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HYDRODYNAMIC, WATER QUALITY AND COASTAL ZONE EROSION MODELING

APPENDIX B-1.1a: Hydrodynamic, Water Quality and Coastal Zone Erosion Modeling

1. HYDRODYNAMIC, WATER QUALITY AND COASTAL EROSION MODELING

Introduction

Simulation of the effects of channel deepening on hydraulics, salinity, water temperature, and dissolved oxygen (DO) requires the use of a sophisticated three-dimensional (3-D) model. The model selected for this study was MIKE3, a modeling system for 3-D simulation of unsteady flows in rivers, estuaries, and coastal seas. MIKE3 allows for easy integration of hydrodynamic and water quality simulations, straightforward modifications to system geometry/bathymetry, and fine-grid resolution in areas of potential deepening.

Objectives

The objectives of the modeling effort were: (1) to develop an accurate model of New York and New Jersey Harbor and surrounding waters, calibrated to and verified for existing conditions; (2) to simulate the existing hydrodynamic, salinity, temperature, and DO dynamics of the Harbor; (3) to evaluate changes in these dynamics under with- and without-project conditions; and (4) to assess the effects of various deepening alternatives under extreme conditions, including high and low freshwater flows, light winds, and high temperatures.

Previous Investigations

New York and New Jersey Harbor is part of a complex coastal ocean/estuarine system which includes the Harbor, the New York Bight, Long Island Sound, and the Hudson River and Raritan River estuaries. The system is influenced by variable tides, winds, and density gradients induced by freshwater inflows and other factors. The system also includes broad, shallow bays; and both narrow and winding, and straight and deep riverine channels.

A large volume of literature exists regarding New York Bight, Long Island Sound, and surrounding estuarine waters, an area where considerable research has been carried out. Previous studies have considered the hydrodynamics and water quality of the Harbor (Jay and Bowman 1975), and circulation patterns within the New York Bight (Beardsley and Boicourt 1981). Of particular interest in the present study are previous 3-D numerical modeling efforts. Among the first 3-D modeling studies was the work of Oey, et al. (1985), which demonstrated a number of complex processes that exist in the Harbor, including density currents and variations in wind-forcing. More recent modeling efforts include the work of Scheffner, et al. (1994), who developed a large-domain model that covered the Bight, Long Island Sound, and its connection to the Harbor via the East River; and Letter, et al. (1996) who describe a similar 3-D model that,

in order to capture complex tidal interactions and phasing in Upper New York Bay, the Arthur Kill and Kill Van Kull, and the Harlem River, included more detailed resolution of these areas.

The complex interactions between the various sub-components of the system are important factors controlling transport in the Harbor. Blumberg and Galperin (1990), for example, demonstrated the importance of the coupling between the New York Bight and Long Island Sound during the summer months. Building on the work of Jay and Bowman (1975), Blumburg and Pritchard (1997) performed a detailed model study and analysis of the East River that supports a general pattern of long-term net flux out of Long Island Sound and into the New York and New Jersey Harbor. Most recently, Blumberg, et al. (in review) developed a comprehensive 3-D model of the hydrodynamics and salinity of the harbor, which illustrates general patterns of long-term net transport throughout the harbor. The model achieves considerable precision, accuracy, and utility over a range of time scales.

Previous studies demonstrate the complex dynamics of the Harbor and suggest that full consideration of the system requires a 3-D model of hydrodynamics, salinity, DO, and temperature applied to an extensive, yet detailed, domain. As outlined in the following sections, the model used in the present study incorporates these features.

Adopted Model

The hydrodynamic and water quality modeling was performed using MIKE3, a general 3-D modeling system developed by the Danish Hydraulics Institute The model, the application of which is continually updated, solves equations that represent the conservation of fluid mass and momentum, the transport of salt and temperature, and the chemical and biological interactions between BOD, nutrients, and bacteria that govern the concentrations of DO in the water. MIKE3 includes nested orthogonal grids, a bottom-resolving (bottom-fitted) coordinate system, a mixed Smagorinsky/k-ε turbulence-closure model, wind-forcing, and time-dependent point source input (over 90 point sources are used in the present model setup). Spatial discretization within the model is based on the finite-difference technique.

In developing modeling strategy it is important to create a computational grid that defines the model domain. In the present study, a nested-grid system was employed; this system uses a varying degree of refinement depending on location relative to the areas of interest. The finest resolution is applied to the Harbor proper and to its associated channels, with coarser resolution applied to surrounding areas. The model grid is illustrated in Figure B-1.1-1. Model resolution varies by section of the study area; horizontal resolution varies from 6645 ft in the New York Bight and eastern Long Island Sound overall, to 2215 ft in parts of the Bight and Sound, to 738 ft in Lower New York Bay and the Upper East and Hudson Rivers, and to 246 ft in the main project areas, including Upper New York Bay, the Kill Van Kull, Newark Bay, and northern Arthur Kill. Vertical resolution in all areas is 6.5 ft. This “dynamically nested” version of MIKE3 described above was adopted in order to refine the model resolution in the vicinity of the navigation channels without an excessive increase in the number of computational points (and

attendant CPU time). With the present configuration the model includes on the order of 200,000 computational points.

Available Data

The bathymetry and computational grid for the MIKE 3 simulations evolved from a grid developed for the USACE Waterways Experiment Station (WES) Harbor-Apex Model (Letter et al. 1996). The Harbor-Apex Model (HAM) bathymetry data were compared with data from various other sources, including bathymetric surveys and NOAA coastal charts, and were revised as necessary to better define the bathymetry in areas where the MIKE 3 grid shows increased resolution. Particular attention was paid to the existing navigational channels in Kill Van Kull, Arthur Kill, and both Lower and Upper New York Bays.

Hydrodynamic data for model calibration and verification consisted of measured elevations and currents from surveys performed in 1991 and 1994-1995. NOAA predictions for elevations and currents were also used to increase the geographic extent of the comparison data. Locations of the hydrodynamic data sites are shown in Figure B-1.1-2. Additional elevation stations (not included in the figure) were located upstream on the Hudson River at Dobbs Ferry, West Point, Poughkeepsie, and Albany. The 1994-1995 data also included current measurements at College Point, Red Hook (near the Brooklyn Bridge), and the Harlem River. Water quality data, including salinity, temperature, DO, and several other parameters, were also available for the 1991 and 1994-1995 periods. Station locations from these surveys in the vicinity of the project areas are shown in Figure B-1.1-3. Additional data required for the 3-D model include air temperature, wind speed, and precipitation from surrounding airport and offshore recording stations; river discharges from USGS stream gaging stations; and the chemical composition of effluents from water pollution control facilities.

Interagency Coordination

The modeling effort has been coordinated with and received data from a number of federal and state agencies. These include USACE-WES, NYCDEP, NJDEP, NYSDEC, USGS, the National Weather Service (NWS), and NOAA. A national expert panel established by USACE-NYD provided technical review. Comments received from theses reviewers were addressed through revisions to the models.

Selection of Boundary Conditions

The model boundaries illustrated in Figure B-1.1-1 extend to approximately Atlantic City, New Jersey, to the south, to Shinnecock Inlet and Orient Point (on the Atlantic Ocean and Long Island Sound, respectively) to the east, and up the Hudson River to the Federal Dam at Troy, New York. Tidal boundary conditions at the offshore locations were created from USACE's tidal constituent database, which is based on large-domain tidal simulations using the coastal/ocean model ADCIRC (Westerink et al. 1993). These data were adjusted slightly to match predicted

elevations at locations just inside the model boundary. Temperature and salinity boundary conditions were obtained from measured salinity and temperature profiles, where available, and from climatological data. Measured wind speed and direction were obtained from Newark Airport and from data recorded off shore at Ambrose Light. Temperature data were obtained from the Central Park National Weather Service station as well as the Ambrose Light data set.

Daily averaged freshwater discharges at the Hudson, Passaic, Raritan, Rahway, Hackensack, Saddle, Second, and Third Rivers were specified in the model, as were discharges from the Connecticut, Quinnipaic, Norwalk, and Housatonic Rivers, all of which discharge into Long Island Sound. Additional sources of freshwater specified in the model included wastewater treatment plant discharges, which were estimated from operating records at over 70 different locations, and stormwater runoff derived from daily rainfall estimates. All sources of freshwater were entered at a constant temperature of 71.6^{o}F.

Model simulations were initiated with a zero-velocity field and a level (or gently sloping) surface elevation, the latter depending on boundary elevations at the start of the simulation. The initial distributions of salinity and temperature were created from available measurements of temperature and salinity. These data were sufficient to create model temperature and salinity fields, which stabilized after several days' run-time, reducing the spinup period.

Model Calibration and Verification

As noted above, calibration and verification data were collected during the 1991 and 1994-1995 survey periods. Data were collected by means of tide gauges, moored velocity meters, moored and cast conductivity-temperature-density (CTD) probes, and grab samples. Hydrodynamic data from 1991 were collected for a 4-6 week period, with weekly and biweekly temperature and salinity measurements taken. The hydrodynamic calibration was performed for approximately 36 days, from 24 June through 30 July 1991. Hydrodynamic and water quality data from the 1994-1995 period were collected from approximately November 1994 to October 1995. The hydrodynamic verification and water quality calibration periods were identical, from 21 August to 9 September 1995. An additional, longer period of approximately 60 days was run between May and August 1995 for the water quality model verification. Results of these calibration and verification tests indicate that the model results reasonably matched measured data for hydrodynamic and water quality components for both low-flow and high-flow freshwater conditions.

To test the model response to different grid resolutions and time steps, model sensitivity analyses were conducted. The results of these investigations indicated that the grid setup shown in Figure B-1.1-1 produces an accurate and computationally efficient solution when run with a 30-sec timestep. The results also indicated that a coarser grid setup, in which the 246-ft sub-grid was removed, could provide a reasonably accurate solution throughout much of the domain using a 60-sec timestep. The hydrodynamic solution in project areas was, however, improved with the 246-ft grid included, a conclusion based primarily on improvements in elevation amplitudes and

phase that occur with the finer grid. Model runs were also performed with the water quality model using up to a 3-min timestep. Water quality results also indicated that results were improved with a 60-sec timestep in the coarse grid setup and 30-sec timestep in the fine grid setup. Additional analyses were conducted with the water quality model to evaluate sensitivity to levels of sediment oxygen demand (SOD) in the system.

Conditions Evaluated

So many channel deepening scenarios and combinations of pathways have been proposed that an independent evaluation of each alternative is impractical. The approach taken, therefore, was to simulate all channels together, as a worst case, for three channel-deepening scenarios: (1) existing conditions; (2) baseline, or future without-project conditions; and (3) future with-project conditions. Each condition was evaluated during periods of both low (30Q10) and high (30Q90) freshwater input. Seasonal factors associated with low DO, i.e., a summer period with high temperature and little wind, were also considered. All alternatives were evaluated without assuming changes in the area of port facilities (i.e., no harbor fills). The assumed depths for the baseline and future scenario conditions are shown in the table below:

Navigation Channel Depths for Model Runs		
Channel	**Future Without-Project Conditions (ft, MLW)**	**Future With-Project Conditions (ft, MLW)**
Ambrose	45	53
Bay Ridge	40	50
Port Jersey	41	50
Kill Van Kull	45	50
Newark Bay	45	50
Arthur Kill to Howland Hook	41	50
Arthur Kill to Gulfport	40	40

Tidal-forcing and offshore salinity, temperature, and DO boundary conditions for the evaluation runs were selected from the 1995 August-September simulation period. Initial conditions for temperature, salinity, DO, and other water quality parameters were selected from this period as well. These conditions correspond to a period of low seasonal flow in the Hudson River and other tributaries. The conditions are considered appropriate for initializing the low-flow scenarios and conservative for initializing the high-flow scenarios. Each scenario run is long enough (more than 30 days) to allow for sufficient spin-up and response of the salinity and DO fields.

Simulations to Assess the Impacts of Future Without-Project Conditions

Model simulations were made to determine the impact of future without-project conditions. Two sets of simulations were conducted, the first set using existing channel depths, and the second using depths as noted for without-project conditions in the above table. Model results for water surface elevation, salinity, and DO were evaluated at each of the survey locations shown in Figure B-1.1-3. These data cover project areas in Upper and Lower New York Bays, the Arthur Kill, Kill Van Kull, and Newark Bay, as well as numerous locations in the Hudson and East Rivers. The comparisons focused on the summer low-flow scenarios, under which high salinity values and low DO values may be expected.

Comparisons were made on the basis of parameter time series at each location, using numerical and graphical means of comparison. The results of these comparisons indicate that water surface elevations are virtually unchanged through most of the system. The only measurable elevation difference occurs where the maximum difference is less than 0.2 in. Minor differences in salinity levels occur in Newark Bay (maximum increase of 0.6 ppt), Kill Van Kull (maximum increase of 0.4 ppt) and the Passaic River (maximum increase of 0.3 ppt). However, tidal-averaged increases in salinity at these locations are less than 0.1 ppt. There were no changes in average salinity for the Hudson, East, or Harlem Rivers.

Differences in DO levels between existing and baseline without-project conditions were negligible at all locations. The largest differences, which were on the order of 0.05 ppm, were observed in the Arthur Kill, Kill Van Kull and Newark Bay, with average DO values for the baseline without-project conditions lower than DO values for existing conditions. No changes in DO levels were noted in the East and Hudson Rivers. It should be noted that the commonly accepted accuracy limit for DO field measurements is 0.1 ppm.

Simulations to Assess the Impacts of Future With-Project Conditions

Additional runs were conducted in order to assess the impact associated with various channel-deepening scenarios, including deepening to 50 ft MLW in portions of the Arthur Kill and Newark Bay, and the Kill Van Kull, Port Jersey, and Bay Ridge, and to 53 ft MLW in the Ambrose Channel as indicated in the above table. Comparisons were made between the baseline (without-project) conditions and future (with-project) conditions.

Model simulations have been conducted to compare the effects of deepening scenarios on elevations, salinity and dissolved oxygen in the project areas and surrounding waters. The results suggest that the initial deepening to 45 feet (future, without project condition) will result in only minor changes to existing conditions. The results also suggest that changes on the order of 1cm or less in elevation and 0.5 ppt in mean salinity could be anticipated in parts of the Kills, Newark Bay and the Passaic and Hackensack Rivers for with project conditions (i.e., a 50 foot deepening scenario).

Coastal Erosion Modeling

Changes in bottom topography associated with deepening affect the direction and magnitude of wave propagation. Shoreline reaches in the Harbor and New York Bight may be affected by wave action caused by offshore storm events and by local winds. In addition, ship generated waves (wakes) in the navigation channels may be sufficient to contribute to erosion of channel banks. To address these issues, additional modeling was performed to assess the potential impacts of harbor deepening on coastal areas, specifically related to erosion of adjacent shorelines.

The objective of the coastal erosion modeling was to simulate the wave environment for existing and future with project conditions and to evaluate changes in the wave environment which may increase the potential for coastal erosion. Since the wave environment in the project area varies by location, the modeling was divided into two parts. The Lower New York Bay is open to waves propagating in from New York Bight and is sufficiently broad to allow wave generation by local winds. Channel deepening in Lower New York Bay may affect the propagation of these waves. Due to the generally uni-directional wave movement induced by the Narrows, however, channel deepening in Upper New York Bay will have little effect on the wave climatology in this region. A greater effect of deepening may be encountered in the confined navigation channels due to wakes generated from larger ships.

Two modeling approaches were adopted. For Lower New York Bay, a series of model runs were conducted using a numerical wave model (MIKE21 NSW) to evaluate the impact of deepening on wave propagation. Two depth configurations for the Ambrose Channel were considered: the presently authorized 45 ft depth at MLW and future with project conditions depth of 53 ft MLW. The model was run to examine the effects of deepening Ambrose Channel on waves propagating from offshore locations and on locally generated wind waves. The wave model grid was developed at 164 ft resolution using bathymetry from the existing hydrodynamic model.

For the offshore waves, runs were conducted for a unit wave amplitude propagating from the dominant exposure directions of east, east northeast, east southeast, southeast, south southeast and south. Wave data from the New York Bight suggest that these component directions considered at 4, 6, 8, 10 and 12 second wave periods are sufficient to cover approximately 80 to 90% of wave conditions (USACE 1997). Locally generated waves were generated using winds out of 10 different directions, from west southwest clockwise to north. Wind speeds were varied from 16.4 to 49.2 ft/s. The results of the wave model runs were evaluated by computing differences in amplification (shoaling) factors between the baseline (45 ft) and future (53 ft) runs over the entire model grid.

The numerical wave model results indicate that deepening Ambrose Channel will increase wave heights in the immediate vicinity of the channel, but that waves on adjacent shorelines will be unchanged in virtually all areas. For waves propagating from offshore the model predicts a small shift in wave energy to the west (due to refraction along the navigation channel) which may

adjust the wave climate near Coney Island and Rockaway Point. These adjustments are expected to be very small, as wave heights may decrease along Coney Island and increase at the western tip of Rockaway Point by a maximum of 1-2%. There were no observable changes in the propagation of locally generated wind waves for the two modeled depths.

For Upper New York Bay, an analytical model (PIANC 1987) was applied to estimate ship generated waves which may contribute to erosion along banks of navigation channels. As water flows around the ship, waves are generated at the both bow and stern and a return current (flowing opposite to direction of ship travel) is induced. The bow, or front wave, is created by the transition between the undisturbed water level in front of the vessel and the water level behind it. These waves move obliquely out from the sailing line. The stern wave is the transition between the water level depression and the water level behind the ship. These waves follow the sailing line and may take the form of a breaking wave, depending on the vessel speed and channel depth.

The analytical model considers the effect of vessel speed (V), ship dimensions (length, beam and draft), bow shape, channel depth (d) and width. The Froude number, $F = V/(gd)^{1/2}$, is an important dimensionless parameter in the formulation. For a given vessel size and shape, wave heights generally increase with increasing Froude number. The Froude number will increase with increasing vessel speed but decrease with increasing channel depth. However, for a given Froude number and channel dimensions, wave heights generally increase with increasing vessel size.

The analytical model was run for the Kill Van Kull/Newark Bay channel, the Arthur Kill, Port Jersey and Bay Ridge channels for currently authorized and future with project dimensions. There is a diverse assortment of ships within the harbor, varying in dimension and operating speed. Since it was not practical to simulate all vessel types, three vessels were considered: a 1300 TEU container ship, a 6000 TEU container ship, and a tug. The tug functioned as a control vessel in the analysis and was evaluated for both current and future channel dimensions. The 1300 TEU container ship (approximately 33 ft draft) was considered as an example of a small draft vessel for currently authorized channel dimensions, while the 6000 TEU container ship was considered as an example of a large draft vessel for future with project channel dimensions. In order to examine the effects of channel dimensions on waves for a given ship, all three of the above vessels were considered for the current and future channel dimensions of the Kill Van Kull (with the 6000 TEU ship operating at a reduced draft). A range of vessel speeds was considered based on conversations with harbor pilots.

The results of the analytical ship wake model suggest that ship generated waves are largest when vessels are underway (e.g., 9 mph) in narrow channels such as the Arthur Kill and Kill Van Kull. Under these conditions, ship generated waves on the order of 2 ft may be observed. As expected, the results also indicate that the larger (6000 TEU) ships will produce a bigger wake for a given channel and vessel speed. Therefore, under without project conditions, the increasing demand for larger ships like the 6000 TEU vessels currently in service (even at reduced draft) could, over

time, accelerate bank erosion. However, under future with project conditions, the impact of ship wakes may, in fact, decrease. This is due to the deeper channels, which result in smaller waves, and, more importantly, the overall decrease in the number of ship calls over the life of the project. For example, preliminary estimates of ship calls from cargo forecasts suggest that ship calls may be reduced by 33% in 2010 under with project conditions. As a result, it is anticipated that an overall reduction in ship cycles will reduce the total amount of wake energy absorbed at the shoreline, thereby reducing the opportunity for bank erosion.

