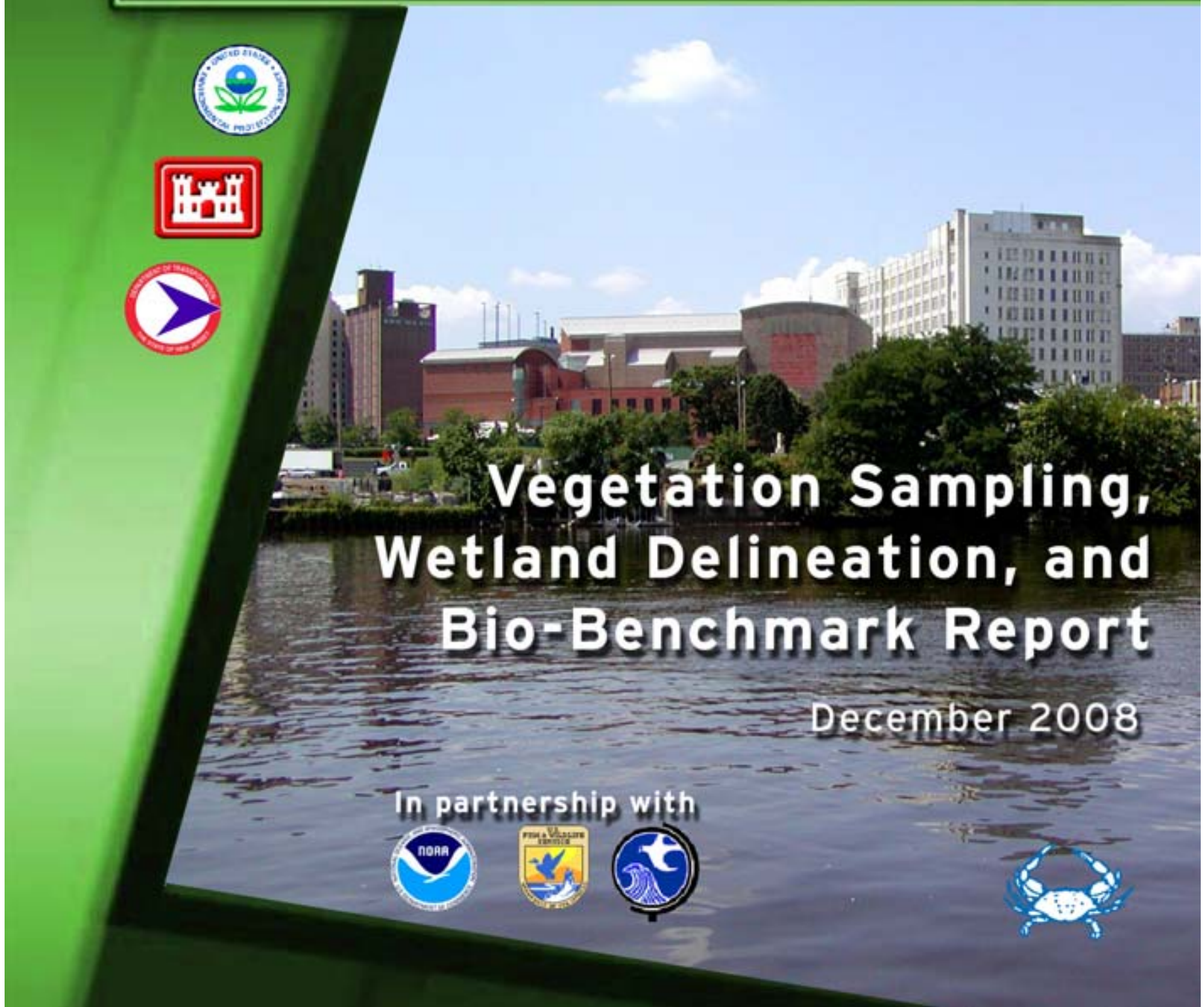
Lower Passaic River Restoration Project



Vegetation Sampling, Wetland Delineation, and Bio-Benchmark Report

December 2008

In partnership with

TABLE OF CONTENTS

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 Introduction

The Lower Passaic River is a 17-mile section of the tidal Passaic River flowing through Passaic, Bergen, Essex, and Hudson counties, New Jersey, from the Dundee Dam to the river mouth in Newark Bay. The Lower Passaic River Restoration Project is an integrated remediation and restoration study of the watershed with the purpose of developing a comprehensive watershed-based plan for the restoration and remediation of the Lower Passaic River and its tributaries. This Comprehensive Restoration Plan (CRP) and Focused Ecosystem Restoration Plan (FERP) for the lower 8 miles will include the identification of restoration opportunities, such as habitat, water quality, and sediment quality improvements, which support broader estuary-wide restoration efforts. Remediation efforts may include: sediment removal, placement of caps, sediment decontamination, and shoreline stabilization. Complimenting restoration goals may include benthic habitat restoration, tidal wetland restoration, vegetative buffer creation, shoreline stabilization, and aquatic habitat improvement.

This study is being conducted through a joint, integrated plan between the U.S. Army Corps of Engineers-New York District (District), the U.S. Environmental Protection Agency, and the New Jersey Department of Transportation. The Lower Passaic River Restoration Project is designated an Urban Rivers Restoration Initiative. The study is being performed in cooperation with the New Jersey Department of Environmental Protection (NJDEP), the U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration (NOAA). These agencies are state and federal Natural Resource Trustees.

As a first step of the restoration component, a survey of vegetation was conducted in the riparian zone of the Lower Passaic River in the Fall of 2007 and Spring/Summer of 2008. Baseline vegetation data for proposed restoration sites along the brackish, transitional and freshwater sections of the Lower Passaic from River Mile 0 to the Dundee Dam (River mile 17.6) were collected during the fall and spring sampling season under leaf-on conditions. Vegetation was identified and quantified at 23 proposed restoration sites located along the shoreline of the main stem of the Lower Passaic River. Vegetation sampling was also conducted at four tributary sites located on the Second River, the Third River, Saddle River and Toney's Brook. Parameters measured included percent cover of trees, shrubs, vines, and herbaceous vegetation, as well as tree basal area. All vegetation was identified to species, and native/non-native status of each was noted.

Vegetation sampling was also conducted at reference sites for tidal brackish, tidal freshwater, and non-tidal freshwater forested habitats. These reference sites include: a wetland along the Lower Passaic River in Harrison which contains brackish marsh vegetation; Rancocas Creek in Willingboro, New Jersey, a freshwater tidal tributary of the Delaware River; and a forested site near the headwaters of the Passaic River in Somerset County, New Jersey. Collecting baseline vegetation data provides a reference to track the success of restoration efforts and can also provide information about what plant species have the potential to survive at a particular restoration site. Collecting data at a reference location as well as the proposed restoration site helps to provide a target at which to set restoration goals and expectations.

Existing biobenchmark data collected previously for the Minish Park Tidal Wetland Mitigation Design was supplemented by collecting biobenchmark data at three locations identified by the District: River Mile 7.7 (Kearny Riverbank Park), River Mile 10.9 (Riverside Park), and Toney's Brook. Formal wetland delineations were also conducted at these locations, as well as a site on the Lower Passaic River in Harrison, per Federal Wetland Delineation procedures.

2.0 Methods

2.1 Vegetation Sampling

Baseline vegetation sampling activities were conducted from October 18 to November 2, 2007 and May 13 to June 27, 2008, at 27 sites along the Lower Passaic River and the Second River, Third River, and Saddle River. All sampling was performed during leaf-on conditions. The sampled sites were selected based on draft notes from the District's 31 May 2007 Lower Passaic River Site Tour, an October 16 telephone call with the District, a November 1 meeting with the District, the April 24, 2008 Potential Restoration Sites on the Passaic River Memorandum, the Preliminary Draft Restoration Opportunities Report prepared by TAMS and Malcolm Pirnie, site accessibility, and best professional judgment. Vegetation was sampled and quantified at 23

potential restoration sites along the shoreline of the main stem of the Lower Passaic River. Baseline vegetation data was collected in the brackish, transitional and freshwater sections of the river. Fifteen of the locations sampled were located in the freshwater section of the river, six locations in the transitional section of the river and two within the brackish portion of the river.

Vegetation sampling methodology followed the Standard Operating Procedure (SOP)-26 presented in the Lower Passaic River Restoration Project Draft Field Sampling Plan Volume 2 (June 2006) for terrestrial vegetation. However, one meter-square quadrats were utilized for identifying and quantifying cover of herbaceous vegetation. In accordance with SOP-26, terrestrial vegetation transects were located parallel to the river's bank at each site. Along each transect, sampling points were selected to identify the composition of tree (overstory) layer, scrub/shrub layer, and herbaceous (non-woody) vegetation layer. Sampling points were placed at a frequency of one per every 100 feet of transect. Overstory trees were located and identified within a 30-ft radius of the fixed point. Each tree was measured with flexible tape to determine diameter at breast-height (DBH). All trees over 4 inches DBH were identified to species and the relative basal area was calculated. All vegetation within the scrub/shrub layer was identified within a 30-ft radius of the fixed point. Vegetation comprising the scrub/shrub layer includes: tree saplings (under 4 DBH and over 4 feet tall) and shrubs (woody vegetation over 1ft in height). Each individual shrub was identified to species and enumerated. Percent canopy coverage for each shrub species was also estimated. Two random one meter-square quadrats were established near the fixed point and all herbaceous vegetation within the quadrats was identified. Herbaceous vegetation, was estimated for percent coverage and enumerated for density estimates. All basal stalks of woody vines for each species were counted within the sampling plot and percent coverage was estimated for each species. If basal stalks of woody vines were not encountered in the sampling station, percent of area coverage that overlies each sampling station was estimated.

