001	00001	00001	00001	00001
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	00000	00000	NC	00000	00000	00000	00000
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	00000	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	00000	NC	NC	00000	00000	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	NC	00000
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	00000	00000
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	00000	00000	00000	NC	00000	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	00000	NC	00000
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000	00000	00000	00000	00000
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	2	3	0.5	0.2	0.08	0.04
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.01	0.2	0.3	0.05	0.02	0.008	0.004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.3	6	10	1	0.03	0.01	0.007
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.1	2	3	0.5	0.005	0.003	0.001

Table E-4-10
Southwest Dietary HQ Calculations for Dieldrin

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.08	0.08	0.08	0.08	0.015	0.015	0.015
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.12	0.12	0.12	0.12	0.03	0.03	0.03
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.054	0.054	0.054	0.054	0.015	0.015	0.015
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.18	0.18	0.18	0.18	0.03	0.03	0.03
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.09E-02	2.09E-02	4.20E-03	4.20E-03	4.20E-03	5.53E-03	4.20E-03
	Plant EPC	mg/kg, ww	Appendix C	1.71E-03	1.71E-03	3.45E-04	3.45E-04	3.45E-04	4.53E-04	3.45E-04
	Polychaete EPC	mg/kg, ww	Appendix C	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03
	Blue crab EPC	mg/kg, ww	Appendix C	4.14E-03	4.14E-03	4.14E-03	4.14E-03	4.14E-03	4.14E-03	4.14E-03
	Softshell clam EPC	mg/kg, ww	Appendix C	8.20E-04	8.20E-04	8.20E-04	8.20E-04	8.20E-04	8.20E-04	8.20E-04
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.37E-03	5.37E-03	5.37E-03	5.37E-03	5.37E-03	5.37E-03	5.37E-03
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.09E-04	7.36E-08	NC	3.19E-07	3.29E-08	1.99E-07	7.45E-09
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	8.85E-05	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.78E-03	NC	NC	9.49E-05	1.08E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	7.29E-05	NC	1.78E-04	2.03E-05	NC	4.59E-06
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.44E-05	NC	3.52E-05	8.03E-06	9.42E-06	9.09E-07
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	7.56E-04	1.22E-03	2.31E-04	NC	1.23E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	1.27E-03	NC	3.23E-04
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	9.44E-04	8.44E-04	1.22E-03	2.69E-04	6.54E-04	2.22E-04	1.64E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.01	0.01	0.02	0.003	0.04	0.01	0.01
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.008	0.007	0.01	0.002	0.02	0.007	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.02	0.02	0.02	0.005	0.04	0.01	0.01
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.005	0.005	0.007	0.001	0.02	0.007	0.005

Table E-4-11
Southwest Dietary HQ Calculations for Total Chlordane

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2.1	2.1	2.1
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	20	20	20	20	21	21	21
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	3.13E-02	3.13E-02	9.18E-03	9.18E-03	9.18E-03	1.44E-02	9.18E-03
	Plant EPC	mg/kg, ww	Appendix C	6.67E-05	6.67E-05	1.95E-05	1.95E-05	1.95E-05	3.08E-05	1.95E-05
	Polychaete EPC	mg/kg, ww	Appendix C	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03	2.42E-03
	Blue crab EPC	mg/kg, ww	Appendix C	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	4.53E-03	4.53E-03	4.53E-03	4.53E-03	4.53E-03	4.53E-03	4.53E-03
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	2.68E-02	2.68E-02	2.68E-02	2.68E-02	2.68E-02	2.68E-02	2.68E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	9.01E-02	9.01E-02	9.01E-02	9.01E-02	9.01E-02	9.01E-02	9.01E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.63E-04	1.10E-07	NC	6.97E-07	7.19E-08	5.20E-07	1.63E-08
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	6.01E-06	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.95E-03	NC	NC	1.04E-04	1.18E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	4.39E-04	NC	1.07E-03	1.22E-04	NC	2.76E-05
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	7.97E-05	NC	1.94E-04	4.44E-05	5.20E-05	5.02E-06
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	3.78E-03	6.09E-03	1.15E-03	NC	6.16E-04	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	7.07E-03	NC	1.80E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.05E-03	4.30E-03	6.09E-03	1.26E-03	3.62E-03	6.75E-04	9.16E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.0005	0.002	0.003	0.0006	0.002	0.0003	0.0004
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.00005	0.0002	0.0003	0.00006	0.0002	0.00003	0.00004
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--

Table E-4-12
Southwest Dietary HQ Calculations for Hexachlorobenzene

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.1	1.1	1.1	1.1	0.013	0.013	0.013
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	5	5	5	5	0.13	0.13	0.13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Plant EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Polychaete EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Blue crab EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Softshell clam EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	00000	00000	NC	00000	00000	00000	00000
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	00000	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	00000	NC	NC	00000	00000	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	NC	00000
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	00000	00000
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	00000	00000	00000	NC	00000	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	00000	NC	00000
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000	00000	00000	00000	00000
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.0002	0.00008	0.0001	0.00004	0.005	0.002	0.001
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.00004	0.00002	0.00002	0.000009	0.0005	0.0002	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--

Table E-4-13
Southwest Dietary HQ Calculations for Total HMW PAH

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.048	0.048	0.048	0.048	0.62	0.62	0.62
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.48	0.48	0.48	0.48	3.1	3.1	3.1
EPCs	Sediment EPC	mg/kg, dw	Appendix C	00070	00070	00015	00015	00015	00030	00015
	Plant EPC	mg/kg, ww	Appendix C	00002	00002	00000	00000	00000	00001	00000
	Polychaete EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Blue crab EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Softshell clam EPC	mg/kg, ww	Appendix C	00001	00001	00001	00001	00001	00001	00001
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	00000	00000	NC	00000	00000	00000	00000
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	00000	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	00000	NC	NC	00000	00000	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	NC	00000
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	00000	00000
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	00000	00000	00000	NC	00000	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	00000	NC	00000
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000	00000	00000	00000	00000
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	4	0.5	0.4	0.3	0.006	0.3	0.0009
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.4	0.05	0.04	0.03	0.001	0.06	0.0002

Table E-4-14
Southwest Dietary HQ Calculations for Total LMW PAH

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.67	0.67	0.67	0.67	50	50	50
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.7	6.7	6.7	6.7	150	150	150
EPCs	Sediment EPC	mg/kg, dw	Appendix C	00017	00017	00003	00003	00003	00007	00003
	Plant EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Polychaete EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Blue crab EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Softshell clam EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	00000	00000	00000	00000	00000	00000	00000
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	00000	00000	NC	00000	00000	00000	00000
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	00000	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	00000	NC	NC	00000	00000	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	NC	00000
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	00000	NC	00000	00000	00000	00000
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	00000	00000	00000	NC	00000	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	00000	NC	00000
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	00000	00000	00000	00000	00000	00000	00000
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	--	--
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	0.07	0.02	0.03	0.007	0.00005	0.0006	0.00001
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	0.007	0.002	0.003	0.0007	0.00002	0.0002	0.000003

Table E-4-15
Southwest Dietary HQ Calculations for Total PAH

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	6.2	6.2	6.2	6.2	6.2	40	40	40	40	0.615	0.615	0.615
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	18	18	18	18	18	Not derived	Not derived	Not derived	Not derived	3.07	3.07	3.07
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	8.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	8.70E+01	8.70E+01	1.70E+01	1.70E+01	1.70E+01	3.73E+01	1.70E+01
	Plant EPC	mg/kg, ww	Appendix C	1.98E+00	4.02E-01	4.02E-01	4.02E-01	4.02E-01	1.98E+00	1.98E+00	4.02E-01	4.02E-01	4.02E-01	8.68E-01	4.02E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
	Blue crab EPC	mg/kg, ww	Appendix C	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02
	Softshell clam EPC	mg/kg, ww	Appendix C	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01	6.29E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02	5.70E-02
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.50E-02	5.45E-03	7.07E-04	7.14E-04	5.94E-04	4.54E-01	3.06E-04	NC	1.29E-03	1.33E-04	1.35E-03	3.01E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.70E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	7.45E-03	9.24E-04	1.73E-03	1.75E-03	7.27E-04	4.17E-02	NC	NC	2.23E-03	2.54E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	3.87E-04	3.62E-04	3.65E-04	3.04E-04	NC	3.82E-04	NC	9.33E-04	1.06E-04	NC	2.41E-05
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.12E-02	1.05E-02	1.06E-02	8.81E-03	NC	1.11E-02	NC	2.70E-02	6.16E-03	7.23E-03	6.97E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	2.83E-03	2.86E-03	NC	NC	2.39E-02	3.86E-02	7.30E-03	NC	3.91E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.02E-03	NC	NC	1.60E-03	NC	NC	NC	NC	4.47E-03	NC	1.14E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	3.25E-02	1.27E-02	1.08E-02	1.63E-02	1.20E-02	2.48E-01	3.57E-02	3.86E-02	1.94E-02	5.56E-03	1.82E-01	9.44E-04
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.005	0.002	0.002	0.003	0.002	0.006	0.0009	0.001	0.0005	0.009	0.3	0.002
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.002	0.0007	0.0006	0.0009	0.0007	--	--	--	--	0.002	0.06	0.0003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-16
Southwest Zone Dietary HQ Calculations for Arsenic

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.52	0.52	0.52	0.52	0.52	10	10	10	10	2.6	2.6	2.6
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.9	1.9	1.9	1.9	1.9	40	40	40	40	5.4	5.4	5.4
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.15E+02	2.98E+01	2.98E+01	2.98E+01	2.98E+01	1.15E+02	1.15E+02	2.98E+01	2.98E+01	2.98E+01	3.75E+01	2.98E+01
	Plant EPC	mg/kg, ww	Appendix C	8.63E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	8.63E-01	8.63E-01	2.23E-01	2.23E-01	2.23E-01	2.81E-01	2.23E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00	2.77E+00
	Blue crab EPC	mg/kg, ww	Appendix C	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00	3.15E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00	8.91E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00	1.11E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.31E-02	9.55E-03	1.24E-03	1.25E-03	1.04E-03	6.00E-01	4.05E-04	NC	2.26E-03	2.33E-04	1.35E-03	5.28E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.49E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	3.99E-01	4.94E-02	9.24E-02	9.34E-02	3.89E-02	2.23E+00	NC	NC	1.19E-01	1.36E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.61E-02	5.24E-02	5.30E-02	4.41E-02	NC	5.54E-02	NC	1.35E-01	1.54E-02	NC	3.49E-03
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.59E-01	1.48E-01	1.50E-01	1.25E-01	NC	1.57E-01	NC	3.83E-01	8.73E-02	1.02E-01	9.87E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	2.08E-02	2.10E-02	NC	NC	1.76E-01	2.84E-01	5.37E-02	NC	2.87E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.97E-02	NC	NC	3.10E-02	NC	NC	NC	NC	8.66E-02	NC	2.20E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	4.32E-01	1.97E-01	2.11E-01	3.19E-01	2.40E-01	1.42E+00	3.89E-01	2.84E-01	3.46E-01	1.02E-01	1.87E-01	1.77E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.8	0.4	0.4	0.6	0.5	0.1	0.04	0.03	0.03	0.04	0.07	0.007
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.1	0.1	0.2	0.1	0.04	0.01	0.007	0.009	0.02	0.03	0.003
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-17
Southwest Zone Dietary HQ Calculations for Cadmium

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.001	0.001	0.001	0.001	0.001	0.4	0.4	0.4	0.4	3.5	3.5	3.5
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.01	0.01	0.01	0.01	0.01	4	4	4	4	13	13	13
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.37E+01	4.64E+00	4.64E+00	4.64E+00	4.64E+00	1.37E+01	1.37E+01	4.64E+00	4.64E+00	4.64E+00	3.97E+00	4.64E+00
	Plant EPC	mg/kg, ww	Appendix C	5.19E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	5.19E-01	5.19E-01	2.88E-01	2.88E-01	2.88E-01	2.64E-01	2.88E-01
	Polychaete EPC	mg/kg, ww	Appendix C	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02	9.23E-02
	Blue crab EPC	mg/kg, ww	Appendix C	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01	4.17E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01	3.45E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.94E-03	1.49E-03	1.93E-04	1.95E-04	1.63E-04	7.15E-02	4.82E-05	NC	3.52E-04	3.64E-05	1.43E-04	8.23E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5.16E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	1.33E-02	1.65E-03	3.08E-03	3.11E-03	1.29E-03	7.43E-02	NC	NC	3.97E-03	4.52E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	7.44E-03	6.95E-03	7.02E-03	5.84E-03	NC	7.34E-03	NC	1.79E-02	2.04E-03	NC	4.62E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	6.15E-03	5.75E-03	5.81E-03	4.84E-03	NC	6.07E-03	NC	1.48E-02	3.38E-03	3.96E-03	3.82E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.67E-03	1.68E-03	NC	NC	1.41E-02	2.27E-02	4.30E-03	NC	2.30E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.78E-03	NC	NC	2.80E-03	NC	NC	NC	NC	7.84E-03	NC	2.00E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.72E-02	1.24E-02	1.18E-02	1.78E-02	1.49E-02	7.29E-02	2.76E-02	2.27E-02	2.07E-02	6.88E-03	5.80E-02	1.42E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	17	12	12	18	15	0.2	0.07	0.06	0.05	0.002	0.02	0.0004
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	2	1	1	2	1	0.02	0.007	0.006	0.005	0.0005	0.004	0.0001
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-18
Southwest Zone Dietary HQ Calculations for Chromium

	Parameter	Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.92	0.92	0.92	0.92	0.92	10.5	10.5	10.5	10.5	0.962	0.962	0.962
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	105	105	105	105	9.62	9.62	9.62
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.76E+02	1.70E+02	1.70E+02	1.70E+02	1.70E+02	2.76E+02	2.76E+02	1.70E+02	1.70E+02	1.70E+02	1.17E+02	1.70E+02
	Plant EPC	mg/kg, ww	Appendix C	2.26E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	2.26E+00	2.26E+00	1.39E+00	1.39E+00	1.39E+00	9.61E-01	1.39E+00
	Polychaete EPC	mg/kg, ww	Appendix C	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01	6.30E-01
	Blue crab EPC	mg/kg, ww	Appendix C	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01	2.83E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00	5.81E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	7.94E-02	5.46E-02	7.09E-03	7.16E-03	5.96E-03	1.44E+00	9.72E-04	NC	1.29E-02	1.33E-03	4.22E-03	3.02E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.88E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	9.06E-02	1.12E-02	2.10E-02	2.12E-02	8.83E-03	5.07E-01	NC	NC	2.71E-02	3.09E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.05E-03	4.72E-03	4.76E-03	3.97E-03	NC	4.98E-03	NC	1.22E-02	1.39E-03	NC	3.14E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.04E-01	9.68E-02	9.78E-02	8.14E-02	NC	1.02E-01	NC	2.50E-01	5.69E-02	6.68E-02	6.44E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	6.17E-03	6.23E-03	NC	NC	5.21E-02	8.41E-02	1.59E-02	NC	8.50E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	5.62E-03	NC	NC	8.83E-03	NC	NC	NC	NC	2.47E-02	NC	6.28E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.70E-01	1.21E-01	9.10E-02	1.37E-01	1.09E-01	9.73E-01	1.60E-01	8.41E-02	1.59E-01	4.37E-02	2.67E-01	6.67E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.1	0.1	0.1	0.1	0.09	0.02	0.008	0.02	0.05	0.3	0.007
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	0.009	0.002	0.0008	0.002	0.005	0.03	0.0007
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-19
Southwest Zone Dietary HQ Calculations for Copper

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1	1	1	1	1	1.9	1.9	1.9	1.9	18	18	18
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	2	2	2	2	2	19	19	19	19	26	26	26
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	2.3	2.3	2.3	2.3	3.4	3.4	3.4
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	4.7	4.7	4.7	4.7	6.8	6.8	6.8
EPCs	Sediment EPC	mg/kg, dw	Appendix C	4.43E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	4.43E+02	4.43E+02	2.82E+02	2.82E+02	2.82E+02	3.04E+02	2.82E+02
	Plant EPC	mg/kg, ww	Appendix C	4.30E+00	3.60E+00	3.60E+00	3.60E+00	3.60E+00	4.30E+00	4.30E+00	3.60E+00	3.60E+00	3.60E+00	3.71E+00	3.60E+00
	Polychaete EPC	mg/kg, ww	Appendix C	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00	2.17E+00
	Blue crab EPC	mg/kg, ww	Appendix C	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01	2.18E+01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.27E-01	9.06E-02	1.18E-02	1.19E-02	9.89E-03	2.31E+00	1.56E-03	NC	2.14E-02	2.21E-03	1.10E-02	5.01E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	7.25E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	3.12E-01	3.86E-02	7.22E-02	7.30E-02	3.04E-02	1.74E+00	NC	NC	9.31E-02	1.06E-02	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.93E-01	5.54E-01	5.59E-01	4.66E-01	NC	5.85E-01	NC	1.43E+00	1.63E-01	NC	3.68E-02
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	3.74E-01	3.50E-01	3.53E-01	2.94E-01	NC	3.70E-01	NC	9.02E-01	2.06E-01	2.41E-01	2.33E-02
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	5.17E-02	5.22E-02	NC	NC	4.37E-01	7.04E-01	1.33E-01	NC	7.13E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	3.88E-01	NC	NC	6.10E-01	NC	NC	NC	NC	1.71E+00	NC	4.34E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	4.39E-01	9.94E-01	6.96E-01	1.05E+00	1.41E+00	2.03E+00	1.39E+00	7.04E-01	1.29E+00	1.04E+00	1.05E+00	2.47E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.4	1	0.7	1	1	1	0.7	0.4	0.7	0.06	0.06	0.01
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.5	0.3	0.5	0.7	0.1	0.07	0.04	0.07	0.04	0.04	0.01
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.9	0.6	0.3	0.6	0.3	0.3	0.07
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.4	0.3	0.1	0.3	0.2	0.2	0.04

Table E-4-20
Southwest Zone Dietary HQ Calculations for Lead

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	12.6	12.6	12.6	12.6	12.6	5.5	5.5	5.5	5.5	11	11	11
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	28	28	28	28	90	90	90
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.19	0.19	0.19	0.19	0.71	0.71	0.71
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	1.9	1.9	1.9	1.9	7	7	7
EPCs	Sediment EPC	mg/kg, dw	Appendix C	2.19E+03	3.03E+02	3.03E+02	3.03E+02	3.03E+02	2.19E+03	2.19E+03	3.03E+02	3.03E+02	3.03E+02	9.98E+02	3.03E+02
	Plant EPC	mg/kg, ww	Appendix C	3.97E+00	1.31E+00	1.31E+00	1.31E+00	1.31E+00	3.97E+00	3.97E+00	1.31E+00	1.31E+00	1.31E+00	2.55E+00	1.31E+00
	Polychaete EPC	mg/kg, ww	Appendix C	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01	6.74E-01
	Blue crab EPC	mg/kg, ww	Appendix C	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01	9.48E+01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01	4.64E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	6.30E-01	9.73E-02	1.26E-02	1.28E-02	1.06E-02	1.14E+01	7.71E-03	NC	2.30E-02	2.38E-03	3.60E-02	5.38E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	4.98E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	9.69E-02	1.20E-02	2.25E-02	2.27E-02	9.45E-03	5.43E-01	NC	NC	2.90E-02	3.30E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.51E-02	2.35E-02	2.37E-02	1.97E-02	NC	2.48E-02	NC	6.05E-02	6.90E-03	NC	1.56E-03
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.69E+00	1.58E+00	1.60E+00	1.33E+00	NC	1.67E+00	NC	4.07E+00	9.29E-01	1.09E+00	1.05E-01
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.16E-02	1.17E-02	NC	NC	9.80E-02	1.58E-01	2.99E-02	NC	1.60E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	8.27E-03	NC	NC	1.30E-02	NC	NC	NC	NC	3.64E-02	NC	9.26E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	7.27E-01	1.23E+00	1.11E+00	1.67E+00	1.38E+00	5.98E+00	1.80E+00	1.58E-01	2.11E+00	4.89E-01	1.64E+00	5.82E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.06	0.1	0.09	0.1	0.1	1	0.3	0.03	0.4	0.04	0.1	0.005
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	0.2	0.06	0.006	0.08	0.005	0.02	0.0006
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	31	9	0.8	11	0.7	2	0.08
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	3	0.9	0.08	1	0.07	0.2	0.008

Table E-4-21
Southwest Zone Dietary HQ Calculations for Mercury

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, dw	Appendix C	7.39E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	7.39E+00	7.39E+00	4.44E+00	4.44E+00	4.44E+00	2.77E+00	4.44E+00
	Plant EPC	mg/kg, ww	Appendix C	2.19E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	2.19E-01	2.19E-01	1.66E-01	1.66E-01	1.66E-01	1.29E-01	1.66E-01
	Polychaete EPC	mg/kg, ww	Appendix C	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02
	Blue crab EPC	mg/kg, ww	Appendix C	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02	4.43E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	2.12E-03	1.42E-03	1.85E-04	1.87E-04	1.55E-04	3.85E-02	2.60E-05	NC	3.37E-04	3.48E-05	1.00E-04	7.87E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2.51E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	4.28E-03	5.31E-04	9.93E-04	1.00E-03	4.17E-04	2.40E-02	NC	NC	1.28E-03	1.46E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.80E-03	1.68E-03	1.70E-03	1.41E-03	NC	1.78E-03	NC	4.33E-03	4.94E-04	NC	1.12E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	3.40E-03	3.17E-03	3.21E-03	2.67E-03	NC	3.35E-03	NC	8.18E-03	1.87E-03	2.19E-03	2.11E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	7.38E-04	7.45E-04	NC	NC	6.24E-03	1.01E-02	1.90E-03	NC	1.02E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.85E-03	NC	NC	2.92E-03	NC	NC	NC	NC	8.15E-03	NC	2.07E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	6.41E-03	6.03E-03	4.54E-03	6.84E-03	7.57E-03	3.13E-02	1.14E-02	1.01E-02	8.02E-03	5.35E-03	2.84E-02	1.20E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	11	11	8	12	14	3	1	1	0.8	0.03	0.2	0.008
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	1	0.8	1	1	0.3	0.1	0.1	0.08	0.02	0.1	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	2	0.9	0.8	0.6	0.3	2	0.08
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	1	0.4	0.4	0.3	0.2	1	0.04

Table E-4-22
Southwest Zone Dietary HQ Calculations for Methylmercury

Parameter		Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.00056	0.00056	0.00056	0.00056	0.00056	0.0096	0.0096	0.0096	0.0096	0.16	0.16	0.16
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.0056	0.0056	0.0056	0.0056	0.0056	0.096	0.096	0.096	0.096	0.25	0.25	0.25
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.013	0.013	0.013	0.013	0.016	0.016	0.016
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	0.026	0.026	0.026	0.026	0.027	0.027	0.027
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.19E-02	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.19E-02	1.19E-02	1.54E-03	1.54E-03	1.54E-03	3.70E-03	1.54E-03
	Plant EPC	mg/kg, ww	Appendix C	2.38E-03	3.07E-04	3.07E-04	3.07E-04	3.07E-04	2.38E-03	2.38E-03	3.07E-04	3.07E-04	3.07E-04	7.39E-04	3.07E-04
	Polychaete EPC	mg/kg, ww	Appendix C	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03	3.70E-03
	Blue crab EPC	mg/kg, ww	Appendix C	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02	4.85E-02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02	7.19E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.42E-06	4.93E-07	6.40E-08	6.47E-08	5.39E-08	6.21E-05	4.19E-08	NC	1.17E-07	1.21E-08	1.33E-07	2.73E-09
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.44E-04	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.32E-04	6.60E-05	1.23E-04	1.25E-04	5.19E-05	2.98E-03	NC	NC	1.59E-04	1.81E-05	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.44E-03	2.29E-03	2.31E-03	1.92E-03	NC	2.41E-03	NC	5.89E-03	6.72E-04	NC	1.52E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	8.65E-04	8.09E-04	8.17E-04	6.80E-04	NC	8.54E-04	NC	2.08E-03	4.75E-04	5.57E-04	5.38E-05
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.20E-03	1.21E-03	NC	NC	1.01E-02	1.63E-02	3.09E-03	NC	1.65E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	1.87E-03	NC	NC	2.94E-03	NC	NC	NC	NC	8.22E-03	NC	2.09E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.35E-04	3.52E-03	2.96E-03	4.46E-03	5.59E-03	1.52E-03	1.34E-02	1.63E-02	5.61E-03	4.69E-03	2.35E-03	1.15E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	1	6	5	8	10	0.2	1	2	0.6	0.03	0.01	0.007
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.1	0.6	0.5	0.8	1	0.02	0.1	0.2	0.06	0.02	0.009	0.005
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.1	1	1	0.4	0.3	0.1	0.07
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	0.06	0.5	0.6	0.2	0.2	0.09	0.04

Table E-4-23
Southwest Zone Dietary HQ Calculations for Nickel

	Parameter	Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.14	0.14	0.14	0.14	0.14	15	15	15	15	40	40	40
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	1.4	1.4	1.4	1.4	1.4	33	33	33	33	80	80	80
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	1.24E+02	5.45E+01	5.45E+01	5.45E+01	5.45E+01	1.24E+02	1.24E+02	5.45E+01	5.45E+01	5.45E+01	9.95E+01	5.45E+01
	Plant EPC	mg/kg, ww	Appendix C	7.97E-01	4.31E-01	4.31E-01	4.31E-01	4.31E-01	7.97E-01	7.97E-01	4.31E-01	4.31E-01	4.31E-01	6.76E-01	4.31E-01
	Polychaete EPC	mg/kg, ww	Appendix C	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01	5.18E-01
	Blue crab EPC	mg/kg, ww	Appendix C	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01	3.25E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01	9.21E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01	3.80E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	3.57E-02	1.75E-02	2.27E-03	2.29E-03	1.91E-03	6.47E-01	4.37E-04	NC	4.14E-03	4.28E-04	3.58E-03	9.67E-05
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.32E-01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	7.45E-02	9.24E-03	1.73E-02	1.74E-02	7.26E-03	4.17E-01	NC	NC	2.23E-02	2.54E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	5.80E-03	5.42E-03	5.47E-03	4.56E-03	NC	5.72E-03	NC	1.40E-02	1.59E-03	NC	3.60E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	8.90E-02	8.32E-02	8.40E-02	6.99E-02	NC	8.79E-02	NC	2.14E-01	4.89E-02	5.73E-02	5.53E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.54E-02	1.55E-02	NC	NC	1.30E-01	2.09E-01	3.96E-02	NC	2.12E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	6.78E-03	NC	NC	1.07E-02	NC	NC	NC	NC	2.98E-02	NC	7.58E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	1.10E-01	8.60E-02	8.27E-02	1.25E-01	9.43E-02	5.32E-01	2.24E-01	2.09E-01	1.47E-01	4.16E-02	2.14E-01	6.78E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.8	0.6	0.6	0.9	0.7	0.04	0.01	0.01	0.01	0.001	0.005	0.0002
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.08	0.06	0.06	0.09	0.07	0.02	0.007	0.006	0.004	0.0005	0.003	0.00008
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-24
Southwest Zone Dietary HQ Calculations for Selenium