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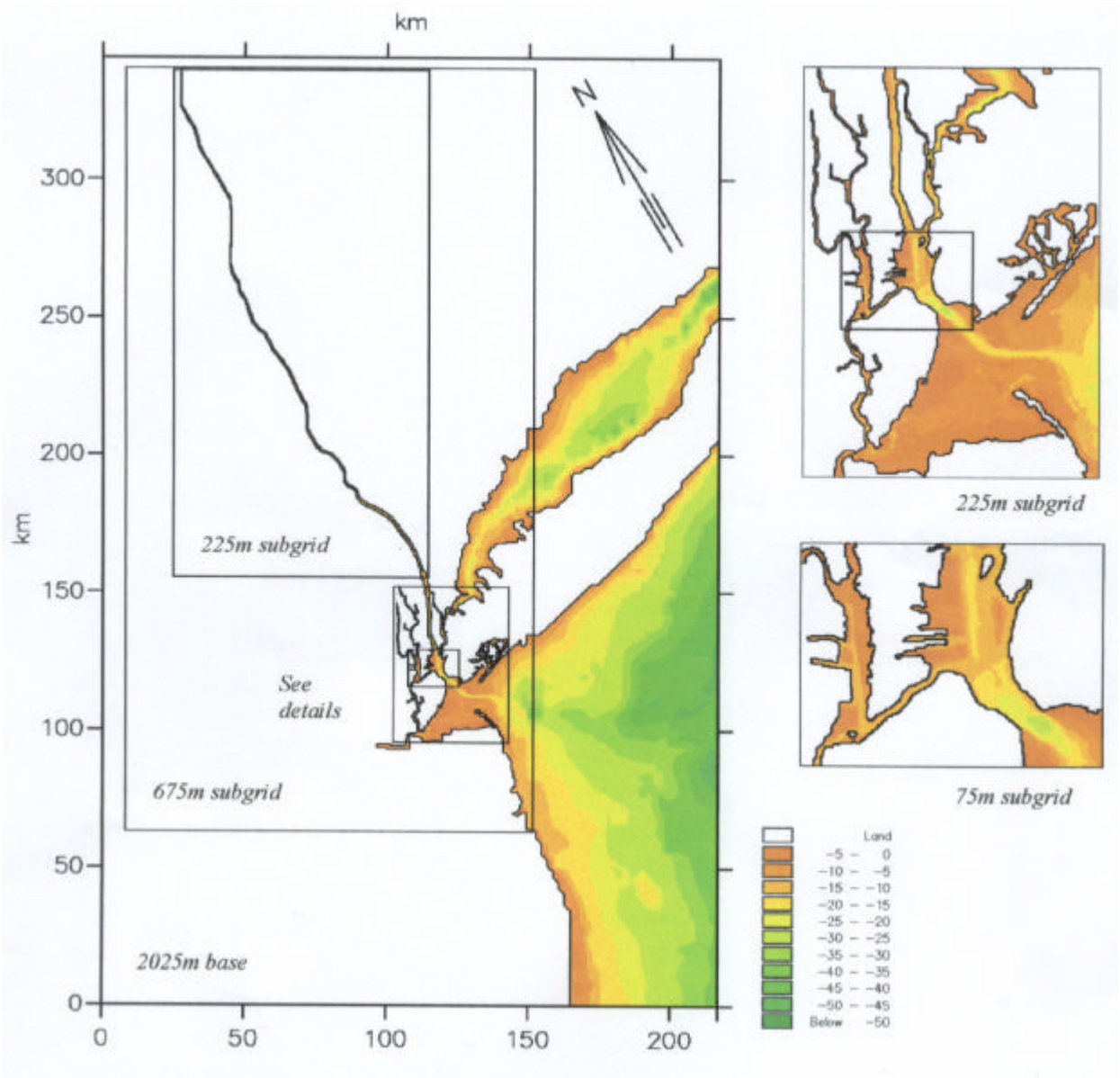


Figure B-1.1-1 Model Grids and Bathymetry (m).

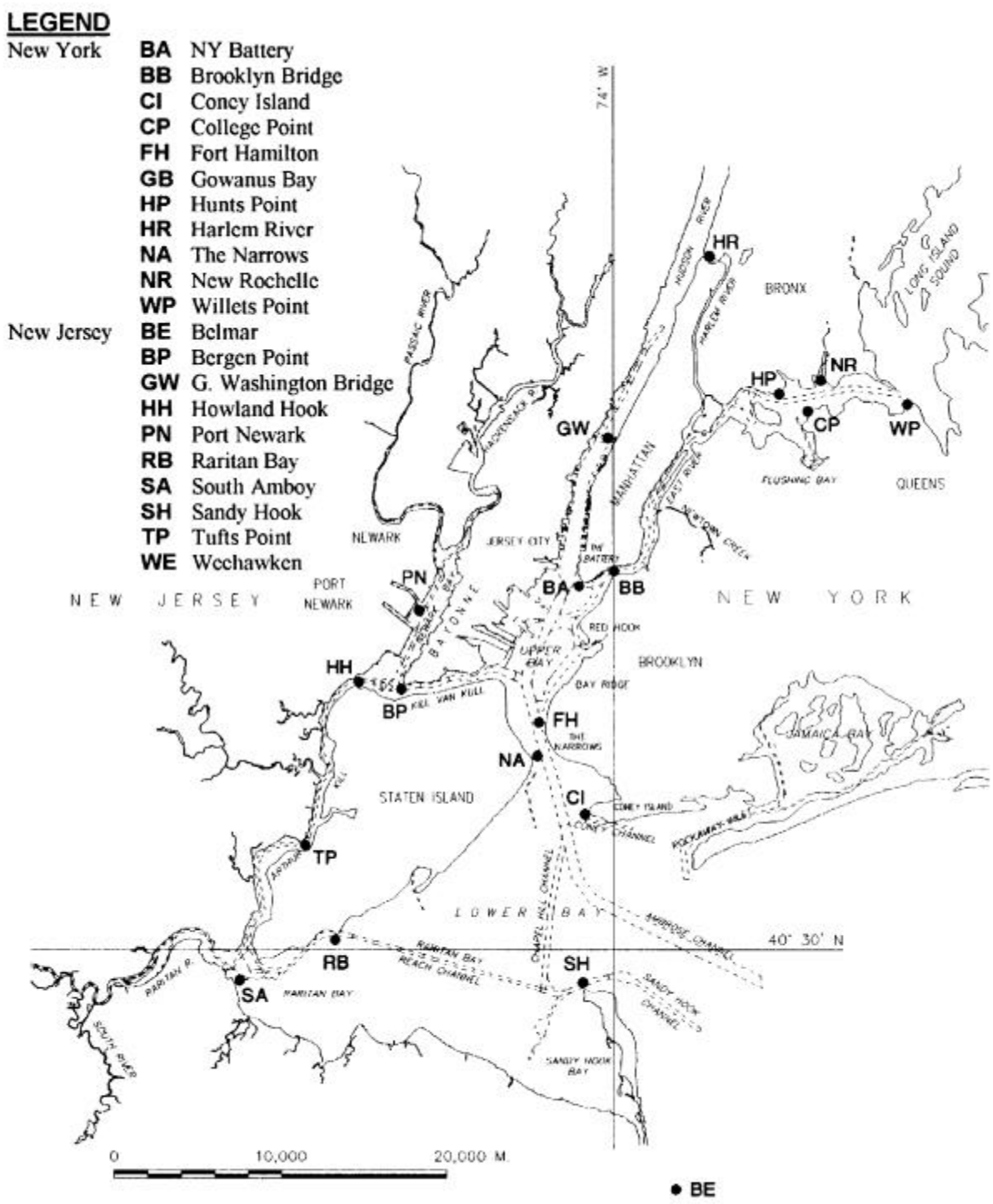


Figure B-1.1-2 Location of Tide and Current Status.

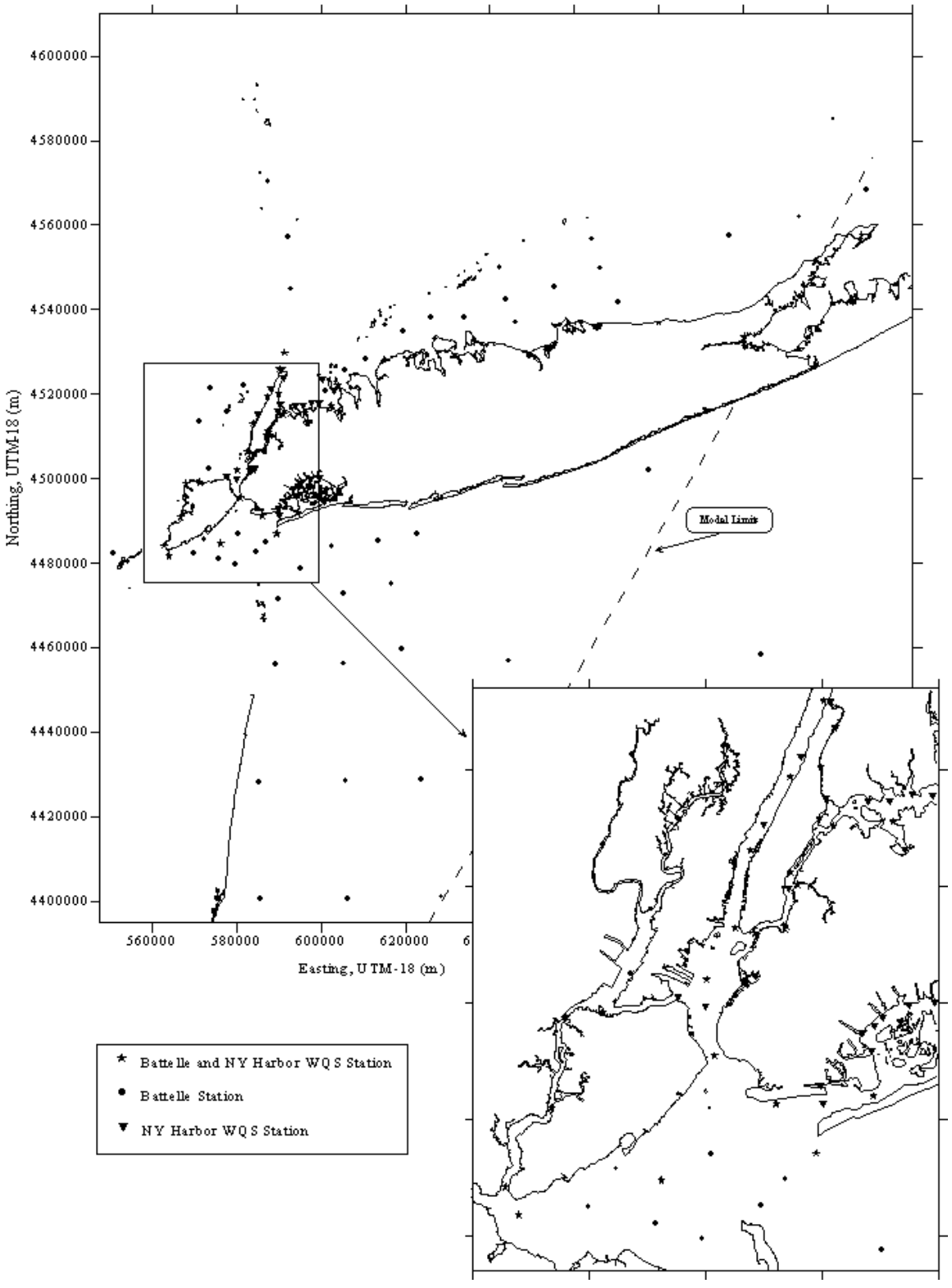


Figure B-1.1-3 Station locations for 1991 and 1994-1995 Water Quality Surveys

APPENDIX B-1.1b: BIOLOGICAL EVALUATION OF MODEL OUTPUT

Biological Thresholds

Several fish and shellfish species have been placed in groups or guilds with similar habitat requirements for the purpose of evaluating the potential impact of changes in water quality and hydrological parameters that may result from the proposed project. A guild is defined as a group of species that exploit a class of environmental resources in a similar manner (Root 1967).

The groups or guilds presented and discussed below are based on depth (i.e., shallow vs. deep) and preferred position in the water column (i.e., demersal vs. pelagic). The following are general descriptions of each guild represented:

- SHALLOW-WATER MARSH SPECIES: Species and life-stages generally occurring in intertidal and subtidal marsh habitat in <10 ft of water. Most species are resident, spending their entire life cycle within the estuary and salt marsh. These species and life-stages often rely on salt-marsh vegetation, detritus, and organic matter; which commonly occurs both in tidal pools on the marsh surface and in intertidal creeks and ditches. These species and life-stages are often highly tolerant to fluctuations in salinity and water temperature, and can often endure low (<0.5 ppm) DO concentrations. These species or life-stages may occupy high salt marsh, low salt marsh, or tidal creeks, commonly moving between intertidal and subtidal areas on flood and ebb tides.

- SHALLOW-WATER DEMERSAL SPECIES: Species and life stages generally inhabiting the shallow estuarine waters of the study area. They commonly occur on or near the bottom of tidal creeks, channel slopes, and shoals. These species and life-stages are often able to tolerate low DO levels or extreme water temperatures, often fleeing the area when DO levels in the water are hypoxic or, if they remain, reducing their metabolism or oxygen consumption and burying themselves in bottom substrates. Many species exhibit preferences for a certain type of substrate (e.g., fine sand) or vegetation (e.g., eel grass). This group includes spawning adults of winter and summer residents as well as juveniles of many species that spawn in marine and estuarine environments.

- SHALLOW-WATER PELAGIC SPECIES: Species and life-stages generally encountered in the shallow-water marine and estuarine environments of the study area, and not generally associated with bottom habitats. These species and life-stages occupy intertidal and subtidal areas, and commonly occur along barrier beaches and in shallow surf-zones (i.e., marine species) or in tidal creeks and backwater bays (i.e., estuarine species). This includes the larval and early juvenile life-stages of many marine and estuarine spawning species, which use these areas as nurseries for growth

and development. Other species include resident and transient forage species that provide an important trophic link between estuarine and marine environments. Shallow-water pelagic species and life-stages are generally tolerant of rapidly changing environmental conditions, often exhibiting diel or tide-dependent movements.

- DEEP-WATER DEMERSAL SPECIES: Species and life stages generally occurring on or near the bottom of natural occurring deep waters or channels in the estuarine and marine waters of the study area. These species and life-stages can occur over a variety of substrates, including mud, silt, and fine sand. Many deep-water demersal species are seasonal residents of the estuary, with different life stages spending only a portion of the in the project area for spawning, feeding, or growth. These species are generally sensitive to changes in water temperature, DO levels, and salinity, and exhibit seasonal or daily movements in response to changing environmental conditions.

- DEEP-WATER PELAGIC SPECIES: Species and life stagesgenerally occurring in the middle and upper levels of the water column. This includes planktonic egg and larval stages of many marine and estuarine species, as well as schooling pelagic adults and juveniles, which are not generally associated with bottom habitats. Many of these species are transient, spending only a portion of their life-cycle in the project area for spawning, growth, or development, while others are anadromous, migrating through the project area to upstream spawning sites. Most pelagic species and life stages, including planktonic egg and larval stages, are intolerant of rapidly changing water temperatures or DO concentrations. Less motile life-stages are dependent on prevailing tides and currents to enter or leave the area, while adult and juvenile movement patterns often reflect responses to changes in water temperature or DO levels.

The guilds are listed in Tables B-1.1-1 through B-1.1-5 which summarize the general habitat parameters of each species by life stage. A change in one or a combination of these parameters could result in a direct or indirect impact on the species at one or more of its developmental stages.

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TABLE B-1.1b-1
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Shallow-water (< 10 ft) Marsh Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Mummichog	Eggs		18			19 – 20			< 4		
	Larvae										
	Juveniles										
	Adults		3 – 45			5 – 20			< 4		
Banded killifish	Eggs										
	Larvae										
	Juveniles										
	Adults					0 – 5					
Striped killifish	Eggs										
	Larvae										
	Juveniles		20			1 – 37					
	Adults					1 – 37					
Fourspine stickleback	Eggs		21								
	Larvae										
	Juveniles										
	Adults										

TABLE B-1.1b-2 (Page 1 of 2)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Shallow-water (< 10 ft) Demersal Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Winter flounder	Eggs		<10			10 – 30					Nov – Apr
	Larvae		<15			4 – 30					Nov – May
	Young-of -the-year		<28			5 – 33					
	Juveniles		<25			10 – 30		2.2			Jan – Dec
	Adults		<25			15 – 33					Jan – Dec
	Spawning adults		<15			5.5 – 36					Oct – Apr
Summer flounder	Eggs					15 – 30					
	Larvae		<15			0 >25					Sep – May
	Juveniles		>3			10 – 30					Mar – Dec
	Adults		0 – 25			10 – 30					Mar - Dec
Scup	Eggs		13 – 23			>15					May – Aug
	Larvae		13 – 23			>15					May – Sep
	Juveniles	7.3	>7.3			>15					May – Oct
	Adults		>7.3			≥25					
Blue mussel	Eggs		18								
	Adults		5 – 20	≥27		5 – 34			>60%sat.		Year-round
Northern Quahog (hard clam)	Eggs		7.2 – 12.5		<20	28	>32	<0.2	≥0.2		
	Juveniles					>20					
	Adults	<1	8 – 31	>34		15 – 35		<5	≥5		Year-round

TABLE B-1.1b-2 (Page 2 of 2)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Shallow-water (< 10 ft) Demersal Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Seasonal Occurrence
Opossum shrimp	Larvae		4 - 15								
	Juveniles	≤4	25			>4					
	Adults		0 – 25		<2	15 - 20	≥34				Year-round
Blue crab	Eggs		19 – 29			23 – 33					
	Juveniles	≤5.5	15 – 30[1]	33		>2		<3	≥3		
	Adults	≤5.5	15 – 35[1]			0 – 34		<3	≥3		Year-round
Atlantic surf clam	Eggs		18.3 –24.9[2]								
	Juveniles	≤4	3 ≥ 29					≤2	>3		
	Adults		3 – 29	≥30	<12.5	14 -52		≤2	>3		Year-round

[1] Depending on salinity
[2] Laboratory conditions

TABLE B-1.1b-3 (Page 1 of 2)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Shallow-water (< 10 ft) Pelagic Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Atlantic silverside	Eggs		22-29								
	Larvae		12 – 30			1 – 14					
	Juveniles		4 – 32			2 – 35		2.6			
	Adults		4 – 32	32		2 – 35		3.0			May – Jul
Bay anchovy	Eggs	9	13 – 30	31	0	4 – 20	32	2.8			
	Larvae	7	15 – 30	31	0	0 – 15	31	2.5			
	Juveniles	6	10 – 30	34	0	9 – 30	30				
	Adults	2.2	5 – 30	34	0	9 – 30	30				
Butterfish	Eggs										
	Larvae		8.9 – 18.9			0.5 – 25					August
	Juveniles		3 – 28			0.5 – 25					Mar – Nov
	Adults		3 – 28			0.5 – 25					Mar – Nov
Weakfish	Eggs		17 – 26.5			12.1 – 31.3					
	Larvae		17 – 26.5			12.1 – 31.3					
	Juveniles										
	Adults										
White mullet	Eggs										
	Larvae										
	Juveniles					10 – 15					Apr – Nov
	Adults										

TABLE B-1.1b-3 (Page 2 of 2)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Shallow-water (< 10 ft) Pelagic Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Atlantic surf clam	Larvae		14 – 30		<16	≥16					
Northern quahog (hard clam)	Larvae	≤15	17.5 – 30[1]	≥33		20 – 27		<4.2	≥4.2		
Blue mussel	Larvae		15 – 20			15 – 35[2]					
Blue crab	Larvae		<21		<20	≥20					

[1] Depends on salinity
[2] Depends on temperature

TABLE B-1.1b-4 (Page 1 of 3)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Deep-water (> 10 ft) Demersal Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Atlantic tomcod	Eggs										
	Larvae					4.5 – 8.7					
	Juveniles			>13		4.5 – 8.7					
	Adults										
Red hake	Eggs										
	Larvae		<19			>0.5					
	Juveniles		4 – 16			0.5 – 33					
	Adults		10 - 12			33 – 34					
Windowpane flounder	Eggs		<20			0.5 - 25					Feb – Nov
	Larvae		<20			0.5 – 25					Feb – Nov
	Juveniles		<25			5.5 – 36					Jan – Dec
	Adults		<26.8			5.5 - 36					Jan – Dec
	Spawning adults		<21			5.5 – 36					Feb – Nov
Black sea bass	Eggs										
	Larvae										
	Juveniles	<4	>6			>18					
	Adults		6 - 28			0.5 ≥ 25					May – Oct

TABLE B-1.1b-4 (Page 2 of 3)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Deep-water (> 10 ft) Demersal Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Seaboard goby	Eggs										
	Larvae		15 – 33								
	Juveniles		15 – 33								
	Adults		15 – 33								
Scup	Eggs		13 – 23			>15					May – Aug
	Larvae		13 – 23			>15					May – Sep
	Juveniles	7.3	>7.3			>15					May – Oct
	Adults					>25					May – Oct
Northern quahog (hard clam)	Eggs		7.2 – 12.5		<20	28	>32	<0.2	≥0.2		
	Juveniles					>20					
	Adults	<1	8 – 31	>34		15 – 35		<5	≥5		Year-round
Opossum shrimp	Larvae		4 - 15								
	Juveniles	≤4	25			>4					
	Adults		0 – 25		<2	15 - 20	≥34				Year-round
Blue crab	Eggs		19 – 29			23 – 33					
	Juveniles	≤5.5	15 - 30[1]	33		>2		<3	≥3		
	Adults	≤5.5	15 - 35[1]			0 – 34		<3	≥3		Year-round