All field information was recorded following SOP-4 and SOP-5 of Field Sampling Plan Volume 2. The locations of all sampling plots were photographed and their positions collected by GPS. Vegetation at 84 sampling plots along the Lower Passaic River and its tributaries was identified and quantified. Appendix contains figures displaying the locations where sampling was conducted. The master plant list containing all plant species present in sampling plots during vegetation sampling are presented in Appendix B. Data sheets for all sampling sites are presented in Appendix C. Photographs characterizing each sampling site, including the tributary sites and reference sites, are presented in Appendix D. A complete set of photographs (i.e. all vegetative plots and site photos) are included on the CD.

Once the Lower Passaic River and tributary sites had been characterized, a search for appropriate reference areas was conducted in coordination with the District. On November 7, 2007, a freshwater tidal wetland reference site along Rancocas Creek, a tributary to the Delaware River, was field-identified, but not sampled until Summer 2008 as several frosts had already occurred and much of the herbaceous vegetation was no longer present. A brackish tidal wetland reference site along the Lower Passaic River in Harrison (at approximately River Mile 3.9) was identified and sampled in June, 2008. While the Harrison site is located in the Lower Passaic River study area, this should not exclude it from consideration as a reference site. Baldwin (2004) suggests that *"Reference areas, ecological benchmarks, should be chosen within the urbanized system where species have succeeded despite urban constraints. Because the vegetation communities in existing urban wetlands are adapted to an urban environment restoring vegetation similar to that found in other urban wetlands provides a more realistic goal than attempting to create vegetation similar to that of undisturbed wetlands."* The Harrison reference site consists of a relatively long brackish fringing marsh growing on a natural slope and substrates and has survived the environmental conditions and stresses of the Lower Passaic River. A non-tidal freshwater forested reference site adjacent to the Upper Passaic River in the Scherman-Hoffman Wildlife Sanctuary was identified and sampled in June, 2008.

2.2 Wetland Delineation

Wetland delineations were conducted on May 13-14, 2008 at several locations along the Lower Passaic River as well as one location along Toney's Brook, a tributary of the Second River. These locations along the Lower Passaic River include: the Harrison Wetland site (approximately from River Mile 3.9 to 4.5), the shoreline adjacent to Kearny Riverbank Park (at River Mile 7.7), and the shoreline adjacent to Riverside County Park

(River Mile 10.9). Wetlands were also delineated along the banks of Toney's Brook, located in Glenfield Park in Glen Ridge. Toney's Brook flows into the Second River which is a tributary of the Passaic River.

Wetlands were delineated in accordance with procedures outlined in the 1989 interagency *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* and the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987) in order to meet state and federal and state wetlands delineation criteria, respectively. Wetlands, as defined in the 1987 manual, are: "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions." Wetlands thus possess three characteristics: 1) hydric soils; 2) wetland hydrology; and 3) hydrophytic vegetation. The "Routine On-Site Inspection Methodology," as set forth in the manual was employed. Typically, tidal wetlands are delineated based on the extent of spring high water tidal level. The New York District Army Corps Regulatory Branch relies on this parameter to determine jurisdictional limits of waters of the U.S. under the Clean Water Act. However, the project area contains wetlands which are tidally influenced, as well as areas that are not tidally influenced, so the three-parameter approach described above was used to delineate these wetlands. The federal and state wetland boundaries were identical. The wetland delineation was performed at a time of the year when the upper 18 inches of soil was not frozen and there was sufficient live and persistent vegetative cover to reasonably make a wetland determination.

The boundaries of the wetlands were marked in the field by sequentially numbered flags, located by a New Jersey licensed surveyor and plotted on a base map using New Jersey State Plane North American Datum 83 (NAD83) Coordinates, U.S. Survey Feet. No data were collected for manmade ditches or stormwater features unless they expressed characteristics of wetlands (hydric soils, hydrophytic vegetation, and wetland hydrology). Data sheets are included in Appendix C.

2.3 Bio-benchmark Surveying

The use of bio-benchmarks is critical in wetland mitigation design for setting grades and elevations. Bio-benchmark studies involve establishing precise vertical elevations within existing wetlands and coupling these elevations with observations of key vegetative, soil, and hydrological characteristics. Bio-benchmark studies were conducted during May 2008 at the following locations: River Mile 7.7, River Mile 10.9, and Toney's Brook. Bio-benchmark studies were also previously conducted during October 2002 at the Joseph G. Minish Passaic River Waterfront Park Wetland Restoration Site and Harrison Wetland. Data collected during these studies is also included in this report. The bio-benchmark data included the lowest (and/or closest to open water) and highest elevations (and/or top of bank slope) of desirable native species and invasive species growing along the river banks. The elevations of the bio-benchmarks were located by a New Jersey licensed surveyor with reference to the National Geodetic Vertical Datum (NGVD) 1929.

3.0 Results

3.1 Vegetation Sampling

A total of 143 distinct plant species were observed at the 23 sites along the main stem of the Lower Passaic River and four sites along tributaries of the Lower Passaic. Figure 1 provides an index to all of the vegetation sampling sites along the Lower Passaic River and its tributaries. Detailed maps of the entire study area are included in Appendix A. Table 1 contains a summary of the data acquired during the vegetation sampling. Table 2 summarizes the dominant plant species observed in each river section.

A Conceptual Site Model Report for the Lower Passaic River Restoration Project was developed in conjunction with the USEPA, the USACE, and NJDOT (Malcolm Pirnie, 2007). In this report, the Lower Passaic River is delineated in three river sections based on the salinity zones – Brackish, Transitional, and Freshwater. These salinity zones were first identified in the Draft Restoration Opportunities Report (Earth Tech and Malcolm Pirnie, 2006). A summary of vegetation surveyed in each river section is provided below. Figure 1 shows a map of the entire 17-mile restoration area and the boundaries of each river section.

Legend

- Federally Authorized (USACE) Navigation Channel Centerline and Rivermile
- Reference Site Vegetation Plots
- Vegetation Plots
- Municipality Boundary
- County Boundary
- Preliminary River Type Boundaries (Conceptual Site Model, 2007)

SADDLE BROOK TWP
HACKENSACK CITY
GARFIELD CITY
LODI BORO
RM 17.6
17
SaR2
16
SOUTH HACKENSACK TWP
HASBROUCK HEIGHTS BORO
PASSAIC
CLIFTON CITY
CEDAR GROVE TWP
PASSAIC CITY
15
WALLINGTON BORO
TETERBORO BORO
RM 15.2
14
RM 14.1
WOOD-RIDGE BORO
RM 13.8
RM 13.6
MOONACHIE BORO
MONTCLAIR TOWN
13
RM 12.8
BERGEN
CARLSTADT BORO
TR 2
RM 12.3
12
RM12.0
NUTLEY TOWN
RM 11.6
RUTHERFORD BORO
RM 11.3
EAST RUTHERFORD BORO
11
RM 11.0
RM 10.9
RM 10.7
Freshwater Tidal (RM 10.0 to 17.4)
TR 3
GLEN RIDGE BORO
BLOOMFIELD TOWN
RM 10.3
SR5
10
RM 9.9
PASSAIC
LYNDHURST TWP
BELLEVILLE TOWN
RM 9.7
9
NORTH ARLINGTON BORO
RM 8.5
Transitional (RM 6.0 to 10.0)
8
SECAUCUS TOWN
ESSEX
RM 7.7
EAST ORANGE CITY
7
RM 7.1
KEARNY TOWN
6
EAST NEWARK BORO
Brackish (RM 0.0 to 6.0)
HARRISON TOWN
RM 3.8
HUDSON
IRVINGTON TOWN
RM 3.9
5
4
3
2
NEWARK CITY
RM 4.3
1
JERSEY CITY
0

0 2,000 4,000 8,000 Feet

Base Map - NJ Office of Information Technology, 2002.

US Army Corps of Engineers New York District	**Lower Passaic River VEGETATION SAMPLING SITES**	**Dec. 2008**	**FIGURE 1**

Appendix B provides a complete list of all plant species observed within the study area. Appendix C contains the complete data sheets for each survey plot at all locations surveyed.

3.1.1 Freshwater Section

The salinity of the tidal freshwater section of the river is less than 0.5 parts per thousand (ppt). This section has been preliminarily defined as the portion of the river that falls between River Mile 10 and River Mile 17.4. A total of 52 vegetation plots were sampled at 15 sites within the tidal freshwater portion of the Lower Passaic River. The dominant tree species observed within the tidal freshwater river section include: American elm (*Ulmus americana*), black locust (*Robinia pseudoacacia*), cottonwood (*Populus deltoides*), and silver maple (*Acer saccharinum*). These four tree species were present in at least four of the sites sampled in the freshwater zone. Black willow (*Salix nigra*), sycamore (*Platanus occidentalis*), and green ash (*Fraxinus pennsylvanica*) were less abundant than the previously mentioned tree species, but were the dominant tree species at two sites. The dominant species within the shrub strata of the freshwater zone were multiflora rose (*Rosa multiflora*) and red osier dogwood (*Corunus stolonifiera*), along with saplings of American elm, green ash, tree of heaven (*Ailanthus altissima*) and Norway maple (*Acer platinoides*). The most abundant herbaceous plants in sampling plots in the freshwater zone were Japanese knotweed (*Polygonum cuspidatum*) and white snakeroot (*Eupatorium rugosum*). Woody vines were present at 16 of the 17 freshwater zone sampling sites. The three most common woody vine species observed were poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*) and oriental bittersweet (*Celastrus orbiculatus*). Tree basal area per plot in the freshwater zone averaged 2,843 square inches (86% of which was native species). Shrub cover averaged 32% (60% of which was cover by native species). Herbaceous cover averaged 61% (57% of which was cover by native species). Vine cover averaged 9% (73% of which was cover by native species). Sampling locations are represented on Figures 2, 3, 4, 5 and 6 of Appendix A.