	Parameter	Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.011	0.011	0.011	0.011	0.011	0.42	0.42	0.42	0.42	0.016	0.016	0.016
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	0.11	0.11	0.11	0.11	0.11	0.82	0.82	0.82	0.82	0.16	0.16	0.16
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	3.00E+00	1.93E+00	1.93E+00	1.93E+00	1.93E+00	3.00E+00	3.00E+00	1.93E+00	1.93E+00	1.93E+00	1.49E+00	1.93E+00
	Plant EPC	mg/kg, ww	Appendix C	3.42E-01	2.10E-01	2.10E-01	2.10E-01	2.10E-01	3.42E-01	3.42E-01	2.10E-01	2.10E-01	2.10E-01	1.57E-01	2.10E-01
	Polychaete EPC	mg/kg, ww	Appendix C	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01	3.59E-01
	Blue crab EPC	mg/kg, ww	Appendix C	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00
	Softshell clam EPC	mg/kg, ww	Appendix C	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01	9.47E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	8.63E-04	6.18E-04	8.03E-05	8.11E-05	6.75E-05	1.56E-02	1.06E-05	NC	1.46E-04	1.51E-05	5.35E-05	3.42E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	3.07E-02	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.16E-02	6.40E-03	1.20E-02	1.21E-02	5.03E-03	2.89E-01	NC	NC	1.54E-02	1.76E-03	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	2.05E-02	1.92E-02	1.93E-02	1.61E-02	NC	2.02E-02	NC	4.94E-02	5.63E-03	NC	1.27E-03
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	1.69E-02	1.58E-02	1.59E-02	1.33E-02	NC	1.67E-02	NC	4.07E-02	9.28E-03	1.09E-02	1.05E-03
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.27E-02	1.28E-02	NC	NC	1.07E-01	1.73E-01	3.27E-02	NC	1.75E-02	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	2.21E-02	NC	NC	3.47E-02	NC	NC	NC	NC	9.71E-02	NC	2.47E-02
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	5.25E-02	4.45E-02	4.00E-02	6.03E-02	6.92E-02	1.52E-01	1.44E-01	1.73E-01	6.92E-02	5.69E-02	5.92E-02	1.35E-02
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	5	4	4	5	6	0.4	0.3	0.4	0.2	4	4	0.8
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.5	0.4	0.4	0.5	0.6	0.2	0.2	0.2	0.08	0.4	0.4	0.08
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-25
Southwest Zone Dietary HQ Calculations for Silver

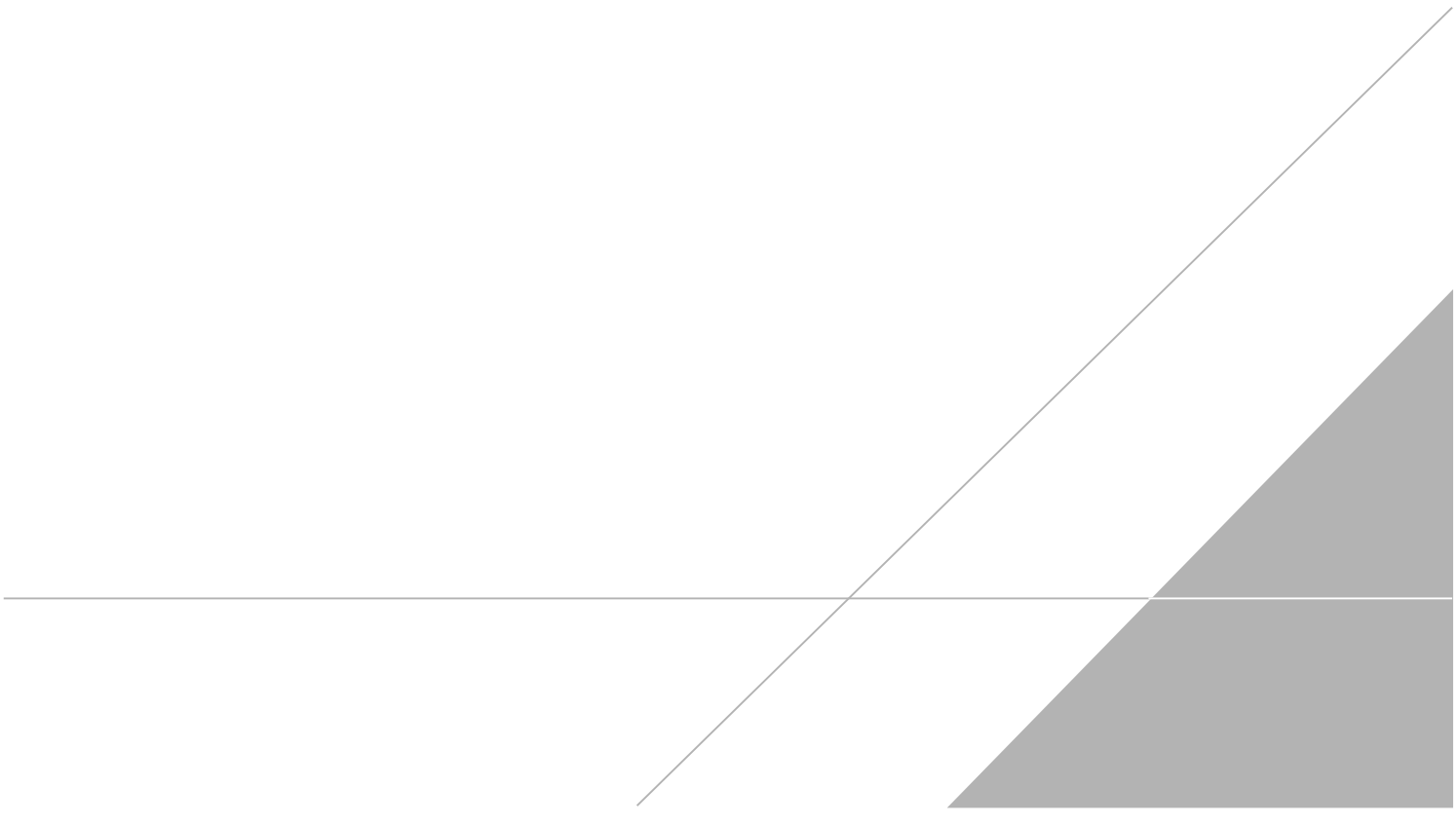
	Parameter	Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	70	70	70	70	70	9.86	9.86	9.86	9.86	18.8	18.8	18.8
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	Not derived	Not derived	Not derived	Not derived	Not derived	98.6	98.6	98.6	98.6	188	188	188
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	5.80E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	5.80E+00	5.80E+00	2.87E+00	2.87E+00	2.87E+00	2.54E+00	2.87E+00
	Plant EPC	mg/kg, ww	Appendix C	1.62E-02	8.03E-03	8.03E-03	8.03E-03	8.03E-03	1.62E-02	1.62E-02	8.03E-03	8.03E-03	8.03E-03	7.11E-03	8.03E-03
	Polychaete EPC	mg/kg, ww	Appendix C	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
	Blue crab EPC	mg/kg, ww	Appendix C	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01
	Softshell clam EPC	mg/kg, ww	Appendix C	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01	3.49E-01
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01	3.36E-01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.67E-03	9.21E-04	1.20E-04	1.21E-04	1.01E-04	3.03E-02	2.04E-05	NC	2.18E-04	2.25E-05	9.15E-05	5.09E-06
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.39E-03	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.35E-03	6.63E-04	1.24E-03	1.25E-03	5.21E-04	2.99E-02	NC	NC	1.60E-03	1.82E-04	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	1.44E-02	1.35E-02	1.36E-02	1.13E-02	NC	1.42E-02	NC	3.47E-02	3.95E-03	NC	8.94E-04
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	6.22E-03	5.82E-03	5.88E-03	4.89E-03	NC	6.15E-03	NC	1.50E-02	3.42E-03	4.01E-03	3.87E-04
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	1.05E-03	1.06E-03	NC	NC	8.87E-03	1.43E-02	2.71E-03	NC	1.45E-03	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	5.99E-03	NC	NC	9.42E-03	NC	NC	NC	NC	2.63E-02	NC	6.70E-03
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	7.02E-03	1.89E-02	1.45E-02	2.19E-02	2.62E-02	3.01E-02	2.92E-02	1.43E-02	2.71E-02	1.70E-02	6.94E-03	4.00E-03
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.0001	0.0003	0.0002	0.0003	0.0004	0.003	0.003	0.001	0.003	0.0009	0.0004	0.0002
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	--	--	--	--	--	0.0003	0.0003	0.0001	0.0003	0.00009	0.00004	0.00002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

Table E-4-26
Southwest Zone Dietary HQ Calculations for Zinc

	Parameter	Units	Table Reference	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone Mudflat	Southwest Zone Mudflat	Southwest Zone	Southwest Zone	Southwest Zone	Southwest Zone All Shorelines	Southwest Zone
				Mummichog	Summer/winter Flounder	White Perch	American Eel <50cm	American Eel ≥50cm	Spotted Sandpiper	Great Blue Heron	Double-crested Cormorant	Lesser Scaup	River Otter	Muskrat	Harbor Seal
Exposure Factors	DF sediment (incidental)	diet fraction	Tables 7-10, 8-1, 9-1	0.10	0.15	0.05	0.05	0.05	0.18	0.01	0.00	0.05	0.02	0.03	0.02
	DF plant	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00
	DF polychaete	diet fraction	Tables 7-10, 8-1, 9-1	1.00	0.25	0.40	0.40	0.20	1.00	0.00	0.00	0.25	0.05	0.00	0.00
	DF blue crab	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.05	0.00	0.05
	DF softshell clam	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.20	0.20	0.20	0.00	0.10	0.00	0.25	0.10	0.05	0.05
	DF fish ≤15cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.00	0.20	0.20	0.00	0.00	0.80	1.00	0.25	0.00	0.10	0.00
	DF fish ≤30cm	diet fraction	Tables 7-10, 8-1, 9-1	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.80	0.00	0.90
	BW	kg	Tables 7-10, 8-1, 9-1	0.0033	0.35	0.13	0.12	0.40	0.04	2.30	2.33	0.82	8.00	1.00	80.00
	IR food	kg/kg bw-d, ww	Tables 7-10, 8-1, 9-1	0.144	0.071	0.083	0.084	0.070	0.805	0.176	0.227	0.172	0.098	0.230	0.022
	IR sediment	kg/kg bw-d, dw	Tables 7-10, 8-1, 9-1	0.0028751	0.0021397	0.0008334	0.0008417	0.0007008	0.0289792	0.0003522	0.00	0.0016153	0.0003920	0.0012870	0.0000887
	Seasonal/Site Use Factor	fraction	Tables 7-10, 8-1, 9-1	1.00	0.67	0.67	1.00	1.00	0.50	1.00	1.00	0.50	0.50	1.00	0.50
Dietary TRVs (NBSA)	NBSA NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	19	19	19	19	19	82	82	82	82	160	160	160
	NBSA LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	38	38	38	38	38	124	124	124	124	320	320	320
Dietary TRVs (FFS)	FFS NOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
	FFS LOAEL TRV	mg/kg bw-day	Tables 7-11, 8-2, 9-3	--	--	--	--	--	--	--	--	--	--	--	--
EPCs	Sediment EPC	mg/kg, dw	Appendix C	6.81E+03	5.54E+02	5.54E+02	5.54E+02	5.54E+02	6.81E+03	6.81E+03	5.54E+02	5.54E+02	5.54E+02	2.83E+03	5.54E+02
	Plant EPC	mg/kg, ww	Appendix C	1.28E+02	3.20E+01	3.20E+01	3.20E+01	3.20E+01	1.28E+02	1.28E+02	3.20E+01	3.20E+01	3.20E+01	7.89E+01	3.20E+01
	Polychaete EPC	mg/kg, ww	Appendix C	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01	3.53E+01
	Blue crab EPC	mg/kg, ww	Appendix C	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01
	Softshell clam EPC	mg/kg, ww	Appendix C	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02
	Fish ≤15 cm EPC	mg/kg, ww	Appendix C	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01	5.32E+01
	Fish ≤30 cm EPC	mg/kg, ww	Appendix C	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01
Doses	Dose from sediment	mg/kg bw-day	Calculated, see equation 1	1.96E+00	1.78E-01	2.31E-02	2.33E-02	1.94E-02	3.55E+01	2.40E-02	NC	4.21E-02	4.35E-03	1.02E-01	9.83E-04
	Dose from plants	mg/kg bw-day	Calculated, see equation 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.54E+01	NC
	Dose from polychaetes	mg/kg bw-day	Calculated, see equation 1	5.07E+00	6.29E-01	1.18E+00	1.19E+00	4.95E-01	2.84E+01	NC	NC	1.52E+00	1.73E-01	NC	NC
	Dose from blue crab	mg/kg bw-day	Calculated, see equation 1	NC	7.68E-01	7.18E-01	7.25E-01	6.04E-01	NC	7.58E-01	NC	1.85E+00	2.11E-01	NC	4.77E-02
	Dose from softshell clam	mg/kg bw-day	Calculated, see equation 1	NC	2.47E+00	2.31E+00	2.33E+00	1.94E+00	NC	2.44E+00	NC	5.94E+00	1.36E+00	1.59E+00	1.53E-01
	Dose from fish ≤15cm	mg/kg bw-day	Calculated, see equation 1	NC	NC	8.87E-01	8.96E-01	NC	NC	7.50E+00	1.21E+01	2.29E+00	NC	1.22E+00	NC
	Dose from fish ≤30cm	mg/kg bw-day	Calculated, see equation 1	NC	7.03E-01	NC	NC	1.10E+00	NC	NC	NC	NC	3.09E+00	NC	7.86E-01
	Total dose = Σdoses x SUF	mg/kg bw-day	Calculated, see equation 1	7.03E+00	3.18E+00	3.42E+00	5.16E+00	4.16E+00	3.20E+01	1.07E+01	1.21E+01	5.82E+00	2.42E+00	1.83E+01	4.94E-01
NBSA-wide HQs NBSA	NOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.4	0.2	0.2	0.3	0.2	0.4	0.1	0.1	0.07	0.02	0.1	0.003
	LOAEL HQ - NBSA	unitless	Calculated, see equation 2	0.2	0.08	0.09	0.1	0.1	0.3	0.09	0.1	0.05	0.008	0.06	0.002
NBSA-wide HQs FFS	NOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--
	LOAEL HQ - FFS	unitless	Calculated, see equation 2	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX F

Sensitivity & Uncertainties Analyses of Risk Estimates



ARCADIS Design & Consultancy for natural and built assets

OXY Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum Corporation

BASELINE ECOLOGICAL RISK ASSESSMENT

APPENDIX F – SENSITIVITY & UNCERTAINTY ANALYSES OF RISK ESTIMATES

Newark Bay Study Area

Newark Bay, New Jersey

July 2020

TABLES

Table F-1-1 Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Table F-1-2 Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone): Diet Includes Fish of All Lengths

Table F-1-3 Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Table F-1-4 Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Table F-1-5 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Table F-1-6 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Diet Includes Fish of All Lengths

Table F-1-7 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Table F-1-8 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Table F-1-9 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Table F-1-10 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (North Zone): Diet Includes Fish of All Lengths

Table F-1-11 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Table F-1-12 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Table F-2-1 Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-2 Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-3 Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-4 Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-5 Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-6 Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-7 Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-8 Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-9 Calculated Tissue HQs for Fish Eggs with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-10 Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-11 Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-12 Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-13 Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of non-detects treated as ND=0, ND=1/2, and ND=1

Table F-2-14 Calculated Dietary HQs for Avian Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-15 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-16 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-17 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-18 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-19 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-20 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-2-21 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Table F-3-1 Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Avian Receptors with NBSA and LPR FFS-Selected TRVs

Table F-3-2 Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Mammal Receptors with NBSA and LPR FFS-Selected TRVs

Table F-4-1 Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs; SUF = 1

Table F-4-2 Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Table F-4-3 Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Table F-5-1 Atlantic Menhaden and Atlantic Silverside Tissue HQs NBSA-wide and by Assessment Zone

Table F-6-1 Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 100% Fish > 30 cm

Table F-6-2 Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 75% Fish ≤ 15 cm; 5% Fish > 30 cm

Table F-6-3 Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 70% Fish ≤ 15 cm; 10% Fish > 30 cm

Table F-7-1 Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 50% Worm; 25% Clam; 25% Crab

Table F-7-2 Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 50% Clam; 25% Crab

Table F-7-3 Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm ; 75% Clam

Table F-8-1 Calculated Dietary HQs for River Otter Using Alternative Diet: 100% Fish > 30 cm

Table F-8-2 Calculated Dietary HQs for River Otter Using Alternative Diet: 5% Worm; 10% Clam; 5% Crab; 70% Fish ≤ 30 cm; 10% Fish > 30 cm

Table F-8-3 Calculated Dietary HQs for River Otter Using Alternative Diet: 5% Worm; 10% Clam; 5% Crab; 75% Fish ≤ 30 cm; 5% Fish > 30 cm

Table F-1-1
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Constituent	Units	Fish Dietary HQs (NBSA-wide)							
		Summer/Winter Flounder				American Eel ≥50 cm			
		Benthic Omnivore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based		NBSA TRV-based HQ		LPR FFS TRV-based	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.002	0.0006	NC	NC	0.002	0.0005	NC	NC
Inorganics									
Arsenic	unitless	0.3	0.08	NC	NC	0.4	0.1	NC	NC
Cadmium	unitless	**9**	0.9	NC	NC	**11**	**1**	NC	NC
Chromium	unitless	0.1	NC	NC	NC	0.09	NC	NC	NC
Copper	unitless	0.7	0.4	NC	NC	0.9	0.5	NC	NC
Lead	unitless	0.03	NC	NC	NC	0.04	NC	NC	NC
Mercury	unitless	**11**	**1**	NC	NC	**15**	**1**	NC	NC
Methylmercury	unitless	**7**	0.7	NC	NC	**11**	**1**	NC	NC
Nickel	unitless	0.4	0.04	NC	NC	0.4	0.04	NC	NC
Selenium	unitless	**4**	0.4	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0003	NC	NC	NC	0.0003	NC	NC	NC
Zinc	unitless	0.1	0.05	NC	NC	0.1	0.07	NC	NC

Table F-1-1
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Notes:

Diet included fish of all lengths

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

cm = centimeters
FFS = focused feasibility study (USEPA 2014)
EPC = exposure point concentration
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-2
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone): Diet Includes Fish of All Lengths

Constituent	Units	Fish Dietary HQs (North Zone)							
		Summer/Winter Flounder				American Eel ≥50 cm			
		Benthic Omnivore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.002	0.0007	NC	NC	0.002	0.0008	NC	NC
Inorganics									
Arsenic	unitless	0.3	0.08	NC	NC	0.5	0.1	NC	NC
Cadmium	unitless	**9**	0.9	NC	NC	**14**	**1**	NC	NC
Chromium	unitless	0.1	NC	NC	NC	0.1	NC	NC	NC
Copper	unitless	0.7	0.3	NC	NC	0.9	0.5	NC	NC
Lead	unitless	0.02	NC	NC	NC	0.03	NC	NC	NC
Mercury	unitless	**13**	**1**	NC	NC	**18**	**2**	NC	NC
Methylmercury	unitless	**8**	0.8	NC	NC	**11**	**1**	NC	NC
Nickel	unitless	0.4	0.04	NC	NC	0.6	0.06	NC	NC
Selenium	unitless	**4**	0.4	NC	NC	**6**	0.6	NC	NC
Silver	unitless	0.0003	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.1	0.05	NC	NC	0.2	0.08	NC	NC

Table F-1-2

Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (North Zone): Diet Includes Fish of All Lengths

Notes:

Diet included fish of all lengths

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-3
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Constituent	Units	Fish Dietary HQs (Southeast Zone)							
		Summer/Winter Flounder				American Eel ≥50 cm			
		Benthic Omnivore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.002	0.0006	NC	NC	0.002	0.0006	NC	NC
Inorganics									
Arsenic	unitless	0.2	0.06	NC	NC	0.4	0.1	NC	NC
Cadmium	unitless	**11**	**1**	NC	NC	**16**	**2**	NC	NC
Chromium	unitless	0.1	NC	NC	NC	0.2	NC	NC	NC
Copper	unitless	0.7	0.3	NC	NC	0.9	0.5	NC	NC
Lead	unitless	0.01	NC	NC	NC	0.02	NC	NC	NC
Mercury	unitless	**9**	0.9	NC	NC	**13**	**1**	NC	NC
Methylmercury	unitless	**7**	0.7	NC	NC	**10**	**1**	NC	NC
Nickel	unitless	0.4	0.04	NC	NC	0.5	0.05	NC	NC
Selenium	unitless	**4**	0.4	NC	NC	**6**	0.6	NC	NC
Silver	unitless	0.0003	NC	NC	NC	0.0005	NC	NC	NC
Zinc	unitless	0.09	0.05	NC	NC	0.2	0.08	NC	NC

Table F-1-3
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Notes:
Diet included fish of all lengths
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-4
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Constituent	Units	Fish Dietary HQs (Southwest Zone)							
		Summer/Winter Flounder				American Eel ≥50 cm			
		Benthic Omnivore				Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.002	0.0007	NC	NC	0.002	0.0008	NC	NC
Inorganics									
Arsenic	unitless	0.4	0.1	NC	NC	0.6	0.2	NC	NC
Cadmium	unitless	**12**	**1**	NC	NC	**17**	**2**	NC	NC
Chromium	unitless	0.1	NC	NC	NC	0.1	NC	NC	NC
Copper	unitless	**1**	0.5	NC	NC	**1**	0.7	NC	NC
Lead	unitless	0.1	NC	NC	NC	0.1	NC	NC	NC
Mercury	unitless	**11**	**1**	NC	NC	**15**	**1**	NC	NC
Methylmercury	unitless	**7**	0.7	NC	NC	**10**	**1**	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.8	0.08	NC	NC
Selenium	unitless	**4**	0.4	NC	NC	**6**	0.6	NC	NC
Silver	unitless	0.0003	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.2	0.08	NC	NC	0.3	0.1	NC	NC

Table F-1-4
Calculated Dietary HQs for Fish Receptors with NBSA-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Notes:

Diet included fish of all lengths

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-5
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Constituent	Units	Avian Dietary HQs (NBSA-wide)							
		NBSA-wide Mudflats				NBSA-wide			
		Great Blue Heron				Double-crested Cormorant			
		Subtidal Piscivore				Pelagic Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Total Dioxin/Furan TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	0.1	0.4	0.3	**2**	0.2	0.6	0.5
Total PCB TEQ Bird	unitless	**1**	0.1	**6**	0.6	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**8**	0.8	**2**	0.2	**12**	**1**
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**5**	**2**	**3**	0.3	**7**	**2**
Dieldrin	unitless	0.02	0.01	0.03	0.01	0.03	0.02	0.05	0.01
Total Chlordane	unitless	0.005	0.0005	NC	NC	0.008	0.0008	NC	NC
Hexachlorobenzene	unitless	0.0003	0.00007	NC	NC	0.0004	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.06	0.006
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.01	0.001
Total PAH	unitless	0.0004	NC	NC	NC	0.0003	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.008	NC	NC	0.03	0.007	NC	NC
Cadmium	unitless	0.05	0.005	NC	NC	0.03	0.003	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.008	0.0008	NC	NC
Copper	unitless	**1**	0.1	**1**	0.5	**1**	0.1	**1**	0.5
Lead	unitless	0.1	0.02	**3**	0.3	0.02	0.003	0.4	0.04
Mercury	unitless	**2**	0.2	**2**	0.8	**3**	0.3	**2**	**1**
Methylmercury	unitless	**2**	0.2	**2**	0.8	**3**	0.3	**2**	**1**
Nickel	unitless	0.007	0.003	NC	NC	0.005	0.002	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.5	0.2	NC	NC
Silver	unitless	0.005	0.0005	NC	NC	0.005	0.0005	NC	NC
Zinc	unitless	0.08	0.05	NC	NC	0.09	0.06	NC	NC

Table F-1-5
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Notes:
Diet included fish of all lengths
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-6
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Diet Includes Fish of All Lengths

Constituent	Units	Avian Dietary HQs (North Zone)							
		North Zone Mudflats				North Zone			
		Subtidal Piscivore				Pelagic Piscivore			
		Great Blue Heron				Double-crested Cormorant			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.06	**3**	0.3	0.8	0.08	**4**	0.4
Total Dioxin/Furan TEQ Bird	unitless	0.7	0.07	**4**	0.4	**1**	0.1	**5**	0.5
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	0.1	0.5	0.4	**2**	0.2	0.7	0.6
Total PCB TEQ Bird	unitless	**2**	0.2	**10**	**1**	**3**	0.3	**15**	**1**
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**11**	**1**	**3**	0.3	**17**	**2**
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**4**	**1**	**2**	0.2	**7**	**2**
Dieldrin	unitless	0.02	0.01	0.03	0.009	0.03	0.02	0.04	0.01
Total Chlordane	unitless	0.007	0.0007	NC	NC	0.01	0.001	NC	NC
Hexachlorobenzene	unitless	0.0003	0.00007	NC	NC	0.0005	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.09	0.009
Total LMW PAH	unitless	NC	NC	0.03	0.003	NC	NC	0.04	0.004
Total PAH	unitless	0.0007	NC	NC	NC	0.0007	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.007	NC	NC	0.02	0.006	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.02	0.002	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.9	0.09	0.8	0.4	0.9	0.09	0.7	0.3
Lead	unitless	0.08	0.02	**2**	0.2	0.02	0.005	0.7	0.07
Mercury	unitless	**3**	0.3	**2**	**1**	**3**	0.3	**2**	**1**
Methylmercury	unitless	**3**	0.3	**2**	**1**	**4**	0.4	**3**	**2**
Nickel	unitless	0.007	0.003	NC	NC	0.005	0.002	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.4	0.2	NC	NC
Silver	unitless	0.005	0.0005	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.08	0.05	NC	NC	0.1	0.07	NC	NC

Table F-1-6
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Diet Includes Fish of All Lengths

Notes:
Diet included fish of all lengths
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-7

Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Constituent	Units	Avian Dietary HQs (Southeast Zone)							
		Southeast Zone Mudflats				Southeast Zone			
		Subtidal Piscivore				Pelagic Piscivore			
		Great Blue Heron				Double-crested Cormorant			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**2**	0.2	0.5	0.05	**2**	0.2
Total Dioxin/Furan TEQ Bird	unitless	0.5	0.05	**3**	0.3	0.7	0.07	**4**	0.4
Polychlorinated Biphenyls									
Total PCBs	unitless	0.9	0.09	0.3	0.2	**1**	0.1	0.5	0.4
Total PCB TEQ Bird	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**8**	0.8	**2**	0.2	**12**	**1**
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**1**	0.1	**3**	**1**	**2**	0.2	**5**	**2**
Dieldrin	unitless	0.02	0.01	0.02	0.007	0.02	0.02	0.04	0.01
Total Chlordane	unitless	0.005	0.0005	NC	NC	0.007	0.0007	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00005	NC	NC	0.0004	0.00008	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.09	0.009
Total LMW PAH	unitless	NC	NC	0.007	0.0007	NC	NC	0.003	0.0003
Total PAH	unitless	0.0003	NC	NC	NC	0.00009	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.006	NC	NC	0.02	0.006	NC	NC
Cadmium	unitless	0.07	0.007	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.02	0.002	NC	NC	0.007	0.0007	NC	NC
Copper	unitless	**1**	0.1	0.8	0.4	0.9	0.09	0.7	0.4
Lead	unitless	0.04	0.009	**1**	0.1	0.01	0.002	0.4	0.04
Mercury	unitless	**2**	0.2	**2**	0.8	**3**	0.3	**2**	**1**
Methylmercury	unitless	**2**	0.2	**2**	0.8	**3**	0.3	**2**	**1**
Nickel	unitless	0.007	0.003	NC	NC	0.006	0.003	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.5	0.3	NC	NC
Silver	unitless	0.005	0.0005	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.07	0.05	NC	NC	0.09	0.06	NC	NC

Table F-1-7

Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Notes:

Diet included fish of all lengths

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
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NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-8

Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Constituent	Units	Avian Dietary HQs (Southwest Zone)							
		Southwest Zone Mudflats				Southwest Zone			
		Subtidal Piscivore				Pelagic Piscivore			
		Great Blue Heron				Double-crested Cormorant			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.2	0.02	0.8	0.08	0.2	0.02	**1**	0.1
Total Dioxin/Furan TEQ Bird	unitless	0.3	0.03	**1**	0.1	0.4	0.04	**2**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	0.1	0.4	0.4	**2**	0.2	0.7	0.5
Total PCB TEQ Bird	unitless	**1**	0.1	**5**	0.5	**1**	0.1	**7**	0.7
Total Dioxin/Furan/PCB TEQ Bird	unitless	**1**	0.1	**6**	0.6	**2**	0.2	**9**	0.9
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**3**	0.3	**8**	**3**	**4**	0.4	**11**	**4**
Dieldrin	unitless	0.03	0.02	0.04	0.01	0.04	0.03	0.06	0.02
Total Chlordane	unitless	0.005	0.0005	NC	NC	0.008	0.0008	NC	NC
Hexachlorobenzene	unitless	0.0003	0.00006	NC	NC	0.0004	0.00009	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.3	0.03	NC	NC	0.1	0.01
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.02	0.002
Total PAH	unitless	0.0005	NC	NC	NC	0.0003	NC	NC	NC
Inorganics									
Arsenic	unitless	0.04	0.01	NC	NC	0.03	0.008	NC	NC
Cadmium	unitless	0.05	0.005	NC	NC	0.03	0.003	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.006	0.0006	NC	NC
Copper	unitless	**2**	0.2	**2**	0.8	**2**	0.2	**2**	**1**
Lead	unitless	0.3	0.06	**9**	0.9	0.02	0.003	0.5	0.05
Mercury	unitless	**2**	0.2	**2**	0.9	**3**	0.3	**2**	**1**
Methylmercury	unitless	**2**	0.2	**2**	0.8	**3**	0.3	**2**	**1**
Nickel	unitless	0.01	0.004	NC	NC	0.006	0.003	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.6	0.3	NC	NC
Silver	unitless	0.007	0.0007	NC	NC	0.008	0.0008	NC	NC
Zinc	unitless	0.1	0.07	NC	NC	0.1	0.07	NC	NC

Table F-1-8

Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Notes:

Diet included fish of all lengths

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

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LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-9

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Constituent	Units	Mammal Dietary HQs (NBSA-wide)							
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.2	**19**	0.7	0.1	0.04	**5**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.7	0.2	**21**	0.8	0.2	0.05	**5**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	0.5	0.4	0.6	0.5	0.1	0.1	0.2	0.1
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.2	0.05	**5**	0.2	0.04	0.01	**1**	0.05
Total PCB TEQ Mammal	unitless	0.7	0.2	**22**	0.8	0.2	0.05	**5**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.09	0.009	0.01	0.003	0.02	0.002	0.004	0.0007
Dieldrin	unitless	0.03	0.02	0.03	0.02	0.008	0.004	0.008	0.004
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.0003	0.00003	NC	NC
Hexachlorobenzene	unitless	0.007	0.0007	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0009	NC	NC	0.0006	0.0001
Total LMW PAH	unitless	NC	NC	0.00004	0.00001	NC	NC	0.00001	0.000003
Total PAH	unitless	0.007	0.001	NC	NC	0.001	0.0003	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.02	NC	NC	0.006	0.003	NC	NC
Cadmium	unitless	0.001	0.0003	NC	NC	0.0003	0.00007	NC	NC
Chromium	unitless	0.04	0.004	NC	NC	0.006	0.0006	NC	NC
Copper	unitless	0.03	0.02	0.2	0.08	0.007	0.005	0.04	0.02
Lead	unitless	0.01	0.002	0.2	0.02	0.002	0.0002	0.03	0.003
Mercury	unitless	0.04	0.02	0.4	0.2	0.008	0.005	0.08	0.05
Methylmercury	unitless	0.04	0.02	0.4	0.2	0.009	0.006	0.09	0.05
Nickel	unitless	0.0007	0.0004	NC	NC	0.0001	0.00006	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	0.6	0.06	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0001	0.00001	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.002	0.001	NC	NC

Table F-1-9

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (NBSA-wide): Diet Includes Fish of All Lengths

Notes:

Diet included fish of all lengths

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
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NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-10

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (North Zone): Diet Includes Fish of All Lengths

Constituent	Units	Mammal Dietary HQs (North Zone)							
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.8	0.2	**27**	**1**	0.2	0.06	**7**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.9	0.3	**29**	**1**	0.2	0.06	**7**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	0.7	0.5	0.8	0.6	0.2	0.1	0.2	0.2
Total PCB TEQ Mammal	unitless	0.3	0.08	**9**	0.3	0.07	0.02	**2**	0.08
Total Dioxin/Furan/PCB TEQ Mamn	unitless	**1**	0.3	**34**	**1**	0.3	0.08	**8**	0.3
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.08	0.008	0.01	0.003	0.02	0.002	0.003	0.0007
Dieldrin	unitless	0.03	0.01	0.03	0.01	0.007	0.004	0.007	0.004
Total Chlordane	unitless	0.002	0.0002	NC	NC	0.0004	0.00004	NC	NC
Hexachlorobenzene	unitless	0.007	0.0007	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.005	0.001	NC	NC	0.0008	0.0002
Total LMW PAH	unitless	NC	NC	0.0001	0.00003	NC	NC	0.00002	0.000008
Total PAH	unitless	0.01	0.002	NC	NC	0.003	0.0005	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.02	NC	NC	0.006	0.003	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.0004	0.0001	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.008	0.0008	NC	NC
Copper	unitless	0.02	0.02	0.02	0.02	0.005	0.004	0.005	0.004
Lead	unitless	0.01	0.001	0.2	0.02	0.002	0.0002	0.02	0.003
Mercury	unitless	0.04	0.03	0.4	0.3	0.01	0.006	0.1	0.06
Methylmercury	unitless	0.05	0.03	0.5	0.3	0.01	0.007	0.1	0.07
Nickel	unitless	0.0007	0.0004	NC	NC	0.0001	0.00006	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	0.6	0.06	NC	NC
Silver	unitless	0.0005	0.00005	NC	NC	0.0001	0.00001	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.002	0.001	NC	NC

Table F-1-10
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (North Zone): Diet Includes Fish of All Lengths

Notes:
Diet included fish of all lengths
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

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NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-11
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Constituent	Units	Mammal Dietary HQs (Southeast Zone)							
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		Piscivore		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.5	0.1	**16**	0.6	0.1	0.03	**4**	0.1
Total Dioxin/Furan TEQ Mammal	unitless	0.5	0.2	**17**	0.6	0.1	0.04	**4**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.3	0.5	0.4	0.1	0.09	0.1	0.1
Total PCB TEQ Mammal	unitless	0.1	0.04	**4**	0.1	0.03	0.009	**1**	0.04
Total Dioxin/Furan/PCB TEQ Mamn	unitless	0.6	0.2	**20**	0.7	0.2	0.04	**5**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.06	0.006	0.01	0.002	0.02	0.002	0.003	0.0005
Dieldrin	unitless	0.02	0.01	0.02	0.01	0.006	0.003	0.006	0.003
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.0003	0.00003	NC	NC
Hexachlorobenzene	unitless	0.006	0.0006	NC	NC	0.001	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0008	NC	NC	0.0007	0.0001
Total LMW PAH	unitless	NC	NC	0.00002	0.000007	NC	NC	0.000004	0.000001
Total PAH	unitless	0.004	0.0009	NC	NC	0.0007	0.0001	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.01	NC	NC	0.005	0.003	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.0004	0.0001	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.008	0.0008	NC	NC
Copper	unitless	0.02	0.02	0.1	0.06	0.005	0.004	0.03	0.01
Lead	unitless	0.006	0.0008	0.1	0.01	0.0009	0.0001	0.01	0.001
Mercury	unitless	0.04	0.02	0.4	0.2	0.008	0.005	0.08	0.05
Methylmercury	unitless	0.04	0.02	0.4	0.2	0.009	0.006	0.09	0.05
Nickel	unitless	0.002	0.0009	NC	NC	0.0001	0.00007	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	0.7	0.07	NC	NC
Silver	unitless	0.0007	0.00007	NC	NC	0.0001	0.00001	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.002	0.001	NC	NC

Table F-1-11
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (Southeast Zone): Diet Includes Fish of All Lengths

Notes:
Diet included fish of all lengths
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

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PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-1-12
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Constituent	Units	Mammal Dietary HQs (Southwest Zone)							
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.2	0.07	**8**	0.3	0.06	0.02	**2**	0.07
Total Dioxin/Furan TEQ Mammal	unitless	0.3	0.08	**9**	0.3	0.07	0.02	**2**	0.08
Polychlorinated Biphenyls									
Total PCBs	unitless	0.6	0.5	0.7	0.6	0.2	0.1	0.2	0.1
Total PCB TEQ Mammal	unitless	0.3	0.07	**8**	0.3	0.06	0.02	**2**	0.07
Total Dioxin/Furan/PCB TEQ Mam	unitless	0.5	0.1	**16**	0.6	0.1	0.04	**4**	0.1
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.005	0.04	0.004	0.006	0.001
Dieldrin	unitless	0.04	0.02	0.04	0.02	0.009	0.005	0.009	0.005
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.0004	0.00004	NC	NC
Hexachlorobenzene	unitless	0.007	0.0007	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.006	0.001	NC	NC	0.0008	0.0002
Total LMW PAH	unitless	NC	NC	0.00005	0.00002	NC	NC	0.00001	0.000003
Total PAH	unitless	0.009	0.002	NC	NC	0.002	0.0003	NC	NC
Inorganics									
Arsenic	unitless	0.04	0.02	NC	NC	0.008	0.004	NC	NC
Cadmium	unitless	0.002	0.0004	NC	NC	0.0003	0.00008	NC	NC
Chromium	unitless	0.04	0.004	NC	NC	0.006	0.0006	NC	NC
Copper	unitless	0.05	0.0	0.3	0.1	0.01	0.009	0.07	0.03
Lead	unitless	0.04	0.005	0.7	0.07	0.005	0.0006	0.08	0.008
Mercury	unitless	0.04	0.02	0.4	0.2	0.009	0.006	0.09	0.05
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.009	0.005	0.09	0.05
Nickel	unitless	0.001	0.0005	NC	NC	0.0002	0.00008	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	0.7	0.07	NC	NC
Silver	unitless	0.001	0.0001	NC	NC	0.0002	0.00002	NC	NC
Zinc	unitless	0.01	0.007	NC	NC	0.003	0.001	NC	NC

Table F-1-12
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-selected TRVs (Southwest Zone): Diet Includes Fish of All Lengths

Notes:
Diet included fish of all lengths
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-1

Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Benthic Invertebrate Tissue - HQs (NBSA-wide)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polychlorinated Biphenyls													
Total PCBs (ND=0)	unitless	**1**	0.1	**10**	**4**	**7**	0.7	**57**	**21**	**3**	0	**22**	**8**
Total PCBs (ND=1/2)	unitless	**1**	0.1	**10**	**4**	**7**	0.7	**57**	**21**	**3**	0	**22**	**8**
Total PCBs (ND=1)	unitless	**1**	0.1	**10**	**4**	**7**	0.7	**57**	**21**	**3**	0	**22**	**8**
Pesticides													
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.07	0.03	0.07	0.03	**2**	0.9	**2**	0.9	0.4	0.2	0.4	0.2
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.07	0.03	0.07	0.03	**2**	0.9	**2**	0.9	0.4	0.2	0.4	0.2
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.07	0.03	0.07	0.03	**2**	0.9	**2**	0.9	0.4	0.2	0.4	0.2
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH (ND=0)	unitless	0.006	0.002	0.8	0.08	0.005	0.002	0.6	0.06	0.05	0.02	**6**	0.6
Total HMW PAH (ND=1/2)	unitless	0.009	0.003	**1**	0.1	0.009	0.003	**1**	0.1	0.05	0.02	**6**	0.6
Total HMW PAH (ND=1)	unitless	0.02	0.01	**2**	0.2	0.009	0.003	**1**	0.1	0.05	0.02	**6**	0.6
Total LMW PAH (ND=0)	unitless	0.001	0.0001	0.2	0.02	0.006	0.0006	0.9	0.09	0.005	0.0005	0.8	0.08
Total LMW PAH (ND=1/2)	unitless	0.001	0.0001	0.2	0.02	0.008	0.0007	**1**	0.1	0.005	0.0005	0.8	0.08
Total LMW PAH (ND=1)	unitless	0.001	0.0001	0.2	0.02	0.009	0.0009	**1**	0.1	0.006	0.0006	0.9	0.09

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-2

Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Benthic Invertebrate Tissue - HQs (North Zone)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polychlorinated Biphenyls													
Total PCBs (ND=0)	unitless	--	--	--	--	**9**	0.9	**76**	**28**	**2**	0.2	**15**	**6**
Total PCBs (ND=1/2)	unitless	--	--	--	--	**9**	0.9	**76**	**29**	**2**	0.2	**15**	**6**
Total PCBs (ND=1)	unitless	--	--	--	--	**9**	0.9	**76**	**29**	**2**	0.2	**15**	**6**
Pesticides													
Total DDx (2,4 & 4,4) (ND=0)	unitless	--	--	--	--	**10**	**1**	**2**	0.9	0.9	0.09	0.2	0.08
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	--	--	--	--	**10**	**1**	**2**	0.9	0.9	0.09	0.2	0.08
Total DDx (2,4 & 4,4) (ND=1)	unitless	--	--	--	--	**10**	**1**	**2**	0.9	0.9	0.09	0.2	0.08
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH (ND=0)	unitless	--	--	--	--	0.01	0.004	**1**	0.1	0.05	0.02	**6**	0.6
Total HMW PAH (ND=1/2)	unitless	--	--	--	--	0.01	0.004	**1**	0.1	0.05	0.02	**6**	0.6
Total HMW PAH (ND=1)	unitless	--	--	--	--	0.01	0.004	**1**	0.1	0.05	0.02	**6**	0.6
Total LMW PAH (ND=0)	unitless	--	--	--	--	0.003	0.0003	0.4	0.04	0.004	0.0004	0.5	0.05
Total LMW PAH (ND=1/2)	unitless	--	--	--	--	0.004	0.0004	0.6	0.06	0.004	0.0004	0.6	0.06
Total LMW PAH (ND=1)	unitless	--	--	--	--	0.005	0.0005	0.8	0.08	0.005	0.0004	0.6	0.06

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-3

Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Benthic Invertebrate Tissue - HQs (Southeast Zone)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polychlorinated Biphenyls													
Total PCBs (ND=0)	unitless	--	--	--	--	**7**	0.7	**54**	**20**	**2**	0.2	**13**	**5**
Total PCBs (ND=1/2)	unitless	--	--	--	--	**7**	0.7	**54**	**20**	**2**	0.2	**13**	**5**
Total PCBs (ND=1)	unitless	--	--	--	--	**7**	0.7	**54**	**20**	**2**	0.2	**13**	**5**
Pesticides													
Total DDx (2,4 & 4,4) (ND=0)	unitless	--	--	--	--	**9**	0.9	**2**	0.7	**1**	0.1	0.2	0.09
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	--	--	--	--	**9**	0.9	**2**	0.7	**1**	0.1	0.2	0.09
Total DDx (2,4 & 4,4) (ND=1)	unitless	--	--	--	--	**9**	0.9	**2**	0.7	**1**	0.1	0.2	0.09
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH (ND=0)	unitless	--	--	--	--	0.01	0.005	**2**	0.2	0.03	0.01	**4**	0.4
Total HMW PAH (ND=1/2)	unitless	--	--	--	--	0.01	0.004	**1**	0.1	0.03	0.01	**4**	0.4
Total HMW PAH (ND=1)	unitless	--	--	--	--	0.01	0.004	**1**	0.1	0.03	0.01	**4**	0.4
Total LMW PAH (ND=0)	unitless	--	--	--	--	0.02	0.002	**2**	0.2	0.003	0.0003	0.4	0.04
Total LMW PAH (ND=1/2)	unitless	--	--	--	--	0.02	0.002	**2**	0.2	0.004	0.0004	0.6	0.06
Total LMW PAH (ND=1)	unitless	--	--	--	--	0.02	0.002	**3**	0.3	0.005	0.0005	0.7	0.07

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-4

Calculated Tissue HQs for Benthic Invertebrate Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Benthic Invertebrate Tissue - HQs (Southwest Zone)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polychlorinated Biphenyls													
Total PCBs (ND=0)	unitless	--	--	--	--	**5**	0.5	**44**	**17**	**5**	0.5	**44**	**17**
Total PCBs (ND=1/2)	unitless	--	--	--	--	**5**	0.5	**44**	**17**	**5**	0.5	**44**	**17**
Total PCBs (ND=1)	unitless	--	--	--	--	**5**	0.5	**44**	**17**	**5**	0.5	**44**	**17**
Pesticides													
Total DDx (2,4 & 4,4) (ND=0)	unitless	--	--	--	--	**15**	**1**	**3**	**1**	**4**	0.4	0.8	0.4
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	--	--	--	--	**15**	**1**	**3**	**1**	**4**	0.4	0.8	0.4
Total DDx (2,4 & 4,4) (ND=1)	unitless	--	--	--	--	**15**	**1**	**3**	**1**	**4**	0.4	0.8	0.4
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH (ND=0)	unitless	--	--	--	--	0.002	0.0007	0.2	0.02	0.06	0.02	**8**	0.8
Total HMW PAH (ND=1/2)	unitless	--	--	--	--	0.003	0.001	0.3	0.03	0.06	0.02	**8**	0.8
Total HMW PAH (ND=1)	unitless	--	--	--	--	0.004	0.001	0.5	0.05	0.06	0.02	**8**	0.8
Total LMW PAH (ND=0)	unitless	--	--	--	--	0.001	0.0001	0.2	0.02	0.01	0.001	**1**	0.1
Total LMW PAH (ND=1/2)	unitless	--	--	--	--	0.002	0.0002	0.3	0.03	0.01	0.001	**1**	0.1
Total LMW PAH (ND=1)	unitless	--	--	--	--	0.003	0.0003	0.4	0.04	0.01	0.001	**2**	0.2

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-5

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (NBSA-wide)											
		Atlantic Menhaden				Atlantic Silverside				Combined Mummichog & Killifish			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	0.6	0.06	**8**	**4**	0.9	0.09	**13**	**6**	**2**	0.2	**32**	**16**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	0.6	0.06	**8**	**4**	**1**	0.1	**14**	**7**	**2**	0.2	**33**	**16**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	0.7	0.07	**9**	**5**	**1**	0.1	**17**	**8**	**3**	0.3	**34**	**17**
Polychlorinated Biphenyls													
Total PCBs (ND=0)	unitless	**2**	0.2	**4**	**1**	**2**	0.2	**5**	**2**	**4**	0.4	**10**	**3**
Total PCBs (ND=1/2)	unitless	**2**	0.2	**4**	**1**	**2**	0.2	**5**	**2**	**4**	0.4	**10**	**3**
Total PCBs (ND=1)	unitless	**2**	0.2	**4**	**1**	**2**	0.2	**5**	**2**	**4**	0.4	**10**	**3**
Total PCB TEQ Fish (ND=0)	unitless	0.05	0.005	0.6	0.3	0.09	0.009	**1**	0.6	0.1	0.01	**2**	0.9
Total PCB TEQ Fish (ND=1/2)	unitless	0.05	0.005	0.6	0.3	0.09	0.009	**1**	0.6	0.1	0.01	**2**	0.9
Total PCB TEQ Fish (ND=1)	unitless	0.05	0.005	0.6	0.3	0.09	0.009	**1**	0.6	0.1	0.01	**2**	0.9
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	0.6	0.06	**9**	**4**	0.9	0.1	**13**	**7**	**3**	0.3	**34**	**17**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	unitless	0.6	0.06	**9**	**4**	**1**	0.1	**15**	**8**	**3**	0.3	**34**	**17**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	0.7	0.07	**10**	**5**	**1**	0.1	**18**	**9**	**3**	0.3	**35**	**17**
Pesticides													
Total DDx (2,4 & 4,4) (ND=0)	unitless	**6**	0.6	**4**	0.8	**4**	0.4	**3**	0.5	**6**	0.6	**4**	0.8
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**6**	0.6	**4**	0.8	**4**	0.4	**3**	0.5	**6**	0.6	**4**	0.8
Total DDx (2,4 & 4,4) (ND=1)	unitless	**6**	0.6	**4**	0.8	**4**	0.4	**3**	0.5	**6**	0.6	**4**	0.8

Table F-2-5
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (NBSA-wide)											
		American Eel				Combined Summer/Winter Flounder				White Perch			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	0.9	0.09	**12**	**6**	0.7	0.07	**9**	**4**	**6**	0.6	**80**	**40**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	0.9	0.09	**12**	**6**	0.7	0.07	**10**	**5**	**6**	0.6	**85**	**42**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	0.9	0.1	**13**	**7**	0.8	0.08	**11**	**5**	**6**	0.6	**86**	**42**
Polychlorinated Biphenyls													
Total PCBs (ND=0)	unitless	**2**	0.2	**4**	**1**	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**
Total PCBs (ND=1/2)	unitless	**2**	0.2	**4**	**1**	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**
Total PCBs (ND=1)	unitless	**2**	0.2	**4**	**1**	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**
Total PCB TEQ Fish (ND=0)	unitless	0.08	0.008	**1**	0.5	0.03	0.003	0.3	0.2	0.1	0.01	**1**	0.6
Total PCB TEQ Fish (ND=1/2)	unitless	0.08	0.008	**1**	0.5	0.03	0.003	0.3	0.2	0.1	0.01	**1**	0.6
Total PCB TEQ Fish (ND=1)	unitless	0.08	0.008	**1**	0.5	0.03	0.003	0.3	0.2	0.1	0.01	**1**	0.6
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	0.9	0.1	**12**	**6**	0.7	0.07	**9**	**4**	**6**	0.6	**81**	**40**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	unitless	0.9	0.1	**13**	**7**	0.8	0.08	**10**	**5**	**6**	0.6	**86**	**42**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	**1**	0.1	**14**	**7**	0.8	0.08	**11**	**6**	**6**	0.6	**86**	**43**
Pesticides													
Total DDx (2,4 & 4,4) (ND=0)	unitless	**6**	0.6	**4**	0.8	0.7	0.07	0.4	0.09	**10**	0.9	**6**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**6**	0.6	**4**	0.8	0.7	0.07	0.4	0.09	**10**	0.9	**6**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	**6**	0.6	**4**	0.8	0.7	0.07	0.4	0.09	**10**	0.9	**6**	**1**

Table F-2-5
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-6

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (North Zone)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	0.6	0.06	**8**	**4**	**1**	0.1	**18**	**9**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	0.6	0.06	**8**	**4**	**1**	0.1	**19**	**9**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	0.7	0.07	**9**	**5**	**2**	0.2	**20**	**10**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**2**	0.2	**4**	**1**	**1**	0.1	**3**	0.9
Total PCBs (ND=1/2)	unitless	**2**	0.2	**4**	**1**	**1**	0.1	**3**	0.9
Total PCBs (ND=1)	unitless	**2**	0.2	**4**	**1**	**1**	0.1	**3**	0.9
Total PCB TEQ Fish (ND=0)	unitless	0.05	0.005	0.6	0.3	0.04	0.004	0.5	0.3
Total PCB TEQ Fish (ND=1/2)	unitless	0.05	0.005	0.6	0.3	0.04	0.004	0.5	0.3
Total PCB TEQ Fish (ND=1)	unitless	0.05	0.005	0.6	0.3	0.04	0.004	0.5	0.3
Total Dioxin/Furan/PCB TEQ Fish (ND=0	unitless	0.6	0.06	**9**	**4**	**1**	0.1	**18**	**9**
Total Dioxin/Furan/PCB TEQ Fish (ND=1	unitless	0.6	0.06	**9**	**4**	**1**	0.1	**19**	**10**
Total Dioxin/Furan/PCB TEQ Fish (ND=1	unitless	0.7	0.07	**10**	**5**	**2**	0.2	**21**	**10**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**6**	0.6	**4**	0.8	**2**	0.2	**1**	0.2
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**6**	0.6	**4**	0.8	**2**	0.2	**1**	0.2
Total DDx (2,4 & 4,4) (ND=1)	unitless	**6**	0.6	**4**	0.8	**2**	0.2	**1**	0.2