TABLE B-1.1b-4 (Page 3 of 3)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Deep-water (> 10 ft) Demersal Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
American lobster	Eggs		15								
	Juveniles	<5	5 – 31		≤16.4	>16.4[2]		0.2, 1.7[3]	>1.7		
	Adults	<5	5 – 31		≤16.4	>16.4[2]		0.2, 1.7[3]	>1.7		
Atlantic surf clam	Eggs		18.3 –24.9[2]								
	Juveniles	≤4	3 ≥ 29					≤2	>3		
	Adults		3 – 29	≥30	<12.5	14 -52		≤2	>3		Year-round
Ocean quahog	Eggs		13.5								
	Juveniles		<20			>22			>2		
	Adults		7 - 19			>22			>2		Year-round
Long-fin squid	Eggs		10 - 23			30 - 32					

[1] Depends on salinity
[2] Depends on temperature and D.O.
[3] Depends on temperature and salinity
[4] Laboratory conditions

TABLE B-1.1b-5 (Page 1 of 3)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Deep-water (> 10 ft) Pelagic Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			Seasonal Occurrence
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	
Alewife	Eggs	12	16 – 21	29.7		0-2			> 5.0		
	Larvae	8	15 – 24			N/A			> 5.0		
	Juveniles		17 – 24			0 - 5			> 3.6		
	Adults		21.3			0 - 5			> 3.6		
American shad	Eggs		13 – 26			0 – 15			> 5.0		
	Larvae		15.5 – 26.1			N/A			> 5.0		
	Juveniles	4 - 6	15.6 – 23.9			0 – 30		< 1.92	> 5.0		
	Adults		10 - 30	30		0 – 30					
Atlantic herring	Eggs										
	Larvae		>16			~32					Mar – May
	Juveniles		>10			26 – 32					Jan – May
	Adults		>10			>28					Jan – May
Blueback herring	Eggs	14	20 – 24			0 – 2			N/A		
	Larvae	14	14 – 26			0 - 22			> 5.0		
	Juveniles		20 - 28			0 - 5			> 4.0		
	Adults					0 - 5			> 4.0		
Bluefish	Eggs										
	Larvae										
	Juveniles					> 15					Apr – Oct
	Adults		11.9 – 29.2			>25					Apr - Oct

TABLE B-1.1b-5 (Page 2 of 3)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Deep-water (> 10 ft) Pelagic Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Seasonal Occurrence
Butterfish	Eggs										
	Larvae		8.9 – 18.9			0.5 – 25					August
	Juveniles		3 – 28			0.5 – 25					Mar – Nov
	Adults		3 – 28			0.5 – 25					Mar – Nov
Red hake	Eggs										
	Larvae		<19			>0.5					May – Dec
	Juveniles										
	Adults										
Weakfish	Eggs		17 – 26.5			12.1 – 31.3					
	Larvae		17 – 26.5			12.1 – 31.3					
	Juveniles										
	Adults										
Windowpane flounder	Eggs										
	Larvae		<20			0.5 – 25					Feb – Nov
	Juveniles										
	Adults										
Atlantic mackerel	Eggs										
	Larvae										
	Juveniles		4 – 22			≥25					Apr – Dec
	Adults		4 - 16			≥25					Apr-Jun, Sep-Dec

TABLE B-1.1b-5 (Page 3 of 3)
Harbor Modeling Evaluation – Biological Thresholds/Guild Analysis
Summary of General Habitat Parameters for Deep-water (> 10 ft) Pelagic Species

Species	Life Stage/ Stage to Maturity	General Habitat Parameters									
		Water Temp (^{o}C)			Salinity (‰)			Dissolved Oxygen (mg/l)			
		Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Lower Limit	Preferred Range	Upper Limit	Seasonal Occurrence
Long-fin squid	Larvae		10 - 26			31.5 – 34					
	Juveniles		8 - 26			31.5 – 34					
	Adults		9 – 21[1] 8 – 16[2]								Apr – Sep
Short-fin squid	Eggs		13 - 26								
	Larvae		5 – 20								
	Juveniles		2 – 23			34 – 37					summer, autumn
	Adults		4 - 19			30 – 36.5					summer
Northern quahog (hard clam)	Larvae	≤15	17.5 – 30[3]	≥33		20 – 27		<4.2	≥4.2		
Atlantic surf clam	Larvae		14 – 30		<16	≥16					
Ocean quahog	Larvae		14 – 18								May, Jul-Nov
American lobster	Larvae	5	15 – 20		<17	>21.4					
Blue crab	Larvae		<21		<20	≥20					

[1] Surface
[2] Bottom
[3] Depends on salinity

DEIS APPENDIX B-1.2

SUMMARY REPORT
BASELINE BIOLOGICAL MONITORING PROGRAM

APPENDIX B-1.2: Summary Report Baseline Biological Monitoring Program

Purpose

A comprehensive review of New York and New Jersey Harbor biological literature (USACE-NYD 1998) indicated that there were limited data available to be used in the preparation of the EIS to evaluate the function and use of Harbor navigation channels. To obtain the biological information needed to prepare the New York and New Jersey Harbor Navigation Study EIS, the USACE-NYD sponsored a 12-month baseline biological monitoring program.

Program Description

The Baseline Biological Program consisted of two sampling programs; a harborwide sampling program, which investigated the Harbor's navigation channels; and a site-specific sampling program, which investigated representative Harbor berthing areas and marine terminals. Two specific aquatic communities were evaluated under each program, benthic macroinvertebrates and fish. In addition, seasonal ichthyoplankton sampling was conducted to determine if spawning and early ichthyoplankton development occurred in the channels and in the vicinity of representative port facilities. A winter crab dredge survey was also conducted to evaluate blue crab overwintering activities.

Sampling stations included in the harborwide sampling program are presented in Table B-1.2-1a (fish) and Table B-1.2-1b (benthos). Two representative Harbor sites were selected for the site-specific program, Port Jersey and South Brooklyn. Sampling stations included in the site-specific program are presented in Table B-1.2-2a (fish) and Table B-1.2-2b (benthos). Figures B-1.2-1 through B-1.2-3 show the actual sampling locations

The sampling program began in October 1998, and will be completed in September 1999 (Table B-1.2-3). Harborwide trawls were conducted on a bi-monthly basis, while site-specific trawling was conducted on a monthly basis. Benthic macroinvertebrate sampling (using a Smith-McIntyre dredge) was conducted quarterly. Ichthyoplankton sampling (using an epi-benthic sled mounted net) and crab dredge sampling were conducted from February through June, and from February through April, respectively.

Preliminary Data

Preliminary results (September 1998 through May 1999) from the baseline biological monitoring program are discussed in Section 5.4 of the DEIS. Preliminary results of the harborwide and site specific trawl samples are shown in Table B-1.2-4 (September 1998 through August 1999).

Final Report

The Baseline Biological Sampling Report will be completed following the collection and analysis of the September 1999 samples. The completed report will be presented in the FEIS.

TABLE B-1.2-1a
1998 – 1999 NEW YORK & NEW JERSEY HARBOR ENVIRONMENTAL SURVEY HARBORWIDE BOTTOM TRAWL AND BENTHOS SAMPLING LOCATIONS

	SITE	CODE	LOCATION	DEPTH (ft)	GPS COORDINATES (DEG., MIN., SEC.)	
					START N W	END N W
TRAWL	LOWER BAY	*HWT-1*	Ambrose Channel North	51	40 33 54 74 01 55	40 33 20 74 01 43
	UPPER BAY	*HWT-2*	Anchorage Channel South	50	40 38 49 74 03 16	40 38 14 74 02 58
	UPPER BAY	*HWT-3*	Red Hook Channel	43	40 40 38 74 01 20	40 40 10 74 01 16
	UPPER BAY	*HWT-4*	Anchorage Channel North	51	40 40 57 74 01 52	40 40 29 74 02 08
	KILL VAN KULL	*HWT-5*	Bergen Point East Reach/ Constable Hook Reach	43	40 38 46 74 06 30	40 38 42 74 06 52
	ARTHUR KILL	*HWT-6*	North of Shooter Island Reach	40	40 38 48 74 10 29	40 38 47 74 09 55
	ARTHUR KILL	*HWT-7*	Elizabeth Reach	38	40 38 22 74 11 31	40 38 35 74 11 16
	NEWARK BAY	*HWT-8*	Middle Reach	41	40 40 23 74 07 58	40 40 50 74 07 50
	NEWARK BAY	*HWT-9*	Newark Bay South Reach	45	40 39 43 74 08 24	40 39 20 74 08 38
	NEWARK BAY	*HWT-10*	Newark Bay/Port Elizabeth	41	40 40 06 74 08 10	40 39 44 74 08 24
BENTHOS	LOWER BAY	*HWB-1*	Ambrose Channel North	51	40 33 51 74 01 50	
	UPPER BAY	*HWB-2*	Anchorage Channel South	50	40 38 20 74 03 03	
	UPPER BAY	*HWB-3*	Red Hook Channel	43	40 40 12 74 01 23	
	UPPER BAY	*HWB-4*	Anchorage Channel North	51	40 40 44 74 01 47	
	KILL VAN KULL	*HWB-5*	Bergen Point East Reach/ Constable Hook Reach	43	40 38 40 74 06 56	
	ARTHUR KILL	*HWB-6*	North of Shooter Island Reach	40	40 38 48 74 10 04	
	ARTHUR KILL	*HWB-7*	Elizabeth Reach	38	40 38 18 74 11 25	
	NEWARK BAY	*HWB-8*	Middle Reach	41	40 40 31 74 07 54	
	NEWARK BAY	*HWB-9*	Newark Bay South Reach	45	40 39 28 74 08 30	
	NEWARK BAY	*HWB-10*	Newark Bay/Port Elizabeth	41	40 39 52 74 08 18	

TABLE B-1.2-1b
1998 – 1999 NEW YORK & NEW JERSEY HARBOR ENVIRONMENTAL SURVEY HARBORWIDE ICHTHYOPLANKTON AND CRAB DREDGE SAMPLING LOCATIONS

	SITE	CODE	LOCATION	DEPTH (ft)	GPS COORDINATES (DEG., MIN., SEC.)			
					START	N W	END	N W
ICHTHYOPLANKTON	LOWER BAY	*HWI-1*	Ambrose Channel North	51	40 33 54 74 01 55		40 33 20 74 01 43	
	UPPER BAY	*HWI-2*	Anchorage Channel South	50	40 38 49 74 03 16		40 38 14 74 02 58	
	UPPER BAY	*HWI-3*	Red Hook Channel	43	40 40 38 74 01 20		40 40 10 74 01 16	
	UPPER BAY	*HWI-4*	Anchorage Channel North	51	40 40 57 74 01 52		40 40 29 74 02 08	
	KILL VAN KULL	*HWI-5*	Bergen Point East Reach/ Constable Hook Reach	43	40 38 46 74 06 30		40 38 42 74 06 52	
	ARTHUR KILL	*HWI-6*	North of Shooter Island Reach	40	40 38 48 74 10 29		40 38 47 74 09 55	
	ARTHUR KILL	*HWI-7*	Elizabeth Reach	38	40 38 22 74 11 31		40 38 35 74 11 16	
	NEWARK BAY	*HWI-8*	Middle Reach	41	40 40 23 74 07 58		40 40 50 74 07 50	
	NEWARK BAY	*HWI-9*	Newark Bay South Reach	45	40 39 65 74 08 44		40 40 16 74 08 13	
	NEWARK BAY	*HWI-10*	Newark Bay/Port Elizabeth	41	40 40 06 74 08 19		40 39 75 74 08 40	
CRAB DREDGE	LOWER BAY	*HWD-1*	Ambrose Channel North	51	40 33 30 74 01 49		40 33 38 74 01 58	
	UPPER BAY	*HWD-2*	Anchorage Channel South	50	40 38 41 74 03 14		40 38 26 74 03 10	
	UPPER BAY	*HWD-3*	Red Hook Channel	43	40 40 11 74 01 20		40 40 29 74 01 27	
	UPPER BAY	*HWD-4*	Anchorage Channel North	51	40 40 36 74 02 13		40 40 25 74 02 19	
	KILL VAN KULL	*HWD-5*	Bergen Point East Reach/ Constable Hook Reach	43	40 38 41 74 06 59		40 38 45 74 06 45	
	ARTHUR KILL	*HWD-6*	North of Shooter Island Reach	40	40 38 51 74 09 45		40 38 51 74 10 01	
	ARTHUR KILL	*HWD-7*	Elizabeth Reach	38	40 38 29 74 11 25		40 38 23 74 11 30	
	NEWARK BAY	*HWD-8*	Middle Reach	41	40 40 38 74 07 54		40 40 24 74 07 59	
	NEWARK BAY	*HWD-9*	Newark Bay South Reach	45	40 39 39 74 08 27		40 39 32 74 08 32	
	NEWARK BAY	*HWD-10*	Newark Bay/Port Elizabeth	41	40 40 07 74 08 09		40 40 06 74 08 10	

TABLE B-1.2-2a
1998-1999 NEW YORK & NEW JERSEY HARBOR ENVIRONMENTAL SURVEY SITE-SPECIFIC BOTTOM TRAWL AND BENTHOS SAMPLING LOCATIONS

	SITE	CODE	LOCATION	DEPTH (ft)	GPS COORD. (DEG., MIN., SEC.)			
					START	N W	END	N W
TRAWL	SOUTH BROOKLYN	*SBT-1*	Gowanus Bay Interpier South	26	40 38 40 74 01 40		40 38 47 74 01 56	
		SBT-2	Gowanus Bay Interpier	24	40 39 05 74 01 25		40 39 35 74 01 06	
		SBT-3	Gowanus Bay Interpier North	29	40 39 37 74 00 28		40 39 44 74 00 41	
		SBT-4	Bay Ridge Channel	41	40 39 22 74 01 20		40 38 01 74 02 02	
	PORT JERSEY	*PJT-1*	Jersey Flats	14	40 40 10 74 03 31		40 39 52 74 03 48	
		PJT-2	Pierhead Channel	26	40 40 20 74 03 37		40 39 59 74 0353	
		PJT-3	Constable Hook	9	40 39 47 74 04 47		40 39 33 74 04 37	
		PJT-4	Port Jersey Channel	42	40 40 26 74 05 19		40 40 08 74 04 43	
		PJT-5	Global Marine Terminal	16	40 40 28 74 04 31		40 40 17 74 03 57	
		PJT-6	Claremont Terminal Channel	29	40 40 38 74 03 50		40 40 28 74 03 34	
BENTHOS	SOUTH BROOKLYN	*SBB-1*	Gowanus Bay Interpier South	26	40 38 44 74 01 52			
		SBB-2	Gowanus Bay Interpier	24	40 39 08 74 01 31			
		SBB-3	Gowanus Bay Interpier North	29	40 39 42 74 00 35			
		SBB-4	Bay Ridge Channel	41	40 39 11 74 01 48			
	PORT JERSEY	*PJB-1*	Jersey Flats	14	40 39 56 74 03 40			
		PJB-2	Pierhead Channel	26	40 39 58 74 03 51			
		PJB-3	Constable Hook	9	40 39 32 74 04 29			
		PJB-4	Port Jersey Channel	42	40 40 02 74 04 25			
		PJB-5	Global Marine Terminal	16	40 40 23 74 04 05			
		PJB-6	Claremont Terminal Channel	29	40 40 34 74 03 42			

TABLE B-1.2-2b
1998-1999 NEW YORK & NEW JERSEY HARBOR ENVIRONMENTAL SURVEY SITE-SPECIFIC ICHTHYOPLANKTON AND CRAB DREDGE SAMPLING LOCATIONS

	SITE	CODE	LOCATION	DEPTH (ft)	GPS COORD. (DEG., MIN., SEC.)			
					START	N W	END	N W
ICHTHYOPLANKTON	SOUTH BROOKLYN	*SBI-1*	Gowanus Bay Interpier South	26	40 38 40 74 01 40		40 38 47 74 01 56	
		SBI-2	Gowanus Bay Interpier	24	40 39 05 74 01 25		40 39 35 74 01 06	
		SBI-3	Gowanus Bay Interpier North	29	40 39 37 74 00 28		40 39 44 74 00 41	
		SBI-4	Bay Ridge Channel	41	40 39 22 74 01 20		40 38 01 74 02 02	
	PORT JERSEY	*PJI-1*	Jersey Flats	14	40 40 10 74 03 31		40 39 52 74 03 48	
		PJI-2	Pierhead Channel	26	40 40 20 74 03 37		40 39 59 74 0353	
		PJI-3	Constable Hook	9	40 39 47 74 04 47		40 39 33 74 04 37	
		PJI-4	Port Jersey Channel	42	40 40 26 74 05 19		40 40 08 74 04 43	
		PJI-5	Global Marine Terminal	16	40 40 28 74 04 31		40 40 17 74 03 57	
		PJI-6	Claremont Terminal Channel	29	40 40 38 74 03 48		40 40 31 74 03 35	
CRAB DREDGE	SOUTH BROOKLYN	*SBD-1*	Gowanus Bay Interpier South	26	40 38 44 74 01 49		40 38 49 74 01 56	
		SBD-2	Gowanus Bay Interpier	24	40 39 29 74 00 56		40 39 34 74 01 05	
		SBD-3	Gowanus Bay Interpier North	29	40 39 41 74 00 39		40 39 46 74 00 47	
		SBD-4	Bay Ridge Channel	41	40 39 08 74 01 42		40 39 01 74 01 50	
	PORT JERSEY	*PJD-1*	Jersey Flats	14	40 39 52 74 03 40		40 40 01 74 03 28	
		PJD-2	Pierhead Channel	26	40 39 59 74 03 53		40 40 04 74 03 47	
		PJD-3	Constable Hook	9	40 39 42 74 04 50		40 39 31 74 04 36	
		PJD-4	Port Jersey Channel	42	40 40 16 74 04 60		40 40 12 74 04 49	
		PJD-5	Global Marine Terminal	16	40 40 27 74 04 15		40 40 19 74 03 59	
		PJD-6	Claremont Terminal Channel	29	40 40 41 74 03 51		40 40 30 74 03 31	

TABLE B-1.2-3
NEW YORK AND NEW JERSEY HARBOR NAVIGATION STUDY
BASELINE BIOLOGICAL SURVEY SAMPLING SCHEDULE: 1998-1999

SAMPLING PROGRAM	1998			1999								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Harborwide Trawls	X		X		X		X		X		X	
Site-Specific Trawls[1]	X	X	X	X	X	X	X	X	X	X	X	X
Benthos[2]		X			X			X			X	
Ichthyoplankton[3]					X	X	X	X	X			
Blue Crab Benthic Dredge[4]					X	X	X					

[1] Trawl sampling at South Brooklyn and Port Jersey
[2]Replicate benthos samples collected at harborwide and site-specific locations
[3]Epibenthic sled samples collected at Harborwide stations and Site-specific stations
[4]Blue crab dredge samples collected at Harborwide stations and Site-specific stations

TABLE B-1.2-4 (Page 1 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 1 (Ambrose Channel North)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife							36					
American shad							6					
Atlantic menhaden											5	
Bay anchovy									28		8	
Black sea bass	2											
Blueback herring							2					
Butterfish											62	
Little skate							1					
Lookdown	1											
Northern pipefish							1					
Silver hake							6					
Spotted hake							13					
Summer flounder							1		9			
Weakfish											14	
Windowpane	1						63					
Winter flounder							12					
Blue crab									32			