3.1.2 Transitional Section

The transitional section of the river represents the portion of the Lower Passaic River between the freshwater and brackish sections of the river where the salinity values fluctuate under typical tidal conditions. This section of the river is influenced by saltwater intrusion and mixing thus water conditions vary continuously from oligohaline (0.5-5 ppt) to mesohaline. This transitional section of the river has been preliminarily defined as the portion that falls between River Mile 6 and River Mile 10. Within the transitional section of the river, a total of 20 vegetation plots were sampled at six sites. Based on the data collected at these sites, white mulberry (*Morus alba*), box elder (*Acer negundo*) and tree of heaven were the most dominant tree species present. The dominant species sampled in the shrub layer were saplings of box elder, tree of heaven and red maple (*Acer rubrum*). Two sites had shrub species present; multiflora rose, red osier dogwood, and Japanese barberry (*Berberis thunbergii*) but the degree of cover was too low for these to be considered dominant species. The herbaceous cover in the transitional zone was similar to the freshwater zone with the dominant species being Japanese knotweed and white snakeroot. One site, RM7.1 had a relatively high percent cover of swamp dock (*Rumex verticillatus*). The most abundant vine in this portion of the river was poison ivy, although Virginia creeper was present at one location. Tree basal area per plot in the transitional zone averaged 2,278 square inches (55% of which was native species). Shrub cover averaged 25% (63% of which was cover by native species). Herbaceous cover averaged 78% (29% of which was cover by native species). Vine cover averaged 2% (92% of which was cover by native species). Sampling locations are represented in Figures 6, 7 and 8 of Appendix A.

3.1.3 Brackish Section

The brackish river section represents the portion of the Lower Passaic River closest to the confluence with Newark Bay where the water salinity is defined as almost always mesohaline (5-18 part per thousand [ppt]) to polyhaline (18-30 ppt). This brackish section of the river has been preliminarily defined as the portion that falls between River Mile 0 and River Mile 6.0. Five vegetation plots were sampled at two sites within the brackish section of the Lower Passaic River. One vegetation sampling site was located at the Joseph G.

Table 1: Passaic River Terrestrial Vegetation Survey
Summary of Data

Salinity Zone	Sampling Site		Number of Plots	Parameter										
				Tree Strata		Shrub Strata Cover		Herbaceous Strata Cover		Vine Strata Cover		All Strata		Tree and Shrub stem density (stems/acre)
	Name	Location		Total Basal Area (in^2)	% Native	Total %	% Native	Total %	% Native	Total %	% Native	# of Species	% Native	
Brackish	RM 3.8	Harrison, Hudson Co.	3	55	0	29	86	89	16	0	NA	10	50	185
	RM 4.3	Newark, Essex Co.	2	902	98	19	72	74	27	0	NA	15	60	439
Transitional	RM 7.1	Kearny, Hudson Co.	2	3,195	24	28	66	76	63	1	100	22	64	455
	RM 7.7East	Kearny, Hudson Co.	4	1,422	85	23	73	66	38	3	92	24	54	308
	RM 7.7West	Newark, Essex	2	866	16	29	28	100	10	1	100	10	60	547
	RM 8.5	Kearny, Hudson Co.	5	3,629	93	19	84	72	3	4	75	21	76	299
	RM 9.7	Belleville, Essex Co.	2	976	43	81	16	51	44	1	100	18	67	1164
	RM 9.9	N. Arlington, Bergen Co.	5	4,363	93	41	64	60	32	15	21	42	62	379
Freshwater	RM 10.3	Lyndhurst, Bergen Co.	4	5,786	81	24	60	65	63	5	95	20	65	351
	RM 10.7	Nutley, Essex Co.	2	2,458	100	26	66	75	35	0	NA	29	66	416
	RM 10.9	Lyndhurst, Bergen Co.	5	2,758	100	17	33	61	10	1	67	20	50	231
	RM 11.0	Lyndhurst, Bergen Co.	4	1,753	95	38	59	59	73	5	0	35	69	370
	RM 11.3	Lyndhurst, Bergen Co.	5	6,374	88	26	72	74	83	1	57	32	66	342
	RM 11.6	Clifton, Passaic Co.	3	3,192	90	45	96	61	85	20	67	34	77	406
	RM 12.0	Rutherford, Bergen Co.	2	17	100	18	76	73	47	3	8	21	52	177
	RM 12.3	Rutherford, Bergen Co.	2	92	79	5	89	13	50	0	NA	13	62	185
	RM 12.8	Rutherford, Bergen Co.	3	4,704	98	33	71	77	28	6	79	23	65	303
	RM 12.9	Clifton, Passaic Co.	2	1,739	83	30	50	63	62	18	71	23	74	393
	RM 13.6	E. Rutherford, Bergen Co.	5	3,813	72	40	60	45	96	1	88	36	72	613
	RM 13.8	Passaic City, Passaic Co.	3	2,612	63	60	25	23	100	37	82	31	79	673
	RM 14.1	E. Rutherford, Bergen Co.	4	740	85	24	27	80	72	48	69	49	51	339
	RM 15.2	Wallington, Bergen Co.	3	2,091	99	25	97	43	61	2	100	22	75	365
	RM 17.6	Clifton, Passaic Co.	5	10,426	98	26	98	40	27	32	100	34	82	281
	Tributaries													
	SR5	Glen Ridge, Essex Co.	2	280	26	23	94	76	16	0	NA	11	73	262
	TR2	Clifton, Passaic Co.	2	235	100	21	80	90	12	0	NA	17	82	216
	TR3	Bloomfield, Essex Co.	2	3,196	97	32	91	86	52	6	100	21	81	370
	SaR2	So. Hackensack, Bergen Co.	2	2,093	100	34	93	84	31	0	NA	12	83	378
	Reference Sites													
	Upper Passaic	Basking Ridge, Somerset Co.	3	3,700	100	40	95	78	94	0	NA	35	86	365
	Rancocas Creek	Willingboro, Burlington Co.	3	1,758	100	38	100	44	100	5	100	27	100	247
Brackish	Harrison Wetland	Harrison, Hudson Co.	4	0	NA	22	97	66	100	1	100	14	92	231

***RM=River Mile, SR=Second River; TR=Third River; SaR=Saddle River**

Minish Wetland Restoration Site and the other site was located on the Harrison side of the Passaic River at approximately River Mile 3.8. Minimal restoration opportunities are present in this river section due to the highly industrialized nature of both river banks, therefore; only two locations were sampled within the brackish river section.

The dominant tree species present at the Minish site was American elm and the dominant tree species at River Mile 3.8 was tree of heaven. Average tree basal area for this zone of the river was 479 square inches (82% percent of which was native species). The dominant shrub species at the two sites were marsh elder (*Iva frutescens*) and green ash saplings. Average shrub cover was 24% (80% of which was cover by native species). Average herbaceous cover was 81% (only 20 % of which was cover by native species. Herbaceous cover by non-native species Japanese knotweed and common reed (*Phragmites australis*) was considerable. The most common native herbaceous species observed at the two sites was swamp dock. No vines were present at either site. Sampling locations are represented in Figures 8 and 9 of Appendix A.

Table 2: Dominant Plant Species Surveyed

		Scientific Name	Common Name	^Indicator Status
Freshwater	Trees and Shrubs	*Acer saccharinum*	Silver maple	FACU-
		Cornus sericea	Red osier dogwood	FACW+
		Fraxinus pennsylvanica	Green ash	FACW
		Morus alba	White mulberry*	UPL
		Populus deltoides	Cottonwood	FAC
		Robinia pseudoacacia	Black locust	FACU-
		Rosa multiflora	Multiflora rose*	FACU
		Ulmus americana	American Elm	FACW-
	Herbaceous	*Allium vineale*	Wild garlic	FACU-
		Eupatorium rugosum	White snakeroot	FACU-
		Polygonum cuspidatum	Japanese knotweed*	FACU-
Transitional	Trees and Shrubs	*Acer negundo*	Box elder	FAC+
		Ailanthus altissima	Tree of heaven*	NI
		Cornus sericea	Red osier dogwood	FACW+
		Gleditsia triacanthos	Honey locust	FAC-
		Morus alba	White mulberry*	UPL
		Robinia pseudoacacia	Black locust	FACU-
		Rosa multiflora	Multiflora rose*	FACU
		Ulmus americana	American Elm	FACW-
	Herbaceous	*Alliaria petiolata*	Garlic mustard*	FACU-
		Eupatorium rugosum	White snakeroot	FACU-
		Polygonum cuspidatum	Japanese knotweed*	FACU-
Brackish	Trees and Shrubs	*Ailanthus altissima*	Tree of heaven*	NI
		Ulmus americana	American Elm	FACW-
	Herbaceous	*Phragmites australis*	Common reed	FACW
		Polygonum cuspidatum	Japanese knotweed*	FACU-
		Rumex verticillatus	Swamp dock	OBL

*Plants identified as non-native species when calculating % native species cover

^The indicator status is the estimated probability of a species occurring in wetlands versus nonwetlands in the northeast region of the country: OBL (>99%), FACW (67-99%), FAC (34-66%), FACU (1-33%) and UPL (<1%). NL designates plants not listed and NI are speices with no idicator status. The plus (+) and minus (-) designations specify, respectively, the higher or lower part of the range (USFWS, 1988 and 1993).