Table F-2-6

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (North Zone)							
		Combined Mummichog & Killifish				American Eel			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	**3**	0.3	**47**	**23**	**1**	0.1	**17**	**8**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	**4**	0.4	**48**	**24**	**1**	0.1	**20**	**10**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	**4**	0.4	**48**	**24**	**1**	0.1	**18**	**9**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**5**	0.5	**10**	**3**	**2**	0.2	**4**	**1**
Total PCBs (ND=1/2)	unitless	**5**	0.5	**10**	**3**	**2**	0.2	**4**	**1**
Total PCBs (ND=1)	unitless	**5**	0.5	**10**	**3**	**2**	0.2	**4**	**1**
Total PCB TEQ Fish (ND=0)	unitless	0.1	0.01	**2**	0.9	0.2	0.02	**2**	**1**
Total PCB TEQ Fish (ND=1/2)	unitless	0.1	0.01	**2**	0.9	0.2	0.02	**2**	**1**
Total PCB TEQ Fish (ND=1)	unitless	0.1	0.01	**2**	0.9	0.2	0.02	**2**	**1**
Total Dioxin/Furan/PCB TEQ Fish (ND=0	unitless	**4**	0.4	**48**	**24**	**1**	0.1	**18**	**9**
Total Dioxin/Furan/PCB TEQ Fish (ND=1	unitless	**4**	0.4	**49**	**24**	**1**	0.1	**18**	**9**
Total Dioxin/Furan/PCB TEQ Fish (ND=1	unitless	**4**	0.4	**50**	**25**	**1**	0.1	**18**	**9**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**4**	0.4	**3**	0.5	**4**	0.4	**3**	0.5
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**4**	0.4	**3**	0.5	**4**	0.4	**3**	0.5
Total DDx (2,4 & 4,4) (ND=1)	unitless	**4**	0.4	**3**	0.5	**4**	0.4	**3**	0.5

Table F-2-6

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (North Zone)							
		Combined Summer/Winter Flounder				White Perch			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	**1**	0.1	**15**	**7**	**11**	**1**	**148**	**73**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	**1**	0.1	**15**	**8**	**14**	**1**	**182**	**90**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	**1**	0.1	**16**	**8**	**14**	**1**	**183**	**91**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**2**	0.2	**4**	**1**	**6**	0.6	**13**	**4**
Total PCBs (ND=1/2)	unitless	**2**	0.2	**4**	**1**	**6**	0.6	**13**	**4**
Total PCBs (ND=1)	unitless	**2**	0.2	**4**	**1**	**6**	0.6	**13**	**4**
Total PCB TEQ Fish (ND=0)	unitless	0.04	0.004	0.5	0.3	0.2	0.02	**2**	**1**
Total PCB TEQ Fish (ND=1/2)	unitless	0.04	0.004	0.5	0.3	0.2	0.02	**2**	**1**
Total PCB TEQ Fish (ND=1)	unitless	0.04	0.004	0.5	0.3	0.2	0.02	**2**	**1**
Total Dioxin/Furan/PCB TEQ Fish (ND=0	unitless	**1**	0.1	**15**	**8**	**14**	**1**	**182**	**90**
Total Dioxin/Furan/PCB TEQ Fish (ND=1	unitless	**1**	0.1	**16**	**8**	**14**	**1**	**184**	**91**
Total Dioxin/Furan/PCB TEQ Fish (ND=1	unitless	**1**	0.1	**17**	**8**	**14**	**1**	**184**	**91**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.8	0.08	0.5	0.1	**9**	0.9	**6**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.8	0.08	0.5	0.1	**9**	0.9	**6**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.8	0.08	0.5	0.1	**9**	0.9	**6**	**1**

Table F-2-6

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
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NC = not calculated; TRV not available
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PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-7
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	--	--	--	--	0.7	0.07	**10**	**5**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	--	--	--	--	0.9	0.09	**13**	**6**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	--	--	--	--	**1**	0.1	**15**	**8**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	--	--	--	--	**1**	0.1	**3**	**1**
Total PCBs (ND=1/2)	unitless	--	--	--	--	**1**	0.1	**3**	**1**
Total PCBs (ND=1)	unitless	--	--	--	--	**1**	0.1	**3**	**1**
Total PCB TEQ Fish (ND=0)	unitless	--	--	--	--	0.04	0.004	0.6	0.3
Total PCB TEQ Fish (ND=1/2)	unitless	--	--	--	--	0.04	0.004	0.6	0.3
Total PCB TEQ Fish (ND=1)	unitless	--	--	--	--	0.04	0.004	0.6	0.3
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	--	--	--	--	0.8	0.08	**10**	**5**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/	unitless	--	--	--	--	0.9	0.1	**13**	**6**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	--	--	--	--	**1**	0.1	**16**	**8**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	--	--	--	--	**2**	0.2	**1**	0.2
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	--	--	--	--	**2**	0.2	**1**	0.2
Total DDx (2,4 & 4,4) (ND=1)	unitless	--	--	--	--	**2**	0.2	**1**	0.2

Table F-2-7
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Combined Mummichog & Killifish				American Eel			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	**2**	0.2	**21**	**10**	0.9	0.09	**12**	**6**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	**2**	0.2	**24**	**12**	0.9	0.09	**12**	**6**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	**2**	0.2	**26**	**13**	0.9	0.1	**13**	**6**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**2**	0.2	**5**	**2**	**2**	0.2	**4**	**1**
Total PCBs (ND=1/2)	unitless	**2**	0.2	**5**	**2**	**2**	0.2	**4**	**1**
Total PCBs (ND=1)	unitless	**2**	0.2	**5**	**2**	**2**	0.2	**4**	**1**
Total PCB TEQ Fish (ND=0)	unitless	0.08	0.008	**1**	0.5	0.03	0.003	0.5	0.2
Total PCB TEQ Fish (ND=1/2)	unitless	0.08	0.008	**1**	0.5	0.04	0.004	0.5	0.3
Total PCB TEQ Fish (ND=1)	unitless	0.08	0.008	**1**	0.5	0.04	0.004	0.6	0.3
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	**2**	0.2	**22**	**11**	0.9	0.09	**12**	**6**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/	unitless	**2**	0.2	**25**	**12**	0.9	0.1	**13**	**6**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	**2**	0.2	**28**	**14**	**1**	0.1	**14**	**7**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**4**	0.4	**3**	0.5	**5**	0.5	**3**	0.7
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**4**	0.4	**3**	0.5	**5**	0.5	**3**	0.7
Total DDx (2,4 & 4,4) (ND=1)	unitless	**4**	0.4	**3**	0.5	**5**	0.5	**3**	0.7

Table F-2-7
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Combined Summer/Winter Flounder				White Perch			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	0.7	0.07	**9**	**5**	**6**	0.6	**74**	**37**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	0.8	0.08	**10**	**5**	**6**	0.6	**75**	**37**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	0.8	0.08	**11**	**6**	**6**	0.6	**76**	**37**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.5	0.05	**1**	0.3	**4**	0.4	**8**	**3**
Total PCBs (ND=1/2)	unitless	0.5	0.05	**1**	0.3	**4**	0.4	**8**	**3**
Total PCBs (ND=1)	unitless	0.5	0.05	**1**	0.3	**4**	0.4	**8**	**3**
Total PCB TEQ Fish (ND=0)	unitless	0.02	0.002	0.3	0.1	0.08	0.008	**1**	0.5
Total PCB TEQ Fish (ND=1/2)	unitless	0.02	0.002	0.3	0.1	0.08	0.008	**1**	0.5
Total PCB TEQ Fish (ND=1)	unitless	0.02	0.002	0.3	0.1	0.08	0.008	**1**	0.5
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	0.7	0.07	**10**	**5**	**6**	0.6	**75**	**37**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/	unitless	0.8	0.08	**10**	**5**	**6**	0.6	**76**	**37**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	0.9	0.09	**11**	**6**	**6**	0.6	**76**	**38**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.7	0.07	0.5	0.1	**8**	0.8	**5**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.7	0.07	0.5	0.1	**8**	0.8	**5**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.7	0.07	0.5	0.1	**8**	0.8	**5**	**1**

Table F-2-7
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-8

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	--	--	--	--	0.7	0.07	**9**	**5**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	--	--	--	--	0.9	0.09	**12**	**6**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	--	--	--	--	**1**	0.1	**17**	**8**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	--	--	--	--	**3**	0.3	**7**	**2**
Total PCBs (ND=1/2)	unitless	--	--	--	--	**3**	0.3	**7**	**2**
Total PCBs (ND=1)	unitless	--	--	--	--	**3**	0.3	**7**	**2**
Total PCB TEQ Fish (ND=0)	unitless	--	--	--	--	0.1	0.01	**2**	0.8
Total PCB TEQ Fish (ND=1/2)	unitless	--	--	--	--	0.1	0.01	**2**	0.8
Total PCB TEQ Fish (ND=1)	unitless	--	--	--	--	0.1	0.01	**2**	0.8
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	--	--	--	--	0.8	0.08	**11**	**5**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	unitless	--	--	--	--	**1**	0.1	**14**	**7**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	--	--	--	--	**1**	0.1	**19**	**9**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	--	--	--	--	**5**	0.5	**3**	0.7
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	--	--	--	--	**5**	0.5	**3**	0.7
Total DDx (2,4 & 4,4) (ND=1)	unitless	--	--	--	--	**5**	0.5	**3**	0.7

Table F-2-8

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Combined Mummichog & Killifish				American Eel			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	**1**	0.1	**20**	**10**	0.9	0.09	**12**	**6**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	**2**	0.2	**21**	**10**	**1**	0.1	**13**	**7**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	**2**	0.2	**22**	**11**	**1**	0.1	**15**	**7**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**9**	0.9	**19**	**6**	**3**	0.3	**7**	**2**
Total PCBs (ND=1/2)	unitless	**9**	0.9	**19**	**6**	**3**	0.3	**7**	**2**
Total PCBs (ND=1)	unitless	**9**	0.9	**19**	**6**	**3**	0.3	**7**	**2**
Total PCB TEQ Fish (ND=0)	unitless	0.4	0.04	**6**	**3**	0.1	0.01	**1**	0.7
Total PCB TEQ Fish (ND=1/2)	unitless	0.4	0.04	**6**	**3**	0.1	0.01	**1**	0.7
Total PCB TEQ Fish (ND=1)	unitless	0.4	0.04	**6**	**3**	0.1	0.01	**1**	0.7
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	**2**	0.2	**22**	**11**	**1**	0.1	**14**	**7**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	unitless	**2**	0.2	**23**	**11**	**1**	0.1	**15**	**7**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	**2**	0.2	**24**	**12**	**1**	0.1	**16**	**8**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**9**	0.9	**6**	**1**	**9**	0.9	**6**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**9**	0.9	**6**	**1**	**9**	0.9	**6**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	**9**	0.9	**6**	**1**	**9**	0.9	**6**	**1**

Table F-2-8

Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Combined Summer/Winter Flounder				White Perch			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	0.3	0.03	**4**	**2**	**3**	0.3	**41**	**20**
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	0.5	0.05	**7**	**3**	**3**	0.3	**41**	**20**
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	0.7	0.07	**10**	**5**	**3**	0.3	**42**	**21**
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**
Total PCBs (ND=1/2)	unitless	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**
Total PCBs (ND=1)	unitless	0.7	0.07	**2**	0.5	**4**	0.4	**10**	**3**
Total PCB TEQ Fish (ND=0)	unitless	0.03	0.003	0.4	0.2	0.09	0.009	**1**	0.6
Total PCB TEQ Fish (ND=1/2)	unitless	0.03	0.003	0.4	0.2	0.09	0.009	**1**	0.6
Total PCB TEQ Fish (ND=1)	unitless	0.03	0.003	0.4	0.2	0.09	0.009	**1**	0.6
Total Dioxin/Furan/PCB TEQ Fish (ND=0)	unitless	0.3	0.03	**5**	**2**	**3**	0.3	**42**	**21**
Total Dioxin/Furan/PCB TEQ Fish (ND=1/2)	unitless	0.5	0.05	**7**	**3**	**3**	0.3	**42**	**21**
Total Dioxin/Furan/PCB TEQ Fish (ND=1)	unitless	0.8	0.08	**10**	**5**	**3**	0.3	**43**	**21**
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.8	0.08	0.5	0.1	**16**	**2**	**10**	**2**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.8	0.08	0.5	0.1	**16**	**2**	**10**	**2**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.8	0.08	0.5	0.1	**16**	**2**	**10**	**2**

Table F-2-8
Calculated Tissue HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-9

Calculated Tissue HQs for Fish Eggs with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituent	Units	Fish Egg Tissue - HQs (NBSA-Wide)							
		Combined Mummichog Killifish							
		CF = 0.6213 (PCBs/Dioxins); CF = 0.101 (Methylmercury)				CF = 1 (all constituents)			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Fish (ND=0)	unitless	**2**	0.2	**2**	0.2	**4**	0.3	**4**	0.3
Total Dioxin/Furan TEQ Fish (ND=1/2)	unitless	**2**	0.2	**2**	0.2	**4**	0.3	**4**	0.3
Total Dioxin/Furan TEQ Fish (ND=1)	unitless	**2**	0.2	**2**	0.2	**4**	0.3	**4**	0.3
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**33**	**3**	NC	NC	**54**	**5**	NC	NC
Total PCBs (ND=1/2)	unitless	**33**	**3**	NC	NC	**54**	**5**	NC	NC
Total PCBs (ND=1)	unitless	**33**	**3**	NC	NC	**54**	**5**	NC	NC
Total PCB TEQ Fish (ND=0)	unitless	0.1	0.01	0.1	0.01	0.2	0.02	0.2	0.02
Total PCB TEQ Fish (ND=1/2)	unitless	0.1	0.01	0.1	0.01	0.2	0.02	0.2	0.02
Total PCB TEQ Fish (ND=1)	unitless	0.1	0.01	0.1	0.01	0.2	0.02	0.2	0.02
Total Dioxin/Furan/PCB TEQ Fish	unitless	**4**	0.3	**4**	0.3	**4**	0.3	**4**	0.3
Total Dioxin/Furan/PCB TEQ Fish	unitless	**4**	0.3	**4**	0.3	**4**	0.3	**4**	0.3
Total Dioxin/Furan/PCB TEQ Fish	unitless	**4**	0.3	**4**	0.3	**4**	0.3	**4**	0.3

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

The relationship between lipid-normalized organic chemicals (PCBs, dioxins/furans) in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): $EPC_{egg,lipid}$ = 0.6213 x EPCadult,lipid. The conversion factor (0.6213) between egg and adult lipid-normalized tissue concentrations is from Niimi (1983). A CF = 1.0 was also evaluated.

The UCL lipid value used in the Lower Passaic River Study Area BERA (Windward Environmental LLC 2019) mummichog eggs (3.3%) was used to convert lipid-normalized egg concentrations from the above equation to wet weight egg concentrations for comparison to fish egg TRVs.

The relationship between mercury/methylmercury in whole bodies of adult fish and their eggs was calculated using the following equation from Niimi (1983): $EPC_{egg,ww}$ = 0.101 x $EPC_{adult,ww}$. The conversion factor (0.101) between egg and adult tissue concentrations is from Niimi (1983). A CF = 1.0 was also evaluated.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TEQ = toxic equivalent
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

Niimi, A.J. 1983. Biological and toxicological effects of environmental contaminants in fish and their eggs. Can J Fish Aquat Sci 40:306-312.
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.
Windward Environmental LLC. 2019. Lower Passaic River Study Area Baseline Ecological Risk Assessment.

Table F-2-10

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	NBSA-wide Mudflats				NBSA-wide				NBSA-wide			
		Mummichog				Summer/Winter Flounder				White Perch			
		Forage Fish				Benthic Omnivore				Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons													
Total PAH (ND=0)	unitless	0.003	0.0009	NC	NC	0.002	0.0006	NC	NC	0.001	0.0004	NC	NC
Total PAH (ND=1/2)	unitless	0.004	0.001	NC	NC	0.002	0.0008	NC	NC	0.002	0.0006	NC	NC
Total PAH (ND=1)	unitless	0.007	0.002	NC	NC	0.003	0.001	NC	NC	0.002	0.0009	NC	NC

Table F-2-10

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	NBSA-wide American Eel <50 cm Pelagic Piscovore				NBSA-wide American Eel ≥50 cm Pelagic Piscovore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH (ND=0)	unitless	0.002	0.0007	NC	NC	0.002	0.0006	NC	NC
Total PAH (ND=1/2)	unitless	0.003	0.001	NC	NC	0.003	0.0009	NC	NC
Total PAH (ND=1)	unitless	0.004	0.001	NC	NC	0.003	0.001	NC	NC

Notes:

This table shows different treatments of non-detected values

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-11

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	North Zone Mudflats Mummichog Forage Fish				North Zone Summer/Winter Flounder Benthic Omnivore				North Zone White Perch Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons													
Total PAH (ND=0)	unitless	0.002	0.0005	NC	NC	0.002	0.0007	NC	NC	0.001	0.0005	NC	NC
Total PAH (ND=1/2)	unitless	0.003	0.001	NC	NC	0.003	0.0009	NC	NC	0.002	0.0007	NC	NC
Total PAH (ND=1)	unitless	0.006	0.002	NC	NC	0.003	0.001	NC	NC	0.003	0.001	NC	NC

Table F-2-11

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	North Zone American Eel <50 cm Pelagic Piscovore NBSA TRV-based HQ NOAEL	North Zone American Eel <50 cm Pelagic Piscovore NBSA TRV-based HQ LOAEL	North Zone American Eel <50 cm Pelagic Piscovore LPR FFS TRV-based HQ NOAEL	North Zone American Eel <50 cm Pelagic Piscovore LPR FFS TRV-based HQ LOAEL	North Zone American Eel ≥50 cm Pelagic Piscovore NBSA TRV-based HQ NOAEL	North Zone American Eel ≥50 cm Pelagic Piscovore NBSA TRV-based HQ LOAEL	North Zone American Eel ≥50 cm Pelagic Piscovore LPR FFS TRV-based HQ NOAEL	North Zone American Eel ≥50 cm Pelagic Piscovore LPR FFS TRV-based HQ LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH (ND=0)	unitless	0.002	0.0007	NC	NC	0.002	0.0007	NC	NC
Total PAH (ND=1/2)	unitless	0.003	0.001	NC	NC	0.003	0.001	NC	NC
Total PAH (ND=1)	unitless	0.004	0.001	NC	NC	0.004	0.001	NC	NC

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
FFS = focused feasibility study (Louis Berger et al. 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-12
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	Southeast Zone Mudflats				Southeast Zone			
		Mummichog				Summer/Winter Flounder			
		Forage Fish				Benthic Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH (ND=0)	unitless	0.002	0.0006	NC	NC	0.002	0.0006	NC	NC
Total PAH (ND=1/2)	unitless	0.004	0.001	NC	NC	0.002	0.0007	NC	NC
Total PAH (ND=1)	unitless	0.006	0.002	NC	NC	0.002	0.0008	NC	NC

Table F-2-12
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	Southeast Zone White Perch Pelagic Invertivore NBSA TRV-based HQ NOAEL	Southeast Zone White Perch Pelagic Invertivore NBSA TRV-based HQ LOAEL	Southeast Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ NOAEL	Southeast Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ LOAEL	Southeast Zone American Eel <50 cm Pelagic Piscovore NBSA TRV-based HQ NOAEL	Southeast Zone American Eel <50 cm Pelagic Piscovore NBSA TRV-based HQ LOAEL	Southeast Zone American Eel <50 cm Pelagic Piscovore LPR FFS TRV-based HQ NOAEL	Southeast Zone American Eel <50 cm Pelagic Piscovore LPR FFS TRV-based HQ LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH (ND=0)	unitless	0.001	0.0004	NC	NC	0.002	0.0006	NC	NC
Total PAH (ND=1/2)	unitless	0.002	0.0006	NC	NC	0.003	0.0009	NC	NC
Total PAH (ND=1)	unitless	0.002	0.0008	NC	NC	0.003	0.001	NC	NC

Table F-2-12
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	Southeast Zone American Eel ≥50 cm Pelagic Piscovore NBSA TRV-based HQ NOAEL	LOAEL	LPR FFS TRV-based HQ NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons					
Total PAH (ND=0)	unitless	0.001	0.0005	NC	NC
Total PAH (ND=1/2)	unitless	0.002	0.0006	NC	NC
Total PAH (ND=1)	unitless	0.003	0.0009	NC	NC

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-13

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	Southwest Zone Mudflats				Southwest Zone			
		Mummichog				Summer/Winter Flounder			
		Forage Fish				Benthic Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH (ND=0)	unitless	0.005	0.002	NC	NC	0.002	0.0007	NC	NC
Total PAH (ND=1/2)	unitless	0.007	0.002	NC	NC	0.003	0.0009	NC	NC
Total PAH (ND=1)	unitless	0.009	0.003	NC	NC	0.003	0.001	NC	NC

Table F-2-13

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	Southwest Zone White Perch Pelagic Invertivore NBSA TRV-based HQ NOAEL	Southwest Zone White Perch Pelagic Invertivore NBSA TRV-based HQ LOAEL	Southwest Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ NOAEL	Southwest Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ LOAEL	Southwest Zone American Eel <50 cm Pelagic Piscovore NBSA TRV-based HQ NOAEL	Southwest Zone American Eel <50 cm Pelagic Piscovore NBSA TRV-based HQ LOAEL	Southwest Zone American Eel <50 cm Pelagic Piscovore LPR FFS TRV-based HQ NOAEL	Southwest Zone American Eel <50 cm Pelagic Piscovore LPR FFS TRV-based HQ LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH (ND=0)	unitless	0.002	0.0006	NC	NC	0.003	0.0009	NC	NC
Total PAH (ND=1/2)	unitless	0.002	0.0007	NC	NC	0.003	0.001	NC	NC
Total PAH (ND=1)	unitless	0.003	0.0009	NC	NC	0.004	0.001	NC	NC

Table F-2-13

Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	Southwest Zone American Eel ≥50 cm Pelagic Piscovore NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons					
Total PAH (ND=0)	unitless	0.002	0.0007	NC	NC
Total PAH (ND=1/2)	unitless	0.003	0.001	NC	NC
Total PAH (ND=1)	unitless	0.004	0.001	NC	NC

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA - Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-14

Calculated Dietary HQs for Avian Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	NBSA-wide Mudflats Spotted Sandpiper Benthivore/Sediment-probing				NBSA-wide Mudflats Great Blue Heron Subtidal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.4	0.04	**2**	0.2	0.4	0.04	**2**	0.2
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.4	0.04	**2**	0.2	0.4	0.04	**2**	0.2
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.5	0.05	**2**	0.2	0.4	0.04	**2**	0.2
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.4	0.3
Total PCBs (ND=1/2)	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.4	0.3
Total PCBs (ND=1)	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.4	0.3
Total PCB TEQ Bird (ND=0)	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total PCB TEQ Bird (ND=1/2)	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total PCB TEQ Bird (ND=1)	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	0.8	0.08	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2))	unitless	0.9	0.09	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.09	0.009	0.2	0.08	**1**	0.1	**4**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.09	0.009	0.2	0.08	**1**	0.1	**4**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.09	0.009	0.2	0.08	**1**	0.1	**4**	**1**
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	**2**	0.2	NC	NC	0.2	0.02
Total HMW PAH (ND=1/2)	unitless	NC	NC	**2**	0.2	NC	NC	0.3	0.03
Total HMW PAH (ND=1)	unitless	NC	NC	**2**	0.2	NC	NC	0.4	0.04
Total LMW PAH (ND=0)	unitless	NC	NC	0.03	0.003	NC	NC	0.01	0.001
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.03	0.003	NC	NC	0.02	0.002
Total LMW PAH (ND=1)	unitless	NC	NC	0.03	0.003	NC	NC	0.03	0.003
Total PAH (ND=0)	unitless	0.002	NC	NC	NC	0.0004	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.003	NC	NC	NC	0.0008	NC	NC	NC
Total PAH (ND=1)	unitless	0.004	NC	NC	NC	0.001	NC	NC	NC

Table F-2-14

Calculated Dietary HQs for Avian Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	NBSA-wide Double-crested Cormorant Pelagic Piscivore				NBSA-wide Lesser Scaup Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.5	0.05	**3**	0.3	0.1	0.01	0.7	0.07
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.5	0.05	**3**	0.3	0.2	0.02	0.8	0.08
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.5	0.05	**3**	0.3	0.2	0.02	0.8	0.08
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**2**	0.2	0.6	0.5	0.3	0.03	0.09	0.07
Total PCBs (ND=1/2)	unitless	**2**	0.2	0.6	0.5	0.3	0.03	0.09	0.07
Total PCBs (ND=1)	unitless	**2**	0.2	0.6	0.5	0.3	0.03	0.09	0.07
Total PCB TEQ Bird (ND=0)	unitless	**2**	0.2	**8**	0.8	0.3	0.03	**2**	0.2
Total PCB TEQ Bird (ND=1/2)	unitless	**2**	0.2	**8**	0.8	0.3	0.03	**2**	0.2
Total PCB TEQ Bird (ND=1)	unitless	**2**	0.2	**8**	0.8	0.3	0.03	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2))	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**2**	0.2	**6**	**2**	0.3	0.03	0.9	0.3
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**2**	0.2	**6**	**2**	0.3	0.03	0.9	0.3
Total DDx (2,4 & 4,4) (ND=1)	unitless	**2**	0.2	**6**	**2**	0.3	0.03	0.9	0.3
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.1	0.01	NC	NC	0.2	0.02
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.3	0.03	NC	NC	0.3	0.03
Total HMW PAH (ND=1)	unitless	NC	NC	0.4	0.04	NC	NC	0.3	0.03
Total LMW PAH (ND=0)	unitless	NC	NC	0.01	0.001	NC	NC	0.006	0.0006
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.03	0.003	NC	NC	0.008	0.0008
Total LMW PAH (ND=1)	unitless	NC	NC	0.04	0.004	NC	NC	0.009	0.0009
Total PAH (ND=0)	unitless	0.0003	NC	NC	NC	0.0003	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.0009	NC	NC	NC	0.0005	NC	NC	NC
Total PAH (ND=1)	unitless	0.001	NC	NC	NC	0.0006	NC	NC	NC

Table F-2-14

Calculated Dietary HQs for Avian Receptors with NBSA- and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:

This table shows different treatments of non-detected values

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-15
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