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 2 (Ambrose Channel South)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife					1		1					
American shad					3							
Bay anchovy											3	
Butterfish											7	
Cunner							1					
Little skate	1				1		2					
Northern pipefish					1							
Scup											2	
Silver hake					11		5					
Smallmouth flounder	2											
Spotted hake					5		27				1	
Striped anchovy											30	
Summer flounder									1		2	
Tautog									1			
Weakfish											61	
Windowpane	3				3		13		1		3	
Winter flounder					1		4				3	
Blue crab							1				5	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 3 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 3 (Red Hook Channel)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife			3						1			
American eel											2	
American shad					5							
Atalntic menhaden											1	
Atlantic tomcod							1		4			
Bay anchovy	6											
Cunner	1				2		1					
Grubby					1							
Little skate							1					
Rock gunnel									1			
Scup	4											
Spotted hake					1		28		9			
Striped bass					1		1					
Striped searobin									2			
Summer flounder									8			
Weakfish	3								5			
Windowpane	2						5		3			
Winter flounder	1				2		15		19		1	
Blue crab							3		73		4	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 4 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 4 (Anchorage Channel North)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Atlantic tomcod									89		4	
Bay anchovy											2	
Black sea bass									1		1	
Cunner									6		3	
Feather blenny									1			
Grubby											6	
Northern searobin									7		1	
Oyster toadfish									1			
Red hake											1	
Scup											1	
Spotted hake							4		56		1	
Striped searobin									6		11	
Summer flounder									10		2	
Tautog									5		1	
Weakfish									1		230	
Windowpane									12		7	
Winter flounder							14		50		42	
Blue crab									10		34	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 5 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 5 (Bergen Point East Reach/ Constable Hook Reach)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
American eel	1											
Atlantic tomcod									1			
Bay anchovy	2									31		
Blueback herring							1					
Bluefish	2										1	
Butterfish										1	4	
Grubby					1		1					
Hickory shad	1											
Inshore lizardfish											1	
Northern pipefish					1		4					
Northern searobin	1											
Northern stargazer										1		
Oyster toadfish										1		
Scup											8	
Smallmouth flounder	3											
Spotted hake						3	4		2			
Striped bass					2							
Striped searobin											1	
Summer flounder										14		
Weakfish	2									494	35	
Windowpane	10				1	3	5			11		
Winter flounder	3				2	1	1		1		1	
Blue crab									13	34	14	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 6 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 6 (North of Shooters Island Reach)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife			13				1				2	
American shad			13		1							
Atlantic herring					1							
Atlantic menhaden	1		1									
Bay anchovy	292		11									
Bluefish	4											
Butterfish											1	
Grubby									3			
Gizzard Shad			2									
Oyster toadfish									1			
Smallmouth flounder			1									
Spotted hake							2		8			
Striped bass			3				10					
Striped searobin	1											
Summer flounder	1								11			
Weakfish	139		1								2	
White Perch			17				2					
Windowpane			1				3		8			
Winter flounder	2		1		1		6		55			
Blue crab							10		565		1	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 7 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 7 (Elizabeth Reach)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife			1									
Atlantic tomcod											1	
Conger eel											1	
Grubby							6		1			
Lookdown	1											
Oyster toadfish									1			
Scup											5	
Silver hake							1					
Spotted hake							89		19			
Striped bass							9				1	
Striped searobin	8										2	
Summer flounder	1								1		1	
Weakfish	28										61	
White Perch							1					
Windowpane							3					
Winter flounder							7		3		1	
Blue crab							19		16		35	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 8 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 8 (Middle Reach)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife	1		15				1					
American eel									3			
American shad	1		10									
Atlantic menhaden	1										1	
Atlantic silverside			1									
Bay anchovy	452		7								1	
Bluefish	3											
Butterfish	20		1						1		1	
Gizzard Shad			3			1						
Lookdown	2											
Northern kingfish	1											
Northern pipefish							1					
Scup											3	
Silver hake						4	9					
Smallmouth flounder			2									
Spotted hake			2			3	175		2			
Striped bass			70		24	82	33		1			
Striped searobin	3		1				1					
Summer flounder	1								4		1	
Tautog	1											
Weakfish	173		9								112	
White Perch			77		131	132						
Windowpane	2		1						2			
Winter flounder	1		8			35	19		4			
Blue crab						14	11		280		13	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 9 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 9 (Newark Bay South Reach)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Atlantic tomcod									1			
Cunner						1						
Grubby						7	1					
Northern searobin									1		1	
Scup											10	
Spotted hake						4	3		5			
Striped bass						78						
Striped searobin									1			
Summer flounder									1		2	
Weakfish											101	
White Perch						102						
Windowpane						2	2		1			
Winter flounder						117	5		9		4	
Blue crab						1	5		28		26	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 10 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	HW – 10 (Newark Bay / Port Elizabeth)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Little skate							1					
Northern pipefish							1					
Scup											18	
Silver hake							6					
Spotted hake						7	122		3			
Striped bass						74	5					
Striped searobin											1	
Summer flounder									3		2	
Weakfish											390	
White Perch						92						
Windowpane							1		1			
Winter flounder						90	76		6		1	
Blue crab						3	3		33		18	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 11 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	SB – 1 (Gowanus Bay Interpier South)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife										3		
American shad		9			2							
Atlantic herring								109				
Atlantic silverside		98		53	25						3	
Atlantic tomcod								102				
Bay anchovy	21							36	28	53		
Butterfish								4		20		
Northern kingfish	5											
Northern pipefish	2											
Scup										77		
Spotted hake								7				
Striped bass	19	31					20			477	144	
Striped searobin											3	
Summer flounder								15	9			
Weakfish		2									3	
Windowpane							3					
Winter flounder	5	4				3	30	7				
Blue crab							23	33	32	7	6	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 12 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	SB – 2 (Gowanus Bay Interpier)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife										7	13	
American shad		3										
Atlantic silverside				4								
Atlantic tomcod								167	3			
Bay anchovy								40	27	13	13	
Black sea bass	9										7	
Blueback herring										10		
Butterfish										7		
Clown fish	9											
Northern pipefish									3			
Rainbow smelt										3		
Scup								7		13	53	
Silver hake							6					
Spotted hake							34	13				
Striped bass		3		4			17	7		687	27	
Striped searobin		3								33	80	
Summer flounder								17		10	3	
Weakfish										97	3	
Windowpane							3	3	10	10	17	
Winter flounder	9	7						3	7	7		
Blue crab						12	31	57	10	3	13	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 13 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	SB – 3 (Gowanus Bay Interpier North)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife											22	
American shad		14										
Atlantic silverside						2						
Atlantic tomcod								20	4			
Bay anchovy								5	44	8		
Blueback herring									10			
Bluefish											2	
Butterfish										40	8	
Northern pipefish											2	
Scup										22	8	
Silver hake						2						
Spot										2		
Spotted goatfish										2		
Spotted hake							3					
Striped bass		269							2	2168	8	
Striped searobin										12		
Weakfish	2	2						3		12	5	
Windowpane									2	8		
Winter flounder	2	2				2	3		2	8		
Blue crab								5	14	5	8	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 14 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	SB – 4 (Bay ridge Channel)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife		2				2			1	19	6	
American shad		63				16						
Atlantic herring						12						
Atlantic menhaden		1										
Atlantic moonfish											1	
Atlantic tomcod								2				
Bay anchovy	3	7							49	4	6	
Blueback herring		13				1						
Bluefish	4											
Butterfish	27	7						2	1	8	8	
Little skate								2				
Lined seahorse											1	
Lookdown	1											
Red hake						1						
Scup	3							1		23	14	
Silver hake									1			
Smallmouth flounder	1											
Spotted hake							2	5	6			
Striped bass							2			3		
Striped cusk-eel							1					
Striped searobin											2	
Summer flounder								8	1		1	
Weakfish	9	1							8	85	3	
Windowpane							3	6	2	1	1	
Winter flounder	11						33	5	2			
Blue crab							54	45	2	3	2	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 15 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	PJ – 1 (Jersey Flats)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife										6		
American shad	1	4										
Atlantic herring				10		1						
Atlantic tomcod									13			
Atlantic silverside										319		
Bay anchovy							1			111		
Black sea bass	2										1	
Blueback herring										1		
Butterfish										7		
Cunner					2					1	1	
Grubby			2				1			2		
Northern kingfish	1											
Northern pipefish									1			
Rock gunnel										1		
Scup	4								4	9	4	
Silver hake			1									
Smallmouth flounder		1	7									
Spotted hake			1									
Striped anchovy											12	
Striped bass		1								239	48	
Weakfish										4		
Windowpane			1		1		3			2		
Winter flounder	2	6	1		3	3	11		4	2		
Blue crab						14	12	7	23	29	19	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 16 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	PJ – 2 (Pierhead Channel)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife					1	1	8			46	40	
American shad		4	2				1				3	
Atlantic herring				7					1			
Atlantic menhaden					1						13	
Atlantic silverside	1		1							13		
Atlantic tomcod			1					1	1			
Bay anchovy			6	1					4	5	36	
Black sea bass	10		1						1		4	
Blueback herring		34								2		
Butterfish	1									61	29	
Cunner											2	
Fourspot flounder	1											
Grubby	1											
Lined seahorse							1					
Little skate			1									
Northern kingfish	1											
Northern pipefish							1					
Red hake		1										
Scup	2								1	28	7	
Silver hake							4					
Smallmouth flounder	3											
Spotted hake							2		3			
Striped bass		2	5				119			2	10	
Striped searobin	4											
Summer flounder								2	7		1	
Tautog	2										1	
Weakfish	13		3					1		403	42	
Windowpane	7						2	1	2	7		
Winter flounder	11		11				10	1	5	3	2	
Blue crab						1	6	49	177	16	5	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 17 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	PJ – 3 (Constable Hook)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
American sandlance	4											
Atlantic tomcod								13	1			
Bay anchovy								159		1	100	
Black sea bass	2								2		1	
Blueback herring								157		2		
Bluefish									1		1	
Butterfish										24		
Grubby	4											
Inshore lizardfish											1	
Naked goby		1										
Northern kingfish	5											
Northern pipefish								1		3		
Pollock								16				
Red hake		1										
Smallmouth flounder	2											
Spot									1			
Spotted hake								4	1			
Striped anchovy											11	
Striped bass										1	11	
Striped searobin										46		
Summer flounder								9	4	1	3	
Tautog	2											
Weakfish										10		
Windowpane									3	3	1	
Winter flounder	4	1		1				7	30	7	2	
Blue crab							10	114	149	49	7	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	PJ – 4 (Port Jersey Channel)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife							4			38	56	
American shad					1		3			3	2	
Atlantic herring						1			8			
Atlantic menhaden										1	28	
Atlantic moonfish										1	1	
Atlantic silverside										76		
Atlantic tomcod									113	2		
Bay anchovy							1		74	9	417	
Black sea bass	1											
Blueback herring											1	
Bluefish	1								1		1	
Butterfish									1	3	25	
Cunner								2				
Fourspot flounder	2											
Lookdown	29											
Northern pipefish								2			3	
Northern puffer										1		
Red hake									3			
Scup										2	4	
Silver hake								7				
Spot									7			
Spotted hake							1	13	3			
Striped bass					1	1	122			2	18	
Striped searobin										7	1	
Summer flounder									2	7	2	
Tautog								2				
Weakfish	7									297	6	
Windowpane						1		2	9	1	1	
Winter flounder	5				2				9	16		
Blue crab						3	14	47	39	24	1	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 19 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	PJ – 5 (Global Marine Terminal)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife							143			121		
American shad		2					10					
Atlantic herring						4			1			
Atlantic menhaden										2	4	
Atlantic silverside				1	1					157		
Atlantic tomcod								3	4			
Bay anchovy									27	4	402	
Blueback herring							9					
Butterfish		2	4							90	13	
Cunner									1			
Northern pipefish							1			8		
Northern puffer										1		
Scup											2	
Spotted hake							1					
Striped bass							251			29		
Striped searobin										24		
Summer flounder									4	8		
Weakfish		1								1322	13	
Windowpane				1					11	3		
Winter flounder					1		1		19	5		
Blue crab						4	7	8	20	15		

NOTE: MONTHS SHADED WERE NOT SAMPLED.

TABLE B-1.2-4 (Page 20 of 20)

TRAWL CPUE (NUMBER PER 10-MIN TOW) AT HARBOR-WIDE AND SITE SPECIFIC STATIONS
OCTOBER 1998 – SEPTEMBER 1999

STATION	PJ – 6 (Claremont Terminal Channel)											
MONTH SAMPLED	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Alewife							260	2	1	140		
American shad							6		1			
Atlantic herring									9			
Atlantic mackerel									1			
Atlantic menhaden					2					3	3	
Atlantic moonfish											4	
Atlantic silverside					2					8		
Atlantic tomcod								162				
Bay anchovy								28	93	25	1349	
Blueback herring							6	18	1			
Butterfish								2		7	8	
Cunner								2				
Fourspot flounder							1					
Pollock								2				
Scup										5	11	
Silver hake							2					
Smallmouth flounder											1	
Spotted hake							2	5				
Striped bass							61	2		20	17	
Striped searobin										7		
Summer flounder									1	2	3	
Tautog								2				
Weakfish									5	493	64	
Windowpane									3	7		
Winter flounder										2		
American lobster							1					
Blue crab								82	31	28	3	

NOTE: MONTHS SHADED WERE NOT SAMPLED.

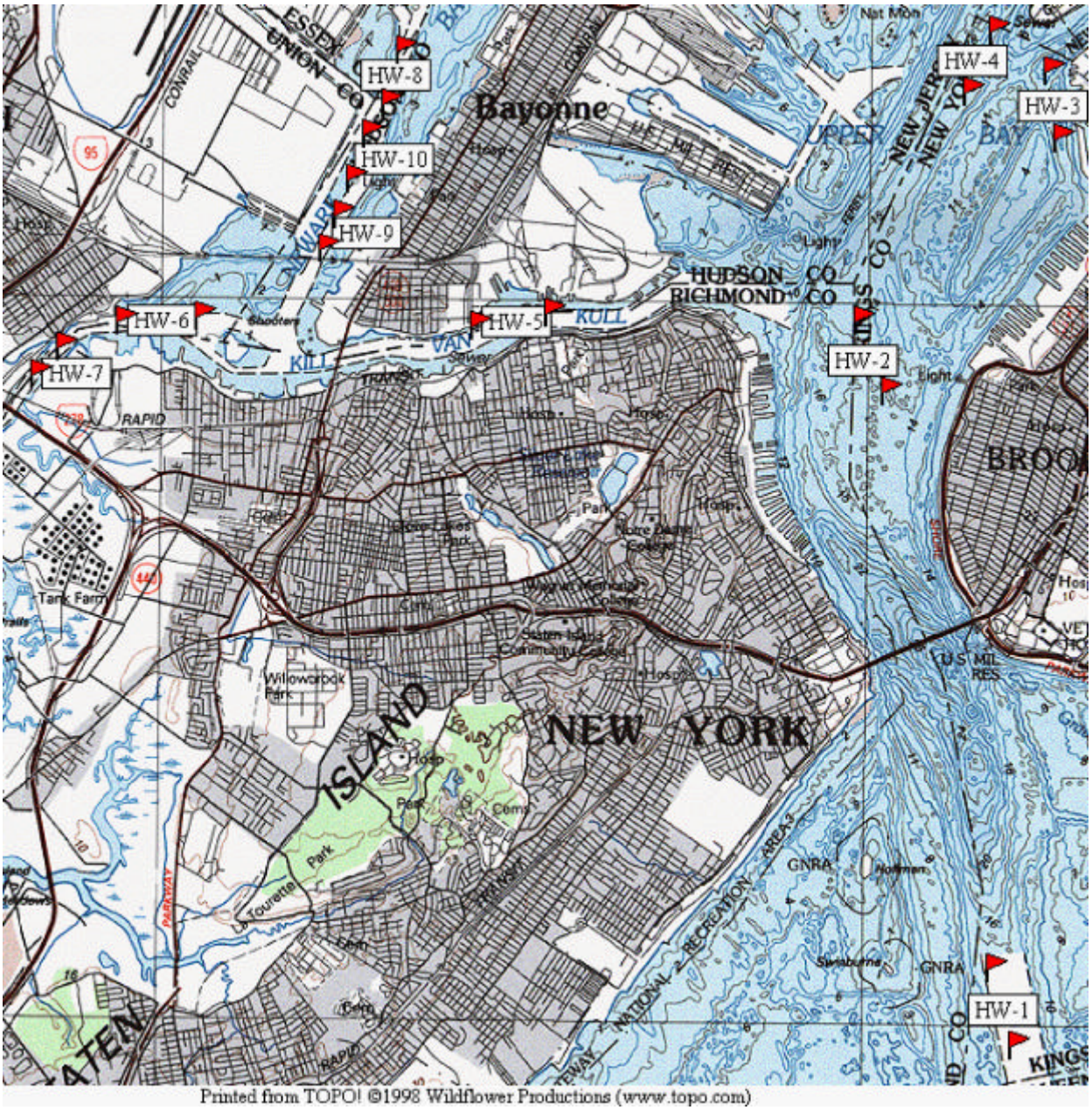
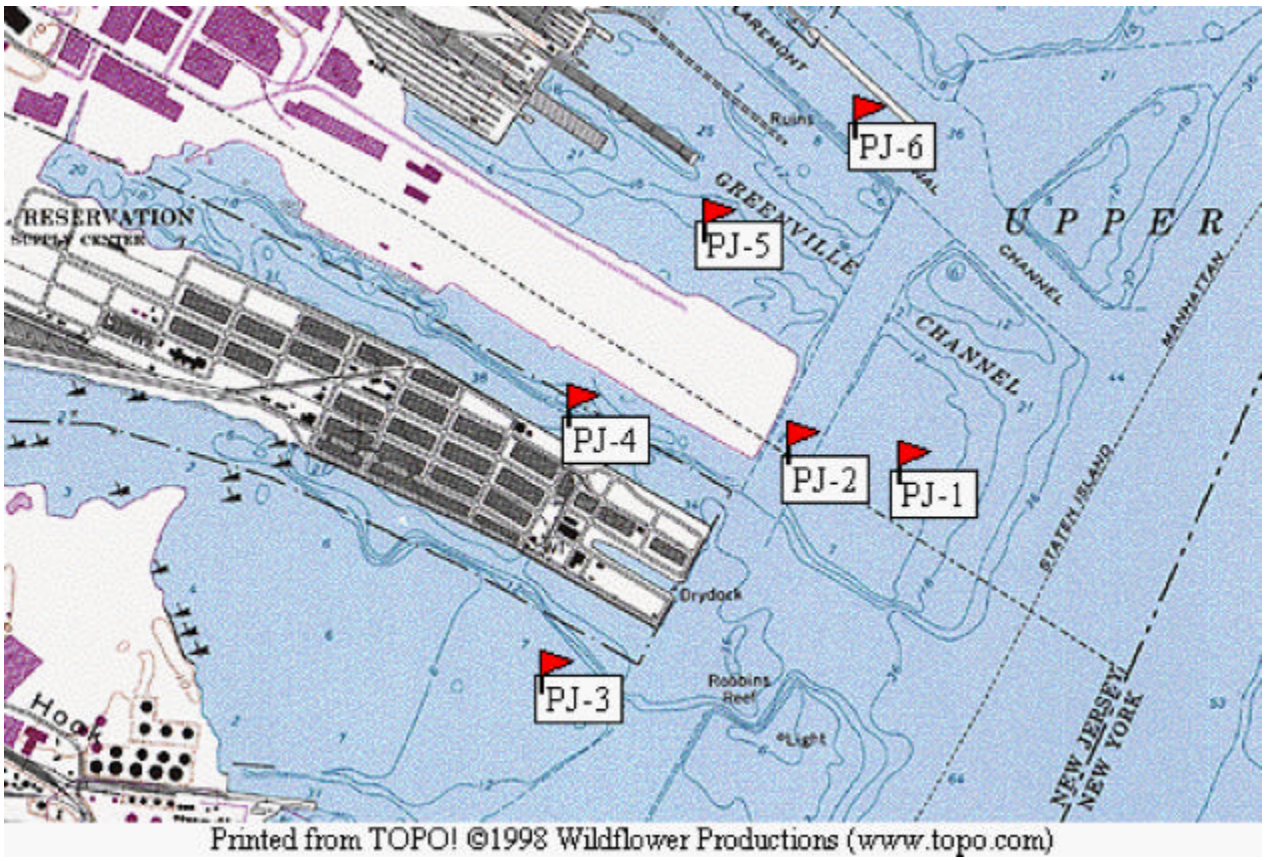


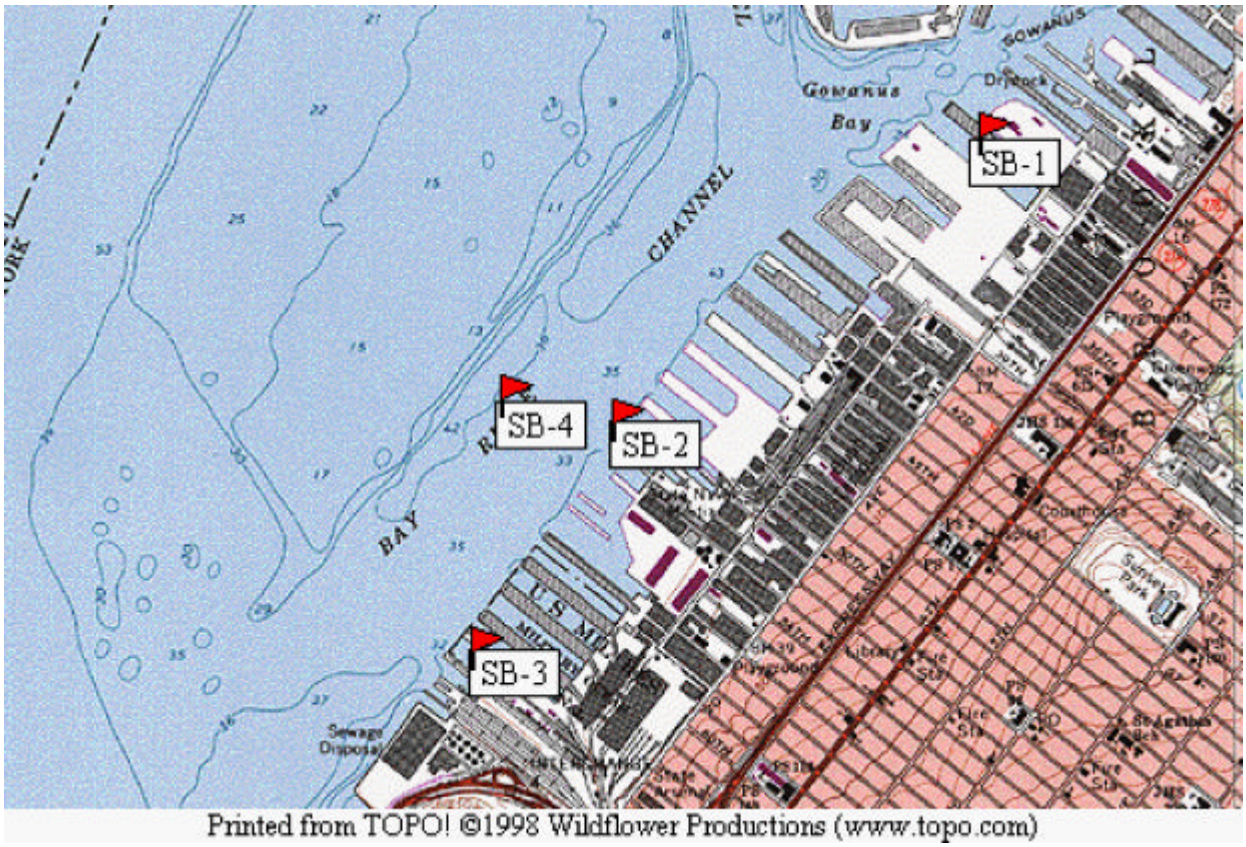
Figure B-1.2-1 Harborwide Sampling Stations