3.1.4 Lower Passaic River Tributaries

In addition to the 23 sites sampled along the main stem of the Lower Passaic River, 4 sites along sites located on tributaries to the Passaic River were also sampled. These include one site along the Saddle River, two along the Third River and one along a tributary to the Second River.

Saddle River (SaR)

Vegetation was sampled at the location identified in a June 2008 Passaic River Tributaries – Potential Restoration Site Memorandum as SaR2 located in South Hackensack in Bergen County adjacent to St. Michael's Cemetery just south of Felician College, on South Main Street. Two plots were sampled at this location and yielded the following results: total tree basal area 2,093 in^2 (100% native species), shrub cover totaled approximately 34% (93% native species), and herbaceous cover totaled approximately 84% (31% native species). No vine species fell within the sampling plots. The most common tree species observed included silver maple and box elder. The majority of the vegetation measured within the shrub strata was silver maple saplings, elderberry (*Sambucus Canadensis*) also feel within one of the sampling plots. The herbaceous layer was dominated by Japanese knotweed. Stinging nettle (*Urtica dioica*) was also present in two of the meter-square quadrats.

Third River (TR)

Vegetation was sampled at two locations along the Third River. They were identified as TR2 and TR3 in a June 2008 Passaic River Tributaries – Potential Restoration Site Memorandum. TR2 is located in Clifton along Route 3 and TR3 is located in Belleville between the Forest Hill Golf Club and the Glenfield Cemetery. Two plots were sampled at each location. TR2 had almost no tree cover with a total basal area of 230 in^2 (100% native species). Shrub cover was also low at roughly 21% (80% native species). Herbaceous cover was very high at this location at 90% although only 12% of that cover was from native species. No vines were sampling within the vegetation plots. The most common tree species sampled was silver maple, shrubs included tree saplings and silky dogwood and the herbaceous strata was dominated by Japanese knotweed.

The tree cover at TR3 was much higher with the basal area covering approximately 3,196 in^2, 97% of which was native species including green ash and silver maple. Percent cover in the shrub strata was approximately 32%, with 91% being comprised of native species such as spice bush and green ash saplings. The total herbaceous cover was similar to TR2 at 86% although the percent cover of native species was higher at approximately 52%. The dominant herbaceous species sampled was Japanese knotweed; other native herbaceous species sampled included violets and swamp rose (*Hibiscus palustris*).

Second River (SR)

Vegetation was sampled at the location identified in a June 2008 Passaic River Tributaries – Potential Restoration Site Memorandum as SR5 located in Glen Ridge in Essex County adjacent located within Glenfield Park. This sampling site is physically located along the stream bank of Toney's Brook which is a tributary of the Second River. Two plots were sampled at this location and yielded the following results: total tree basal area 280 in^2 (26% native species), shrub cover totaled approximately 23% (94% native species), and herbaceous cover totaled approximately 76% (18% native species). No vine species fell within the sampling plots. The two tree species observed were Norway maple (*Acer platanoides*) and pin oak (*Quercus palustris*). The most common shrub species observed was spicebush. The herbaceous layer was dominated by Japanese knotweed. Jewelweed (*Impatiens capensis*) was also present in several of the meter-square quadrats.

3.1.5 Summary

Overall, 45 of the 143 species observed during sampling are not native to New Jersey. Many of these non-native species are ornamentals planted in parks where sampling occurred, or are species which are garden escapees (i.e. *Iris psuedacorus*). As the sampling methodology only results in a portion of each site's

vegetation being surveyed, the data likely under-represent numbers of native and non-native species present at any given site.

Japanese knotweed was found in vegetative plots at all four of the tributary sites sampled and in plots at 17 of the 23 sites sampled along the Lower Passaic River. Tree of heaven was present in plots at 20 of the 23 Lower Passaic sites and one of the tributary sites. Multiflora rose was present in plots at 14 of the Lower Passaic River sites and one tributary site. Oriental bittersweet was present in plots at 16 of the Lower Passaic River sites, all located within the freshwater section of the river. Other common non-native, invasive species present along the Lower Passaic River include white mulberry, Norway maple, Japanese honeysuckle, garlic mustard, and mugwort. Purple loosestrife was present in sampling plots at four of the Lower Passaic River sites, and common reed, an invasive species prevalent in many estuarine systems, was only present in plots at three of the Lower Passaic River sites.

Tree basal area in the brackish portion of the river averaged 479 in^2; 82 percent of the tree cover consisted of native species. The one native tree species observed was the American elm and the non-native tree species observed was the tree-of-heaven. Shrub cover was lowest in the brackish river section at roughly 24 percent and 80 percent of the shrubs surveyed were native species. The most common native shrub observed was marsh elder; non-native shrub species observed included wineberry and honeysuckle. Herbaceous plant cover was the highest in this river section at 81 percent although, only 20 percent of the herbaceous plant species measured were native species. The most common (and non-native) herbaceous plant species observed were Japanese knotweed and common reed.

Tree basal area in the transitional portion of the river averaged 2,278 in^2; 86 percent of the tree cover consisted of native species. Native tree species observed included box elder and green ash and non-native tree species observed were tree-of-heaven and white mulberry. Shrub cover was only slightly higher than the brackish river section at roughly 25 percent although only 63 percent of the shrub cover consisted of native species. The most common native shrub observed was red-osier dogwood and the most common non-native shrub species was multiflora rose. Herbaceous plant cover was only slight lower in the transitional river section at 78 percent although, similar to the brackish section, only 29 percent of the herbaceous plant species measured were native species. The most common non-native herbaceous plant species observed was Japanese knotweed.

Tree basal area in the freshwater portion of the river was the highest of the tree river sections and averaged 2,843 in^2; 86 percent of the tree cover consisted of native species. Native tree species observed in the freshwater section included American elm, cottonwood, and silver maple. Common non-native tree species observed were Norway maple and white mulberry. Shrub cover was the highest in this river section at roughly 32 percent and 60 percent of the shrub cover consisted of native species. The most common native and non-native shrub species observed was the same as the transitional river section; red-osier dogwood and multiflora rose. Herbaceous plant cover was the lowest in the freshwater river section at 61 percent although, this river section consisted of the highest percentage of native herbaceous species at 57 percent native. The most common native herbaceous plant species observed was white snakeroot and the most common non-native herbaceous was Japanese knotweed.

3.2 Reference Sites

The objective in selecting reference sites was to find reasonably local streams and rivers with diverse, native emergent and riparian plant communities, ideally, in an undisturbed setting. The resultant reference sites possess these attributes, and are located in streams and rivers of similar width, morphology, salinity regimes, and adjacent upland topography as the Lower Passaic River and its tributaries. The Hudson and Hackensack rivers were determined not to be the best match of these plant community attributes and physical features.

The following sites were sampled to provide reference data for future restoration projects along the Lower Passaic River: River Mile 3.9 – Harrison Reference Wetland, Rancocas Creek, and the Scherman-Hoffman Wildlife Sanctuary, near the headwaters of the Passaic River. Plant species lists for these sites appear in

Appendix B. Photographs documenting the habitat as well as vegetation sampling plots were taken at each location, and appear in Appendix D.

3.2.1 Harrison Wetland – Tidal Brackish Reference Site

This wetland is located on the Lower Passaic River in Harrison at River Mile 3.9, across from the Joseph G. Minish Wetland Restoration Site. This site was chosen as tidal brackish reference site because of its natural slope and substrates, and the presence of a brackish marsh community supporting native emergent plant species. This reference wetland site contains fringing growth of *Spartina alterniflora* along the banks of the river. Also common at this site is chairmaker's bulrush (*Scirpus americanus*), water hemp (*Amaranthus cannabinus*), and seaside goldenrod (*Solidago sempervirens*). Woody vegetation in the sampled plots consists primarily of the shrub stratum, dominated by marsh elder. Other shrubs present include desert false indigo and chokecherry (*Aronia* sp.). Vegetative tissue, fruits, and seeds of the herbaceous and shrub strata at this site are valuable food sources for small wildlife species. There are few trees at this site, due to the immediately adjacent industrial development and composition of upland soil (mostly gravel and cement fill).

While the Harrison site is located in the Lower Passaic River study area, it was included as a reference because the site consists of a relatively long brackish fringing marsh growing on a natural slope and substrates that have survived the environmental conditions and stresses of the Lower Passaic River.

3.2.2 Rancocas Creek – Tidal Freshwater Reference Site

Rancocas Creek is a tributary of the Delaware River, approximately 30 mi (48 km) long, in southwestern New Jersey. The site sampled is just upstream of Mill Creek, adjacent to Mill Creek Park in Willingboro, NJ. This site was selected because it is a tidal, freshwater site with similar bank morphology and sediments as the Lower Passaic River, and contains fringing growth of emergent, native wetland plant species. This area has been recognized for its characteristic freshwater tidal marsh habitats by the Partnership for the Delaware Estuary (Westervelt et al., 2006). All plant species identified within sampling plots at this reference site were native. This site contains considerable cover of native, emergent wetland vegetation, including yellow pond lily (*Nuphar lutea*), pickerelweed (*Pontederia cordata*), arrow arum (*Peltandra virginica*) and wild rice (*Zizania aquatica*). Eighteen species of trees and shrubs were present in sampling plots at this reference site, fifteen of which were also identified in sampling plots along the Lower Passaic River.