COC	Units	North Zone Mudflats Spotted Sandpiper Benthivore/Sediment-probing				North Zone Mudflats Great Blue Heron Subtidal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.5	0.05	**2**	0.2	0.6	0.06	**3**	0.3
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.5	0.4
Total PCBs (ND=1/2)	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.5	0.4
Total PCBs (ND=1)	unitless	0.2	0.02	0.07	0.05	**1**	0.1	0.5	0.4
Total PCB TEQ Bird (ND=0)	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total PCB TEQ Bird (ND=1/2)	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total PCB TEQ Bird (ND=1)	unitless	0.6	0.06	**3**	0.3	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	0.8	0.08	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2	unitless	0.9	0.09	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.08	0.008	0.2	0.08	**2**	0.2	**4**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.08	0.008	0.2	0.08	**2**	0.2	**4**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.08	0.008	0.2	0.08	**2**	0.2	**4**	**1**
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.8	0.08	NC	NC	0.3	0.03
Total HMW PAH (ND=1/2)	unitless	NC	NC	**1**	0.1	NC	NC	0.4	0.04
Total HMW PAH (ND=1)	unitless	NC	NC	**2**	0.2	NC	NC	0.7	0.07
Total LMW PAH (ND=0)	unitless	NC	NC	0.01	0.001	NC	NC	0.02	0.002
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.01	0.001	NC	NC	0.04	0.004
Total LMW PAH (ND=1)	unitless	NC	NC	0.01	0.001	NC	NC	0.05	0.005
Total PAH (ND=0)	unitless	0.001	NC	NC	NC	0.0005	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.002	NC	NC	NC	0.001	NC	NC	NC
Total PAH (ND=1)	unitless	0.003	NC	NC	NC	0.002	NC	NC	NC

Table F-2-15
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	North Zone Double-crested Cormorant Pelagic Piscivore				North Zone Lesser Scaup Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.8	0.08	**4**	0.4	0.2	0.02	**1**	0.1
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.8	0.08	**4**	0.4	0.2	0.02	**1**	0.1
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.8	0.08	**4**	0.4	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**2**	0.2	0.7	0.6	0.3	0.03	0.1	0.08
Total PCBs (ND=1/2)	unitless	**2**	0.2	0.7	0.6	0.3	0.03	0.1	0.08
Total PCBs (ND=1)	unitless	**2**	0.2	0.7	0.6	0.3	0.03	0.1	0.08
Total PCB TEQ Bird (ND=0)	unitless	**2**	0.2	**9**	0.9	0.4	0.04	**2**	0.2
Total PCB TEQ Bird (ND=1/2)	unitless	**2**	0.2	**9**	0.9	0.4	0.04	**2**	0.2
Total PCB TEQ Bird (ND=1)	unitless	**2**	0.2	**9**	0.9	0.4	0.04	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**3**	0.3
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2)	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**3**	0.3
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**2**	0.2	**11**	**1**	0.5	0.05	**3**	0.3
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**2**	0.2	**7**	**2**	0.3	0.03	**1**	0.3
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**2**	0.2	**7**	**2**	0.3	0.03	**1**	0.3
Total DDx (2,4 & 4,4) (ND=1)	unitless	**2**	0.2	**7**	**2**	0.3	0.03	**1**	0.3
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.1	0.01	NC	NC	0.3	0.03
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.4	0.04	NC	NC	0.3	0.03
Total HMW PAH (ND=1)	unitless	NC	NC	0.9	0.09	NC	NC	0.4	0.04
Total LMW PAH (ND=0)	unitless	NC	NC	0.03	0.003	NC	NC	0.006	0.0006
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.05	0.005	NC	NC	0.008	0.0008
Total LMW PAH (ND=1)	unitless	NC	NC	0.07	0.007	NC	NC	0.01	0.001
Total PAH (ND=0)	unitless	0.0005	NC	NC	NC	0.0004	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.002	NC	NC	NC	0.0006	NC	NC	NC
Total PAH (ND=1)	unitless	0.003	NC	NC	NC	0.0007	NC	NC	NC

Table F-2-15
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-16

Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southeast Zone Mudflats Spotted Sandpiper Benthivore/Sediment-probing				Southeast Zone Mudflats Great Blue Heron Subtidal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.4	0.04	**2**	0.2	0.4	0.04	**2**	0.2
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.4	0.04	**2**	0.2	0.4	0.04	**2**	0.2
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.5	0.05	**2**	0.2	0.4	0.04	**2**	0.2
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.2	0.02	0.07	0.05	0.9	0.09	0.3	0.2
Total PCBs (ND=1/2)	unitless	0.2	0.02	0.07	0.06	0.9	0.09	0.3	0.2
Total PCBs (ND=1)	unitless	0.2	0.02	0.07	0.06	0.9	0.09	0.3	0.2
Total PCB TEQ Bird (ND=0)	unitless	0.7	0.07	**3**	0.3	**1**	0.1	**5**	0.5
Total PCB TEQ Bird (ND=1/2)	unitless	0.7	0.07	**3**	0.3	**1**	0.1	**5**	0.5
Total PCB TEQ Bird (ND=1)	unitless	0.7	0.07	**3**	0.3	**1**	0.1	**5**	0.5
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	0.9	0.09	**4**	0.4	**1**	0.1	**7**	0.7
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2))	unitless	0.9	0.09	**5**	0.5	**1**	0.1	**7**	0.7
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**1**	0.1	**5**	0.5	**1**	0.1	**7**	0.7
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.08	0.008	0.2	0.08	**1**	0.1	**3**	**1**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.08	0.008	0.2	0.08	**1**	0.1	**3**	**1**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.08	0.008	0.2	0.08	**1**	0.1	**3**	**1**
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	**1**	0.1	NC	NC	0.2	0.02
Total HMW PAH (ND=1/2)	unitless	NC	NC	**1**	0.1	NC	NC	0.2	0.02
Total HMW PAH (ND=1)	unitless	NC	NC	**2**	0.2	NC	NC	0.3	0.03
Total LMW PAH (ND=0)	unitless	NC	NC	0.02	0.002	NC	NC	0.008	0.0008
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.02	0.002	NC	NC	0.01	0.001
Total LMW PAH (ND=1)	unitless	NC	NC	0.02	0.002	NC	NC	0.02	0.002
Total PAH (ND=0)	unitless	0.001	NC	NC	NC	0.0003	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.002	NC	NC	NC	0.0005	NC	NC	NC
Total PAH (ND=1)	unitless	0.003	NC	NC	NC	0.0007	NC	NC	NC

Table F-2-16

Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southeast Zone Double-crested Cormorant Pelagic Piscivore NBSA TRV-based HQ NOAEL	Southeast Zone Double-crested Cormorant Pelagic Piscivore NBSA TRV-based HQ LOAEL	Southeast Zone Double-crested Cormorant Pelagic Piscivore LPR FFS TRV-based HQ NOAEL	Southeast Zone Double-crested Cormorant Pelagic Piscivore LPR FFS TRV-based HQ LOAEL	Southeast Zone Lesser Scaup Omnivore NBSA TRV-based HQ NOAEL	Southeast Zone Lesser Scaup Omnivore NBSA TRV-based HQ LOAEL	Southeast Zone Lesser Scaup Omnivore LPR FFS TRV-based HQ NOAEL	Southeast Zone Lesser Scaup Omnivore LPR FFS TRV-based HQ LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.5	0.05	**2**	0.2	0.1	0.01	0.7	0.07
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.5	0.05	**2**	0.2	0.2	0.02	0.8	0.08
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.5	0.05	**2**	0.2	0.2	0.02	0.8	0.08
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**1**	0.1	0.5	0.4	0.2	0.02	0.07	0.06
Total PCBs (ND=1/2)	unitless	**1**	0.1	0.5	0.4	0.2	0.02	0.07	0.06
Total PCBs (ND=1)	unitless	**1**	0.1	0.5	0.4	0.2	0.02	0.07	0.06
Total PCB TEQ Bird (ND=0)	unitless	**1**	0.1	**7**	0.7	0.3	0.03	**2**	0.2
Total PCB TEQ Bird (ND=1/2)	unitless	**1**	0.1	**7**	0.7	0.3	0.03	**2**	0.2
Total PCB TEQ Bird (ND=1)	unitless	**1**	0.1	**7**	0.7	0.3	0.03	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	**2**	0.2	**10**	**1**	0.4	0.0	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2))	unitless	**2**	0.2	**10**	**1**	0.5	0.1	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**2**	0.2	**10**	**1**	0.5	0.1	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**2**	0.2	**4**	**1**	0.2	0.02	0.7	0.2
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**2**	0.2	**4**	**1**	0.2	0.02	0.7	0.2
Total DDx (2,4 & 4,4) (ND=1)	unitless	**2**	0.2	**4**	**1**	0.2	0.02	0.7	0.2
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.09	0.009	NC	NC	0.2	0.02
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.2	0.02	NC	NC	0.2	0.02
Total HMW PAH (ND=1)	unitless	NC	NC	0.3	0.03	NC	NC	0.3	0.03
Total LMW PAH (ND=0)	unitless	NC	NC	0.005	0.0005	NC	NC	0.007	0.0007
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.009	0.0009	NC	NC	0.009	0.0009
Total LMW PAH (ND=1)	unitless	NC	NC	0.01	0.001	NC	NC	0.01	0.001
Total PAH (ND=0)	unitless	0.0001	NC	NC	NC	0.0003	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.0003	NC	NC	NC	0.0004	NC	NC	NC
Total PAH (ND=1)	unitless	0.0006	NC	NC	NC	0.0005	NC	NC	NC

Table F-2-16
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-17
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southwest Zone Mudflats				Southwest Zone Mudflats			
		Spotted Sandpiper				Great Blue Heron			
		Benthivore/Sediment-probing				Subtidal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.5	0.05	**2**	0.2	0.2	0.02	**1**	0.1
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.5	0.05	**2**	0.2	0.2	0.02	**1**	0.1
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.5	0.05	**3**	0.3	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.2	0.02	0.08	0.06	**2**	0.2	0.7	0.6
Total PCBs (ND=1/2)	unitless	0.2	0.02	0.08	0.06	**2**	0.2	0.7	0.6
Total PCBs (ND=1)	unitless	0.2	0.02	0.08	0.06	**2**	0.2	0.7	0.6
Total PCB TEQ Bird (ND=0)	unitless	0.7	0.07	**4**	0.4	**2**	0.2	**8**	0.8
Total PCB TEQ Bird (ND=1/2)	unitless	0.7	0.07	**4**	0.4	**2**	0.2	**8**	0.8
Total PCB TEQ Bird (ND=1)	unitless	0.7	0.07	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**9**	0.9
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2))	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**9**	0.9
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**1**	0.1	**5**	0.5	**2**	0.2	**9**	0.9
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.1	0.01	0.3	0.1	**2**	0.2	**6**	**2**
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.1	0.01	0.3	0.1	**2**	0.2	**6**	**2**
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.1	0.01	0.3	0.1	**2**	0.2	**6**	**2**
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	**4**	0.4	NC	NC	0.5	0.05
Total HMW PAH (ND=1/2)	unitless	NC	NC	**4**	0.4	NC	NC	0.5	0.05
Total HMW PAH (ND=1)	unitless	NC	NC	**5**	0.5	NC	NC	0.5	0.05
Total LMW PAH (ND=0)	unitless	NC	NC	0.07	0.007	NC	NC	0.02	0.002
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.07	0.007	NC	NC	0.02	0.002
Total LMW PAH (ND=1)	unitless	NC	NC	0.07	0.007	NC	NC	0.02	0.002
Total PAH (ND=0)	unitless	0.006	NC	NC	NC	0.0009	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.007	NC	NC	NC	0.001	NC	NC	NC
Total PAH (ND=1)	unitless	0.008	NC	NC	NC	0.001	NC	NC	NC

Table F-2-17
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southwest Zone Double-crested Cormorant Pelagic Piscivore				Southwest Zone Lesser Scaup Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Bird (ND=0)	unitless	0.3	0.03	**1**	0.1	0.1	0.01	0.5	0.05
Total Dioxin/Furan TEQ Bird (ND=1/2)	unitless	0.3	0.03	**1**	0.1	0.1	0.01	0.5	0.05
Total Dioxin/Furan TEQ Bird (ND=1)	unitless	0.3	0.03	**1**	0.1	0.1	0.01	0.6	0.06
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	**3**	0.3	**1**	0.9	0.4	0.04	0.1	0.1
Total PCBs (ND=1/2)	unitless	**3**	0.3	**1**	0.9	0.4	0.04	0.1	0.1
Total PCBs (ND=1)	unitless	**3**	0.3	**1**	0.9	0.4	0.04	0.1	0.1
Total PCB TEQ Bird (ND=0)	unitless	**3**	0.3	**13**	**1**	0.4	0.04	**2**	0.2
Total PCB TEQ Bird (ND=1/2)	unitless	**3**	0.3	**13**	**1**	0.4	0.04	**2**	0.2
Total PCB TEQ Bird (ND=1)	unitless	**3**	0.3	**13**	**1**	0.4	0.04	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=0)	unitless	**3**	0.3	**13**	**1**	0.5	0.05	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird (ND=1/2))	unitless	**3**	0.3	**13**	**1**	0.5	0.05	**3**	0.3
Total Dioxin/Furan/PCB TEQ Bird (ND=1)	unitless	**3**	0.3	**14**	**1**	0.5	0.05	**3**	0.3
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	**3**	0.3	**10**	**3**	0.5	0.05	**1**	0.5
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	**3**	0.3	**10**	**3**	0.5	0.05	**1**	0.5
Total DDx (2,4 & 4,4) (ND=1)	unitless	**3**	0.3	**10**	**3**	0.5	0.05	**1**	0.5
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.4	0.04	NC	NC	0.3	0.03
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.5	0.05	NC	NC	0.3	0.03
Total HMW PAH (ND=1)	unitless	NC	NC	0.5	0.05	NC	NC	0.4	0.04
Total LMW PAH (ND=0)	unitless	NC	NC	0.03	0.003	NC	NC	0.007	0.0007
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.03	0.003	NC	NC	0.008	0.0008
Total LMW PAH (ND=1)	unitless	NC	NC	0.03	0.003	NC	NC	0.008	0.0008
Total PAH (ND=0)	unitless	0.001	NC	NC	NC	0.0005	NC	NC	NC
Total PAH (ND=1/2)	unitless	0.001	NC	NC	NC	0.0005	NC	NC	NC
Total PAH (ND=1)	unitless	0.001	NC	NC	NC	0.0006	NC	NC	NC

Table F-2-17
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-18

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	NBSA-wide				NBSA-wide Shorelines			
		River Otter				Muskrat			
		Piscivore				Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.7	0.2	**21**	0.8	0.3	0.09	**10**	0.3
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.8	0.2	**27**	**1**	0.3	0.08	**9**	0.3
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.7	0.2	**21**	0.8	0.3	0.09	**10**	0.3
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.6	0.5	0.7	0.6	0.3	0.3	0.4	0.3
Total PCBs (ND=1/2)	unitless	0.6	0.5	0.7	0.6	0.3	0.3	0.4	0.3
Total PCBs (ND=1)	unitless	0.6	0.5	0.7	0.6	0.3	0.3	0.4	0.3
Total PCB TEQ Mammal (ND=0)	unitless	0.2	0.06	**6**	0.2	0.2	0.05	**6**	0.2
Total PCB TEQ Mammal (ND=1/2)	unitless	0.2	0.06	**6**	0.2	0.1	0.04	**4**	0.2
Total PCB TEQ Mammal (ND=1)	unitless	0.2	0.06	**6**	0.2	0.1	0.04	**4**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.8	0.2	**25**	0.9	0.4	0.1	**13**	0.5
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.8	0.2	**27**	**1**	0.4	0.1	**13**	0.5
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.8	0.2	**27**	**1**	0.4	0.1	**14**	0.5
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.1	0.01	0.02	0.003	0.05	0.005	0.008	0.002
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.1	0.01	0.02	0.003	0.05	0.005	0.008	0.002
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.1	0.01	0.02	0.003	0.05	0.005	0.008	0.002
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.004	0.0009	NC	NC	0.2	0.03
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.007	0.001	NC	NC	0.2	0.03
Total HMW PAH (ND=1)	unitless	NC	NC	0.01	0.002	NC	NC	0.2	0.03
Total LMW PAH (ND=0)	unitless	NC	NC	0.00006	0.00002	NC	NC	0.0003	0.0001
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.0001	0.00003	NC	NC	0.0004	0.0001
Total LMW PAH (ND=1)	unitless	NC	NC	0.0001	0.00004	NC	NC	0.0004	0.0001
Total PAH (ND=0)	unitless	0.008	0.002	NC	NC	0.1	0.03	NC	NC
Total PAH (ND=1/2)	unitless	0.02	0.003	NC	NC	0.1	0.03	NC	NC
Total PAH (ND=1)	unitless	0.02	0.005	NC	NC	0.1	0.03	NC	NC

Table F-2-18

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	NBSA-wide Harbor Seal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.2	0.05	**5**	0.2
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.2	0.06	**7**	0.2
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.2	0.05	**5**	0.2
Polychlorinated Biphenyls					
Total PCBs (ND=0)	unitless	0.1	0.1	0.2	0.1
Total PCBs (ND=1/2)	unitless	0.1	0.1	0.2	0.1
Total PCBs (ND=1)	unitless	0.1	0.1	0.2	0.1
Total PCB TEQ Mammal (ND=0)	unitless	0.05	0.01	**2**	0.06
Total PCB TEQ Mammal (ND=1/2)	unitless	0.05	0.01	**2**	0.06
Total PCB TEQ Mammal (ND=1)	unitless	0.05	0.01	**2**	0.06
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.2	0.06	**6**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.2	0.06	**7**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.2	0.06	**7**	0.2
Pesticides					
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.02	0.002	0.004	0.0008
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.02	0.002	0.004	0.0008
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.02	0.002	0.004	0.0008
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH (ND=0)	unitless	NC	NC	0.0006	0.0001
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.001	0.0003
Total HMW PAH (ND=1)	unitless	NC	NC	0.002	0.0004
Total LMW PAH (ND=0)	unitless	NC	NC	0.00001	0.000005
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.00002	0.000008
Total LMW PAH (ND=1)	unitless	NC	NC	0.00003	0.00001
Total PAH (ND=0)	unitless	0.002	0.0003	NC	NC
Total PAH (ND=1/2)	unitless	0.004	0.0007	NC	NC
Total PAH (ND=1)	unitless	0.005	0.001	NC	NC

Table F-2-18

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (NBSA-wide): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:

This table shows different treatments of non-detected values

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-19

Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	North Zone				North Zone All Shorelines			
		River Otter				Omnivore			
		Piscivore				Muskrat		Muskrat	
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	**1**	0.3	**35**	**1**	0.4	0.1	**14**	0.5
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	**1**	0.3	**35**	**1**	0.4	0.1	**14**	0.5
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	**1**	0.3	**36**	**1**	0.4	0.1	**14**	0.5
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.8	0.6	0.9	0.8	0.4	0.3	0.4	0.4
Total PCBs (ND=1/2)	unitless	0.8	0.6	0.9	0.8	0.4	0.3	0.4	0.4
Total PCBs (ND=1)	unitless	0.8	0.6	0.9	0.8	0.4	0.3	0.4	0.4
Total PCB TEQ Mammal (ND=0)	unitless	0.2	0.07	**7**	0.3	0.1	0.03	**4**	0.1
Total PCB TEQ Mammal (ND=1/2)	unitless	0.2	0.06	**7**	0.3	0.1	0.04	**4**	0.1
Total PCB TEQ Mammal (ND=1)	unitless	0.2	0.06	**7**	0.3	0.1	0.04	**4**	0.1
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	**1**	0.4	**41**	**1**	0.5	0.2	**17**	0.6
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	**1**	0.4	**41**	**1**	0.5	0.2	**17**	0.6
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	**1**	0.4	**41**	**2**	0.5	0.2	**18**	0.6
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.08	0.008	0.01	0.003	0.05	0.005	0.009	0.002
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.08	0.008	0.01	0.003	0.05	0.005	0.009	0.002
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.08	0.008	0.01	0.003	0.05	0.005	0.009	0.002
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.005	0.001	NC	NC	0.08	0.02
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.007	0.001	NC	NC	0.08	0.02
Total HMW PAH (ND=1)	unitless	NC	NC	0.01	0.003	NC	NC	0.08	0.02
Total LMW PAH (ND=0)	unitless	NC	NC	0.0001	0.00004	NC	NC	0.0002	0.00008
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.0002	0.00006	NC	NC	0.0003	0.00009
Total LMW PAH (ND=1)	unitless	NC	NC	0.0002	0.00007	NC	NC	0.0003	0.0001
Total PAH (ND=0)	unitless	0.01	0.003	NC	NC	0.07	0.01	NC	NC
Total PAH (ND=1/2)	unitless	0.02	0.005	NC	NC	0.08	0.02	NC	NC
Total PAH (ND=1)	unitless	0.03	0.007	NC	NC	0.08	0.02	NC	NC

Table F-2-19
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	North Zone Harbor Seal Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.3	0.08	**9**	0.3
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.3	0.08	**9**	0.3
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.3	0.08	**9**	0.3
Polychlorinated Biphenyls					
Total PCBs (ND=0)	unitless	0.2	0.2	0.2	0.2
Total PCBs (ND=1/2)	unitless	0.2	0.2	0.2	0.2
Total PCBs (ND=1)	unitless	0.2	0.2	0.2	0.2
Total PCB TEQ Mammal (ND=0)	unitless	0.06	0.02	**2**	0.07
Total PCB TEQ Mammal (ND=1/2)	unitless	0.05	0.02	**2**	0.06
Total PCB TEQ Mammal (ND=1)	unitless	0.05	0.02	**2**	0.06
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.3	0.09	**10**	0.4
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.3	0.09	**10**	0.4
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.3	0.09	**10**	0.4
Pesticides					
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.02	0.002	0.003	0.0007
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.02	0.002	0.003	0.0007
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.02	0.002	0.003	0.0007
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH (ND=0)	unitless	NC	NC	0.0008	0.0002
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.001	0.0003
Total HMW PAH (ND=1)	unitless	NC	NC	0.003	0.0005
Total LMW PAH (ND=0)	unitless	NC	NC	0.00003	0.00001
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.00004	0.00001
Total LMW PAH (ND=1)	unitless	NC	NC	0.00005	0.00002
Total PAH (ND=0)	unitless	0.003	0.0006	NC	NC
Total PAH (ND=1/2)	unitless	0.006	0.001	NC	NC
Total PAH (ND=1)	unitless	0.008	0.002	NC	NC

Table F-2-19
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (North Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-20
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southeast Zone				Southeast Zone All Shorelines			
		River Otter				Muskrat			
		Piscivore				Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.7	0.2	**22**	0.8	0.3	0.08	**9**	0.3
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.7	0.2	**22**	0.8	0.3	0.09	**10**	0.3
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.7	0.2	**22**	0.8	0.3	0.09	**10**	0.4
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.5	0.4	0.5	0.4	0.2	0.2	0.3	0.2
Total PCBs (ND=1/2)	unitless	0.5	0.4	0.5	0.4	0.2	0.2	0.3	0.2
Total PCBs (ND=1)	unitless	0.5	0.4	0.5	0.4	0.2	0.2	0.3	0.2
Total PCB TEQ Mammal (ND=0)	unitless	0.1	0.04	**5**	0.2	0.1	0.03	**3**	0.1
Total PCB TEQ Mammal (ND=1/2)	unitless	0.1	0.04	**5**	0.2	0.1	0.03	**3**	0.1
Total PCB TEQ Mammal (ND=1)	unitless	0.1	0.04	**5**	0.2	0.1	0.03	**3**	0.1
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.7	0.2	**24**	0.9	0.3	0.1	**11**	0.4
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.8	0.2	**25**	0.9	0.3	0.1	**11**	0.4
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.8	0.2	**25**	0.9	0.4	0.1	**12**	0.4
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.07	0.007	0.01	0.002	0.04	0.004	0.006	0.001
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.07	0.007	0.01	0.002	0.04	0.004	0.006	0.001
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.07	0.007	0.01	0.002	0.04	0.004	0.006	0.001
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.004	0.0008	NC	NC	0.08	0.02
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.005	0.001	NC	NC	0.08	0.02
Total HMW PAH (ND=1)	unitless	NC	NC	0.007	0.001	NC	NC	0.08	0.02
Total LMW PAH (ND=0)	unitless	NC	NC	0.00003	0.00001	NC	NC	0.0003	0.00009
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.00005	0.00002	NC	NC	0.0003	0.00009
Total LMW PAH (ND=1)	unitless	NC	NC	0.00008	0.00003	NC	NC	0.0003	0.00009
Total PAH (ND=0)	unitless	0.004	0.0009	NC	NC	0.07	0.01	NC	NC
Total PAH (ND=1/2)	unitless	0.007	0.001	NC	NC	0.07	0.01	NC	NC
Total PAH (ND=1)	unitless	0.01	0.002	NC	NC	0.08	0.02	NC	NC

Table F-2-20
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southeast Zone / Harbor Seal / Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.2	0.05	**5**	0.2
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.2	0.05	**5**	0.2
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.2	0.05	**5**	0.2
Polychlorinated Biphenyls					
Total PCBs (ND=0)	unitless	0.1	0.1	0.1	0.1
Total PCBs (ND=1/2)	unitless	0.1	0.1	0.1	0.1
Total PCBs (ND=1)	unitless	0.1	0.1	0.1	0.1
Total PCB TEQ Mammal (ND=0)	unitless	0.04	0.01	**1**	0.04
Total PCB TEQ Mammal (ND=1/2)	unitless	0.04	0.01	**1**	0.04
Total PCB TEQ Mammal (ND=1)	unitless	0.04	0.01	**1**	0.04
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.2	0.05	**6**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.2	0.06	**6**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.2	0.06	**6**	0.2
Pesticides					
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.02	0.002	0.003	0.0006
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.02	0.002	0.003	0.0006
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.02	0.002	0.003	0.0006
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH (ND=0)	unitless	NC	NC	0.0007	0.0001
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.0009	0.0002
Total HMW PAH (ND=1)	unitless	NC	NC	0.001	0.0003
Total LMW PAH (ND=0)	unitless	NC	NC	0.000007	0.000002
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.00001	0.000004
Total LMW PAH (ND=1)	unitless	NC	NC	0.00002	0.000007
Total PAH (ND=0)	unitless	0.0007	0.0001	NC	NC
Total PAH (ND=1/2)	unitless	0.001	0.0003	NC	NC
Total PAH (ND=1)	unitless	0.002	0.0004	NC	NC

Table F-2-20
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southeast Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:

This table shows different treatments of non-detected values

Shaded/bolded HQ values indicate an HQ greater than 1.

HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-2-21
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southwest Zone				Southwest Zone All Shorelines			
		River Otter				Muskrat			
		Piscivore				Omnivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.4	0.1	**12**	0.4	0.2	0.05	**6**	0.2
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.4	0.1	**12**	0.4	0.2	0.05	**5**	0.2
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.4	0.1	**12**	0.4	0.2	0.05	**6**	0.2
Polychlorinated Biphenyls									
Total PCBs (ND=0)	unitless	0.8	0.7	0.9	0.8	0.6	0.5	0.7	0.6
Total PCBs (ND=1/2)	unitless	0.8	0.7	0.9	0.8	0.6	0.5	0.7	0.6
Total PCBs (ND=1)	unitless	0.8	0.7	0.9	0.8	0.6	0.5	0.7	0.6
Total PCB TEQ Mammal (ND=0)	unitless	0.3	0.09	**10**	0.4	0.5	0.1	**15**	0.5
Total PCB TEQ Mammal (ND=1/2)	unitless	0.3	0.09	**10**	0.4	0.4	0.1	**15**	0.5
Total PCB TEQ Mammal (ND=1)	unitless	0.3	0.09	**10**	0.4	0.5	0.1	**15**	0.5
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.6	0.2	**20**	0.7	0.4	0.1	**14**	0.5
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.6	0.2	**19**	0.7	0.4	0.1	**14**	0.5
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.6	0.2	**21**	0.7	0.4	0.1	**15**	0.5
Pesticides									
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.2	0.02	0.03	0.005	0.08	0.008	0.01	0.003
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.2	0.02	0.03	0.005	0.08	0.008	0.01	0.003
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.2	0.02	0.03	0.005	0.08	0.008	0.01	0.003
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH (ND=0)	unitless	NC	NC	0.006	0.001	NC	NC	0.3	0.06
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.008	0.002	NC	NC	0.3	0.06
Total HMW PAH (ND=1)	unitless	NC	NC	0.01	0.002	NC	NC	0.3	0.06
Total LMW PAH (ND=0)	unitless	NC	NC	0.00005	0.00002	NC	NC	0.0006	0.0002
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.00008	0.00003	NC	NC	0.0006	0.0002
Total LMW PAH (ND=1)	unitless	NC	NC	0.0002	0.00005	NC	NC	0.0006	0.0002
Total PAH (ND=0)	unitless	0.009	0.002	NC	NC	0.3	0.06	NC	NC
Total PAH (ND=1/2)	unitless	0.02	0.005	NC	NC	0.3	0.06	NC	NC
Total PAH (ND=1)	unitless	0.04	0.007	NC	NC	0.3	0.06	NC	NC

Table F-2-21
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Constituents	Units	Southwest Zone / Harbor Seal / Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans					
Total Dioxin/Furan TEQ Mammal (ND=0)	unitless	0.09	0.03	**3**	0.1
Total Dioxin/Furan TEQ Mammal (ND=1/2)	unitless	0.09	0.03	**3**	0.1
Total Dioxin/Furan TEQ Mammal (ND=1)	unitless	0.09	0.03	**3**	0.1
Polychlorinated Biphenyls					
Total PCBs (ND=0)	unitless	0.2	0.2	0.2	0.2
Total PCBs (ND=1/2)	unitless	0.2	0.2	0.2	0.2
Total PCBs (ND=1)	unitless	0.2	0.2	0.2	0.2
Total PCB TEQ Mammal (ND=0)	unitless	0.08	0.02	**3**	0.09
Total PCB TEQ Mammal (ND=1/2)	unitless	0.08	0.02	**3**	0.09
Total PCB TEQ Mammal (ND=1)	unitless	0.08	0.02	**3**	0.09
Total Dioxin/Furan/PCB TEQ Mammal (ND=0)	unitless	0.2	0.04	**5**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=1/2)	unitless	0.1	0.04	**5**	0.2
Total Dioxin/Furan/PCB TEQ Mammal (ND=1)	unitless	0.2	0.05	**5**	0.2
Pesticides					
Total DDx (2,4 & 4,4) (ND=0)	unitless	0.04	0.004	0.007	0.001
Total DDx (2,4 & 4,4) (ND=1/2)	unitless	0.04	0.004	0.007	0.001
Total DDx (2,4 & 4,4) (ND=1)	unitless	0.04	0.004	0.007	0.001
Polycyclic Aromatic Hydrocarbons					
Total HMW PAH (ND=0)	unitless	NC	NC	0.0009	0.0002
Total HMW PAH (ND=1/2)	unitless	NC	NC	0.001	0.0003
Total HMW PAH (ND=1)	unitless	NC	NC	0.002	0.0004
Total LMW PAH (ND=0)	unitless	NC	NC	0.00001	0.000003
Total LMW PAH (ND=1/2)	unitless	NC	NC	0.00002	0.000006
Total LMW PAH (ND=1)	unitless	NC	NC	0.00004	0.00001
Total PAH (ND=0)	unitless	0.002	0.0003	NC	NC
Total PAH (ND=1/2)	unitless	0.005	0.001	NC	NC
Total PAH (ND=1)	unitless	0.008	0.002	NC	NC

Table F-2-21
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs (Southwest Zone): Comparison of Non-detects Treated as ND=0, ND=1/2, and ND=1

Notes:
This table shows different treatments of non-detected values
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
Arcadis = Arcadis U.S., Inc.
FFS = focused feasibility study (Louis Berger et al. 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
NBSA = New Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-3-1

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Avian Receptors with NBSA and LPR FFS-Selected TRVs

Constituent	Units	Avian Dietary HQs (NBSA-wide)							
		NBSA-wide Mudflats				NBSA-wide			
		Spotted Sandpiper				Lesser Scaup			
		Benthivore/Sediment-probing				Omnivore			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**2**	0.2	0.1	0.01	0.5	0.05
2378-TCDD sed:worm regression	unitless	0.1	0.01	0.6	0.06	0.1	0.01	0.5	0.05

Table F-3-1

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Avian Receptors with NBSA and LPR FFS-Selected TRVs

Constituent	Units	Avian Dietary HQs (North Zone)							
		North Zone Mudflats				North Zone			
		Benthivore/Sediment-probing				Omnivore			
		Spotted Sandpiper				Lesser Scaup			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**2**	0.2	0.1	0.01	0.7	0.07
2378-TCDD sed:worm regression	unitless	0.1	0.01	0.5	0.05	0.1	0.01	0.7	0.07

Table F-3-1

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Avian Receptors with NBSA and LPR FFS-Selected TRVs

Constituent	Units	Avian Dietary HQs (Southeast Zone)							
		Southeast Zone Mudflats				Southeast Zone			
		Benthivore/Sediment-probing				Omnivore			
		Spotted Sandpiper				Lesser Scaup			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**2**	0.2	0.1	0.01	0.5	0.05
2378-TCDD sed:worm regression	unitless	0.1	0.01	0.6	0.06	0.09	0.009	0.5	0.05

Table F-3-1

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Avian Receptors with NBSA and LPR FFS-Selected TRVs

Constituent	Units	Avian Dietary HQs (Southwest Zone)							
		Southwest Zone Mudflats				Southwest Zone			
		Benthivore/Sediment-probing				Omnivore			
		Spotted Sandpiper				Lesser Scaup			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.4	0.04	**2**	0.2	0.07	0.007	0.4	0.04
2378-TCDD sed:worm regression	unitless	0.4	0.04	**2**	0.2	0.06	0.006	0.3	0.03

Table F-3-1

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Avian Receptors with NBSA and LPR FFS-Selected TRVs

Notes:

A regression analysis was performed to assess the relationship between sediment concentrations and polychaete worm tissue concentrations, using 2,3,7,8-TCDD as an example COPEC. There was a strongly significant relationship between sediment and polychaete worm tissue 2,3,7,8-TCDD concentrations ((r2 = 0.91, p=0.0002; Figure 8-2). The regression equation from this analysis was used to predict polychaete worm 2,3,7,8-TCDD concentrations from sediment concentrations. The predicted polychaete worm tissue concentrations were then used in the food web models used to calculate NBSA-wide and assessment zone risk HQs. See Section 8.3.1.2 in the BERA for further information.

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
TCDD = tetrachlorodibenzo-p-dioxin
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-3-2

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Mammal Receptors with NBSA and LPR FFS-Selected TRVs

Constituent	Units	Mammal Dietary HQs (NBSA-wide) NBSA-wide River Otter Piscivore NBSA TRV-based HQ NOAEL	NBSA TRV-based HQ LOAEL	FFS TRV-based HQ NOAEL	FFS TRV-based HQ LOAEL	Mammal Dietary HQs (North Zone) North Zone Piscivore River Otter NBSA TRV-based HQ NOAEL	NBSA TRV-based HQ LOAEL	FFS TRV-based HQ NOAEL	FFS TRV-based HQ LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.2	**20**	0.7	**1**	0.3	**33**	**1**
2378-TCDD sed:worm regression	unitless	0.6	0.2	**19**	0.7	**1**	0.3	**33**	**1**

Table F-3-2

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Mammal Receptors with NBSA and LPR FFS-Selected TRVs

Constituent	Units	Mammal Dietary HQs (Southeast Zone)				Mammal Dietary HQs (Southwest Zone)			
		Southeast Zone				Southwest Zone			
		Piscivore				Piscivore			
		River Otter				River Otter			
		NBSA TRV-based HQ		FFS TRV-based HQ		NBSA TRV-based HQ		FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.2	**19**	0.7	0.3	0.09	**10**	0.4
2378-TCDD sed:worm regression	unitless	0.6	0.2	**19**	0.7	0.3	0.09	**10**	0.4

Table F-3-2

Calculated Dietary HQs Using Sediment:Polychaete Worm Regression for 2,3,7,8-TCDD for Mammal Receptors with NBSA and LPR FFS-Selected TRVs

Notes:

A regression analysis was performed to assess the relationship between sediment concentrations and polychaete worm tissue concentrations, using 2,3,7,8-TCDD as an example COPEC. There was a strongly significant relationship between sediment and polychaete worm tissue 2,3,7,8-TCDD concentrations ((r2 = 0.91, p=0.0002; Figure 8-2). The regression equation from this analysis was used to predict polychaete worm 2,3,7,8-TCDD concentrations from sediment concentrations. The predicted polychaete worm tissue concentrations were then used in the food web models used to calculate NBSA-wide and assessment zone risk HQs. See Section 9.2.2.2

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
TCDD = tetrachlorodibenzo-p-dioxin
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-4-1
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs; SUF = 1

Constituent	Units	NBSA-wide Summer/Winter Flounder Benthic Omnivore				NBSA-wide White Perch Pelagic Invertivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.003	0.0009	NC	NC	0.002	0.0007	NC	NC
Inorganics									
Arsenic	unitless	0.4	0.1	NC	NC	0.5	0.1	NC	NC
Cadmium	unitless	**15**	**1**	NC	NC	**15**	**1**	NC	NC
Chromium	unitless	0.2	NC	NC	NC	0.1	NC	NC	NC
Copper	unitless	**1**	0.5	NC	NC	0.9	0.4	NC	NC
Lead	unitless	0.05	NC	NC	NC	0.04	NC	NC	NC
Mercury	unitless	**16**	**2**	NC	NC	**13**	**1**	NC	NC
Methylmercury	unitless	**9**	0.9	NC	NC	**8**	0.8	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.5	0.05	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0004	NC	NC	NC	0.0003	NC	NC	NC
Zinc	unitless	0.2	0.08	NC	NC	0.2	0.09	NC	NC

Table F-4-1
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs; SUF = 1

Constituent	Units	North Zone Summer/Winter Flounder Benthic Omnivore NBSA TRV-based HQ NOAEL	North Zone Summer/Winter Flounder Benthic Omnivore NBSA TRV-based HQ LOAEL	North Zone Summer/Winter Flounder Benthic Omnivore LPR FFS TRV-based HQ NOAEL	North Zone Summer/Winter Flounder Benthic Omnivore LPR FFS TRV-based HQ LOAEL	North Zone White Perch Pelagic Invertivore NBSA TRV-based HQ NOAEL	North Zone White Perch Pelagic Invertivore NBSA TRV-based HQ LOAEL	North Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ NOAEL	North Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.003	0.001	NC	NC	0.002	0.0007	NC	NC
Inorganics									
Arsenic	unitless	0.4	0.1	NC	NC	0.5	0.1	NC	NC
Cadmium	unitless	**14**	**1**	NC	NC	**14**	**1**	NC	NC
Chromium	unitless	0.2	NC	NC	NC	0.1	NC	NC	NC
Copper	unitless	**1**	0.5	NC	NC	0.9	0.4	NC	NC
Lead	unitless	0.04	NC	NC	NC	0.03	NC	NC	NC
Mercury	unitless	**18**	**2**	NC	NC	**16**	**2**	NC	NC
Methylmercury	unitless	**11**	**1**	NC	NC	**9**	0.9	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.6	0.06	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0004	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.1	0.07	NC	NC	0.2	0.08	NC	NC

Table F-4-1
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs; SUF = 1

Constituent	Units	Southeast Zone Summer/Winter Flounder Benthic Omnivore NBSA TRV-based HQ NOAEL	Southeast Zone Summer/Winter Flounder Benthic Omnivore NBSA TRV-based HQ LOAEL	Southeast Zone Summer/Winter Flounder Benthic Omnivore LPR FFS TRV-based HQ NOAEL	Southeast Zone Summer/Winter Flounder Benthic Omnivore LPR FFS TRV-based HQ LOAEL	Southeast Zone White Perch Pelagic Invertivore NBSA TRV-based HQ NOAEL	Southeast Zone White Perch Pelagic Invertivore NBSA TRV-based HQ LOAEL	Southeast Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ NOAEL	Southeast Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.002	0.0008	NC	NC	0.002	0.0006	NC	NC
Inorganics									
Arsenic	unitless	0.3	0.09	NC	NC	0.4	0.1	NC	NC
Cadmium	unitless	**16**	**2**	NC	NC	**16**	**2**	NC	NC
Chromium	unitless	0.2	NC	NC	NC	0.2	NC	NC	NC
Copper	unitless	**1**	0.5	NC	NC	0.9	0.4	NC	NC
Lead	unitless	0.02	NC	NC	NC	0.02	NC	NC	NC
Mercury	unitless	**13**	**1**	NC	NC	**12**	**1**	NC	NC
Methylmercury	unitless	**10**	**1**	NC	NC	**9**	0.9	NC	NC
Nickel	unitless	0.6	0.06	NC	NC	0.5	0.05	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0005	NC	NC	NC	0.0004	NC	NC	NC
Zinc	unitless	0.1	0.07	NC	NC	0.2	0.08	NC	NC

Table F-4-1
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs; SUF = 1

Constituent	Units	Southwest Zone Summer/Winter Flounder Benthic Omnivore NBSA TRV-based HQ NOAEL	Southwest Zone Summer/Winter Flounder Benthic Omnivore NBSA TRV-based HQ LOAEL	Southwest Zone Summer/Winter Flounder Benthic Omnivore LPR FFS TRV-based HQ NOAEL	Southwest Zone Summer/Winter Flounder Benthic Omnivore LPR FFS TRV-based HQ LOAEL	Southwest Zone White Perch Pelagic Invertivore NBSA TRV-based HQ NOAEL	Southwest Zone White Perch Pelagic Invertivore NBSA TRV-based HQ LOAEL	Southwest Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ NOAEL	Southwest Zone White Perch Pelagic Invertivore LPR FFS TRV-based HQ LOAEL
Polycyclic Aromatic Hydrocarbons									
Total PAH	unitless	0.003	0.001	NC	NC	0.003	0.0009	NC	NC
Inorganics									
Arsenic	unitless	0.6	0.2	NC	NC	0.6	0.2	NC	NC
Cadmium	unitless	**19**	**2**	NC	NC	**18**	**2**	NC	NC
Chromium	unitless	0.2	NC	NC	NC	0.1	NC	NC	NC
Copper	unitless	**1**	0.7	NC	NC	**1**	0.5	NC	NC
Lead	unitless	0.1	NC	NC	NC	0.1	NC	NC	NC
Mercury	unitless	**16**	**2**	NC	NC	**12**	**1**	NC	NC
Methylmercury	unitless	**9**	0.9	NC	NC	**8**	0.8	NC	NC
Nickel	unitless	0.9	0.09	NC	NC	0.9	0.09	NC	NC
Selenium	unitless	**6**	0.6	NC	NC	**5**	0.5	NC	NC
Silver	unitless	0.0004	NC	NC	NC	0.0003	NC	NC	NC
Zinc	unitless	0.2	0.1	NC	NC	0.3	0.1	NC	NC

Table F-4-1
Calculated Dietary HQs for Fish Receptors with NBSA-Selected TRVs; SUF = 1

Notes:
SUF = 1
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
cm = centimeters
FFS = focused feasibility study (USEPA 2014)
EPC = exposure point concentration
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
SUF = site use factor
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-4-2
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Constituent	Units	Avian Dietary HQs (SUF=1)							
		NBSA-wide Mudflats				North Zone Mudflats			
		Spotted Sandpiper				Spotted Sandpiper			
		Benthivore/Sediment-probing				Benthivore/Sediment-probing			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.7	0.07	**3**	0.3	0.7	0.07	**3**	0.3
Total Dioxin/Furan TEQ Bird	unitless	0.9	0.09	**4**	0.4	0.8	0.08	**4**	0.4
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.04	0.1	0.1	0.4	0.04	0.1	0.1
Total PCB TEQ Bird	unitless	**1**	0.1	**6**	0.6	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**8**	0.8	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.2	0.02	0.5	0.2	0.2	0.02	0.5	0.2
Dieldrin	unitless	0.02	0.02	0.03	0.01	0.02	0.01	0.03	0.01
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.001	0.0001	NC	NC
Hexachlorobenzene	unitless	0.0003	0.00007	NC	NC	0.0003	0.00006	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	**3**	0.3	NC	NC	**2**	0.2
Total LMW PAH	unitless	NC	NC	0.06	0.006	NC	NC	0.02	0.002
Total PAH	unitless	0.005	NC	NC	NC	0.002	NC	NC	NC
Inorganics									
Arsenic	unitless	0.2	0.06	NC	NC	0.2	0.06	NC	NC
Cadmium	unitless	0.2	0.02	NC	NC	0.2	0.02	NC	NC
Chromium	unitless	0.1	0.01	NC	NC	0.09	0.009	NC	NC
Copper	unitless	**1**	0.1	**1**	0.6	**1**	0.1	**1**	0.5
Lead	unitless	0.8	0.2	**23**	**2**	0.2	0.04	**7**	0.7
Mercury	unitless	**4**	0.4	**3**	**1**	**3**	0.3	**3**	**1**
Methylmercury	unitless	0.3	0.03	0.2	0.1	0.3	0.03	0.2	0.1
Nickel	unitless	0.04	0.02	NC	NC	0.04	0.02	NC	NC
Selenium	unitless	0.7	0.4	NC	NC	0.7	0.4	NC	NC
Silver	unitless	0.004	0.0004	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.5	0.3	NC	NC	0.4	0.2	NC	NC

Table F-4-2
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Constituent	Units	Avian Dietary HQs (SUF=1)							
		Southeast Zone Mudflats				Southwest Zone Mudflats			
		Spotted Sandpiper				Spotted Sandpiper			
		Benthivore/Sediment-probing				Benthivore/Sediment-probing			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.7	0.07	**3**	0.3	0.8	0.08	**4**	0.4
Total Dioxin/Furan TEQ Bird	unitless	0.8	0.08	**4**	0.4	**1**	0.1	**5**	0.5
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.04	0.1	0.1	0.4	0.04	0.2	0.1
Total PCB TEQ Bird	unitless	**1**	0.1	**7**	0.7	**1**	0.1	**7**	0.7
Total Dioxin/Furan/PCB TEQ Bird	unitless	**2**	0.2	**9**	0.9	**2**	0.2	**10**	**1**
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.2	0.02	0.5	0.2	0.2	0.02	0.7	0.2
Dieldrin	unitless	0.02	0.02	0.03	0.01	0.02	0.02	0.03	0.01
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.001	0.0001	NC	NC
Hexachlorobenzene	unitless	0.0003	0.00007	NC	NC	0.0004	9.0E-05	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	**2**	0.2	NC	NC	**8**	0.8
Total LMW PAH	unitless	NC	NC	0.04	0.004	NC	NC	0.1	0.01
Total PAH	unitless	0.003	NC	NC	NC	0.01	NC	NC	NC
Inorganics									
Arsenic	unitless	0.2	0.06	NC	NC	0.3	0.07	NC	NC
Cadmium	unitless	0.2	0.02	NC	NC	0.4	0.04	NC	NC
Chromium	unitless	0.1	0.01	NC	NC	0.2	0.02	NC	NC
Copper	unitless	**1**	0.1	**1**	0.5	**2**	0.2	**2**	0.9
Lead	unitless	0.2	0.04	**6**	0.6	**2**	0.4	**63**	**6**
Mercury	unitless	**4**	0.4	**3**	**1**	**7**	0.7	**5**	**2**
Methylmercury	unitless	0.3	0.03	0.2	0.1	0.3	0.03	0.2	0.1
Nickel	unitless	0.04	0.02	NC	NC	0.07	0.03	NC	NC
Selenium	unitless	0.7	0.4	NC	NC	0.7	0.4	NC	NC
Silver	unitless	0.004	0.0004	NC	NC	0.006	0.0006	NC	NC
Zinc	unitless	0.4	0.2	NC	NC	0.8	0.5	NC	NC

Table F-4-2
Calculated Dietary HQs for Avian Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Notes:
SUF = 1
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
HMW = high molecular weight
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SUF = site use factor
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-4-3
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Constituent	Units	Mammal Dietary HQs (SUF=1)							
		NBSA-wide				NBSA-wide			
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	**1**	0.4	**39**	**1**	0.3	0.09	**10**	0.3
Total Dioxin/Furan TEQ Mammal	unitless	**1**	0.4	**43**	**2**	0.3	0.1	**11**	0.4
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	**1**	**1**	**1**	0.3	0.2	0.3	0.3
Total PCB TEQ Mammal	unitless	0.4	0.1	**12**	0.4	0.09	0.03	**3**	0.1
Total Dioxin/Furan/PCB TEQ Mammal	unitless	**2**	0.5	**50**	**2**	0.4	0.1	**12**	0.4
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.2	0.02	0.03	0.006	0.05	0.005	0.008	0.002
Dieldrin	unitless	0.06	0.03	0.06	0.03	0.01	0.007	0.01	0.007
Total Chlordane	unitless	0.003	0.0003	NC	NC	0.0009	0.00009	NC	NC
Hexachlorobenzene	unitless	0.01	0.001	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.009	0.002	NC	NC	0.001	0.0003
Total LMW PAH	unitless	NC	NC	0.0001	0.00004	NC	NC	0.00003	0.000009
Total PAH	unitless	0.02	0.003	NC	NC	0.003	0.0006	NC	NC
Inorganics									
Arsenic	unitless	0.07	0.03	NC	NC	0.01	0.006	NC	NC
Cadmium	unitless	0.004	0.0009	NC	NC	0.0008	0.0002	NC	NC
Chromium	unitless	0.08	0.008	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.06	0.04	0.3	0.2	0.01	0.01	0.08	0.04
Lead	unitless	0.03	0.004	0.5	0.05	0.004	0.0005	0.06	0.006
Mercury	unitless	0.06	0.04	0.6	0.4	0.01	0.009	0.1	0.08
Methylmercury	unitless	0.06	0.04	0.6	0.4	0.02	0.01	0.2	0.09
Nickel	unitless	0.001	0.0007	NC	NC	0.0002	0.0001	NC	NC
Selenium	unitless	**6**	0.6	NC	NC	**1**	0.1	NC	NC
Silver	unitless	0.001	0.0001	NC	NC	0.0003	0.00003	NC	NC
Zinc	unitless	0.02	0.01	NC	NC	0.005	0.002	NC	NC

Table F-4-3
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Constituent	Units	Mammal Dietary HQs (SUF=1)							
		North Zone				North Zone			
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	**2**	0.6	**66**	**2**	0.5	0.1	**16**	0.6
Total Dioxin/Furan TEQ Mammal	unitless	**2**	0.6	**70**	**3**	0.5	0.2	**17**	0.6
Polychlorinated Biphenyls									
Total PCBs	unitless	**2**	**1**	**2**	**2**	0.4	0.3	0.5	0.4
Total PCB TEQ Mammal	unitless	0.4	0.1	**14**	0.5	0.1	0.03	**4**	0.1
Total Dioxin/Furan/PCB TEQ Mammal	unitless	**2**	0.7	**81**	**3**	0.6	0.2	**20**	0.7
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.2	0.02	0.03	0.005	0.04	0.004	0.007	0.001
Dieldrin	unitless	0.06	0.03	0.06	0.03	0.01	0.007	0.01	0.007
Total Chlordane	unitless	0.004	0.0004	NC	NC	0.001	0.0001	NC	NC
Hexachlorobenzene	unitless	0.02	0.002	NC	NC	0.004	0.0004	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.01	0.002	NC	NC	0.002	0.0003
Total LMW PAH	unitless	NC	NC	0.0002	0.00008	NC	NC	0.00006	0.00002
Total PAH	unitless	0.03	0.006	NC	NC	0.006	0.001	NC	NC
Inorganics									
Arsenic	unitless	0.07	0.03	NC	NC	0.01	0.006	NC	NC
Cadmium	unitless	0.003	0.0009	NC	NC	0.0007	0.0002	NC	NC
Chromium	unitless	0.1	0.01	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.05	0.04	0.05	0.04	0.01	0.009	0.01	0.009
Lead	unitless	0.02	0.003	0.4	0.04	0.003	0.0004	0.05	0.005
Mercury	unitless	0.07	0.04	0.7	0.4	0.02	0.01	0.2	0.09
Methylmercury	unitless	0.07	0.05	0.7	0.4	0.02	0.01	0.2	0.1
Nickel	unitless	0.002	0.0008	NC	NC	0.0003	0.0001	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**1**	0.1	NC	NC
Silver	unitless	0.001	0.0001	NC	NC	0.0003	0.00003	NC	NC
Zinc	unitless	0.02	0.01	NC	NC	0.005	0.003	NC	NC