0 1 mi

SCALE (Miles)

Figure B-1.2-2 Port Jersey Sampling Stations



0 1 mi

SCALE (Miles)

Figure B-1.2-3 South Brooklyn Sampling Stations

DEIS APPENDIX B-1.3

CULTURAL RESOURCES

DRAFT
MEMORANDUM OF AGREEMENT
AMONG
THE U. S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICER
AND
THE NEW YORK STATE HISTORIC PRESERVATION OFFICER
REGARDING
NEW YORK AND NEW JERSEY HARBOR NAVIGATION STUDY

WHEREAS, the U.S. Army Corps of Engineers, New York District, (New York District), has been authorized to conduct a feasibility study to evaluate the federal participation in navigation improvements in New York and New Jersey Harbor (Harbor). The New York and New Jersey Harbor Navigation Project (Project), authorized by Section 435 of the Water Resources Development Act of 1996, addresses improvements, including deepening of existing channels to 50 feet or greater, to provide economically efficient and environmentally sound navigation to meet current and future requirements;

WHEREAS, the National Economic Development Plan provides for navigation improvements to nine channels in the Harbor, which will permit access by larger, deeper-draft vessels to four main container terminals. Navigation improvements consist of channel deepening, widening and realignment. Selected for improvement are the Ambrose, Anchorage, Port Jersey, Kill Van Kull, Arthur Kill (to Howland Hook), Newark Bay, Elizabeth, South Elizabeth, and Bay Ridge Navigation Channels (Figure 1);

WHEREAS, the New York District has defined the "Area of Potential Effect" for this undertaking to include all areas within and adjacent to the Ambrose, Anchorage, Port Jersey, Kill Van Kull, Arthur Kill (to Howland Hook), Newark Bay, Elizabeth, South Elizabeth, and Bay Ridge Navigation Channels. In locations where blasting will be undertaken the APE will also encompass nearshore and on-shore areas within zones anticipated to experience a certain force from the blast;

WHEREAS, the New York District has determined that properties listed and/or eligible for listing on the National Register of Historic Places (National Register) may be adversely affected by implementation of the Project;

WHEREAS, the New York District is applying the National Register Criteria (Criteria) to properties identified within the "Area of Potential Effect" on a phased basis, and to date has completed initial geomorphological and archaeological surveys in the Ambrose, Anchorage, Kill Van Kull, Arthur Kill, Newark Bay, Elizabeth, Port Jersey, Bay Ridge Channels;

WHEREAS, the New York District has identified locations within and adjacent to the Anchorage, Kill Van Kull, Newark Bay and Bay Ridge Channels and the Jersey Flats at

Port Jersey to be sensitive locations for prehistoric materials but has acknowledged that traditional archaeological techniques are not feasible for use in submerged areas;

WHEREAS, insufficient data were available from geomorphological and archaeological investigations in the Ambrose Channel to determine sensitivity for prehistoric deposits;

WHEREAS, the New York District has identified National Register eligible vessels and structures in the nearshore area of the Arthur Kill, Kill Van Kull and Bay Ridge through the New York District's Collection and Removal of Drift Project. Signed MOAs are available for Shooters Island in the Arthur Kill, and for nearshore resources along the Brooklyn, NY waterfront on the Bay Ridge Channel, and for certain nearshore resources along the Bayonne, NJ shoreline on the Kill Van Kull and Newark Bay Channels. A draft MOA has been coordinated for nearshore resources along the Kill Van Kull. An amended MOA has been coordinated to include additional nearshore resources along the Bayonne shore of the Kill Van Kull and the Newark Bay shoreline. The stipulations contained in the existing MOAs will be implemented for any individual resources that will be impacted by this Project;

WHEREAS, the New York District, in consultation with the NJSHPO and NYSHPO has determined that there are no submerged historic period resources within the existing navigation channels;

WHEREAS, the New York District in consultation with the NJSHPO has determined that there are no resources in the Elizabeth Channel;

WHEREAS, the New York District, in consultation with the appropriate State Historic Preservation Office (SHPO), will identify and develop treatment plans for any cultural resources that are identified and determined to be significant. These treatment plans, once implemented, will ensure that project plans will not adversely affect these properties;

WHEREAS, the New York District has identified several interested parties to participate in the Section 106 consultation process and project planning, to include the New York City Landmarks Preservation Commission, New Jersey Historical Society and other local municipalities, historical societies and organizations (Appendix**);

WHEREAS the New York District is coordinating, and shall continue to coordinate a public outreach program for this undertaking which in the past has consisted of a number of public meetings and the circulation of cultural resource and environmental documents related to the Section 106 review process;

WHEREAS, the New York District shall continue to consult with appropriate SHPO(s) regarding plans and surveys to identify, evaluate and treat historic properties as the New York District and its agents implement all phases of the Project;

WHEREAS, the New York District shall provide the appropriate SHPO(s) all plans and

reports, including but not limited to all comments, notifications, and scope of works by certified mail; and

NOW, THEREFORE, the New York District, the Council, NJSHPO and the NYSHPO agree that the Project shall be administered in accordance with the following stipulations to satisfy the New York District's Section 106 and Abandoned Shipwreck Act of 1987 responsibilities for all individual undertaking of the Project.

Stipulations

The New York District shall ensure that the following measures are carried out:

I. IDENTIFICATION AND EVALUATION

A. The New York District shall conduct remote sensing surveys along the channel edge of the Ambrose, Anchorage, Kill Van Kull, Arthur Kill and Newark Bay Channels and in area of proposed channel realignment at the Jersey Flats to identify potential shipwrecks or submerged historic resources.

B. The New York District shall conduct a cultural resource evaluation for both prehistoric and historic resources within and adjacent to the South Elizabeth Channel.

C. The New York District shall conduct architectural surveys within areas anticipated to experience a force of 0.5 peak particle velocity or greater where blasting is proposed along the Kill Van Kull, Arthur Kill, Bay Ridge and Newark Bay shorelines.

D. The New York District shall consult with the appropriate SHPO(s) to develop Plans to complete the identification of historic properties within the remaining portion of the Project's Area of Potential Effect. The appropriate SHPO(s) will provide comments on the scope of work and final Plans within 30 days of receipt.

E. The New York District shall revise Plans to address comments and recommendations provided by the appropriate SHPO(s) prior to proceeding with identification and evaluation activities.

F. The New York District shall ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to complete all identification and evaluation plans related to this undertaking, to include archaeological surveys and testing, historic structure inventories, and documentation.

G. The New York District and the appropriate SHPO(s) shall consider the views of the public or interested parties in completing its identification and evaluation responsibilities.

H. The New York District shall maintain records of all decisions it makes related to the

National Register eligibility of properties.

II. TREATMENT OF HISTORIC PROPERTIES.

The New York District shall adhere to the following treatment strategies in order to avoid adverse effect to historic properties.

A. The New York District shall excavate a limited number of borings in locations determined by a qualified geomorphologist within or adjacent to the Ambrose, Anchorage, Kill Van Kull, Arthur Kill, Newark Bay, South Elizabeth and Bay Ridge Channels as well as in the Jersey Flats at Port Jersey. These sediments will be subject to foraminifera, pollen and Carbon-14 analysis. The results of this work will be incorporated into a sensitivity model of now inundated former prehistoric occupation areas. This work will be entered into a Geographic Information System (GIS) compatible with other GIS data developed for the Project.

B. The New York District shall notify appropriate institutions and organizations of the availability of the prehistoric sensitivity model on GIS. A list of appropriate institutions and organizations will be developed by the New York District and will be submitted to the SHPO(s) for review. If the New York District does not receive a response from the SHPO(s) within 45 days of receipt the New York District will notify availability to the institutions and organizations on the list submitted for review.

C. The New York District, in consultation with the SHPO, shall develop appropriate treatment plans for historic properties identified within the unsurveyed portion of the Area of Potential Effect which may be affected by the Project. Unless the SHPO objects within 30 days of receipt of any plan, the New York District shall ensure that treatment plans are implemented by the New York District or its representative(s). The New York District shall revise Plans to address comments and recommendations provided by the SHPO.

D. The New York District shall ensure that qualified professionals meeting the National Park Service professional qualifications for the appropriate discipline [National Park Service Professional Qualification Standards, Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44738-39)] are used to develop and implement all treatment plan.

E. Avoidance. The preferred treatment is avoidance of effects to historic properties. The New York District shall, to the extent feasible, avoid historic properties either through project design changes. The New York District, and the SHPO shall consult to develop plans for avoiding impacts to historic properties. The New York District shall incorporate feasible avoidance measures into project activities as part of the implementation of the Project. If, in consultation with the SHPO, avoidance is determined to be infeasible, the New York District shall develop and implement treatment/mitigation plans.

III. RESOLUTION OF ADVERSE EFFECTS

A. When the New York District, in consultation with the SHPO, determines that Project related activities would have an adverse effect, the New York District shall:

1. Develop a Standard Mitigation Agreement (SMA) with the SHPO; or

2. Consult with the Council to develop a Memorandum of Agreement (MOA) in accordance with 36 CFR Part 800.6 (c).

B. The New York District shall invite the Council to participate in consultation when:

1. The New York District and SHPO determine that an agreement or a SMA cannot be reached;

2. a National Historic Landmark is involved;

3. human remains have been identified; or

4. there is widespread public interest in a historic property or properties.

C. The New York District and the SHPO, and interested parties as appropriate, shall consult to develop alternatives to mitigate or minimize adverse effects. The analysis of alternatives shall consider program needs, cost, public benefit and values, and design feasibility.

D. Development of Standard Mitigation Agreements (SMA).

1. The New York District, in consultation with the SHPO and interested parties, as appropriate, shall develop SMAs for historic properties which will be adversely affected by the Project. The New York District shall submit the **S**MA to the SHPO for review and approval by certified mail. The SHPO shall have 30 days from receipt of adequate information in which to review and comment on the SMA(s) . If the SHPO fails to respond within 30 days, or if there is disagreement, the New York District shall notify the Council and consult to develop the propose SMA into an MOA and submit copies of background information and the proposed SMA to facilitate consultation to develop an MOA in accordance with 36 CFR Part 800.

2. After signing by the New York District and SHPO, the New York District shall file all SMAs with the Council.

E. Standard Mitigation Agreements (SMA)

1. SMAs developed between the New York District and the SHPO, may include one or more of the following stipulations which address routine adverse effects that may occur to historic properties as a result of project implementation.

2. Recordation. The New York District shall consult with the SHPO or Historic American Building Survey/Historic American Engineering Record (HABS/HAER) to determine the appropriate level and type of recordation for affected resources. For historic properties with state and/or local significance, recordation shall be consistent with the requirements and standards of the Department of the Interior (October 1997). All documentation must be submitted to SHPO and HABS/HAER for acceptance, prior to the initiation of project activities, unless otherwise agreed to by the SHPO or

NPS.

3. Salvage and Donation of Significant Structural Elements. Prior to removal, partial removal, or substantial alteration of historic properties, the New York District, in consultation with the SHPO, shall develop a salvage and donation plan to identify appropriate parties willing and capable of receiving and preserving the salvaged significant structural elements. The New York District shall submit the plans to the SHPO for review and approval.

4. Data recovery for archaeological sites eligible under Criterion D and others and data recovery and treatment of archaeological sites where data recovery will not result in a finding of no adverse effect. The New York District shall conduct data recovery on archaeological sites following agreement on the perspective data recovery and treatment plans between the New York District and the SHPO when the archaeological sites are eligible for National Register inclusion under additional Criteria than Criterion D (for the information which they contain) or when the full informational value of the site cannot be substantially preserved through the conduct of appropriate research to professional standards and guidelines. To the maximum extent feasible, data recovery and treatment plans shall be developed to take into account and mitigate for the fullest range of archaeological site values and significance. Prior to construction, the New York District shall develop a data recovery plan for archaeological sites eligible under Criterion D and others. The New York District shall submit the plans to the SHPO for review and approval.

IV. UNATICIPATED DISCOVERY

A. If previously unidentified properties are discovered during Project implementation, the New York District shall cease all work in the vicinity of the discovered historic property until it can be evaluated pursuant to the guidelines in Stipulation I of this MOA. If the property is determined to be eligible, the New York District shall consult with the SHPO to develop a treatment plan or SMA in accordance with Stipulations II and III of this MOA.

B. The New York District shall implement the treatment or SMA once approved by the SHPO.

V. COORDINATION OF REVIEWS FOR PROJECT ACTIVITIES

A. All plans, documents, reports, and materials shall be submitted by the New York District (or its representative) to the appropriate SHPO(s) by certified mail, for a 30 day review period unless otherwise stipulated in this MOA. If the SHPO(s) fails to comment within the specified time, the New York District must request the Council`s comments unless the MOA provides for the New York District to assume the SHPO`s concurrence when the 30-day review period has elapsed.

B. When interested parties are participating in the review of activities or actions outlined in this MOA the New York District shall ensure that all interested parties are provided documentation at the time it is forwarded to the SHPO and afforded a 30 day review

period. As appropriate, the New York District shall submit the comments of interested parties to the SHPO to facilitate further consultation.

C. If after consulting with the SHPO and interested parties for a period of 90 days on any action or activity provided for in this MOA, the New York District or SHPO concludes there is no progress in developing treatment/mitigation plan or other documents required by this MOA, the New York District or SHPO may notify the Council and request the Council's involvement to expedite completion of the consultation process.

D. The New York District shall ensure that all submissions to the SHPO, interested parties, and the Council include all relevant information to facilitate their review. The New York District shall provide all additional information requested by SHPO, interested parties, or Council within a timely manner unless the signatories to this MOA agree otherwise.

E. The New York District shall ensure that all draft and final reports resulting from actions pursuant to the Stipulations of this MOA will be provided to the SHPO, and upon request, to other interested parties and will identify the Principal Investigator responsible for the report. All reports will be responsive to contemporary standards, and as appropriate to the Department of the Interior's Format Standards for Final Reports of Data Recovery Programs (42 FR 5377-79) and HPO report standards. Precise locational data may be provided only in a separate appendix if it appears that its release could jeopardize archaeological sites consistent with National Register Bulletin Number 29, Guidelines for Restricting Information about Historic and Prehistoric Resources.

G. If the District proposes revisions or addenda to SHPO approved treatment/ mitigation plans or other documents, the New York District and SHPO shall consult to determine whether additional conditions or mitigation measures are appropriate.

H. The New York District shall certify in writing that all requirements for identification and evaluation, and the implementation of treatment/mitigation plans have been satisfactorily completed prior to the initiation of construction activities for a specified portion of the Project. The New York District shall submit a copy of this certification to the SHPO by certified mail. The SHPO shall have 30 days to object to the certification based on the SHPO's finding of incomplete compliance or inadequate compliance with the terms of this MOA. If the SHPO does not object, the District may proceed with construction for the specified segment of the Project.

VI. DISPUTE RESOLUTION

A. The SHPO shall have 30 days to object to determinations, evaluations, plans, and documents submitted by the New York District . The New York District and SHPO shall attempt to resolve any disagreement arising from implementation of this MOA. If there is a determination that the disagreement cannot be resolved, the New York District shall request the Council`s recommendations or request the comments of the Council in accordance with 36 CFR Part 800.6(b).

B. Any Council recommendations or comments provided in response will be considered in accordance with 36 CFR Part 800.6(c)(2), with reference only to the subject of the dispute. The New York District shall respond to Council recommendations or comments indicating how the New York District has taken the Council's recommendations or comments into account and complied with same prior to proceeding with Project activities that are subject to dispute. Responsibility to carry out all other actions under this MOA that are not the subject of the dispute will remain unchanged.

VII. PUBLIC INVOLVEMENT

A. In consultation with the SHPO, the New York District shall develop a plan to inform the interested public of the existence of this Agreement, and the New York District plan for meeting the terms of this MOA. Copies of this Agreement and relevant documentation prepared pursuant to the terms of this MOA shall be made available for public inspection (information regarding the locations of archaeological sites will be withheld in accordance with the Freedom of Information Act and National Register Bulletin 29, if it appears that this information could jeopardize archaeological sites). Any comments received from the public under this Agreement shall be taken into account by the New York District.

B. Public Objections. The New York District shall review and resolve timely substantive public objections. Public objections shall be considered timely when they are provided within the review periods specified in Appendix 4 of this MOA public participation plan specified. The New York District shall consult with the SHPO, and as appropriate with the Council, to resolve objections. Project actions which are not the subject of the objection may proceed while the consultation is conducted.

VIII. MONITORING

A. Upon execution of the Project Cooperation Agreement, the New York District shall prepare annual reports summarizing the status of compliance with the terms of this MOA and a summary of the completed activities and the exempt activities for the past year and proposed activities for the next fiscal year to the SHPO, Council, and interested parties by the New York District. Reports shall be submitted by January 31 of every year. The Annual Reports shall be provided to Council, SHPO, and interested parties until the Project-related activities are complete.

B. The Council and the SHPO may request a site visit to follow up information in the annual Report or to monitor activities carried out pursuant to this MOA. The Council and the SHPO shall provide the New York District with 30 days written notice when requesting a site visit unless otherwise agreed. The New York District may also schedule a site visit with the SHPO and the Council at its discretion.

IX. AMENDMENTS

Any signatory to this MOA may request that it be amended, whereupon all the parties will consult in accordance with 36 CFR Part 800.6(b)(7) to consider such amendment.

X. TERMINATION
Any signatory to this MOA may terminate it by providing thirty days notice to the other parties, provided that the parties will consult during the period prior to termination by certified mail to seek agreement on amendments or other actions that would avoid termination.

XI. SUNSET CLAUSE.
This MOA will continue in full force and effect until the construction of the Project is complete and all terms of this MOA are met, unless the Project is terminated or authorization is rescinded.

Execution and implementation of this MOA evidences that the New York District has satisfied its Section 106 responsibilities for all individual undertakings of the Project, and that the New York District has afforded the Council and the SHPO an opportunity to comment on the undertaking and its effects on historic properties.

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _____ Date: _____
John M. Fowler, Executive Director

NEW JERSEY STATE HISTORIC PRESERVATION OFFICE

By: _____ Date: _____
Dorothy P. Guzzo, Deputy State Historic Preservation Officer

NEW YORK STATE HISTORIC PRESERVATION OFFICE

By: _____ Date: _____
**********, State Historic Preservation Officer

U.S. ARMY CORPS OF ENGINEERS

By: _____ Date: _____
Gary Thomas
District Engineer, New York District

Appendix ** Area of Potential Effect

Appendix ** SHPO Approval Letters for Plans for Historic Properties Identified in the Investigated Portion of the Area of Potential Effect

Appendix ** Public Coordination for the Harbor Navigation Study

Appendix ** Abandoned Shipwreck Act of 1987

DEIS APPENDIX B-1.4

COORDINATION ACT REPORT

DEIS APPENDIX B-1.5

DREDGED MATERIAL DISPOSAL OPTIONS

APPENDIX B-1.5: DREDGED MATERIAL DISPOSAL OPTIONS

1. DREDGED MATERIAL MANAGEMENT PLAN FOR THE NEW YORK AND NEW JERSEY HARBOR

U.S. Army Corps of Engineers (USACE) guidance (EC 1165-200-2) directs that a Dredged Material Management Plan (DMMP) be prepared for all USACE navigation projects to allow for unimpeded maintenance for a period of at least 20 years. The DMMP for the Port of New York and New Jersey has been under development for several years. The DMMP Implementation Report for the Port of New York and New Jersey, along with its draft Programmatic Environmental Impact Statement (PEIS) and Technical Appendix, and was released in September 1999 for public review and comment. The document released for review is the culmination of several years of studies, evaluations of alternative dredged material management options and public comment. The DMMP identifies the preferred options and current status of those options with regard to design, NEPA evaluation, and permitting. Specific sites are identified where possible for selected options, or general areas are identified when additional study is needed before an option could be implemented.