3.2.3 Upper Passaic River – Non-Tidal Freshwater Reference Site

The Scherman-Hoffman Wildlife Sanctuary, located in Bernardsville, Basking Ridge, and Harding townships in Somerset County, NJ, contains a mixture of habitats including upland deciduous forest, fields, woodland, and the floodplain along the headwaters of the Passaic River. This site is generally undisturbed and was selected as a reference site for the tributaries of the Lower Passaic River, as it is non-tidal, freshwater forested habitat. Additionally, stream width, bank morphology and stream substrates are similar to those of the tributaries sampled for the project. Three vegetation sampling plots were sampled in the riparian zone of the Passaic River at this reference site, which has a high percentage of native vegetation. Tree species observed included sycamore (*Platanus occidentalis*), tuliptree (*Liriodendron tulipifera*) American beech (*Fagus grandifolia*), green ash, and red maple. Common shrub species observed included flowering dogwood (*Cornus florida*), sassafras (*Sassafras albidum*) and witch hazel (*Hamamelis virginiana*). Herbaceous vegetation consisted of mostly native species such as sedges (*Carex* sp.), flat-top goldenrod (*Euthamia graminifolia*), dotted smartweed (*Polygonum punctatum*) and skunk cabbage (*Symplocarpus foetidus*).

3.3 Wetland Delineations

Wetlands at the following three locations along the Lower Passaic River were delineated: the Harrison Wetland across from the Joseph G. Minish Wetland Restoration Site (including the Harrison Reference site at approximately River Mile 3.9), the shoreline adjacent to Kearny Riverbank Park at River Mile 7.7, and the

shoreline adjacent to Riverside Park at River 10.9. Wetlands were also delineated along the banks of Toney's Brook located in Glenfield Park in Glen Ridge. The four wetlands delineated for the project were categorized according to Cowardin's *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). Wetland delineation data sheets are included in Appendix C. Maps of the delineated wetlands appear in Appendix A.

The sites delineated are located within the Hackensack-Passaic Watershed (USGS Cataloging Unit No. 02030103) and the Passaic River Lower Basin (Saddle River to Newark bay) sub-watershed (USGS Cataloging Unit No. 02030103150). For the sites delineated within this watershed, hydrology is associated with the Lower Passaic River, which flows into Newark Bay and ultimately drains to the Atlantic Ocean. A description of each of the sites delineated is provided below.

3.3.1 River Mile 3.9 – Harrison Wetland

Wetlands at the Harrison Wetland (including the reference site RM 3.9) are estuarine intertidal with substrates composed of concrete debris, gravel, and very fine silt. Emergent, persistent vegetation is present (primarily *Phragmites australis*, *Spartina alterrniflora*, and *Scirpus americanus*), as is scrub-shrub vegetation (*Iva frutescens* and desert false indigo (*Amorpha fruticosa*)). Ground surface was saturated at the time the delineation was conducted although it was not inundated. The location is tidal and it is expected the wetland would be inundated at high tide. Uplands adjacent to this site are industrial (PSEG facility and PATH railroad yard). The wetland delineation line is indicated in Figure 9 of Appendix A.

The General Soil Map of Essex and Hudson Counties, New Jersey (USDA-NRCS, 1993) was consulted to identify the soil types within the survey area. The survey map identifies one soil type within the delineation site. This soil type is named Sulfaquents-Udorthents-Psamments and is described as nearly level, very poorly drained, very deep mineral and organic soils on tide-flooded flats and similar areas overlain by fill materials. A hydrologic group is not assigned although sulfaquents are considered hydric soils. A hydric soil is one that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, July 13, 1994).

3.3.2 River Mile 7.7East – Kearny Riverbank Park

Wetlands at RM 7.7 East are estuarine intertidal with substrates composed of concrete debris, gravel, and silty sand. These wetlands are generally unvegetated, but sparse emergent, persistent vegetation is present (*Polygonum hydropiperoides* and *Rumex verticillatus*). This site has a steep, filled shoreline, and extensive mudflats are exposed at low tide. Ground surface was saturated at the time the delineation was conducted although it was not inundated. The location is tidal and it is expected the wetland would be inundated at high tide. Uplands adjacent to this site are town parkland (Kearny Riverbank Park). The wetland delineation line is indicated in Figure 7 of Appendix A.

The General Soil Map of Essex and Hudson Counties, New Jersey (USDA-NRCS, 1993) was consulted to identify the soil types within the survey area. The survey map identifies one soil type within the delineation site. This soil type is named Urbanland-Dunallan-Riverhead and is described as nearly level to strongly sloping, deep and very deep, well drained gravelly, sandy loams. These soils formed in sandy, stratified glacial outwash on outwash plains and terraces and on river and stream terraces. These soils are non-hydric.

3.3.3 River Mile 10.9 – Riverside County Park

Wetlands at RM 10.9 are primarily riverine intertidal with substrates composed of gravel, sand, and silty sand. Emergent, persistent vegetation is present (largely *Phragmites australis* and some *Peltandra virginica*), as well as scrub-shrub vegetation (*Amorpha fruticosa*). Ground surface was saturated at the time the delineation was conducted although it was not inundated. The location is tidal and it is expected the wetland would be inundated at high tide. Uplands adjacent to this site are county parkland (Riverside County Park). The wetland delineation line is indicated in Figures 5 and 6 of Appendix A.

Natural Resource Conservation Service Web Soil Survey Data for Bergern County, New Jersey was consulted to identify soils within the project area. This soil survey identifies two soil map units in the delineation area. These soil types are described below:

Udorthents, organic substratum, 0 to 8 percent slopes (UdoB): The Udorthents, organic substratum component makes up 90 percent of the map unit. Slopes are 0 to 8 percent. This component is on flats on uplands, leveled land, fills. The parent material consists of loamy lateral spread deposits over organic material. Depth to a root restrictive layer is greater than 60 inches. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

Urban land (UR): Urban land is land mostly covered by streets, parking lots, buildings, and other structures of urban areas. Slopes range from 0 to 45 percent. Generally consists of loamy material in the upper part and sandy to loamy material mixed with household and industrial refuse in the lower part.

3.3.4 SR5 – Glenfield Park

This wetland is located within Glenfield Park. The ordinary high water mark of SR5-Toney's Brook was delineated at during the survey. SR5 - Toney's Brook is riverine, with substrates primarily composed of gravel, cobble, and sand. Emergent vegetation is lacking, and wetlands are largely limited to the area within the stream bank, which runs through a deep gorge. This site is bordered by county parkland (Glenfield County Park) and commuter railroad tracks (NJ Transit's Montclair-Boonton line). The wetland delineation line is indicated in Figure 11 of Appendix A.

Natural Resource Conservation Service Web Soil Survey Data for Essex County, New Jersey was consulted to identify soils within the project area. This soil survey identifies three soil map units in the delineation area. These soil types are described below:

Boonton silt loam, red sandstone lowland, 3 to 8 percent slopes (BooB) and 8 to 15 percent slopes (BooC): The Boonton, red sandstone lowland component makes up 95 percent of the map unit. Slopes range from 3 to 15 percent. This component is on round moraines on till plains. The parent material consists of coarse-loamy till derived from sandstone and shale. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded or ponded. There is no zone of water saturation within a depth of 72 inches. This soil does not meet hydric criteria.

Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded (FmhAt): Fluvaquents, loamy consist of very deep, poorly and somewhat poorly drained soils on flood plains. They formed in alluvium. Typically these soils have a reddish brown silt loam surface layer 7 inches thick. The mottled silt loam subsoil is reddish brown from 7 to 16 inches and pinkish gray from 16 to 35 inches. The substratum from 35 to 52 inches is pinkish gray sandy loam and below 52 inches is variegated pinkish gray stratified sand and gravel. Slopes range from 0 to 3 percent. Depth to seasonal high water table averages 0 to 1 feet. These are considered to be hydric soils.

3.4 Bio-benchmarks

The use of bio-benchmarks is especially critical in tidal and alluvial wetland designs for setting grades and elevations. The bio-benchmark studies involved establishing precise vertical elevations within the reference wetlands and coupling these elevations with observations of upper and lower elevational limits of key vegetative and hydrological characteristics. The elevations of the bio-benchmarks were surveyed with

reference to NGVD 1929. The locations of the selected bio-benchmark locations are depicted on the vegetation sampling site maps in Appendix A. Photographs of the bio-benchmark study areas are provided in Appendix D of this document. Table 3 presents the descriptions and elevations of individual bio-benchmark points collected during the bio-benchmark study.

3.4.1 Joseph G. Minish Wetland Restoration Site and Harrison Wetland

On October 31, 2002, bio-benchmark studies of the Minish Restoration Site and the Harrison Reference Wetland (River Mile 3.9) were conducted. Elevations of the existing sparse communities of *Spartina alterniflora* within the Joseph G. Minish Wetland Restoration Site and Harrison reference wetland were measured during the bio-benchmark studies. It should be noted that these communities are rare in the Lower Passaic River, and no *Spartina alterniflora* was observed at the Minish site during the 2007/2008 sampling efforts. Much of the shoreline of the Passaic River in this area consists of cement or sheetpile bulkheads. In areas where the shoreline is composed of rubble fill material (i.e. stone, brick, and cement), mudflats are exposed at low tide. The bio-benchmark data included the lowest and highest elevations of both *Spartina alterniflora* and *Phragmites australis* communities.