Table F-4-3
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Constituent	Units	Mammal Dietary HQs (SUF=1)							
		Southeast Zone				Southeast Zone			
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	**1**	0.4	**39**	**1**	0.3	0.09	**9**	0.3
Total Dioxin/Furan TEQ Mammal	unitless	**1**	0.4	**43**	**2**	0.3	0.1	**11**	0.4
Polychlorinated Biphenyls									
Total PCBs	unitless	0.9	0.8	**1**	0.9	0.2	0.2	0.3	0.2
Total PCB TEQ Mammal	unitless	0.3	0.09	**9**	0.3	0.07	0.02	**2**	0.08
Total Dioxin/Furan/PCB TEQ Mammal	unitless	**1**	0.4	**49**	**2**	0.4	0.1	**12**	0.4
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.005	0.04	0.004	0.006	0.001
Dieldrin	unitless	0.04	0.02	0.04	0.02	0.01	0.006	0.01	0.006
Total Chlordane	unitless	0.003	0.0003	NC	NC	0.0007	0.00007	NC	NC
Hexachlorobenzene	unitless	0.01	0.001	NC	NC	0.003	0.0003	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.008	0.002	NC	NC	0.001	0.0003
Total LMW PAH	unitless	NC	NC	0.00006	0.00002	NC	NC	0.00001	0.000005
Total PAH	unitless	0.009	0.002	NC	NC	0.001	0.0003	NC	NC
Inorganics									
Arsenic	unitless	0.06	0.03	NC	NC	0.01	0.005	NC	NC
Cadmium	unitless	0.004	0.001	NC	NC	0.0008	0.0002	NC	NC
Chromium	unitless	0.1	0.01	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.05	0.03	0.3	0.1	0.01	0.008	0.06	0.03
Lead	unitless	0.01	0.002	0.2	0.02	0.002	0.0002	0.03	0.003
Mercury	unitless	0.06	0.04	0.6	0.4	0.01	0.01	0.1	0.09
Methylmercury	unitless	0.07	0.04	0.7	0.4	0.02	0.01	0.2	0.1
Nickel	unitless	0.004	0.002	NC	NC	0.0002	0.0001	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**1**	0.1	NC	NC
Silver	unitless	0.001	0.0001	NC	NC	0.0002	0.00002	NC	NC
Zinc	unitless	0.02	0.01	NC	NC	0.004	0.002	NC	NC

Table F-4-3
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Constituent	Units	Mammal Dietary HQs (SUF=1)							
		Southwest Zone				Southwest Zone			
		River Otter				Harbor Seal			
		Piscivore				Piscivore			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.2	**20**	0.7	0.1	0.04	**5**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.7	0.2	**24**	0.9	0.2	0.05	**6**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	**2**	**1**	**2**	**2**	0.4	0.3	0.5	0.4
Total PCB TEQ Mammal	unitless	0.6	0.2	**20**	0.7	0.2	0.05	**5**	0.2
Total Dioxin/Furan/PCB TEQ Mammal	unitless	**1**	0.4	**40**	**1**	0.3	0.09	**10**	0.4
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.3	0.03	0.05	0.01	0.08	0.008	0.01	0.003
Dieldrin	unitless	0.09	0.04	0.09	0.04	0.02	0.01	0.02	0.01
Total Chlordane	unitless	0.003	0.0003	NC	NC	0.0009	0.00009	NC	NC
Hexachlorobenzene	unitless	0.01	0.001	NC	NC	0.002	0.0002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.01	0.002	NC	NC	0.002	0.0004
Total LMW PAH	unitless	NC	NC	0.00009	0.00003	NC	NC	0.00002	0.000007
Total PAH	unitless	0.02	0.004	NC	NC	0.003	0.0006	NC	NC
Inorganics									
Arsenic	unitless	0.08	0.04	NC	NC	0.01	0.007	NC	NC
Cadmium	unitless	0.004	0.001	NC	NC	0.0008	0.0002	NC	NC
Chromium	unitless	0.09	0.009	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.1	0.08	0.6	0.3	0.03	0.02	0.1	0.07
Lead	unitless	0.09	0.01	**1**	0.1	0.01	0.001	0.2	0.02
Mercury	unitless	0.07	0.04	0.7	0.4	0.02	0.01	0.2	0.09
Methylmercury	unitless	0.06	0.04	0.6	0.3	0.01	0.009	0.1	0.09
Nickel	unitless	0.002	0.001	NC	NC	0.0003	0.0002	NC	NC
Selenium	unitless	**7**	0.7	NC	NC	**2**	0.2	NC	NC
Silver	unitless	0.002	0.0002	NC	NC	0.0004	0.00004	NC	NC
Zinc	unitless	0.03	0.02	NC	NC	0.006	0.003	NC	NC

Table F-4-3
Calculated Dietary HQs for Mammal Receptors with NBSA and LPR FFS-Selected TRVs; SUF = 1

Notes:
SUF = 1
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
HMW = high molecular weight
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SUF = site use factor
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-5-1
Atlantic Menhaden and Atlantic Silverside Tissue HQs NBSA-wide and by Assessment Zone

Constituent	Units	Fish Tissue - HQs (NBSA-wide)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.4	0.04	**5**	**3**	0.8	0.08	**11**	**6**
Total Dioxin/Furan TEQ Fish	unitless	0.6	0.06	**8**	**4**	0.9	0.09	**13**	**6**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**5**	0.5	NC	NC
Polychlorinated Biphenyls									
Total PCBs	unitless	**2**	0.2	**4**	**1**	**2**	0.2	**5**	**2**
Total PCB TEQ Fish	unitless	0.05	0.005	0.6	0.3	0.09	0.009	**1**	0.6
Total PCB TEQ Fish Alternative TRV	unitless	0.2	0.02	NC	NC	0.5	0.05	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	0.6	0.06	**9**	**4**	**1**	0.1	**13**	**7**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**5**	0.5	NC	NC
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**6**	0.6	**4**	0.8	**4**	0.39	**3**	0.52
Dieldrin	unitless	0.07	0.04	**1**	0.2	0.02	0.01	0.3	0.06
Total Chlordane	unitless	0.02	0.002	NC	NC	0.01	0.001	NC	NC
Hexachlorobenzene	unitless	0.000003	NC	NC	NC	0.000001	NC	NC	NC
Inorganics									
Arsenic	unitless	0.9	0.5	NC	NC	0.5	0.3	NC	NC
Chromium	unitless	0.3	0.3	NC	NC	0.2	0.2	NC	NC
Copper	unitless	0.3	0.2	**3**	0.7	0.3	0.2	**3**	0.7
Lead	unitless	0.2	0.1	**1**	0.1	0.1	0.09	0.9	0.09
Mercury	unitless	**2**	0.2	**1**	0.2	**2**	0.2	**1**	0.3
Methylmercury	unitless	**3**	0.3	**2**	0.4	**4**	0.4	**3**	0.5
Selenium	unitless	NC	0.3	NC	NC	NC	0.3	NC	NC
Silver	unitless	0.9	0.4	NC	NC	0.2	0.09	NC	NC
Zinc	unitless	0.06	0.05	NC	NC	0.1	0.1	NC	NC

Table F-5-1
Atlantic Menhaden and Atlantic Silverside Tissue HQs NBSA-wide and by Assessment Zone

Constituent	Units	Fish Tissue - HQs (North Zone)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	0.4	0.04	**5**	**3**	**1**	0.1	**16**	**8**
Total Dioxin/Furan TEQ Fish	unitless	0.6	0.06	**8**	**4**	**1**	0.1	**18**	**9**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**7**	0.7	NC	NC
Polychlorinated Biphenyls									
Total PCBs	unitless	**2**	0.2	**4**	**1**	**1**	0.1	**3**	0.9
Total PCB TEQ Fish	unitless	0.05	0.005	0.6	0.3	0.04	0.004	0.5	0.3
Total PCB TEQ Fish Alternative TRV	unitless	0.2	0.02	NC	NC	0.2	0.02	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	0.6	0.06	**9**	**4**	**1**	0.1	**18**	**9**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	**3**	0.3	NC	NC	**7**	0.7	NC	NC
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**6**	0.6	**4**	0.8	**2**	0.2	**1**	0.2
Dieldrin	unitless	0.07	0.04	**1**	0.2	0.02	0.009	0.2	0.05
Total Chlordane	unitless	0.02	0.002	NC	NC	0.009	0.0009	NC	NC
Hexachlorobenzene	unitless	0.000003	NC	NC	NC	0.0000007	NC	NC	NC
Inorganics									
Arsenic	unitless	0.9	0.5	NC	NC	0.3	0.2	NC	NC
Chromium	unitless	0.3	0.3	NC	NC	0.3	0.3	NC	NC
Copper	unitless	0.3	0.2	**3**	0.7	0.2	0.2	**2**	0.5
Lead	unitless	0.2	0.1	**1**	0.1	0.05	0.03	0.3	0.03
Mercury	unitless	**2**	0.2	**1**	0.2	**2**	0.2	**1**	0.3
Methylmercury	unitless	**3**	0.3	**2**	0.4	**3**	0.3	**2**	0.4
Selenium	unitless	NC	0.3	NC	NC	NC	0.3	NC	NC
Silver	unitless	0.9	0.4	NC	NC	0.9	0.4	NC	NC
Zinc	unitless	0.06	0.05	NC	NC	0.1	0.09	NC	NC

Table F-5-1
Atlantic Menhaden and Atlantic Silverside Tissue HQs NBSA-wide and by Assessment Zone

Constituent	Units	Fish Tissue - HQs (Southeast Zone)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	--	--	--	--	0.7	0.07	**9**	**4**
Total Dioxin/Furan TEQ Fish	unitless	--	--	--	--	0.7	0.07	**10**	**5**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	--	--	--	--	**4**	0.4	NC	NC
Polychlorinated Biphenyls									
Total PCBs	unitless	--	--	--	--	**1**	0.1	**3**	**1**
Total PCB TEQ Fish	unitless	--	--	--	--	0.04	0.004	0.6	0.3
Total PCB TEQ Fish Alternative TRV	unitless	--	--	--	--	0.2	0.02	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	--	--	--	--	0.8	0.08	**10**	**5**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	--	--	--	--	**4**	0.4	NC	NC
Pesticides									
Total DDx (2,4 & 4,4)	unitless	--	--	--	--	**2**	0.2	**1**	0.2
Dieldrin	unitless	--	--	--	--	0.02	0.01	0.3	0.07
Total Chlordane	unitless	--	--	--	--	0.02	0.002	NC	NC
Hexachlorobenzene	unitless	--	--	--	--	0.000002	NC	NC	NC
Inorganics									
Arsenic	unitless	--	--	--	--	0.5	0.3	NC	NC
Chromium	unitless	--	--	--	--	0.2	0.2	NC	NC
Copper	unitless	--	--	--	--	0.3	0.2	**3**	0.7
Lead	unitless	--	--	--	--	0.2	0.1	**1**	0.1
Mercury	unitless	--	--	--	--	**2**	0.2	**2**	0.3
Methylmercury	unitless	--	--	--	--	**5**	0.5	**3**	0.7
Selenium	unitless	--	--	--	--	NC	0.3	NC	NC
Silver	unitless	--	--	--	--	0.2	0.09	NC	NC
Zinc	unitless	--	--	--	--	0.1	0.1	NC	NC

Table F-5-1
Atlantic Menhaden and Atlantic Silverside Tissue HQs NBSA-wide and by Assessment Zone

Constituent	Units	Fish Tissue - HQs (Southwest Zone)							
		Atlantic Menhaden				Atlantic Silverside			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2,3,7,8-TCDD	unitless	--	--	--	--	0.6	0.06	**8**	**4**
Total Dioxin/Furan TEQ Fish	unitless	--	--	--	--	0.7	0.07	**9**	**5**
Total Dioxin/Furan TEQ Fish Alternative TRV	unitless	--	--	--	--	**4**	0.4	NC	NC
Polychlorinated Biphenyls									
Total PCBs	unitless	--	--	--	--	**3**	0.3	**7**	**2**
Total PCB TEQ Fish	unitless	--	--	--	--	0.1	0.01	**2**	0.8
Total PCB TEQ Fish Alternative TRV	unitless	--	--	--	--	0.6	0.06	NC	NC
Total Dioxin/Furan/PCB TEQ Fish	unitless	--	--	--	--	0.8	0.08	**11**	**5**
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	unitless	--	--	--	--	**4**	0.4	NC	NC
Pesticides									
Total DDx (2,4 & 4,4)	unitless	--	--	--	--	**5**	0.5	**3**	0.7
Dieldrin	unitless	--	--	--	--	0.02	0.01	0.2	0.05
Total Chlordane	unitless	--	--	--	--	0.009	0.0009	NC	NC
Hexachlorobenzene	unitless	--	--	--	--	0.000001	NC	NC	NC
Inorganics									
Arsenic	unitless	--	--	--	--	0.7	0.3	NC	NC
Chromium	unitless	--	--	--	--	0.2	0.2	NC	NC
Copper	unitless	--	--	--	--	0.3	0.3	**4**	0.8
Lead	unitless	--	--	--	--	0.2	0.1	**1**	0.1
Mercury	unitless	--	--	--	--	**2**	0.2	**1**	0.2
Methylmercury	unitless	--	--	--	--	**3**	0.3	**2**	0.5
Selenium	unitless	--	--	--	--	NC	0.4	NC	NC
Silver	unitless	--	--	--	--	0.9	0.4	NC	NC
Zinc	unitless	--	--	--	--	0.2	0.1	NC	NC

Table F-5-1
Atlantic Menhaden and Atlantic Silverside Tissue HQs NBSA-wide and by Assessment Zone

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs for the initial evaluation are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
-- = data not available
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-6-1
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 100% Fish > 30 cm

Constituent	Units	Great Blue Heron Dietary HQs (Diet = 100% Fish > 30 cm)							
		NBSA-wide Mudflats				North Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.08	0.008	0.4	0.04	0.1	0.01	0.6	0.06
Total Dioxin/Furan TEQ Bird	unitless	0.1	0.01	0.7	0.07	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs	unitless	0.8	0.08	0.3	0.2	0.8	0.08	0.3	0.2
Total PCB TEQ Bird	unitless	0.2	0.02	**1**	0.1	0.5	0.05	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**5**	**2**	**2**	0.2	**5**	**2**
Dieldrin	unitless	0.02	0.01	0.03	0.01	0.03	0.02	0.04	0.01
Total Chlordane	unitless	0.005	0.0005	NC	NC	0.006	0.0006	NC	NC
Hexachlorobenzene	unitless	0.0005	0.0001	NC	NC	0.0006	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.04	0.004	NC	NC	0.1	0.01
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.008	0.0008
Total PAH	unitless	0.0002	NC	NC	NC	0.0002	NC	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.005	NC	NC	0.02	0.006	NC	NC
Cadmium	unitless	0.03	0.003	NC	NC	0.04	0.004	NC	NC
Chromium	unitless	0.004	0.0004	NC	NC	0.006	0.0006	NC	NC
Copper	unitless	0.1	0.01	0.08	0.04	0.09	0.009	0.07	0.03
Lead	unitless	0.01	0.002	0.3	0.03	0.01	0.002	0.4	0.04
Mercury	unitless	**4**	0.4	**3**	**1**	**5**	0.5	**4**	**2**
Methylmercury	unitless	**4**	0.4	**3**	**1**	**6**	0.6	**4**	**2**
Nickel	unitless	0.005	0.002	NC	NC	0.002	0.001	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.3	0.1	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0008	0.00008	NC	NC
Zinc	unitless	0.07	0.04	NC	NC	0.07	0.05	NC	NC

Table F-6-1
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 100% Fish > 30 cm

Constituent	Units	Great Blue Heron Dietary HQs (Diet = 100% Fish > 30 cm)							
		Southeast Mudflats				Southwest Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.08	0.008	0.4	0.04	0.1	0.01	0.6	0.06
Total Dioxin/Furan TEQ Bird	unitless	0.2	0.02	0.8	0.08	0.2	0.02	0.8	0.08
Polychlorinated Biphenyls									
Total PCBs	unitless	0.8	0.08	0.3	0.2	**1**	0.1	0.4	0.3
Total PCB TEQ Bird	unitless	0.06	0.006	0.3	0.03	0.2	0.02	**1**	0.1
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.2	0.02	**1**	0.1	0.3	0.03	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**2**	0.2	**5**	**2**	**3**	0.3	**8**	**3**
Dieldrin	unitless	0.03	0.02	0.04	0.01	0.03	0.02	0.04	0.01
Total Chlordane	unitless	0.005	0.0005	NC	NC	0.004	0.0004	NC	NC
Hexachlorobenzene	unitless	0.0004	0.0001	NC	NC	0.0006	0.0001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.02	0.002	NC	NC	0.08	0.008
Total LMW PAH	unitless	NC	NC	0.002	0.0002	NC	NC	0.03	0.003
Total PAH	unitless	0.00006	NC	NC	NC	0.0005	NC	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.005	NC	NC	0.03	0.007	NC	NC
Cadmium	unitless	0.04	0.004	NC	NC	0.03	0.003	NC	NC
Chromium	unitless	0.002	0.0002	NC	NC	0.004	0.0004	NC	NC
Copper	unitless	0.08	0.008	0.06	0.03	0.1	0.01	0.1	0.05
Lead	unitless	0.008	0.002	0.2	0.02	0.01	0.002	0.3	0.03
Mercury	unitless	**4**	0.4	**3**	**1**	**3**	0.3	**3**	**1**
Methylmercury	unitless	**3**	0.3	**3**	**1**	**4**	0.4	**3**	**1**
Nickel	unitless	0.02	0.007	NC	NC	0.008	0.004	NC	NC
Selenium	unitless	0.7	0.3	NC	NC	0.2	0.1	NC	NC
Silver	unitless	0.0008	0.00008	NC	NC	0.0008	0.00008	NC	NC
Zinc	unitless	0.08	0.05	NC	NC	0.07	0.05	NC	NC

Table F-6-1
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 100% Fish > 30 cm

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-6-2

Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 75% Fish ≤ 15 cm; 5% Fish > 30 cm

Constituent	Units	Great Blue Heron Dietary HQs (Diet = 10% Clam; 10% Crab; 75% Fish ≤ 15 cm; 5% Fish > 30 cm)							
		NBSA-wide Mudflats				North Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**1**	0.1	0.4	0.04	**2**	0.2
Total Dioxin/Furan TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.6	0.06	**3**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	0.1	0.4	0.3	**1**	0.1	0.4	0.4
Total PCB TEQ Bird	unitless	**1**	0.1	**5**	0.5	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird	unitless	**1**	0.1	**7**	0.7	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**1**	0.1	**4**	**1**	**2**	0.2	**4**	**1**
Dieldrin	unitless	0.02	0.01	0.03	0.008	0.02	0.01	0.03	0.009
Total Chlordane	unitless	0.004	0.0004	NC	NC	0.005	0.0005	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00004	NC	NC	0.0004	0.00008	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.02	0.002
Total PAH	unitless	0.0004	NC	NC	NC	0.0005	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.008	NC	NC	0.03	0.008	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.7	0.07	0.5	0.3	0.8	0.08	0.6	0.3
Lead	unitless	0.1	0.02	**3**	0.3	0.09	0.02	**3**	0.3
Mercury	unitless	**2**	0.2	**1**	0.6	**2**	0.2	**1**	0.7
Methylmercury	unitless	**2**	0.2	**1**	0.6	**2**	0.2	**2**	0.8
Nickel	unitless	0.007	0.003	NC	NC	0.008	0.004	NC	NC
Selenium	unitless	0.3	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.003	0.0003	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.09	0.06	NC	NC	0.09	0.06	NC	NC

Table F-6-2

Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 75% Fish ≤ 15 cm; 5% Fish > 30 cm

Constituent	Units	Great Blue Heron Dietary HQs (Diet = 10% Clam; 10% Crab; 75% Fish ≤ 15 cm; 5% Fish > 30 cm)							
		Southeast Mudflats				Southwest Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**1**	0.1	0.2	0.02	0.8	0.08
Total Dioxin/Furan TEQ Bird	unitless	0.3	0.03	**2**	0.2	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs	unitless	0.8	0.08	0.3	0.2	**2**	0.2	0.7	0.6
Total PCB TEQ Bird	unitless	0.9	0.09	**5**	0.5	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird	unitless	**1**	0.1	**7**	0.7	**2**	0.2	**9**	0.9
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**1**	0.1	**3**	**1**	**2**	0.2	**6**	**2**
Dieldrin	unitless	0.02	0.01	0.02	0.007	0.01	0.008	0.02	0.005
Total Chlordane	unitless	0.004	0.0004	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00004	NC	NC	0.0001	0.00002	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.4	0.04
Total LMW PAH	unitless	NC	NC	0.008	0.0008	NC	NC	0.02	0.002
Total PAH	unitless	0.0003	NC	NC	NC	0.0009	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.007	NC	NC	0.04	0.01	NC	NC
Cadmium	unitless	0.07	0.007	NC	NC	0.07	0.007	NC	NC
Chromium	unitless	0.02	0.002	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.6	0.06	0.5	0.2	0.7	0.07	0.6	0.3
Lead	unitless	0.05	0.009	**1**	0.1	0.3	0.06	**9**	0.9
Mercury	unitless	**2**	0.2	**1**	0.7	**1**	0.1	**1**	0.5
Methylmercury	unitless	**2**	0.2	**2**	0.8	**2**	0.2	**1**	0.6
Nickel	unitless	0.008	0.004	NC	NC	0.01	0.007	NC	NC
Selenium	unitless	0.3	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.004	0.0004	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.08	0.05	NC	NC	0.1	0.08	NC	NC

Table F-6-2
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 75% Fish ≤ 15 cm; 5% Fish > 30 cm

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-6-3
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 70% Fish ≤ 15 cm; 10% Fish > 30 cm

Constituent	Units	Great Blue Heron Dietary HQs (Diet = 10% Clam; 10% Crab; 70% Fish ≤ 15 cm; 10% Fish > 30 cm)							
		NBSA-wide Mudflats				North Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**1**	0.1	0.4	0.04	**2**	0.2
Total Dioxin/Furan TEQ Bird	unitless	0.4	0.04	**2**	0.2	0.5	0.05	**3**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	**1**	0.1	0.4	0.3	**1**	0.1	0.4	0.3
Total PCB TEQ Bird	unitless	**1**	0.1	**5**	0.5	**1**	0.1	**6**	0.6
Total Dioxin/Furan/PCB TEQ Bird	unitless	**1**	0.1	**7**	0.7	**1**	0.1	**7**	0.7
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**1**	0.1	**4**	**1**	**2**	0.2	**4**	**1**
Dieldrin	unitless	0.02	0.01	0.03	0.008	0.02	0.01	0.03	0.009
Total Chlordane	unitless	0.004	0.0004	NC	NC	0.005	0.0005	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00004	NC	NC	0.0004	0.00008	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.01	0.001	NC	NC	0.02	0.002
Total PAH	unitless	0.0004	NC	NC	NC	0.0005	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.008	NC	NC	0.03	0.008	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.6	0.06	0.5	0.3	0.8	0.08	0.6	0.3
Lead	unitless	0.1	0.02	**3**	0.3	0.09	0.02	**3**	0.3
Mercury	unitless	**2**	0.2	**1**	0.7	**2**	0.2	**2**	0.8
Methylmercury	unitless	**2**	0.2	**1**	0.7	**2**	0.2	**2**	0.9
Nickel	unitless	0.007	0.003	NC	NC	0.008	0.004	NC	NC
Selenium	unitless	0.3	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.003	0.0003	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.09	0.06	NC	NC	0.09	0.06	NC	NC

Table F-6-3
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 70% Fish ≤ 15 cm; 10% Fish > 30 cm

Constituent	Units	Great Blue Heron Dietary HQs (Diet = 10% Clam; 10% Crab; 70% Fish ≤ 15 cm; 10% Fish > 30 cm)							
		Southeast Mudflats				Southwest Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.3	0.03	**1**	0.1	0.2	0.02	0.8	0.08
Total Dioxin/Furan TEQ Bird	unitless	0.3	0.03	**2**	0.2	0.2	0.02	**1**	0.1
Polychlorinated Biphenyls									
Total PCBs	unitless	0.8	0.08	0.3	0.2	**2**	0.2	0.7	0.6
Total PCB TEQ Bird	unitless	0.9	0.09	**4**	0.4	**2**	0.2	**8**	0.8
Total Dioxin/Furan/PCB TEQ Bird	unitless	**1**	0.1	**6**	0.6	**2**	0.2	**8**	0.8
Pesticides									
Total DDx (2,4 & 4,4)	unitless	**1**	0.1	**3**	**1**	**2**	0.2	**6**	**2**
Dieldrin	unitless	0.02	0.01	0.03	0.008	0.01	0.008	0.02	0.005
Total Chlordane	unitless	0.004	0.0004	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.0002	0.00004	NC	NC	0.0001	0.00003	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.4	0.04
Total LMW PAH	unitless	NC	NC	0.008	0.0008	NC	NC	0.02	0.002
Total PAH	unitless	0.0003	NC	NC	NC	0.0009	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.007	NC	NC	0.04	0.01	NC	NC
Cadmium	unitless	0.07	0.007	NC	NC	0.07	0.007	NC	NC
Chromium	unitless	0.02	0.002	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.6	0.06	0.5	0.2	0.7	0.07	0.6	0.3
Lead	unitless	0.05	0.009	**1**	0.1	0.3	0.06	**9**	0.9
Mercury	unitless	**2**	0.2	**1**	0.7	**1**	0.1	**1**	0.5
Methylmercury	unitless	**2**	0.2	**2**	0.8	**2**	0.2	**1**	0.6
Nickel	unitless	0.008	0.004	NC	NC	0.01	0.007	NC	NC
Selenium	unitless	0.4	0.2	NC	NC	0.3	0.2	NC	NC
Silver	unitless	0.004	0.0004	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.08	0.05	NC	NC	0.1	0.08	NC	NC

Table F-6-3
Calculated Dietary HQs for Great Blue Heron Using Alternative Diet: 10% Clam; 10% Crab; 70% Fish ≤ 15 cm; 10% Fish > 30 cm

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-7-1
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 50% Worm; 25% Clam; 25% Crab

Constituent	Units	Lesser Scaup Dietary HQs (Diet = 50% Worm; 25% Clam; 25% Crab)							
		NBSA-wide				North			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.08	0.008	0.4	0.04	0.1	0.01	0.5	0.05
Total Dioxin/Furan TEQ Bird	unitless	0.1	0.01	0.6	0.06	0.1	0.01	0.7	0.07
Polychlorinated Biphenyls									
Total PCBs	unitless	0.1	0.01	0.03	0.03	0.1	0.01	0.04	0.03
Total PCB TEQ Bird	unitless	0.2	0.02	**1**	0.1	0.3	0.03	**1**	0.1
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.3	0.03	**1**	0.1	0.3	0.03	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.4	0.1	0.1	0.01	0.3	0.1
Dieldrin	unitless	0.003	0.002	0.004	0.001	0.004	0.002	0.005	0.002
Chlordane	unitless	0.0005	0.00005	NC	NC	0.0007	0.00007	NC	NC
Hexachlorobenzene	unitless	0.00004	0.000009	NC	NC	0.00005	0.00001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.005	0.0005	NC	NC	0.003	0.0003
Total PAH	unitless	0.0003	NC	NC	NC	0.0004	NC	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.008	NC	NC	0.03	0.008	NC	NC
Cadmium	unitless	0.04	0.004	NC	NC	0.04	0.004	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.5	0.05	0.5	0.2	0.5	0.05	0.4	0.2
Lead	unitless	0.1	0.02	**4**	0.4	0.09	0.02	**3**	0.3
Mercury	unitless	0.8	0.08	0.6	0.3	**1**	0.1	0.7	0.4
Methylmercury	unitless	0.4	0.04	0.3	0.2	0.5	0.05	0.3	0.2
Nickel	unitless	0.006	0.003	NC	NC	0.007	0.003	NC	NC
Selenium	unitless	0.1	0.07	NC	NC	0.1	0.07	NC	NC
Silver	unitless	0.003	0.0003	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.04	0.03	NC	NC	0.04	0.03	NC	NC