The Recommended Course of Action emphasizes beneficial use options and provides options for material suitable for ocean placement (HARS suitable material) and options for material unsuitable for the ocean (HARS unsuitable material). The Recommended Course of Action identifies two planning periods: (1) 2000-2010 the period during which major New York/New Jersey Harbor navigation channel improvements are expected to be implemented and maintenance continues on existing channels and berths; and (2) 2011-2040 the period during which the bulk of dredged material originates from maintenance of existing and improved channels and berths.

Because of the variety of materials to be dredged, the need to manage contaminated sediments (HARS unsuitable) separately from clean material (HARS suitable) and the limited capacity of all options, a combination of options is needed for efficient management of dredged material.

For HARS suitable material and rock, the following options were presented in the DMMP and discussed with resource agencies:

- Ocean remediation (HARS)
- Habitat creation, enhancement and restoration
- Land remediation
- Beach nourishment
- Artificial (fish) reefs
- Shoreline erosion protection

Ocean remediation would generally involve glacial tills, sand, silts and clay. Habitat creation, enhancement and restoration could use a variety of materials depending on the habitat development plan. Land remediation would utilize sand at a quarry site and clay to cap/close landfills. Beach nourishment would potentially require large volumes of sand, and artificial reefs and possibly breakwaters for shoreline protection would utilize large volumes of rock.

For non-HARS suitable material the DMMP recommends the following options:

- Land remediation: landfills, brownfields and mine reclamation
- Habitat creation and restoration
- Sediment processing for beneficial use (NJ Facility)
- Decontamination

Land remediation would utilize dredged material which has been stabilized with binding agents such as Portland cement, fly ash and kiln dust to create an impermeable material which is effective for capping brownfields (contaminated upland sites suitable for development after remediation) and mine reclamation (including surface and deep shaft mines). Habitat creation and restoration would involve the use of HARS unsuitable material as a sub-layer, which would be capped by HARS suitable material. Sediment processing would mix dredged material with an additive to create a construction material. Decontamination could entail a variety of techniques for washing, chemically treating or thermally treating dredged material, with beneficial use of the end product. (The DMMP Implementation Report provides a description of the options for HARS suitable and HARS unsuitable material.)

2. DREDGED MATERIAL VOLUME ESTIMATES: IMPROVED NAVIGATION CHANNELS, AND OPERATIONS AND MAINTENANCE ACTIVITIES

The proposed New York and New Jersey Harbor navigation channel improvement plan calls for the staged deepening of the following channels: the Ambrose Channel located in Lower New York Bay; the Bay Ridge, Port Jersey and Anchorage Channels located in Upper New York Bay; and the Kill Van Kull, Arthur Kill (to Howland Hook) and Newark Bay (to Port Newark/Elizabeth Marine Terminal) Channels. The volume of dredged material by category associated with the proposed navigation channel improvement plan is detailed in the following table. The table volumes include an allowable 2-ft overdredge and, therefore, represent the maximum volume of material that would be removed from the navigation channels included in the Recommended Plan.

Estimated Volume (CY) of Dredged Material by Category					
Navigation Channel	**Proposed Dredge Depth[1] (ft)**	**HARS Suitable**	**HARS Unsuitable**	**Rock**	**Total**
Ambrose	53	13,370,800			13,370,800
Anchorage[2]	50	4,158,994	716,706		4,875,700
Port Jersey	52	3,663,752	311,048		3,974,800
Kill Van Kull	52	4,135,337	2,142,034	3,193,129	9,470,500
Newark Bay[3]	52	6,590,950	2,355,966	1,249,584	10,196,500
Arthur Kill (Howland Hook)	52	456,529	788,836	3,218,935	4,464,300
Bay Ridge	50	3,130,819	1,853,581		4,984,400
TOTAL		35,507,181	8,168,171	7,661,648	51,337,000

[1]50-ft in soft sediments and 52-ft in rock and hard sediments – with the exception of the Ambrose Channel, navigation channels will be maintained at a depth of 50-ft MLW
[2]Southern terminus to the Port Jersey Channel
[3]Includes Elizabeth and South Elizabeth Channels

Estimated Operations and Maintenance (O&M) dredged material for the improved navigation channels is presented in the following table:

Estimated Annual Dredged Material Operations and Maintenance Volume (CY) Existing, Authorized and Improved Navigation Channel Depths			
Navigation Channel	**Base Year (Existing or Authorized Channel Depth)**	**Improved Channel (50 ft Depth)**	**Increase (Decrease)**
Ambrose	400,000	432,000	32,000
Anchorage[1]	0	0	0
Port Jersey	58,000	51,500	(6,500)
Kill Van Kull	24,800	28,000	3,200
Newark Bay[2]	55,800	581,300	23,300
Arthur Kill (Howland Hook)	122,000	160,200	38,200
Bay Ridge[3]	520,000	464,700	(55,300)
TOTAL	1,682,800	1,717,700	34,900

[1]Southern terminus to the Port Jersey Channel
[2]Includes Elizabeth and South Elizabeth Channels
[3]Includes Red Hook Channel although this channel will not be deepened it is included in the O&M program

3. DREDGED MATERIAL DISPOSAL OPTIONS FOR NAVIGATION CHANNEL IMPROVEMENTS

3.1 Rock

A total of 7,661,648 CY of rock is estimated to be removed from the Kill Van Kull, Newark Bay and the Arthur Kill channels as a part of the navigation channel improvement plan. Rock has considerable beneficial use potential with artificial reefs as the primary rock placement option. As discussed below, reef construction is planned for all of the rock removed for navigation improvements, but because of its value, rock could be used for other applications, such as shoreline protection/stabilization.

There are permitted artificial reef construction programs in New York and New Jersey, which include a reef under construction in each state and sites planned for the future. For artificial reefs under construction, material is added to each site as rock becomes available until the site reaches design capacity. The program then begins development of alternative sites in the reef development plan. It may be desirable to place rock at several sites simultaneously so that an aquatic community begins development and the benefits of reefs to anglers is distributed along the New York and New Jersey coast.

New Jersey is currently constructing an artificial reef near Sandy Hook, which is only at 15% of capacity, and they have identified a site near Sea Girt for reef development. New Jersey's reef program coordinator reported that their program could utilize all of the rock produced during the navigation improvement work (NJDEP 1999). New York has a reef currently under construction near Atlantic Beach, which is nearing capacity, and several other sites, which could accept large quantities of rock. As with New Jersey, New York believes they could accept virtually all of the rock produced during the navigation improvement projects (NYSDEC 1999).

The coordinators of the reef programs in New York and New Jersey would be the points of contact for rock placement and other information needed to coordinate placement operations. Currently, rock produced in shared channels would likely be shared by the states for their artificial reef construction programs.

3.2 Sand

Large quantities of sand (13.4 MCY) would be produced in the deepening of the Ambrose Channel and during maintenance dredging of this channel. Sand could be applied to a number of beneficial use options. The sand is projected to be relatively free of contaminants, which would allow for applications without treatment. Grain size of the sand could be a limiting factor depending on the proposed application. Options for sand disposal range from those that are permitted and currently available to others that are under study. The following placement options were considered for sand:

- HARS
- Construction material
- Beach nourishment
- Hunterdon Quarry
- Habitat restoration at existing borrow pits

HARS would provide a permitted low cost option for sand disposal, which is close to the Ambrose Channel. Sand would be effective for remediation at HARS and there is existing capacity at this site (estimated at 39 MCY [USACE-NYD 1999]).

Ambrose Channel sand could be used for construction material under existing permits. Sand was formerly mined from Lower New York Bay, which created pits in the bay bottom, some of which have degraded water quality and habitat conditions. The use of Ambrose Channel sand for upland construction would avoid future sand mining and the adverse effects associated with the pits it would create. Approximately 0.5 MCY/yr of sand could be used for construction material.

Beach nourishment is a low cost beneficial use option for sand disposal, with potential sites along the New York and New Jersey ocean shore relatively close to Ambrose Channel. A permit application is pending for this option. The volumes of sand, which could be used for beach nourishment are unknown at this time, but it is likely that such projects would use large quantities of sand. Grain size could be a limiting factor for use of this option.

The Hunterdon Quarry in New Jersey may be remediated with clean sand. Evaluation and design are needed before permitting could take place, but it has already been determined that the sand would be washed prior to placement in the quarry to remove salts. This site could use on the order of 30 MCY. The Hunterdon Quarry is the preferred site for sand for the non-Federal partners (letter dated August 25, 1999, from the partners to Frank Santomauro, USACE).

Habitat restoration at existing pits with degraded conditions is a potential beneficial use option for sand, but this option would not be available until a series of small-scale tests confirmed that the concept is environmentally acceptable. The testing program could use on the order of 2 MCY at sites in Jamaica Bay.

3.3 **HARS Suitable Material**

HARS suitable material other than sand would total approximately 22 MCY from navigation channel deepening. This material would be glacial tills, silty muds and clay from deepening and primarily silty mud from maintenance work. The HARS is a permitted site currently available for the placement of this category of dredged material. Glacial tills, silty muds, and clay are appropriate for remediation in that they would provide a cap for existing contaminated sediments at HARS and would be a suitable substrate for benthic life.

There are other potential beneficial uses for HARS suitable material, but they are under evaluation and are not currently available. These include creation of marsh, oyster, shellfish, and bird habitats at selected locations where a significant gain in habitat value could be achieved. Habitat restoration at existing pits with degraded conditions is a potential beneficial use option for this material. However, it would not be available until a series of small-scale tests confirmed that this concept is environmentally acceptable. The testing program could use on the order of 2 MCY at sites in Jamaica Bay.

Clay could also be used for capping landfills such as those in the Hackensack Meadowlands. These sites could become available while navigation improvements are underway providing alternatives disposal locations.

3.4 **HARS Unsuitable Material**

There is an estimated 8.2 MCY of material that would be unsuitable for use at the HARS from channel deepening and approximately 1.7 MCY annually from maintenance of existing and improved channels. This material would be silty mud with relatively low levels of contaminants. Most of this material would be recent deposits in the existing channels, but would include some surficial material from off-channel area which have not been dredged recently for maintenance purposes.

The DMMP and the non-Federal partners have identified beneficial use as the preferred option for HARS unsuitable material, with sub-channel placement cells (SPC) as a back-up contingency in the event that the potential beneficial use options are not available as needed. Among the beneficial use options that could accept HARS unsuitable material, only the upland remediation sites in Bayonne (OENJ) and Kearny (SK Services) and the Bark Camp, PA mine demonstration site are currently permitted. These sites provide more than 5 MCY of capacity. Land remediation at these sites requires sediment stabilization with additives such as Portland cement, fly ash and kiln dust. The treated sediments are transported to the remediation area and spread on the ground to create an impermeable base layer. Ultimately, the site is capped with clean material to create usable habitat or to permit future commercial development.

Several upland remediation sites are being developed full-scale remediation of mine sites in Pennsylvania could provide large capacities for HARS unsuitable material. The NJDIG program has identified 40.7 MCY of HARS unsuitable capacity, including the permitted sites at Bayonne and Kearny. Decontamination is advancing from the demonstration stage to larger capacity operations that could process up to 0.95 MCY/yr.

DEIS APPENDIX B-1.6

SECTION 404(b)(1) GUIDELINES EVALUATION

APPENDIX B-1.6: SECTION 404(b)(1) GUIDELINES EVALUATION

Introduction

This appendix of the New York and New Jersey Harbor Navigation Study presents a Section 404(b)(1) Guideline evaluation for the comprehensive evaluation of navigation improvements to the New York and New Jersey Harbor including deepening of existing channels and berthing areas, to meet current and future navigation needs. The evaluation is based on the regulations found at 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The regulations implement Sections 404(b) and 501(a) of the Clean Water Act, which govern the disposal of dredged and fill material inside the territorial sea baseline (§230.2(b)).

Draft Generic 404 (b)(1) Evaluation

The following Section 404(b)(1) evaluation is presented in a format consistent with typical evaluations in the New York and New Jersey Harbor area and addresses all required elements of the evaluation.

Project Description

a. Location: All channels proposed for deepening exist in the Port of New York and New Jersey.

b. General Description: The proposed project plan is to deepen various Federal navigation channels from their authorized depths to 50 ft MLW or greater. The plan is as follows:

- Deepening the Ambrose Channel to 53 ft
- Deepening the Anchorage Channel to 50 ft
- Deepening the Kill Van Kull, Newark Bay and Port Jersey Channels to 52 ft – Note: channels maintained at 50 ft.
- Deepening the Bay Ridge Channel to 50 ft
- Deepening the Arthur Kill Channel to Howland Hook to 52 ft – Note: Channel maintained at 50 ft.

Some channel realignment will result from the channel deepening, and from proposed modifications to facilitate waterway navigation.

c. Authority and Purpose: The authority to conduct the New York and New Jersey Harbor Navigation Study is granted in §435 of the Water Resources Development Act (WRDA) of 1996.

d. General Description of Dredged Material: Approximately 250 million cubic yards of dredged material would be removed by the proposed action. This includes about 26 million cubic yards of rock.

e. Proposed Discharge Site: Discharge sites vary depending on dredged material type. Rock is proposed for discharge in designated artificial reef sites. Discharge sites of other sediments will be identified in the DMMP.

f. Disposal Method: Overflow of barges being filled with dredged material during dredging activities and movement to disposal area(s).

Factual Determinations

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope: There will be changes to substrate elevation and side slopes due to the deepening. The current authorized channel depths (baseline Harbor Navigation Study depths) are as follows:

- Ambrose 45 ft
- Anchorage 45 ft
- Bay Ridge 40 ft
- Kill Van Kull 45 ft
- Newark Bay 45 ft
- Arthur Kill to Howland Hook 41 ft
- Arthur Kill from Howland Hook to Gulfport 40 ft
- Port Jersey 41 ft

All channels are proposed to be dredged to 50 ft or greater, with a 2 ft overdredge for soft material. An additional 2 ft is provided in the authorized depth as a safety factor is hard material and rock. Channel side slopes are 1V:3H in non-rock, and 1V:1H in rock and hard material.

(2) Sediment Type: Temporary change from fine silt and mud to either clay or rock in the Arthur Kill, Kill Van Kull and Newark Bay. No long-term impact.

(3) Dredged Material Movement: Minor short-term movement.

(4) Physical Effects on Benthos: Minor short-term disruption. No long-term impact.

(5) Other Effects: None identified

(6) Action to Minimize Impacts: Not applicable

b. Water Circulation, Fluctuations, and Salinity Determinations

(1) Water

(a) Salinity: Proposed project is not expected to affect salinity because channel deepening does not govern the overall water mass movements (tidal flow and river discharge) that control salinity.

(b) Water Chemistry: The proposed project will have small, localized effects on water chemistry during the dredging operations. The effects are associated with sediment resuspension from dredging activities and barge overflow from dredged material suitable for HARS remediation. The localized effects will be limited to the period of time that the dredging activities take place.

(c) Clarity: Temporary increase in turbidity will occur from sediment resuspension during dredging activities and barge overflow.

(d) Color: Minor temporary changes possible

(e) Odor: Odors typical of dredging operations will be created in the project area during dredging operations. Because the site is remote from residential areas, potential odors will have minimal to no impact.

(f) Taste: Not applicable

(g) Dissolved Gas Levels: Turbulence created by barge overflow may cause temporary, primarily surface variations in dissolved gas levels.

(h) Nutrients: Temporary and localized nutrient increases may occur due to sediment resuspension during dredging activities and barge overflow. No long-term increase in nutrients and eutrophication will result from the proposed project.

(i) Eutrophication: A short-term, localized increase in nutrients could contribute to an increase in algal growth. However, the limited quantity of disturbed sediments will result in minimal short-term nutrient releases, which will not result in project area eutrophication.

(j) Other: None identified

(2) Current Patterns and Circulation: No impacts identified

(3) Normal Water Level Fluctuations: No impacts identified

(4) Salinity Gradients: No impacts expected

(5) Actions to Minimize Impacts: Not applicable

c. Suspended Particulate/Turbidity Determination

(1) Change at Disposal Site: Short-term, localized increases in suspended particulates/turbidity as a result of barge overflow and placement of material at ocean remediation (HARS)/ artificial reef sites, but no long-term changes.

(2) Effects on Chemical and Physical Properties of the Water Column: Impact should be minimal since dredging activities would cause prior disturbance.

(3) Effects on Biota: Short-term exposure due to localized sediment resuspension during dredging activities and barge overflow. No long-term effects.

(4) Action to Minimize Impacts: Where appropriate, dredging activities will adhere to mechanical dredging conditions (e.g., hoist-rates) proscribed by state water quality certifications and dredging permits.

d. Contaminant Determination: As noted in the Code of Federal Regulations, 40 CFR §227.13 (b) dredged material which meets the criteria set forth in the following paragraphs (b) (1), (2), or (3) of this section is environmentally acceptable for ocean dumping without further testing under this section *(if)*:

(1) Dredged material is composed predominantly of sand, gravel, rock, or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy such as streams with large bed loads or coastal areas with shifting bars and channels; or

(2) Dredged material is for beach nourishment or restoration and is composed predominantly of sand, gravel or shell with particle sizes compatible with material on the receiving beaches; or

(3) *When* (ii) The site from which the material proposed for dumping is to be taken is far removed from known existing and historical sources of pollution so as to provide reasonable assurance that such material has not been contaminated by such pollution.

Since the navigation channel sediments in the project area is predominantly undisturbed, and a large percentage of clean material consists of rock and clay, the dredged material to be removed below the existing authorized channel depth meets the criteria listed above under (b) (1) and (b) (3) (ii) for ocean disposal without testing. Barge overflow related to sediments from the channel area should not contain any contaminants and therefore will have no adverse environmental impacts. In addition, rock material removed from the project area could be used in the construction of artificial reefs.

e. Aquatic Ecosystems and Organisms Determination: No impact

f. Proposed Disposal Site Determination: Appropriate disposal sites as identified in the DMMP will be used.

g. Determination of Cumulative Effects on the Aquatic Ecosystem: None identified

h. Determination of Secondary Effects on the Aquatic Ecosystem: None identified

Findings of Compliance or Noncompliance

a. There are no practicable alternatives for the proposed action under the jurisdiction of Section 404(b)(1) Guidelines.

b. The proposed action does not appear to violate applicable state water quality standards or effluent standards

c. The U.S. Fish and Wildlife Service (USFWS) is concerned that channel deepening may cause resuspension of contaminated sediments and that the contaminants could be transported through the food chain and result in adverse impacts to peregrine falcons. Pursuant to the Endangered Species Act, the U.S. Army Corps of Engineers - New York District (USACE-NYD) is currently preparing a Biological Assessment to evaluate the potential impacts of resuspension of contaminants during dredging. The USACE-NYD will consult with the USFWS to evaluate the need for and design of a monitoring program, which will fully evaluate the nature and extent of any outstanding concerns.

   The proposed action would result in moving the channel away from the colonial wading bird rookery on Shooters Island. Minimal short-term impacts and no long-term impacts area expected.

d. The proposed action will not result in significant adverse impacts on human health or welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife and special aquatic sites.

e. All appropriate steps to minimize adverse environmental impacts have been taken.

f. No significant adaptations of the guidelines were made relative to this evaluation.

Conclusions

Based on all of the above, the proposed action is determined to be in compliance with the Section 404(b)(1) Guidelines, subject to appropriate and reasonable conditions, to be determined on a case-by-case basis, to protect the public interest.

DEIS APPENDIX B-1.7

STATES OF NEW YORK AND NEW JERSEY COASTAL ZONE MANAGEMENT POLICIES

AND

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM

APPENDIX B-1.7a: NEW YORK STATE COASTAL ZONE MANAGEMENT POLICY

The Coastal Zone Management Act of 1972 (16 U.S.C. 1451 *et seq.*) was enacted by Congress to balance the competing demands of growth and development with the need to protect coastal resources. Its stated purpose is to ". . . preserve, protect, develop and, where possible to restore or enhance, the resources of the nation's coastal zone . . ." The primary means of achieving this balance is through coastal zone management programs adopted by the states and designed to regulate land use activities that could affect coastal waters. The act offers incentives to encourage the coastal states and territories to exercise their full authority over coastal areas through development of coastal zone management programs, consistent with the minimum federal standards. The Coastal Zone Act Reauthorization Act Amendments of 1990 strengthened the Act by requiring the state programs to focus on controlling land use activities and on the cumulative effect of activities in coastal zones.