Results of the bio-benchmark studies indicate that *Spartina alterniflora* is present near the Minish site at elevations from 0.9 to 2.4 feet and at elevations from 1.3 to 3.6 feet at the Harrison Reference site. The lower limits of *Spartina alterniflora* at the Minish site and Harrison site were similar (0.9 feet and 1.2 feet, respectively), however the upper limit of this species at Minish was considerably lower than at Harrison (2.44 feet and 3.57 feet, respectively). These apparent upper edge elevational differences are likely due to the very small amount of *Spartina alterniflora* which was present and available for sampling at the Minish site in 2002; no *Spartina alterniflora* remained there by 2008. The Harrison site had much more *Spartina alterniflora* present than Minish in 2002. The Harrison site is still a functioning fringe marsh in 2008 and also contains other brackish marsh plants such as chairmaker's bulrush, water hemp, seaside goldenrod, and *Phragmites*. As such, the Minish and Harrison biobenchmark data should be viewed as a single data set representative of the brackish portion of the Lower Passaic River. The bio-benchmark locations are indicated in Figure 9 of Appendix A.

3.4.2 River Mile 7.7 – Kearny Riverbank Park

On May 13, 2008, bio-benchmark studies were conducted along the shoreline of the Lower Passaic River at River Mile 7.7 which is adjacent to Kearny Riverbank Park in Kearny. Bio-benchmark data was collected at two locations at this site, and the upper and lower limits of native and invasive riverbank vegetation were measured. Results of the bio-benchmark studies for the northern sampling area show that *Polygonum hydropiperoides* is present at elevations from 2.08 to 2.28 feet. Growth of Japanese knotweed began at 2.28 feet and continued to the top of the slope at 11.69 feet. Vegetation from 2.28 to 8.41 feet was exclusively knotweed. The southern sampling area exhibited similar vegetation presence with respect to elevation. *Polygonum hydropiperoides* was present between 2.10 and 3.76 feet and Japanese knotweed was present between 3.76 and 11.03 feet. Vegetation between 3.76 and 5.08 feet was exclusively knotweed. The bio-benchmark locations are indicated in Figure 7 of Appendix A.

3.4.3 River Mile 10.9 – Riverside County Park

On May 13, 2008, bio-benchmark studies were conducted along the shoreline of the Lower Passaic River at River Mile 10.9 which is adjacent to Riverside County Park in Lyndhurst. Bio-benchmark data was collected at two locations at this site. Results of the bio-benchmark studies for the northern sampling area indicate that the lowest elevation for vegetation growth was at 2.37 feet (*Polygonum hydropiperoides*), below which was unvegetated mudflat. Shrub growth occurred between 3.99 and 5.70 feet and included box elder, tree of heaven, and multiflora rose. Growth of garlic mustard began at 5.70 feet and continued until the top of the slope at 6.11 feet where a mowed lawn is maintained. Results from the southern bio-benchmark sampling location show *Phragmites australis* growing from an elevation of 1.56 feet to the top of bank at 6.20 feet; vegetation between 1.57 and 2.16 feet was exclusively *Phragmites australis*. Shrub growth occurred from

3.72 to 4.34 feet and included *Amorpha fruticosa* and multiflora rose growing with *Phragmites australis*. The bio-benchmark locations are indicated in Figures 5 and 6 of Appendix A.

Table 3: Bio-benchmarks - Lower Passaic River and Tributaries

Location	Bio-benchmark	
	Description	**Elevation** (feet NGVD 1929)
Minish Restoration Site	Waterward edge of *Spartina alterniflora* clump nearest outfall	0.9
	Upper edge of biggest *Spartina alterniflora* clump bordered by rocky substrate	1.93
	Waterward edge of *Spartina alterniflora* clump furthest from outfall; most waterward of all *Spartina alterniflora* clumps on-site	1.14
	Upper edge of middle *Spartina alterniflora* clump appears to be highest elevation of *Spartina alterniflora* on site	2.44
Harrison Wetland	Waterward edge of smallest clump of *Spartina alterniflora*	2.03
	Center of *Spartina alterniflora* clump	3.11
	Top of clump between goldenrod/rock wall and *Spartina alterniflora*	3.56
	Waterward edge of new clump of *Spartina alterniflora*	1.28
	Top of *Spartina alterniflora* clump; no *Phragmites* by these clumps	2.57
	Waterward edge of *Phragmites*	3.01
	At edge of small clearing within *Phragmites* primarily vegetated by *Atriplex patula*	4.77
	Top of *Phragmites australis;* bottom of rock embankment	5.42
River Mile 7.7 - North	Lowest elevation of *Polygonum hydropiperoides* (1 clump); mudflat elsewhere	2.08
	Lowest of *Polygonum cuspidatum*; toe of slope and start of wrack line (exclusively *Polygonum cuspidatum*)	2.28
	Dense *Polygonum cuspidatum;* top edge of wrack	5.74
	Dense knotweed, tree line, some poison ivy, break in slope, top edge of wrack (exclusively *Polygonum cuspidatum*)	8.41
	Top of slope; *Polygonum cuspidatum* and *Allium vineale*	11.77
	Edge of mowed grass/*Polygonum cuspidatum* interface	11.69
River Mile 7.7 - South	Unvegetated, line between unconsolidated and consolidated sediments	-0.25
	Lowest elevation of *Polygonum hydropiperoides*	2.10
	Lowest elevation of *Polygonum hydropiperoides*; steep slope above with dense *Polygonum cuspidatum* and concrete debris; bottom of wrack	3.76
	Dense *Polygonum cuspidatum*; Top of wrack	5.08
	Tree line, top of steep slope; dense *Polygonum cuspidatum* and *Toxicodendron radicans*; some *Alliaria petiolata*	8.85
	Top of slope; *Rosa multiflora, Toxicodendron radicans, Acer platinoides*; no *Polygonum cuspidatum*	11.03
	Edge of mowed grass, unmowed side is *Artemisia vulgaris* and *Rumex* sp.	11.59

Table 3, continued.

River Mile 10.9 - North	Unvegetated mudflat riverward of this point, lowest elevation of *Polygonum hydropiperoides*, area is sheltered by trees	2.37
	Highest elevation of *Polygonum hydropiperoides*, also *Viola* sp.; *Cornus* sp. shrub nearby at same elevation; start of wrack line	3.82
	Ailanthus altissima, Rosa multiflora, Acer negundo; Mid wrack line	3.99
	Rosa multiflora, Acer negundo, start of *Alliaria petiolata*; top of wrack line	5.70
	Top of slope, mowed grass, *Alliaria petiolata, Iris* sp.; near large *Populus deltoides*	6.11
River Mile 10.9 - South	Lowest elevation of vegetation, 6" *Phragmites australis* plant on mudflat	1.56
	Lower elevation of dense *Phragmites australis* stand; tidally influenced; plants approximately 3' tall (exclusively *Phragmites*)	2.16
	Denser and taller *Phragmites australis* growing with *Bidens* sp. and *Polygonum hydropiperoides*, still tidal; lower edge of wrack line	3.01
	Denser and taller *Pragmites australis*, some *Amorpha fruticosa*, middle of wrack line	3.72
	Amount and size of *Phragmites australis* same as BB-4, Also *Rumex* sp., *Rosa multiflora, Ipomoea* sp., and *Artemisia vulgaris;* top of wrack line	4.34
	Top of bank, a lot of *Amorpha fruticosa*, some *Phragmites australis*, mowed grass, *Artemisia vulgaris, Taraxacum officinale*	6.20
Toney's Brook - SR5[#]	Toe of slope/edge of water (south bank of stream)	182.85
	Approximate edge of bankfull (south bank of stream)	186.77
	Base of steep slope; begin tree growth (south bank of stream)	186.10
	Large diameter *Quercus prinus* (south bank of stream)	188.44
	Top of slope (south bank of stream)	216.61
	Toe of slope/edge of water (north bank of stream)	182.85
	Approximate edge of bankfull (north bank of stream)	184.28
	Begin tree growth (north bank of stream)	184.77
	Large diameter tree growth (north bank of stream)	191.56
	Top of slope (north bank of stream)	209.58

3.4.4 SR5 – Toney's Brook

On May 13, 2008, bio-benchmark studies of Toney's Brook, a tributary of the Second River which is a tributary of the Passaic River, were conducted. Elevations of the existing toe of slope, bankfull and top of slope were measured on both sides of the stream channel, as well as the elevations where tree growth begins on either side of the stream. It is noted that Toney's Brook is located at a much higher elevation than the Lower Passaic River, and that the brook runs through a deep valley. Results of the bio-benchmark studies indicate that the stream edge occurs at 182 feet, stream bankfull occurs between 184 and 186 feet and tree growth along the stream begin at 184 – 187 feet. The bio-benchmark locations are indicated in Figure 11 of Appendix A.