Table F-7-1
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 50% Worm; 25% Clam; 25% Crab

Constituent	Units	Lesser Scaup Dietary HQs (Diet = 50% Worm; 25% Clam; 25% Crab)							
		Southeast				NBSA-wide Mudflats			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.09	0.009	0.4	0.04	0.07	0.007	0.3	0.03
Total Dioxin/Furan TEQ Bird	unitless	0.1	0.01	0.6	0.06	0.1	0.01	0.5	0.05
Polychlorinated Biphenyls									
Total PCBs	unitless	0.09	0.009	0.03	0.02	0.1	0.01	0.04	0.03
Total PCB TEQ Bird	unitless	0.2	0.02	**1**	0.1	0.2	0.02	**1**	0.1
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.3	0.03	**1**	0.1	0.3	0.03	**1**	0.1
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.3	0.09	0.2	0.02	0.5	0.2
Dieldrin	unitless	0.003	0.002	0.005	0.001	0.003	0.002	0.004	0.001
Chlordane	unitless	0.0004	0.00004	NC	NC	0.0004	0.00004	NC	NC
Hexachlorobenzene	unitless	0.00004	0.000008	NC	NC	0.00004	0.000009	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.2	0.02	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.007	0.0007	NC	NC	0.005	0.0005
Total PAH	unitless	0.0003	NC	NC	NC	0.0004	NC	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.006	NC	NC	0.04	0.009	NC	NC
Cadmium	unitless	0.05	0.005	NC	NC	0.05	0.005	NC	NC
Chromium	unitless	0.02	0.002	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.6	0.06	0.5	0.2	0.7	0.07	0.6	0.3
Lead	unitless	0.05	0.01	**2**	0.2	0.4	0.08	**11**	**1**
Mercury	unitless	0.7	0.07	0.5	0.2	0.8	0.08	0.6	0.3
Methylmercury	unitless	0.5	0.05	0.3	0.2	0.4	0.04	0.3	0.2
Nickel	unitless	0.006	0.003	NC	NC	0.009	0.004	NC	NC
Selenium	unitless	0.1	0.07	NC	NC	0.1	0.07	NC	NC
Silver	unitless	0.004	0.0004	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.04	0.03	NC	NC	0.07	0.04	NC	NC

Table F-7-1
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 50% Worm; 25% Clam; 25% Crab

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-7-2
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 50% Clam; 25% Crab

Constituent	Units	Lesser Scaup Dietary HQs (Diet = 25% Worm; 50% Clam; 25% Crab)							
		NBSA-wide				North			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.08	0.008	0.4	0.04	0.1	0.01	0.5	0.05
Total Dioxin/Furan TEQ Bird	unitless	0.1	0.01	0.6	0.06	0.1	0.01	0.7	0.07
Polychlorinated Biphenyls									
Total PCBs	unitless	0.1	0.01	0.04	0.03	0.1	0.01	0.04	0.03
Total PCB TEQ Bird	unitless	0.2	0.02	**1**	0.1	0.3	0.03	**1**	0.1
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.3	0.03	**1**	0.1	0.3	0.03	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.4	0.1	0.1	0.01	0.3	0.1
Dieldrin	unitless	0.003	0.002	0.004	0.001	0.003	0.002	0.005	0.001
Chlordane	unitless	0.0005	0.00005	NC	NC	0.0007	0.00007	NC	NC
Hexachlorobenzene	unitless	0.00004	0.000009	NC	NC	0.00005	0.00001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.4	0.04	NC	NC	0.4	0.04
Total LMW PAH	unitless	NC	NC	0.007	0.0007	NC	NC	0.004	0.0004
Total PAH	unitless	0.0006	NC	NC	NC	0.0006	NC	NC	NC
Inorganics									
Arsenic	unitless	0.04	0.009	NC	NC	0.04	0.01	NC	NC
Cadmium	unitless	0.05	0.005	NC	NC	0.05	0.005	NC	NC
Chromium	unitless	0.02	0.002	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.7	0.07	0.6	0.3	0.6	0.06	0.5	0.3
Lead	unitless	0.2	0.05	**7**	0.7	0.2	0.03	**5**	0.5
Mercury	unitless	**1**	0.1	0.9	0.4	**1**	0.1	**1**	0.5
Methylmercury	unitless	0.5	0.05	0.4	0.2	0.5	0.05	0.4	0.2
Nickel	unitless	0.009	0.004	NC	NC	0.01	0.005	NC	NC
Selenium	unitless	0.2	0.09	NC	NC	0.2	0.09	NC	NC
Silver	unitless	0.004	0.0004	NC	NC	0.004	0.0004	NC	NC
Zinc	unitless	0.05	0.03	NC	NC	0.04	0.02	NC	NC

Table F-7-2
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 50% Clam; 25% Crab

Constituent	Units	Lesser Scaup Dietary HQs (Diet = 25% Worm; 50% Clam; 25% Crab)							
		Southeast				Southwest			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.09	0.009	0.4	0.04	0.07	0.007	NC	NC
Total Dioxin/Furan TEQ Bird	unitless	0.1	0.01	0.6	0.06	0.1	0.01	0.5	0.05
Polychlorinated Biphenyls									
Total PCBs	unitless	0.09	0.009	0.03	0.02	0.4	0.04	0.1	0.1
Total PCB TEQ Bird	unitless	0.2	0.02	0.9	0.09	0.4	0.04	**2**	0.2
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.3	0.03	**1**	0.1	0.5	0.05	**2**	0.2
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.3	0.1	0.5	0.05	**1**	0.5
Dieldrin	unitless	0.003	0.002	0.004	0.001	0.003	0.002	0.005	0.001
Chlordane	unitless	0.0004	0.00004	NC	NC	NC	0.00002	NC	NC
Hexachlorobenzene	unitless	0.00004	0.000008	NC	NC	0.00004	0.000009	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.3	0.03	NC	NC	0.3	0.03
Total LMW PAH	unitless	NC	NC	0.008	0.0008	NC	NC	0.007	0.0007
Total PAH	unitless	0.0005	NC	NC	NC	0.0005	NC	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.006	NC	NC	0.03	0.009	NC	NC
Cadmium	unitless	0.06	0.006	NC	NC	0.05	0.005	NC	NC
Chromium	unitless	0.03	0.003	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.7	0.07	0.6	0.3	0.7	0.07	0.6	0.3
Lead	unitless	0.09	0.02	**3**	0.3	0.4	0.08	**11**	**1**
Mercury	unitless	0.8	0.08	0.6	0.3	0.2	0.08	0.6	0.3
Methylmercury	unitless	0.6	0.06	0.4	0.2	0.1	0.06	0.4	0.2
Nickel	unitless	0.009	0.004	NC	NC	0.01	0.004	NC	NC
Selenium	unitless	0.2	0.09	NC	NC	0.2	0.08	NC	NC
Silver	unitless	0.006	0.0006	NC	NC	0.0002	0.00002	NC	NC
Zinc	unitless	0.04	0.02	NC	NC	0.2	0.02	NC	NC

Table F-7-2
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 50% Clam; 25% Crab

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-7-3
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 75% Clam

Constituent	Units	Lesser Scaup Dietary HQs (Diet = 25% Worm; 75% Clam)							
		NBSA-wide				North			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.05	0.005	0.2	0.02	0.06	0.006	0.3	0.03
Total Dioxin/Furan TEQ Bird	unitless	0.07	0.007	0.3	0.03	0.08	0.008	0.4	0.04
Polychlorinated Biphenyls									
Total PCBs	unitless	0.08	0.008	0.03	0.02	0.05	0.005	0.02	0.02
Total PCB TEQ Bird	unitless	0.1	0.01	0.5	0.05	0.1	0.01	0.5	0.05
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.1	0.01	0.7	0.07	0.1	0.01	0.6	0.06
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.07	0.007	0.2	0.07	0.03	0.003	0.08	0.03
Dieldrin	unitless	0.001	0.0007	0.002	0.0005	0.001	0.0007	0.002	0.0005
Chlordane	unitless	0.0001	0.00001	NC	NC	0.0001	0.00001	NC	NC
Hexachlorobenzene	unitless	0.00002	0.000005	NC	NC	0.00002	0.000005	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.5	0.05	NC	NC	0.6	0.06
Total LMW PAH	unitless	NC	NC	0.006	0.0006	NC	NC	0.004	0.0004
Total PAH	unitless	0.0007	NC	NC	NC	0.0008	NC	NC	NC
Inorganics									
Arsenic	unitless	0.04	0.01	NC	NC	0.05	0.01	NC	NC
Cadmium	unitless	0.04	0.004	NC	NC	0.04	0.004	NC	NC
Chromium	unitless	0.03	0.003	NC	NC	0.03	0.003	NC	NC
Copper	unitless	0.5	0.05	0.4	0.2	0.4	0.04	0.3	0.1
Lead	unitless	0.3	0.07	**10**	**1**	0.2	0.05	**7**	0.7
Mercury	unitless	**1**	0.1	**1**	0.5	**2**	0.2	**1**	0.6
Methylmercury	unitless	0.3	0.03	0.2	0.1	0.3	0.03	0.2	0.1
Nickel	unitless	0.01	0.006	NC	NC	0.01	0.006	NC	NC
Selenium	unitless	0.2	0.08	NC	NC	0.2	0.09	NC	NC
Silver	unitless	0.003	0.0003	NC	NC	0.003	0.0003	NC	NC
Zinc	unitless	0.05	0.03	NC	NC	0.03	0.02	NC	NC

Table F-7-3
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 75% Clam

Constituent	Units	Lesser Scaup Dietary HQs (Diet = 25% Worm; 75% Clam)							
		Southeast				Southwest			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.06	0.006	0.3	0.03	0.04	0.004	0.2	0.02
Total Dioxin/Furan TEQ Bird	unitless	0.08	0.008	0.4	0.04	0.07	0.007	0.4	0.04
Polychlorinated Biphenyls									
Total PCBs	unitless	0.05	0.005	0.02	0.01	0.1	0.01	0.05	0.04
Total PCB TEQ Bird	unitless	0.05	0.005	0.2	0.02	0.2	0.02	0.9	0.09
Total Dioxin/Furan/PCB TEQ Bird	unitless	0.1	0.01	0.6	0.06	0.2	0.02	**1**	0.1
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.03	0.003	0.1	0.03	0.1	0.01	0.3	0.1
Dieldrin	unitless	0.001	0.0008	0.002	0.0005	0.001	0.0008	0.002	0.0006
Chlordane	unitless	0.0001	0.00001	NC	NC	0.0002	0.00002	NC	NC
Hexachlorobenzene	unitless	0.00002	0.000005	NC	NC	0.00003	0.000007	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.4	0.04	NC	NC	0.7	0.07
Total LMW PAH	unitless	NC	NC	0.004	0.0004	NC	NC	0.01	0.001
Total PAH	unitless	0.0005	NC	NC	NC	0.001	NC	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.006	NC	NC	0.06	0.02	NC	NC
Cadmium	unitless	0.05	0.005	NC	NC	0.06	0.006	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.04	0.004	NC	NC
Copper	unitless	0.5	0.05	0.4	0.2	0.7	0.07	0.6	0.3
Lead	unitless	0.1	0.03	**4**	0.4	**1**	0.2	**32**	**3**
Mercury	unitless	0.8	0.08	0.6	0.3	**1**	0.1	**1**	0.5
Methylmercury	unitless	0.3	0.03	0.2	0.1	0.3	0.03	0.2	0.1
Nickel	unitless	0.01	0.005	NC	NC	0.02	0.01	NC	NC
Selenium	unitless	0.2	0.08	NC	NC	0.2	0.08	NC	NC
Silver	unitless	0.005	0.0005	NC	NC	0.002	0.0002	NC	NC
Zinc	unitless	0.03	0.02	NC	NC	0.1	0.08	NC	NC

Table F-7-3
Calculated Dietary HQs for Lesser Scaup Using Alternative Diet: 25% Worm; 75% Clam

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
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LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-8-1
Calculated Dietary HQs for River Otter Using Alternative Diet 100% fish > 30 cm

Constituent	Units	River Otter Dietary HQs (Diet = 100% fish > 30 cm)							
		NBSA-wide				North			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.1	0.04	**4**	0.1	0.2	0.05	**6**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.2	0.05	**5**	0.2	0.3	0.08	**9**	0.3
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.3	0.5	0.4	0.4	0.3	0.5	0.4
Total PCB TEQ Mammal	unitless	0.2	0.05	**6**	0.2	0.6	0.2	**18**	0.7
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.3	0.1	**11**	0.4	0.7	0.2	**23**	0.8
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.003	0.09	0.009	0.01	0.003
Dieldrin	unitless	0.03	0.02	0.03	0.02	0.04	0.02	0.04	0.02
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.01	0.001	NC	NC	0.01	0.001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.001	0.0002	NC	NC	0.003	0.0005
Total LMW PAH	unitless	NC	NC	0.00004	0.00001	NC	NC	0.00003	0.00001
Total PAH	unitless	0.004	0.0008	NC	NC	0.004	0.0007	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.01	NC	NC	0.02	0.01	NC	NC
Cadmium	unitless	0.0008	0.0002	NC	NC	0.001	0.0004	NC	NC
Chromium	unitless	0.01	0.001	NC	NC	0.02	0.002	NC	NC
Copper	unitless	0.003	0.002	0.02	0.008	0.003	0.002	0.003	0.002
Lead	unitless	0.001	0.0002	0.02	0.002	0.002	0.0002	0.03	0.003
Mercury	unitless	0.06	0.04	0.6	0.4	0.09	0.06	0.9	0.5
Methylmercury	unitless	0.07	0.04	0.7	0.4	0.1	0.06	**1**	0.6
Nickel	unitless	0.0005	0.0003	NC	NC	0.0003	0.0001	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**2**	0.2	NC	NC
Silver	unitless	0.00008	0.000008	NC	NC	0.0001	0.00001	NC	NC
Zinc	unitless	0.009	0.005	NC	NC	0.01	0.005	NC	NC

Table F-8-1
Calculated Dietary HQs for River Otter Using Alternative Diet 100% fish > 30 cm

Constituent	Units	River Otter Dietary HQs (Diet = 100% fish > 30 cm)							
		Southeast				Southwest			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.1	0.04	**4**	0.1	0.2	0.05	**6**	0.2
Total Dioxin/Furan TEQ Mammal	unitless	0.2	0.05	**6**	0.2	0.2	0.05	**6**	0.2
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.3	0.5	0.4	0.5	0.4	0.6	0.5
Total PCB TEQ Mammal	unitless	0.06	0.02	**2**	0.07	0.3	0.08	**9**	0.3
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.2	0.07	**8**	0.3	0.3	0.1	**11**	0.4
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.003	0.1	0.01	0.02	0.005
Dieldrin	unitless	0.04	0.02	0.04	0.02	0.04	0.02	0.04	0.02
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.001	0.0001	NC	NC
Hexachlorobenzene	unitless	0.01	0.001	NC	NC	0.01	0.001	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.0004	0.00008	NC	NC	0.002	0.0003
Total LMW PAH	unitless	NC	NC	0.000009	0.000003	NC	NC	0.00009	0.00003
Total PAH	unitless	0.001	0.0002	NC	NC	0.009	0.002	NC	NC
Inorganics									
Arsenic	unitless	0.02	0.01	NC	NC	0.03	0.01	NC	NC
Cadmium	unitless	0.001	0.0004	NC	NC	0.0008	0.0002	NC	NC
Chromium	unitless	0.008	0.0008	NC	NC	0.01	0.001	NC	NC
Copper	unitless	0.002	0.002	0.01	0.006	0.004	0.003	0.02	0.01
Lead	unitless	0.001	0.0002	0.02	0.002	0.001	0.0002	0.02	0.002
Mercury	unitless	0.06	0.04	0.6	0.3	0.06	0.04	0.6	0.3
Methylmercury	unitless	0.06	0.04	0.6	0.3	0.06	0.04	0.6	0.4
Nickel	unitless	0.004	0.002	NC	NC	0.0008	0.0004	NC	NC
Selenium	unitless	**5**	0.5	NC	NC	**2**	0.2	NC	NC
Silver	unitless	0.0001	0.00001	NC	NC	0.0001	0.00001	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.01	0.005	NC	NC

Table F-8-1
Calculated Dietary HQs for River Otter Using Alternative Diet 100% fish > 30 cm

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-8-2
Calculated Dietary HQs for River Otter Using Alternative Diet 5% worm; 10% clam; 5% crab; 70% fish ≤ 30 cm; 10% fish > 30 cm

Constituent	Units	River Otter Dietary HQs (Diet = 5% worm; 10% clam; 5% crab; 70% fish ≤ 30 cm; 10% fish > 30 cm)							
		NBSA-wide				North			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.5	0.2	**18**	0.6	0.9	0.3	**30**	**1**
Total Dioxin/Furan TEQ Mammal	unitless	0.6	0.2	**19**	0.7	**1**	0.3	**32**	**1**
Polychlorinated Biphenyls									
Total PCBs	unitless	0.6	0.5	0.7	0.5	0.7	0.6	0.8	0.7
Total PCB TEQ Mammal	unitless	0.2	0.05	**6**	0.2	0.3	0.07	**8**	0.3
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.7	0.2	**23**	0.8	**1**	0.3	**38**	**1**
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.003	0.08	0.008	0.01	0.003
Dieldrin	unitless	0.03	0.01	0.03	0.01	0.03	0.02	0.03	0.02
Total Chlordane	unitless	0.002	0.0002	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.006	0.0006	NC	NC	0.009	0.0009	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0009	NC	NC	0.005	0.001
Total LMW PAH	unitless	NC	NC	0.00006	0.00002	NC	NC	0.0001	0.00004
Total PAH	unitless	0.008	0.002	NC	NC	0.01	0.003	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.02	NC	NC	0.03	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.002	0.0005	NC	NC
Chromium	unitless	0.04	0.004	NC	NC	0.05	0.005	NC	NC
Copper	unitless	0.03	0.02	0.1	0.07	0.03	0.02	0.03	0.02
Lead	unitless	0.01	0.002	0.2	0.02	0.01	0.001	0.2	0.02
Mercury	unitless	0.03	0.02	0.3	0.2	0.04	0.03	0.4	0.2
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.04	0.03	0.4	0.3
Nickel	unitless	0.0007	0.0004	NC	NC	0.0008	0.0004	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0006	0.00006	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.01	0.006	NC	NC

Table F-8-2
Calculated Dietary HQs for River Otter Using Alternative Diet 5% worm; 10% clam; 5% crab; 70% fish ≤ 30 cm; 10% fish > 30 cm

Constituent	Units	River Otter Dietary HQs (Diet = 5% worm; 10% clam; 5% crab; 70% fish ≤ 30 cm; 10% fish > 30 cm)							
		Southeast				Southwest			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.5	0.2	**18**	0.6	0.3	0.09	**10**	0.3
Total Dioxin/Furan TEQ Mammal	unitless	0.6	0.2	**20**	0.7	0.3	0.1	**11**	0.4
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.4	0.5	0.4	0.7	0.6	0.9	0.7
Total PCB TEQ Mammal	unitless	0.1	0.04	**4**	0.2	0.3	0.09	**10**	0.4
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.7	0.2	**22**	0.8	0.6	0.2	**19**	0.7
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.07	0.007	0.01	0.002	0.2	0.02	0.03	0.005
Dieldrin	unitless	0.02	0.01	0.02	0.01	0.04	0.02	0.04	0.02
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.006	0.0006	NC	NC	0.006	0.0006	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0008	NC	NC	0.006	0.001
Total LMW PAH	unitless	NC	NC	0.00003	0.00001	NC	NC	0.00005	0.00002
Total PAH	unitless	0.004	0.0009	NC	NC	0.009	0.002	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.01	NC	NC	0.04	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.002	0.0005	NC	NC
Chromium	unitless	0.05	0.005	NC	NC	0.05	0.005	NC	NC
Copper	unitless	0.02	0.02	0.1	0.06	0.05	0.04	0.3	0.1
Lead	unitless	0.006	0.0008	0.1	0.01	0.04	0.005	0.7	0.07
Mercury	unitless	0.03	0.02	0.3	0.2	0.04	0.02	0.4	0.2
Methylmercury	unitless	0.04	0.02	0.4	0.2	0.03	0.02	0.3	0.2
Nickel	unitless	0.002	0.001	NC	NC	0.001	0.0005	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0008	0.00008	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.01	0.007	NC	NC

Table F-8-2

Calculated Dietary HQs for River Otter Using Alternative Diet 5% worm; 10% clam; 5% crab; 70% fish ≤ 30 cm; 10% fish > 30 cm

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table F-8-3

Calculated Dietary HQs for River Otter Using Alternative Diet 5% worm; 10% clam; 5% crab; 75% fish ≤ 30 cm; 5% fish > 30 cm

Constituent	Units	River Otter Dietary HQs (Diet = 5% worm; 10% clam; 5% crab; 75% fish ≤ 30 cm; 5% fish > 30 cm)							
		NBSA-wide				North			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.2	**19**	0.7	**1**	0.3	**31**	**1**
Total Dioxin/Furan TEQ Mammal	unitless	0.6	0.2	**20**	0.7	**1**	0.3	**34**	**1**
Polychlorinated Biphenyls									
Total PCBs	unitless	0.6	0.5	0.7	0.6	0.7	0.6	0.9	0.7
Total PCB TEQ Mammal	unitless	0.2	0.05	**6**	0.2	0.2	0.07	**8**	0.3
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.7	0.2	**24**	0.9	**1**	0.4	**39**	**1**
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.1	0.01	0.02	0.003	0.08	0.008	0.01	0.003
Dieldrin	unitless	0.03	0.01	0.03	0.01	0.03	0.02	0.03	0.02
Total Chlordane	unitless	0.002	0.0002	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.005	0.0005	NC	NC	0.009	0.0009	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0009	NC	NC	0.005	0.001
Total LMW PAH	unitless	NC	NC	0.00006	0.00002	NC	NC	0.0001	0.00004
Total PAH	unitless	0.008	0.002	NC	NC	0.01	0.003	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.02	NC	NC	0.03	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.002	0.0005	NC	NC
Chromium	unitless	0.04	0.004	NC	NC	0.05	0.005	NC	NC
Copper	unitless	0.03	0.02	0.2	0.08	0.03	0.02	0.03	0.02
Lead	unitless	0.01	0.002	0.2	0.02	0.01	0.001	0.2	0.02
Mercury	unitless	0.03	0.02	0.3	0.2	0.04	0.02	0.4	0.2
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.04	0.03	0.4	0.2
Nickel	unitless	0.0007	0.0004	NC	NC	0.0008	0.0004	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0006	0.00006	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.01	0.006	NC	NC

Table F-8-3

Calculated Dietary HQs for River Otter Using Alternative Diet 5% worm; 10% clam; 5% crab; 75% fish ≤ 30 cm; 5% fish > 30 cm

Constituent	Units	River Otter Dietary HQs (Diet = 5% worm; 10% clam; 5% crab; 75% fish ≤ 30 cm; 5% fish > 30 cm)							
		Southeast				Southwest			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans									
2378-TCDD	unitless	0.6	0.2	**18**	0.7	0.3	0.09	**10**	0.4
Total Dioxin/Furan TEQ Mammal	unitless	0.6	0.2	**21**	0.8	0.4	0.1	**11**	0.4
Polychlorinated Biphenyls									
Total PCBs	unitless	0.4	0.4	0.5	0.4	0.8	0.6	0.9	0.7
Total PCB TEQ Mammal	unitless	0.1	0.04	**5**	0.2	0.3	0.09	**10**	0.4
Total Dioxin/Furan/PCB TEQ Mammal	unitless	0.7	0.2	**23**	0.8	0.6	0.2	**19**	0.7
Pesticides									
Total DDx (2,4 & 4,4)	unitless	0.07	0.007	0.01	0.002	0.2	0.02	0.03	0.005
Dieldrin	unitless	0.02	0.01	0.02	0.01	0.04	0.02	0.04	0.02
Total Chlordane	unitless	0.001	0.0001	NC	NC	0.002	0.0002	NC	NC
Hexachlorobenzene	unitless	0.006	0.0006	NC	NC	0.005	0.0005	NC	NC
Polycyclic Aromatic Hydrocarbons									
Total HMW PAH	unitless	NC	NC	0.004	0.0008	NC	NC	0.006	0.001
Total LMW PAH	unitless	NC	NC	0.00003	0.00001	NC	NC	0.00005	0.00002
Total PAH	unitless	0.004	0.0009	NC	NC	0.009	0.002	NC	NC
Inorganics									
Arsenic	unitless	0.03	0.01	NC	NC	0.04	0.02	NC	NC
Cadmium	unitless	0.002	0.0005	NC	NC	0.002	0.0005	NC	NC
Chromium	unitless	0.06	0.006	NC	NC	0.05	0.005	NC	NC
Copper	unitless	0.02	0.02	0.1	0.06	0.06	0.04	0.3	0.1
Lead	unitless	0.006	0.0008	0.1	0.01	0.04	0.005	0.7	0.07
Mercury	unitless	0.03	0.02	0.3	0.2	0.03	0.02	0.3	0.2
Methylmercury	unitless	0.03	0.02	0.3	0.2	0.03	0.02	0.3	0.2
Nickel	unitless	0.002	0.0009	NC	NC	0.001	0.0005	NC	NC
Selenium	unitless	**3**	0.3	NC	NC	**3**	0.3	NC	NC
Silver	unitless	0.0006	0.00006	NC	NC	0.0009	0.00009	NC	NC
Zinc	unitless	0.01	0.005	NC	NC	0.01	0.007	NC	NC

Table F-8-3

Calculated Dietary HQs for River Otter Using Alternative Diet 5% worm; 10% clam; 5% crab; 75% fish ≤ 30 cm; 5% fish > 30 cm

Notes:

Shaded/bolded HQ values indicate an HQ greater than 1.

Exposure doses and HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit in sediment and tissue, if applicable.

- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:

FFS = focused feasibility study (USEPA 2014)
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adv Total Chlordane
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:

USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.