The State of New York currently administers its Federally approved coastal zone program (N.Y. Executive Law §910 *et seq.* [Consol. 1996]) through the New York State Department of State (NYSDOS). Pursuant to the Federal Coastal Zone Management Act, New York State has defined its coastal zone boundaries and the policies to be utilized to evaluate projects occurring within the designated zones. In 1981 New York State adopted the Waterfront Revitalization and Coastal Resources Act, creating the New York State Coastal Management Program (CMP). The CMP embodies 44 policy statements supportive of the Act's intent to promote a balance between economic development and coastal resource preservation and optimization.

The proposed project is within the coastal zone boundary of New York State. The following assessment identifies the coastal zone policies and evaluates the project's consistency with the applicable policies. The consistency evaluation is provided to enable New York to consider the effect of the project on its coastal zone resources.

1) Restore, revitalize and redevelop deteriorated and underutilized waterfront areas for commercial, industrial, cultural, recreational and other compatible uses.

Construction of the proposed project would enhance the revitalization of the waterfront area by improving access of commercial vessels to existing container and oil refinery/storage facilities. The project deepening will likely spur the development of additional water-dependent uses of the Staten Island and South Brooklyn waterfronts, especially commercial uses, which would otherwise not occur without the proposed project.

2) Facilitate the siting of water-dependent uses and facilities on or adjacent to coastal waters.

The proposed project would improve the existing navigation channel serving existing water-dependent facilities at the South Brooklyn and Howland Hook (see DEIS, Section 3.1). Improved access to the Howland Hook Marine Terminal and South Brooklyn Marine Terminals would assist in the placement of water-dependent uses adjacent to coastal waters. [See list under

response to policy #3 below.] The proposed project would therefore be consistent with this policy.

3) Promote the development and use of the state's major ports as centers of commerce and industry, emphasizing the siting, in these port areas, including those under the jurisdiction of state public authorities, of land use and development which is essential to, or in support of, the waterborne transportation of cargo and people.

Construction of the proposed project would improve commercial navigation and access to existing centers of commerce and industry in the Port of New York and New Jersey, and thereby help to prevent the loss of port business to competing East Coast ports. The proposed channel deepening will allow for more efficient movement of cargo to the South Brooklyn and Howland Hook Marine Terminals. It should be noted that no specific land use and development projects are associated with the proposed channel improvements. The proposed project would therefore be consistent with this policy.

4) Strengthen the economic base of smaller harbor areas by encouraging the development and enhancement of those traditional uses and activities, which have provided such areas with their unique maritime identity.

Construction of the proposed project would assist in keeping the Port of New York and New Jersey the dominant center for the receipt and shipment of petroleum and container cargo on the east coast. This would sustain the numerous maritime support industries located along the Kill Van Kull, including tug and barge companies, marine repair and drydock facilities, oil and petroleum transporters, vessel outfitters and converters, and marina operations. It would also sustain the water-dependent facilities along the Brooklyn Waterfront. Both areas are designated as Significant Maritime and Industrial Areas in the New York City Comprehensive Waterfront Plan (NYCDCP 1992). The proposed project would be consistent with this policy.

5) Encourage the location of development in areas where public services and facilities essential to such development are adequate.

Construction of the proposed project would not result directly in any new development in the area requiring additional public services or facilities. This policy, therefore, does not apply.

6) Expedite permit procedures in order to facilitate the siting of development activities at suitable locations.

Construction of the proposed project would not involve the siting of development activities; the policy, therefore, does not apply.

7) Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.

Potential impacts to significant coastal fish and wildlife habitats are described in DEIS Section 6.2. Adherence to time schedule dredging (environmental) windows (if imposed) and proximity

limits for dredging and blasting set forth by USFWS and cooperating state agencies will ensure that no direct impacts occur to significant coastal fish habitat. Potential impacts to wetlands, and intertidal and shoal areas are addressed in DEIS Section 6.2. Measures to protect resources and mitigate potential adverse effects are described in a general way in DEIS Section 7.0. All mitigation needs are currently being explored via interagency coordination, which includes both state and federal agencies. A mitigation plan will be incorporated into the NEPA process and included in the ROD. By avoiding or mitigating potential impacts, the proposed project would be consistent with this policy.

8) Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sub-lethal or lethal effect on those resources.

Potential impacts to fish and wildlife resources may include exposure to contaminants released from sediments during dredging and disposal operations. Such potential impacts will be minimized by employing Best Management Practices during dredging operations in contaminated material. (See DEIS Section 8.4.) Potential measures to mitigate this impact include closed-bucket dredging and silt curtains. By employing these management measures, the proposed project would be consistent with this policy.

9) Expand recreational use of fish and wildlife resources in coastal areas by increasing access to existing resources, supplementing existing stocks, and developing new resources. Recreational uses include: (1) consumptive uses such as fishing and hunting; and (2) non-consumptive uses such as wildlife photography, bird watching and nature study.

Construction of the proposed project could expand recreational use of fish resources in coastal areas. Rock excavated during project construction could be used to create/restore permitted artificial reef structures. Sediment suitable for ocean disposal would be used to remediate the HARS and would therefore create/restore fish and shellfish habitats in that area (see DEIS Appendix B-1.9). Therefore, the proposed project would be consistent with this policy.

10) Further develop commercial finfish, shellfish and crustacean resources in the coastal area by encouraging the construction of new, or improvement of existing on-shore commercial fishing facilities, increasing marketing of the state's seafood products, maintaining adequate stocks, and expanding aquaculture facilities.

Construction of the proposed project would not develop commercial fishing resources, construct or improve on-shore fishing facilities, or expand aquacultural facilities. Therefore, this policy does not apply.

11) Buildings and other structures will be sited in the coastal area so as to minimize damage to property and the endangering of human lives caused by flooding and erosion.

The proposed project does not include the siting of buildings or other structures in the coastal area. Therefore, this policy does not apply.

12) Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands and bluffs.

Construction of the proposed project would not involve beaches, dunes, barrier islands, or bluffs. The project impacts on wetlands are discussed in DEIS Section 6.2. Possible methods of mitigation are discussed in DEIS Section 7.0. A mitigation plan will be included in the ROD that will be issued as the NEPA process proceeds. By avoiding or mitigating potential impacts, the proposed project would be consistent with this policy.

13) The construction or reconstruction of erosion protection structures shall be undertaken only if they have a reasonable probability of controlling erosion for at least thirty years as demonstrated in design and construction standards and/or assured maintenance or replacement programs.

The proposed project does not include the construction or reconstruction of erosion protection structures. Therefore, this policy does not apply.

14) Activities and development, including the construction or reconstruction of erosion protection structures, shall be undertaken so that there will be no measurable increase in erosion or flooding at the site of such activities or development, or at other locations.

The proposed project does not include the construction or reconstruction of erosion protection structures. Bank/wetland erosion is not expected to increase as a result of the proposed project. Therefore, this policy does not apply.

15) Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.

Dredging and excavation associated with the proposed project would not affect natural coastal processes or increase the potential of erosion from adjacent land. Erosion of land adjacent to those waters will be avoided by means of constructing channel sides with stable slope angles and by developing structural solutions to areas where shoreline facilities are involved (see Engineering Appendix). In addition, construction of the proposed project would not involve beaches. The proposed project would therefore be consistent with this policy.

16) Public funds shall only be used for erosion protective structures where necessary to protect human life, and new development which requires a location within or adjacent to an erosion hazard area to be able to function, or existing development; and only where the public benefits outweigh the long-term monetary and other costs including the potential for increasing erosion and adverse effects on natural protective features.

The proposed project does not include the construction of erosion protection structures. Therefore, this policy does not apply.

17) Nonstructural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.

Construction of the proposed project would not include structural flood control elements. Therefore, this policy does not apply.

18) To safeguard the vital economic, social and environmental interests of the state and of its citizens, proposed major actions in the coastal area must give full consideration to those interests, and to the safeguards which the state has established to protect valuable coastal resource areas.

Construction of the proposed project would improve the safety and efficiency of commercial navigation and access to the Port of New York and New Jersey, thereby safeguarding the vital economic interests of the state and its citizens. Safeguarding of social and environmental interests of the state and its citizens is being given full consideration by virtue of compliance with the federal NEPA process. Compliance includes issuance of draft and final EIS and SEIS documents along with a mandate for dialogue on each of these between the USACE-NYD and NYSDOS, NYSDEC, other state and federal agencies, and all interested businesses, interest groups and individuals via public meetings and opportunities for written commentary (See DEIS Section 1.2). Potential impacts to valuable coastal resources (e.g., colonial wading bird rookery, wetlands) and measures to mitigate adverse effects (i.e., safeguards), are described in DEIS Sections 6.2 and 7.0, respectively. The proposed project would be consistent with this policy.

19) Protect, maintain, and increase the level and types of access to public water related recreation resources and facilities.

Construction of the proposed project would not preclude access to public water-related recreation resources and facilities. Deepening and realignment of the navigation channel will maintain access to existing public water-related recreation resources and facilities. The project would therefore be consistent with this policy.

20) Access to the publicly-owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly-owned shall be provided and it shall be provided in a manner compatible with adjoining uses.

No publicly owned foreshore is located in the project area. Construction of the proposed project would not preclude public access to waterfront land in the project vicinity. Therefore, this policy does not apply.

21) Water-dependent and water-enhanced recreation will be encouraged and facilitated, and will be given priority over nonwater related use along the coast.

Construction of the proposed project would not preclude access to public water-related recreation resources and facilities. Deepening and realignment of the navigation channel will maintain

access to public water-related recreation resources and facilities. Therefore, the project would be consistent with this policy.

22) Development, when located adjacent to the shore, will provide for water related recreation, whenever such use is compatible with reasonably anticipated demand for such activities, and is compatible with the primary purpose of the development.

The proposed project does not include shoreline development; therefore, this policy does not apply.

23) Protect, enhance and restore structures, districts, areas or sites that are of significance in history, architecture, archaeology or culture of the state, its communities, or the nation.

Dredging and blasting associated with this project should not have an impact on significant historic vessel hulks eligible or potentially eligible for the National Register of Historic places located throughout the project area (See DEIS Section 5.6). The effects of blasting will be monitored to ensure that this activity does not adversely impact historic properties on land. Coordination with the New York and New Jersey State Historic Preservation Officers (SHPO) will be undertaken to determine specific monitoring requirements during blasting (See DEIS Section 6.6). Further, cores will be taken in order to characterize layering of intact pre-estuarine Holocene and Pleistocene sediments located within and adjacent to the project area for the purpose of documentation prior to removal (See DEIS Section 5.6). The proposed project would therefore be consistent with this policy.

24) Prevent impairment of scenic resources of statewide significance. This impairment would include: (a) the irreversible modification of geologic forms, the destruction or removal of structures, whenever the geologic forms, vegetation or structures are significant to the scenic quality of an identified resource; and (b) the addition of structure which, because of siting or scale will reduce identified views or which because of scale, form, or materials, will diminish the scenic quality of an identified source.

Although several scenic resources of statewide significance are located in the project area (See DEIS Section 5.1), construction of the proposed project should not impair these resources. The proposed project would therefore be consistent with this policy.

25) Protect, restore or enhance natural and man-made resources which are not identified as being of statewide significance but which contribute to the overall scenic quality of the coastal area.

The proposed project would not adversely impact the overall scenic quality of the coastal area. Therefore, this policy does not apply.

26) Conserve and protect agricultural lands in the state's coastal area.

The project study area is not located adjacent to agricultural lands. Therefore, this policy does not apply.

27) Decisions on the siting and construction of major energy facilities in the coastal area will be based on public energy needs, compatibility of such facilities with the environment, and the facility's need for a shorefront location.

Construction of the proposed project would not involve siting of an energy facility. Therefore, this policy does not apply.

28) Ice management practices shall not interfere with the production of hydroelectric power, damage significant fish and wildlife and their habitats, or increase shoreline erosion or flooding.

This policy is not applicable to the project area.

29) Encourage the development of energy resources on the outer continental shelf in Lake Erie and in other water bodies, and ensure the environmental safety of such activities.

Construction of the proposed project does not involve development of energy resources. Therefore, this policy does not apply.

30) Municipal, industrial, and commercial discharge of pollutants, including but not limited to, toxic and hazardous substances, into coastal waters will conform to state and national water quality standards.

All reasonable measures will be taken to prevent or minimize any impacts from the loss of contaminated dredged material during dredging and disposal activities (See DEIS Section 8.4.) In addition, the project would comply with the applicable permitting requirements. The proposed project would therefore be consistent with this policy.

31) State coastal area policies and management objectives of approved local waterfront revitalization programs will be considered while reviewing coastal water classifications and while modifying water quality standards; however, those waters already overburdened with contaminants will be recognized as being a development constraint.

Construction of the proposed project would not affect the water classification or water quality standards in the proposed project area. Therefore, this policy does not apply.

32) Encourage the use of alternative or innovative sanitary waste systems in small communities where the costs of conventional facilities are unreasonably high, given the size of the existing tax base of these communities.

Construction of the proposed project would not involve sanitary waste systems; therefore, this policy does not apply.

33) Best management practices will be used to ensure the control of stormwater runoff and combined sewer overflows draining into coastal waters.

The proposed project would not involve stormwater runoff or construction of combined sewer overflows. Therefore, this policy does not apply.

34) Discharge of waste materials into coastal waters from vessels subject to state jurisdiction will be limited so as to protect significant fish and wildlife habitats, recreational areas and water supply areas.

Construction of the proposed project would not affect discharge from vessels into waters of the Port of New York and New Jersey. Therefore, this policy does not apply.

35) Dredging and dredge spoil disposal in coastal waters will be undertaken in a manner that meets existing state dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands, and wetlands.

Potential impacts from release of contaminants from sediments during dredging or disposal operations will be minimized by employing Best Management Practices during dredging operations, as required by Water Quality Certification permits. Based upon testing prior to dredging, material suitable for the HARS will be designated for disposal at that site in accordance with procedures established by USEPA. Material not suitable for the HARS will be designated for disposal according to the guidelines of the DMMP (See DEIS Appendix B-1.9). Therefore, the proposed project would be consistent with this policy.

36) Activities related to the shipment and storage of petroleum and other hazardous materials will be conducted in a manner that will prevent or at least minimize spills into coastal waters; all practicable efforts will be undertaken to expedite the cleanup of such discharges; and restitution for damages will be required when these spills occur.

Construction of the proposed project would provide safer and more efficient transportation of petroleum. The proposed project would therefore be consistent with this policy.

37) Best management practices will be utilized to minimize the non-point discharge of excess nutrients, organics and eroded soils into coastal waters.

Construction of the proposed project does not involve the non-point discharge of nutrients, organics and eroded soils. Therefore, this policy does not apply.

38) The quality and quantity of surface water and groundwater supplies will be conserved and protected particularly where such waters constitute the primary or sole source of water supply.

The proposed project would not affect the surface water or groundwater supply in the area. Therefore, this policy does not apply.

39) The transport, storage, treatment and disposal of solid wastes, particularly hazardous wastes, within the coastal areas will be conducted in such a manner so as to protect groundwater and surface water supplies, significant fish and wildlife habitats, recreation areas, important agricultural land, and scenic resources.

The proposed project does not involve the transport, storage, treatment and disposal of solid wastes. Therefore, this policy does not apply.

40) Effluent discharged from major steam electric generating and industrial facilities into coastal waters will not be unduly injurious to fish and wildlife and shall conform to state water quality standards.

The proposed project would not affect any effluent discharge from generating and industrial facilities into the waters of the Port of New York and New Jersey. Therefore, this policy does not apply.

41) Land use or development in the coastal area will not cause national or state air quality standards to be violated.

The proposed project would not contravene air quality standards. Reduction in marine traffic and congestion would benefit overall air quality in the project area. The proposed project would therefore be consistent with this policy.

42) Coastal management policies will be considered if the state reclassifies land areas pursuant to the prevention of significant deterioration regulations of the Federal clean air act.

The proposed project would not affect state classifications of land areas. Therefore, this policy does not apply.

43) Land use or development in the coastal area must not cause the generation of significant amounts of acid rain precursors nitrates and sulfates.

The proposed project would not cause the generation of significant amounts of acid rain precursors, namely, nitrates and sulfates. Therefore, this policy does not apply.

44) Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.

The proposed project will result in the excavation of a total of approximately 276,952.67 square ft (6.36 acres) of tidal wetland along the Kill Van Kull, Arthur Kill, Newark Bay and Port Elizabeth Channels. There are no viable structural or procedural means by which this disruption can be avoided. To compensate the loss, a mitigation plan is being prepared in cooperation with city, state, and federal agencies. This plan will be included in the ROD that will be issued as the NEPA process proceeds. Therefore, the proposed project is consistent with this policy.

APPENDIX B-1.7b: NEW JERSEY COASTAL ZONE MANAGEMENT POLICY

The State of New Jersey administers its Federally approved coastal zone program (N.J.A.C. 7:7, 7:7E) through the Department of Environmental Protection. Pursuant to the Federal Coastal Zone Management Act, New Jersey has defined its coastal zone boundaries and the policies to be utilized to evaluate projects occurring within the designated zones. The Waterfront Development Law (N.J.S.A. 12:5-3) and related requirements (N.J.A.C. 7:7-23) provide the authority for issuance of permits for, among other activities, the placement or construction of structures, pilings, or other obstructions in any tidal waterway. New Jersey's Rules on Coastal Zone Management are employed by the state's Land Use Regulation Program in the review of permit applications and coastal decision-making; they address issues of location, use, and resources. New Jersey's rules provide for a balancing between economic development and coastal resource protection, recognizing that coastal management involves explicit consideration of a broad range of concerns, in contrast to other resource management programs with a more limited concern.

The proposed project is within the coastal zone boundaries of New Jersey. The following assessment identifies the coastal zone policies and evaluates the project's consistency with the applicable policies. The consistency evaluation is provided to enable New Jersey to consider the effect of the project on its coastal zone resources.

SUBCHAPTER 3 - SPECIAL AREAS

7:7E-3.2 Shellfish Habitat.

This policy generally limits disturbance of shellfish habitat. Shellfish habitats are present within the project area, but will not be impacted by the proposed project. A complete discussion of shellfish habitats may be found in Section 5.

7:7E-3.3 Surf Clam Areas.

This policy prohibits development that would destroy or contaminate surf clam areas. Although surf clams are present and commercially harvested in the study area, they will not be impacted by dredging activities (See Section 6.1). The project is therefore consistent with this policy.

7:7E-3.4 Prime Fishing Areas.

This policy prohibits sand or gravel submarine mining in prime fishing areas. The project does not involve submarine mining. Therefore, this policy is not applicable.

7:7E-3.5 Finfish Migratory Pathways.

This policy prohibits development, such as dams or dikes, which would create physical barriers to migratory fish. Development which would lower water quality so as to interfere with fish move-

ment is also prohibited. While there are migratory pathways within the project area, the proposed project will not interfere with fish movement. The proposed project is therefore consistent with this policy.

7:7E-3.6 Submerged Vegetation Habitat.

This policy prohibits or restricts dredging so as to protect water areas that support submerged vegetation. This project area is not a submerged vegetation habitat area. Therefore, this policy is not applicable.

7:7E-3.7 Navigation Channels.

This policy prohibits construction that would extend into a navigation channel and restricts dredging in navigation channels.

The proposed project would deepen and realign navigation channels in the project area. Dredging standards (e.g., channel side slopes and stability) would meet all applicable conditions for new or maintenance dredging in navigation channels. The project is therefore consistent with this policy.

7:7E-3.8 Canals.

This policy prohibits actions that would interfere with boat traffic in canals used for navigation. The project area is not a canal as defined by NJDEP. Therefore, this policy is not applicable.

7:7E -3.9 Inlets.

This policy prohibits filling and discourages submerged infrastructure in coastal inlets. The project area is not an inlet as defined by NJDEP. Therefore, this policy is not applicable.

7:7E -3.10 Marina Moorings.

This policy prohibits non-water-dependent development in marina mooring areas. Construction of the proposed project would not involve development in any marina mooring areas. Therefore, this policy is not applicable.

7:7E -3.11 Ports.

This policy prohibits actions which would interfere with port uses. The proposed project would not interfere with port uses. By deepening the project area navigation channels, the proposed project would benefit port-related activities (e.g., improve navigation, efficiency of cargo delivery). The project is therefore consistent with this policy.

7:7E-3.12 Submerged Infrastructure Routes.

This policy prohibits any activity which would increase the likelihood of submerged infrastructure (pipelines, cables) damage or interfere with maintenance operations. Several submerged pipelines exist within the project area. According to Federal policy, all buried pipelines and cables must be at least 7 ft below the authorized navigation channel project depth. Exceptions may be made provided that plans providing less top cover are found to be technically sound and owners guarantee that the Government and its contractors would be held free of any liability for damage during construction and maintenance. Construction of the project would meet all applicable Federal and state guidelines. The project is therefore consistent with this policy.