4.0 Summary

Vegetation studies were conducted along the Lower Passaic River, tributaries of the Passaic River and reference sites from October 19 – November 2, 2007 and May 13 – June 25, 2008. Seventy six vegetation sampling plots were surveyed at 23 sites along the main stem of the Lower Passaic River. Four sites on tributaries to the Passaic River; Saddle River, Third River, and Toney's Brook (a tributary of the Second River), were also sampled for a total of eight plots. Ten vegetation plots were also sampled at three reference sites; the brackish Harrison Reference Wetland, the tidal freshwater Rancocas Creek, and the non-tidal forested Upper Passaic River in the Scheman Hoffman Wildlife Sanctuary. The reference sites consisted almost entirely of native species, many of which were also found along the Lower Passaic River and its tributaries. A total of 143 distinct plant species were observed along the Lower Passaic River and its tributaries, 45 of them being invasive or exotic species. Sampling was performed at five plots in the brackish river section, 20 plots in the transitional river section, and fifty-one plots in the freshwater river section providing a broad level of plant cover data in the three salinity zones of the Lower Passaic River.

Two sites and a total of five plots were sampled at potential restoration sites within the brackish section of the river. Much of the shoreline of Lower Passaic River within the brackish section is lined with concrete or sheet pile therefore opportunities to characterize baseline vegetative habitats were limited. Within the sites sampled tree basal area in the brackish portion of the river averaged 479 in^2; 82 percent of the tree cover consisted of native species. Shrub cover was lowest in the brackish river section at roughly 24 percent and 80 percent of the shrubs surveyed were native species. Herbaceous plant cover was the highest in this river section at 81 percent although, only 20 percent of the herbaceous plant species measured were native species.

Six sites and a total of twenty plots were sampled at potential restoration sites within the transitional section of the river. Tree basal area in the transitional portion of the river averaged 2,278 in^2; 86 percent of the tree cover consisted of native species. Shrub cover was only slightly higher than the brackish river section at roughly 25 percent although only 63 percent of the shrub cover consisted of native species. Herbaceous plant cover was only slight lower in the transitional river section at 78 percent although, similar to the brackish section, only 29 percent of the herbaceous plant species measured were native species.

Fifteen sites and a total of fifty-one plots were sampled at potential restoration sites within the freshwater section of the river. The freshwater section of the river is the largest portion of the study area. Much of the land use adjacent to the east bank of this section of the Lower Passaic River is designated as parkland and provides the most opportunities for restoration. Tree basal area in the freshwater portion of the river was the highest of the tree river sections and averaged 2,843 in^2; 86 percent of the tree cover consisted of native species. Shrub cover was the highest in this river section at roughly 32 percent and 60 percent of the shrub cover consisted of native species. Herbaceous plant cover was the lowest in the freshwater river section at 61 percent, although this river section consisted of the highest percentage of native herbaceous species at 57 percent native.

Wetland delineations were conducted at four sites along the Passaic River; River Mile 3.9 (Harrison Wetland), River Mile 7.7, River Mile 10.9 and SR5 (Toney's Brook). The wetlands at River Mile 3.9 and 7.7 were estuarine intertidal with native emergent, persistent vegetation. Wetlands at River Mile 10.9 were riverine intertidal, with both native and invasive emergent, persistent vegetation. Wetlands at SR5 were riverine and lacked emergent vegetation.

Bio-benchmark studies were conducted at River Mile 7.7, River Mile 10.9 and SR5, and were complemented by bio-benchmark studies conducted at River Mile 3.9 and the Minish Wetland Restoration Site in October 2002. Bio-benchmarks included the lower and upper limits of native and non-native plant species growth. Bio-benchmark data from Minish and Harrison provided low and high elevations for growth zones of *Spartina alternifolia* and *Phragmites australis.* Data from River Mile 7.7 and River Mile 10.9 provided low and high elevations for growth zones of other emergent vegetation such as *Polygonum hydropiperoides*.

5.0 List of Preparers

Peg McBrien, P.E., PWS – Manager, Ecological Engineering
Certified Professional Wetland Scientist #000972
M.S., Environmental Engineering, Northwestern University, 1989
B.A., Geology, Mount Holyoke College, 1986

Tom Shinskey – Principal Environmental Scientist
M.S., Biology, University of Massachusetts, 1994
B.A., Natural Science, St. Anselm College, 1991

Heather Shaw – Senior Environmental Scientist
Professional Certification in Geomatics, Rutgers University, 1999
B.S., Natural Resource Management, Rutgers University, 1996

Michelle Verdugo – Environmental Scientist
B.S., Marine Science, the Richard Stockton College of New Jersey, 2002

GEOD Corporation – NJ Licensed Surveyor
24 Kanouse Road
Newfoundland, NJ 07435

6.0 References

Baldwin, A.H. 2004. Restoring Complex Vegetation in the Urban Setting: The Case of Tidal Freshwater Marshes. Urban Ecosystems 7:125-137.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. The Classification of Wetlands and Deepwater Habitats of the United States. US Fish and Wildlife Service, Washington, D.C. FWS/OBS-79/31.

Earth Tech, Inc. 2005. Report for December 14, 204 – February 24, 2005 Field Reconnaissance. February 2005.

Earth Tech, Inc in conjunction with Malcom Pirnie, Inc. 2006. Lower Passaic River Restoration Project – Draft Final Restoration Opportunities Report. July 2006.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report. Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Federal Interagency Committee for Wetland Delineation. 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication.

Hough, Mary Y. 1983. New Jersey Wild Plants. Harmony Press. Harmony, NJ.

Little, Elbert L. 1980. National Audubon Society Field Guide to North American Trees Eastern Region. Alfred A. Knopf, Inc. New York, NY. 714pp.

Knobel, Edward. 1980. Field Guide to the Grasses, Sedges, and Rushes of the United States. Dover Publications, Inc. New York, NY.

Malcom Pirnie, Inc. 2005. Report for October 20 – 22, 2004 Field Reconnaissance. January 2005.

Malcolm Pirnie, Inc.. 2007. Conceptual Site Model – Lower Passaic River Restoration Project.

Munsell Soil Color Charts. 2000. Gretag Macbeth, New Winsor, NY.

Newcomb, Lawrence. 1977. Newcomb's Wildflower Guide. Little, Brown and Company, Inc. Boston, MA. 484pp.

Shisler, Joseph K., T.J. Iannuzzi, D.F. Ludwig and P. J. Bluestein. 2008. Ecological Benchmarking in an Urbanized Estuarine River System. Ecological Restoration Vol. 26, No. 3. pgs. 235-254.

Swearingen, J., K. Reshetiloff, B. Slattery, and S. Zwicker. 2002. Plant Invaders of Mid-Atlantic Natural Areas. National Park Service and U.S. Fish and Wildlife Service. Washington, D.C. 82pp.

Symonds, George W.D. 1973. The Shrub Identification Book – Visual Method for the Practical Identification and Recognition of Shrubs. Harper Collins Publishers, Inc. New York, NY.

Westervelt, K., E. Largay, R. Coxe, W. McAvoy, S. Perles, G. Podniesinski, L. Sneddon, and K. Strakosch Walz. 2006. Guide to the Natural Communities of the Delaware Estuary: Version 1. NatureServe, Arlington, Virginia. Partnership for the Delaware Estuary, Report #06-02. 338 pp.

USDA, NRCS. 1993. General Soil Map Essex and Hudson Counties, New Jersey. June 1993.

USDA, NRCS. 2008. Soil Data Mart. Soil Survey Data for Essex and Bergen County, New Jersey.

USDA, NRCS. 2008. The PLANTS Database (http://plants.usda.gov, 17 March 2008). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

U.S. Fish and Wildlife Service. 1988. National list of vascular plant species that occur in wetlands. U.S. Fish & Wildlife Service Biological Report 88 (26.9).

U.S. Fish and Wildlife Service. 1993. 1993 supplement to list of plant species that occur in wetlands: Northwest (Region 1). Supplement to U.S. Fish & Wildlife Service Biological Report 88 (26.9).

Uva, Richard H., J. Neal, and J. DiTomaso. 1997. Weeds of the Northeast. Cornell University Press. Ithaca, NY. 396pp.

APPENDIX A - VEGETATION SAMPLING POINT MAPS

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 16.6 - 17.6**	**Dec. 2008**	**FIGURE 2**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 14.2 - 16.6**	**Dec. 2008**	**FIGURE 3**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 12.7 - 14.2**	**Dec. 2008**	**FIGURE 4**

US Army Corps of Engineers New York District	VEGETATION SAMPLING POINTS River Mile 11 - 12.6 and Tributary Site TR2	Dec. 2008	FIGURE 5

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 9.5 - 11**	**Dec. 2008**	**FIGURE 6**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 7.6 - 9**	**Dec. 2008**	**FIGURE 7**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 6.2 - 7.6**	**Dec. 2008**	**FIGURE 8**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **River Mile 3.3 - 5.1**	**Dec. 2008**	**FIGURE 9**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **Tributary Site SaR2**	**Dec. 2008**	**FIGURE 10**

US Army Corps of Engineers New York District	**VEGETATION SAMPLING POINTS** **Tributary Site TR3**	**Dec. 2008**	**FIGURE 11**

US Army Corps of Engineers New York District	VEGETATION SAMPLING POINTS AND WETLAND LIMIT Tributary Site SR5	Dec. 2008	FIGURE 12

APPENDIX B – PLANT LISTS

LOWER PASSAIC RIVER STUDY AREA

Passaic River Terrestrial Vegetation Survey
Vegetation List - Fall 2007 and Spring 2008
Lower Passaic River and Tributaries