7:7E-3.13 Shipwrecks and Artificial Reefs.

This policy restricts the use of special areas with shipwrecks and artificial reefs which would adversely affect the usefulness of this special area as a fisheries resource. The project area does not contain any known shipwrecks or artificial reefs. Therefore, this policy is not applicable.

7:7E -3.14 Wet Borrow Pits.

This policy restricts the use and filling of wet borrow pits. The project area does contain any known wet borrow pits; therefore, this policy is not applicable.

7:7E-3.15 Intertidal and Subtidal Shallows.

This policy discourages disturbance of shallow-water areas (i.e., permanently or twice daily submerged areas from the spring high tide to a depth of 4 ft below mean low water). [See Sections 5.4 and 6 for a discussion of impacts to intertidal and subtidal shallows.] Impacts are expected to be incremental and temporary.

7:7E-3.16 Dunes.

This policy protects and preserves ocean and bay front dunes. The project area does not contain any dunes, and therefore this policy is not applicable.

7:7E-3.17 Over-wash Areas.

This policy restricts development in over-wash areas due to their sensitive nature. The project area does not contain any over-wash areas. This policy is therefore not applicable.

7:7E-3.18 Coastal High-Hazard Areas.

This policy restricts development in coastal high-hazard (i.e., flood-prone) areas. The project area is not a coastal high-hazard area. Therefore, this policy is not applicable.

7:7E-3.19 Erosion Hazard Areas.

This policy prohibits development under most circumstances to protect public safety. The project area is not an erosion hazard area, and therefore this policy is not applicable.

7:7E-3.20 Barrier Island Corridor.

This policy restricts new development on barrier islands. The project area is not a barrier island corridor, and therefore this policy is not applicable.

7:7E-3.21 Bay Islands.

This policy restricts development on bay islands. The project area does not contain any bay islands. This policy is therefore not applicable.

7:7E-3.22 Beaches.

This policy restricts developmet on beach areas. The project area does contain beaches, but no direct impacts to beaches are anticipated (see DEIS Section 6.1). No reduction in use of presently accessible public areas will occur. The project is therefore consistent with this policy.

7:7E-3.23 Filled Water's Edge.

This policy seeks to promote water-dependent uses at areas along the waterfront that have been previously filled. The proposed project is not a waterfront development, and therefore this policy is not applicable.

7:7E-3.24 Existing Lagoon Edges.

This policy restricts development at lagoon edges because of potential water quality problems. The project area does not contain any lagoon edges, and therefore this policy is not applicable.

7:7E-3.25 Flood Hazard Areas.

This policy is designed to restrict development in flood hazard areas and ensure that the waterfront is not pre-empted by uses which could function equally well at inland locations. The project does not involve any development of areas subject to tidal or fluvial flooding. This policy is therefore not applicable.

7:7E-3.26 (Reserved) NOT APPLICABLE

7:7E-3.27 Wetlands.

This policy restricts disturbance in wetland areas and requires mitigation if wetlands are destroyed or disturbed.

The proposed project will result in the disturbance of approximately 6.3 acres of tidal wetland (littoral zone: area between mean low water [MLW] and a depth of 6 ft) along the Kill Van Kull, Arthur Kill, Newark Bay and Port Elizabeth Channels. There are no viable structural or procedural means by which this disruption can be avoided. To compensate the loss, a mitigation plan is being prepared in cooperation with city, state, and federal agencies and will be included in the ROD that will be issued as the NEPA process proceeds. Construction of the project will meet all applicable agency guidelines or permit requirements (e.g., mitigation). The project is therefore consistent with this policy.

7:7E-3.28 Wetland Buffers.

This policy restricts development in wetalnd buffer areas in order to protect wetlands. The proposed project will not affect upland buffers or wetland adjacent areas. The project is therefore consistent with this policy.

7:7E-3.29 (Reserved) NOT APPLICABLE

7:7E-3.30 (Reserved) NOT APPLICABLE

7:7E-3.31 Coastal Bluffs.

This policy restricts development on coastal bluffs. The project area does not contain coastal bluffs, and therefore this policy is not applicable.

7:7E-3.32 Intermittent Stream Corridors.

This policy restricts action in the stream corridors. Intermittent streams in the project area are not tidally influenced, and will not be impacted. (See Section 6.1 for a discussion of impacts to wetland areas.)

7:7E-3.33 Farmland Conservation Areas

This policy seeks to preserve large parcels of land used for farming. The project area does not contain farmland conservation areas, and therefore this policy is not applicable.

7:7E-3.34 Steep Slopes

This policy seeks to preserve steep slopes by restricting development in such areas. Steep slopes help to control erosion and reduce flooding. There are no steep slopes in the project area. This policy is therefore not applicable.

7:7E -3.35 Dry Borrow Pits

This policy restricts the excavation and filling of dry borrow pits. The project area does not contain nor is it proposed to contain any dry borrow pits. This policy is not applicable.

7:7E-3.36 Historic and Archaeological Resources.

This policy protects the value of historic and archaeological resources and may require cultural resource surveys and other protective measures. The proposed project involves work in deep waters only. No impacts on known historic or archaeological resources will occur. The project is therefore consistent with this policy. [See Section 5 for a discussion of historic and archaeological resources in the project area.]

7:7E-3.37 Specimen Trees

This policy seeks to protect specimen trees as defined by NJDEP. The project area does not contain specimen trees, and therefore this policy is not applicable.

7:7E-3.38 Endangered or Threatened Wildlife or Vegetation Species Habitats.

This policy restricts development in endangered or threatened wildlife or vegetation species habitat areas. Several species of birds, fish and marine mammals were identified by the USFWS as residents of the project area (See Section 6.5 for a discussion of impacts to threatened and endangered species.) Any impacts would be temporary and would most likely be avoided by organisms in the area.

7:7E-3.39 Critical Wildlife Habitats

This policy discourages development that would adversely affect critical wildlife habitat. As no critical habitats will be affected by the proposed project, this policy is not applicable.

7:7E-3.40 Public Open Space

This policy encourages new public open spaces and discourages development that might adversely affect existing public open space. The proposed project would not affect any public open space, and therefore this policy is not applicable.

7:7E-3.41 Special Hazard Areas

This policy discourages development in hazard areas due to potential dangers. The project does not include any Special Hazard Areas. This policy is therefore not applicable.

7:7E-3.42 Excluded Federal Lands

Federal lands are beyond the jurisdiction of the New Jersey Coastal Zone. New Jersey has the authority to review activities on Federal lands if there may be spillover impacts on New Jersey's Coastal Zone. There are no excluded federal lands in the project area. This policy is therefore not applicable.

7:7E-3.43 Special Urban Areas

This policy seeks to encourage waterfront development that would benefit certain municipalities that receive state aid. Special urban areas located within the project area include Bayonne, Elizabeth, Jersey City, and Newark. Construction of the proposed project would provide indirect economic benefits to these areas because of improved shipping efficiencies. The proposed project would therefore be consistent with this policy.

7:7E-3.44 Pinelands National Reserve and Pinelands Protection Area

This policy allows the Pinelands Commission to serve as the reviewing agency for actions within the Pinelands National Reserve. The proposed project is not located within the Pinelands, and therefore this policy is not applicable.

7:7E-3.45 Hackensack Meadowlands District

This policy allows HMDC to serve as the reviewing agency for actions within the Hackensack Meadowlands District. The proposed project is not located within the Hackensack Meadowlands District, and therefore this policy is not applicable.

7:7E-3.46 Wild and Scenic River Corridors

This policy recognizes the outstanding value of certain rivers in New Jersey by restricting development to compatible uses. The proposed project is not located within a wild and scenic river corridor. Therefore, this policy is not applicable.

7:7E-3.47 Geodetic Control Reference Marks

This policy discourages disturbance of geodetic control reference marks. There are no known geodetic control reference marks in the project study area, and therefore, this policy is not applicable.

7:7E-3.48 Hudson River Waterfront Area

This policy sets forth non-industrial and industrial development standards for public access and open space along the Hudson River Waterfront Area, and requires development, maintenance, and management of a section of the Hudson Waterfront Walkway coincident with the shoreline of the development property. The proposed project is not a waterfront development. Therefore this policy is not applicable.

SUBCHAPTER 3A - STANDARDS FOR BEACH AND DUNE ACTIVITIES

These standards apply to routine beach maintenance, emergency post-storm beach restoration, dune creation and maintenance, and construction of boardwalks. The proposed project is not located within a beach or dune area, and therefore these standards are not applicable.

SUBCHAPTER 3B - WETLAND MITIGATION PROPOSALS

This section details the requirements of a wetland mitigation proposal. Construction of the project will meet all applicable guidelines, agency, or permit requirements. The project is therefore consistent with this section.

SUBCHAPTER 3C - IMPACT ASSESSMENT FOR ENDANGERED AND THREATENED WILDLIFE SPECIES.

This section details the performance and reporting standards for impact assessments for endangered and threatened wildlife species. The peregrine falcon, nesting on local area bridges, was the only threatened and/or endangered species for which potential adverse impacts were identified. The impact assessment for endangered and threatened wildlife species is described in Sections 6.4 and 6.5 Threatened and Endangered Species. These sections are consistent with the standards provided with this policy.

SUBCHAPTER 4 - GENERAL WATER AREAS

This section defines general water areas. For purposes of definition, general water areas within the project area are as follows: Large tidal river – Hudson River; Open bay – Raritan Bay, Sandy Hook Bay, and Upper New York Bay; Tidal gut – Arthur Kill and Kill Van Kull.

7:7E4.2 Acceptability Conditions for Uses.

This section defines the important uses of general water areas and sets conditions or standards of acceptability for certain uses. Only those standards applicable to the proposed project area are listed:

(g) Standards relevant to new dredging
(h) Standards relevant to dredged material disposal

Dredging and dredged material disposal would meet the acceptability conditions for both applicable standards in accordance with DMMP. The proposed project is therefore consistent with this policy.

SUBCHAPTER 5 - GENERAL LAND AREAS.

This section defines general land areas (including coastal zones) and the appropriate level of growth and development allowed within each region. No development is associated with the proposed project, and therefore this policy is not applicable.

SUBCHAPTER 6 - GENERAL LOCATION RULES.

7:7E-6.1 Rule on Location of Linear Development

This rule sets conditions for acceptability of linear development (e.g., roads, walkways, pipelines). The proposed project does not include linear development, and therefore this policy is not applicable.

7:7E-6.2 Basic Location Rule.

This rule states that NJDEP may reject or conditionally approve a project for safety, protection of certain property, or preservation of the environment. The proposed project is consistent under the location rule as the remediation will protect the public health and protect fish and wildlife resources by closing a hazardous waste site.

7:7E-6.3 Secondary Impacts.

This rule sets the requirements for the secondary impact analysis. The proposed project would be consistent with the requirements for secondary impact analysis. See DEIS Section 6.2 for a complete discussion of secondary impacts.

SUBCHAPTER 7 - USE RULES.

7:7E-7.2 Housing Use Rules

These rules set standards for housing construction in the coastal area. The proposed project does not involve housing construction, and therefore this policy is not applicable.

7:7E-7.3 Resort Recreational Use

This rule sets standards for resort and recreational uses in the coastal area. The proposed project does not involve resort recreational uses, and therefore this policy is not applicable.

7:7E-7.3A Marina Development

This rule sets standards for marina development in the coastal area. The proposed project does not involve marina development. Therefore, this policy not applicable.

7:7E-7.4 Energy Use Rule

This rule sets standards for energy uses in the coastal area. The proposed project will not create a need for increased energy production or major offsite energy conveyance systems; therefore, this policy is not applicable.

7:7E-7.5 Transportation Use Rule

This rule sets standards for roads, public transportation, footpaths, and parking facilities in the coastal area. The proposed project does not involve construction of offsite roads, public transportation, foot paths, or parking facilities, and therefore this policy is not applicable.

7:7E-7.6 Public Facility Use Rule

This rule sets standards for public facilities (e.g., solid waste facilities) in the coastal area. The proposed project does not involve construction of a public facility, and therefore this policy is not applicable.

7:7E-7.7 Industry Use Rule

This rule sets standards for industrial uses in the coastal area. Since the project takes place in the water, there are no zoning regulations. Therefore this policy is not applicable.

7:7E-7.8 Mining Use Rule

This rule sets standards for mining in the coastal area. The proposed project does not involve mining. Therefore, this policy is not applicable.

7:7E-7.9 Port Use Rule

This rule sets standards for port uses and port-related development. The standards are designed to ensure that port facilities retain their economic vitality. The project will ensure the vitality of the ports for future years, and the proposed project is therefore consistent with this policy.

7:7E-7.10 Commercial Facility Use Rule

This rule sets standards for commercial facilities such as hotels, casinos, retail trade, and convention centers in the coastal zone. The proposed project does not involve construction of these types of commercial facilities, and therefore this policy is not applicable.

7:7E-7.11 Coastal Engineering

This rule sets standards to protect the shoreline and maintain dunes, and provides for beach nourishment. Standards applicable to structural shore protection are included. Any impacts to the coastal portion of the study area will be addressed in the mitigation plan.

7:7E-7.12 Dredged Material Disposal on Land

This rule sets standards for disposal of dredged materials. Dredging operations and disposal of dredged materials would be done in accordance with the District's DMMP, and would comply with project-specific state and federal permit regulations and special conditions.

7:7E-7.13 National Defense Facility Use Rule

This rule sets standards for the location of defense facilities in the coastal zone. The proposed project does not involve location of a defense facility, and therefore this policy is not applicable.

7:7E-7.14 High-Rise Structures

This rule sets standards for high-rise structures in the coastal zone. The proposed project may qualify as the construction of high-rise structures when the depth of stabilized fill is added to the potential height of the proposed structures. Since the development will take place in an area with existing multi-story structures (oil tanks, power plants, railroad bridges) this policy is not applicable.

SUBCHAPTER 8 - RESOURCE RULES.

7:7E-8.2 Marine Fish and Fisheries.

This rule sets standards of acceptability so as to cause minimal interference with the reproductive and migratory patterns of estuarine and marine species of finfish and shellfish. While the project area is used by migratory estuarine and marine fish, the proposed project would not interfere with the reproductive and migratory patterns of fish (see DEIS Section 6.4). The project is therefore consistent with this policy.

7:7E-8.3 (Reserved) NOT APPLICABLE

7:7E-8.4 Water Quality

This rule sets standards for coastal development so as to limit effects on water quality. Construction of the project will meet all applicable Federal and state guidelines or permit requirements and regulations for water quality as specified in the dredge permits.The project is therefore consistent with this policy.

7:7E-8.5 Surface Water Use

This rule sets standards for coastal development so as to limit effects on surface water. The proposed project will not cause unacceptable surface water disturbances. There will be no use or consumption of surface waters.The project is therefore consistent with this policy.

7:7E-8.6 Groundwater Use

This rule sets standards for coastal development so as to limit effects on groundwater supplies. The proposed project will not place a demand on groundwater supplies, and therefore this policy is not applicable.

7:7E-8.7 Stormwater Management

This rule sets standards for coastal development so as to limit effects of stormwater runoff. No land-based work requiring stormwater management or erosion control measures will take place. The project is therefore consistent with this policy.

7:7E-8.8 Vegetation

This rule sets standards for coastal development so as to protect vegetation. The proposed project does not include vegetated areas, and therefore this policy is not applicable.

7:7E-8.9 (Reserved) NOT APPLICABLE

7:7E-8.10 Air Quality

This rule sets standards for coastal development with requirements that projects meet applicable air quality standards. The proposed project will not contravene Federal or state air quality standards (see DEIS Section 6.2). Therefore, the proposed project would be consistent with this policy.

7:7E-8.11 Public Access to the Waterfront

This rule requires that coastal development adjacent to the waterfront provide perpendicular and linear access to the waterfront to the extent practicable, including both visual and physical access. The proposed project will not affect access to the waterfront, and therefore this policy is not applicable.

7:7E-8.12 Scenic Resources and Design

This rule sets standards for new coastal development to be visually compatible with its surroundings. The project does not involve coastal development. Therefore, this policy is not applicable.

7:7E-8.13 Buffers and Compatibility of Uses

This rule sets standards for adequate buffers between uses found to be not compatible. Because the proposed project is compatible with existing land uses in the vicinity, the project would be consistent with this policy.

7:7E-8.14 Traffic

This rule sets standards for coastal development so as not to disturb traffic systems. The proposed project does not involve any improvements to existing traffic systems, and therefore this policy is not applicable (see DEIS Section 3).

7:7E-8.15 through 8.20 (Reserved) NOT APPLICABLE

7:7E-8.21 Subsurface Sewage Disposal Systems

This rule sets standards for subsurface sewage disposal systems in the coastal zone. The proposed project does not involve onsite sewage disposal and will use the existing municipal disposal system. This policy is not applicable.

APPENDIX B-1.7c: THE NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM (WRP)

The twelve New York City WRP policies and their applicability to the proposed channel deepening are discussed below.

Policy A – Improve Urban Shorelines by Maintaining, Removing, or Recycling Waterfront Structures (Piers, Docks, Wharves, etc.) in Accordance with Waterfront Development Policies and Plans. Identify Alternative Uses for Underutilized Waterfront Structures.

The project does not directly involve the maintenance or alteration of piers, docks, wharves, or other waterfront structures. To this extent, this policy does not apply to the proposed project. Indirect benefits may occur as a result of improved shipping access to maritime industries along the Arthur Kill, in Newark Bay, and elsewhere in New York Harbor.

Policy B – Improve Channels as Necessary to Maintain and Stimulate Economic Development.

The proposed project directly supports this policy by maintaining and promoting economic growth for the Port of New York. Construction of the proposed project would improve commercial navigation and access to existing centers of commerce and industry in the Port of New York and New Jersey, and thereby help to prevent the loss of Port business to competing East Coast ports. The proposed channel deepening will allow for more efficient movement of cargo to the South Brooklyn and Howland Hook Marine Terminals. It should be noted that no specific land use and development projects are associated with the proposed channel improvements. The proposed project would therefore be consistent with this policy.

Policy C – Provide Shoreline Protection Against Coastal Erosion Hazards Where There is Public Benefit and Public Use Along Non-Public Shores.

The proposed project will not include the siting of buildings or other structures in the coastal area and does not include erosion control structures. Coastal zone erosion is not expected to increase as a result of the proposed project. Therefore, this policy does not apply.

Policy D – Provide Technical Assistance for the Identification and Evaluation of Erosion Problems, as well as the Development of Erosion Control Plans along Privately Owned Eroding Shores.

The proposed project will not include the siting of buildings or other structures in the coastal area and therefore will not include erosion control structures and will not

contribute to coastal zone erosion. Therefore, this policy does not apply to the proposed project.

Policy E – Implement Public and Private Structural Flood and Erosion Projects.

The proposed project is not a structural flood and erosion control project. Therefore, this policy does not apply to the proposed project.

Policy F – Priority shall be given to the Development of Mapped Parklands and Appropriate Open Space Where the Opportunity Exists to Meet the Recreational Needs of Immobile User Groups and to Communities without Adequate Waterfront Park Space and/or Facilities.

The proposed channel deepening does not directly affect existing or required access to facilities along the coastal waters, public access points, public parks, or open spaces. The proposed work will not limit or preclude existing or future waterfront access. One of the goals of the wetland mitigation program may include the incorporation, where possible, of a public access component. Thus the project supports this policy.

Policy G – Maintain and Protect New York City Beaches to the Fullest Extent Possible.

The proposed project will not affect any New York City public beaches. The proposed project would therefore be consistent with this policy

Policy H – Insure Ongoing Maintenance of all Waterfront Parks and Beaches to Promote Full Use of Secure, Clean Areas with Fully Operable Facilities.

The proposed project will not affect the use, enjoyment or operation of any New York City-public or private beaches or waterfront parks. The proposed project would therefore be consistent with this policy.

Policy I – Siting of Liquified and Substitute Natural Gas Facilities, Including Those Associated with the Tinkering of such Gas, Shall Take Into Consideration State and National Energy Needs, Public Safety Concerns, and the Necessity for a Shorefront Location.

The proposed project does not involve placement of natural gas facilities; therefore, this policy is not applicable.

Policy J – Adopt End-Use Plans for Landfill Areas.

The proposed project will not affect landfill areas; therefore, this policy is not applicable.

Policy K – Curtail Illegal Dumping Throughout the Coastal Zone and Restore Areas Scarred by this Practice.

The proposed project will follow all agency-specified best management practices and special permit conditions during dredging, blasting, placement, and transport of removed material. All requisite permits for the work will be obtained. Illegal dumping will not occur. Therefore, the proposed project is consistent with this policy.

Policy L – Encourage Energy Development from Waste and Waste Landfills.

The purpose of this policy is to assist in achieving the national objective of energy independence through the recovery or production of energy from waste. The proposed project does not involve energy development from waste or waste landfills. Therefore, this policy is not applicable.