Trees, Shrubs, and Woody Vines			
Scientific Name	**Common Name**	**^Indicator Status**	**#River Section**
Acer negundo	Box elder	FAC+	B, T, F
Acer palmatum	Japanese maple*	NL	F
Acer platanoides	Norway Maple*	NL	B, T, F
Acer rubrum	Red maple	FAC	T
Acer saccharinum	Silver maple	FACU-	T, F
Ailanthus altissima	Tree of heaven*	NI	B, T, F
Albizia julibrissin	Silktree*	NL	T
Amorpha fruticosa	Indigobush	FACW	T, F
Ampelopsis brevipendunculata	Porcelainberry*	NL	F
Berberis thunbergii	Japanese barberry*	FACU-	T
Betula lenta	Black birch	FACU-	F
Betula nigra	River birch	FACW	T
Carya sp.	Hickory	--	F
Castanea sp.	Chestnut	--	T
Catalpa bignonioides	Southern catalpa	UPL	T
Celastrus orbiculatus	Oriental bittersweet	UPL	T, F
Celtis occidentalis	Hackberry	FACU-	T, F
Cephalanthus occidentalis	Buttonbush	OBL	F
Cornus alternifolia	Alternate leaf dogwood	NL	F
Cornus amomum	Silky dogwood	FACW	B, F
Cornus sericea	Red osier dogwood	FACW+	T, F
Crataegus sp.	Hawthorn	--	F
Euonymus alatus	Burningbush*	NL	T
Fraxinus pennsylvanica	Green ash	FACW	B, T, F
Gleditsia triacanthos	Honey locust	FAC-	T, F
Hibiscus moscheutos	Swamp rosemallow	OBL	F
Hibiscus syriacus	Rose of Sharon*	NL	T, F
Iva frutescens	Marsh elder	FACW+	B
Juglans nigra	Black walnut	FACU	T, F
Juniperus chinensis	Old gold juniper*	NL	F
Juniperus horizontalis	Creeping juniper*	FACU	F
Juniperus virginiana	Eastern red cedar	FACU	F
Lindera benzoin	Spicebush	FACW-	F
Lonicera japonica	Japanese honeysuckle*	NL	T, F
Lonicera tartarica	Tartarian honeysuckle*	FACU	B, T, F
Malus coronaria	Crab apple	NL	T, F
Morus alba	White mulberry*	UPL	B, T, F
Parthenocissus quinquefolia	Virginia creeper	FACU	T, F
Paulownia tomentosa	Princess tree*	UPL	F
Photinia sp.	Chokecherry	--	F
Pinus banksiana	Jack pine*	FACU	F
Pinus strobus	Eastern white pine	FACU	F
Platanus occidentalis	Sycamore	FACW-	T, F
Populus candicans	Balsam of Gilead Poplar*	NL	F
Populus deltoides	Cottonwood	FAC	T, F
Prunus serotina	Black Cherry	FACU	B, T, F
Prunus virginiana	Chokecherry	FACU	F
Pyrus calleryana	Bradford Pear*	NL	F
Quercus bicolor	Swamp white oak	FACW+	F
Quercus palustris	Pin oak	FACW	T, F
Quercus prinus	Chestnut oak	UPL	F

Scientific Name	Common Name	^Indicator Status	#River Section
Quercus rubra	Northern red oak	FACU-	T, F
Rhododendron sp.	Rhododendron	--	F
Rhus glabra	Smooth sumac	NL	F
Robinia pseudoacacia	Black locust	FACU-	T, F
Rosa multiflora	Multiflora rose*	FACU	T, F
Rubus phoenicolasius	Wineberry*	NL	B, T, F
Salix babylonica	Weeping willow	FACW-	F
Salix nigra	Black willow	FACW+	T, F
Sambucus canadensis	Elderberry	FACW-	F
Sassafras albidum	Sassafras	FACU-	F
Smilax rotundifolia	Common greenbriar	FAC	F
Spiraea japonica	Japanese spirea*	FACU-	F
Taxus baccata	Common yew*	NL	F
Tilia americana	American basswood	FACU	T
Toxidendron radicans	Poison ivy	FAC	T, F
Ulmus americana	American Elm	FACW-	B, T, F
Viburnum dentatum	Arrowwood	FAC	F
Vitis sp.	Grape	--	F

Herbaceous

Scientific Name	Common Name	Indicator Status	River Section
Abutilon theophrasti	Velvetleaf*	UPL	F
Alliaria petiolata	Garlic mustard*	FACU-	T, F
Allium vineale	Wild garlic	FACU-	T, F
Arctium minus	Common burdock*	NL	F
Artemisia vulgaris	Common mugwort*	NL	B, F
Aster sp.	Aster	--	F
Atriplex patula	Orach	FACW	B
Bidens sp.	Beggars ticks	--	T, F
Boehmeria cylindrica	False nettle	FACW+	F
Cerastium vulgatum	Mouse-eared chickweed*	FACU-	T
Cirsium sp.	Thistle	--	F
Commelina communis	Asiatic day flower*	FAC-	T
Convolvulus sepium	Hedge bindweed	NL	F
Cypripedium acaule	Pink Lady's slipper	FACU-	F
Daucus carota	Wild carrot*	NL	F
Echinocystis lobata	Wild cucumber	FAC	F
Eupatorium rugosum	White snakeroot	FACU-	B, T, F
Eupatorium serotinum	Late flowering throughwort	FAC-	F
Galingosa sp.	Quickweed	--	F
Galium sp.	Bedstraw*	--	T
Glechoma hederacea	Creeping charlie*	FACU	F
Hedera helix	English ivy*	NL	F
Heteranthera reniformis	Mud plantain	OBL	F
Hibiscus moscheutos	Swamp rose mallow	OBL	T, F
Hydrocotyle sp.	Pennywort	--	F
Humulus japonicus	Wild hops*	FACW	F
Impatiens capensis	Jewelweed	FACW	T, F
Iris psuedacorus	Yellow iris*	OBL	T, F
Iris versicolor	Blueflag iris	OBL	F
Lemna sp.	Duckweed	--	F
Lythrum salicaria	Purple loosestrife*	FACW+	T, F
Oenothera biennis	Common evening primrose	FACU-	T, F
Onoclea sensibilis	Sensitive fern	FACW	F
Phytolacca americana	Pokeweed	FACU+	T
Plantango lanceolata	English Plantain*	UPL	F
Polygonatum canaliculatum	Great Solomon's seal	NL	F

Scientific Name	Common Name	^Indicator Status	#River Section
Polygonum convolvulus	Black bindweed*	FACU	F
Polygonum cuspidatum	Japanese knotweed*	FACU-	B, T, F
Polygonum hydropiperoides	Swamp smartweed	OBL	T
Polygonum punctatum	Dotted smartweed	OBL	T
Portulaca sp.	Purslane	--	F
Rumex crispus	Curly dock	FACU	T
Rumex obtusifolius	Broadleaf dock	FACU-	T
Rumex verticillatus	Swamp dock	OBL	B
Sicyos angulatus	Bur cucumber	FACU	F
Solanum nigrum	Black nightshade	FACU-	T, F
Solidago sempervirens	Seaside goldenrod	FACW	B
Symplocarpus foetidus	Skunk cabbage	OBL	F
Taraxacum officinale	Common dandelion*	FACU-	T, F
Trifolium sp.	Clover	--	F
Urtica dioica	Stinging nettle	FACU	F
Urtica sp.	Nettle	--	F
Verbascum thapsus	Common mullein*	NL	F
Viola sp.	Violet	--	T, F

Grasses, Sedges, and Rushes

Scientific Name	Common Name	Indicator Status	River Section
Agrostis alba	Red Top*	FACW	F
Agrostis sp.	Bent grass	--	T
Carex lurida	Shallow sedge	OBL	F
Carex scoparia	Broom sedge	FACW	F
Carex vulpinoidea	Fox sedge	OBL	T
Cyperus strigosus	Straw-colored flatsedge	FACW	F
Dactylis glomerata	Orchard grass*	FACU	T
Digitaria sp.	Crabgrass	--	F
Elymus virginicus	Wild rye	FACW-	F
Lolium multiflorum	Annual ryegrass*	NL	T
Microstegium vimineum	Japanese stiltgrass*	FAC	F
Panicum sp.	Panic grass	--	T
Paspalum dilatatum	Dallisgrass*	FAC+	F
Phragmites australis	Common reed*	FACW	B, T, F
Phalaris arundinacea	Reed canary grass	FACW+	F
Poa pratensis	Bluegrass	FACU	T, F
Setaria pumilia	Yellow bristletail	FAC	F

Mosses and Liverworts

Scientific Name	Common Name	Indicator Status	River Section
Polytrichum sp.	Hairycap moss	--	F
Bryophyta	unidentified mosses	--	F
Marchantiophyta	unidentified liverworts	--	F

*Plants identified as non-native species when calculating % native species cover

^The indicator status is the estimated probability of a species occurring in wetlands versus nonwetlands in the northeast region of the country: OBL (>99%), FACW (67-99%), FAC (34-66%), FACU (1-33%) and UPL (<1%). NL designates plants not listed and NI are speices with no idicator status. The plus (+) and minus (-) designations specify, respectively, the higher or lower part of the range (USFWS, 1988 and 1993).

#B=Brackish, T=Transitional, F=Freshwater

REFERENCE SITES

Passaic River Terrestrial Vegetation Survey
Reference Site Vegetation List - Harrison Reference Wetland, River Mile 3.9

Trees, Shrubs, and Woody Vines	
Scientific Name	**Common Name**
Ailanthus altissima	Tree of heaven
Amorpha fruticosa	Indigobush
Aronia sp.	Chokeberry
Cephalanthus occidentalis	Buttonbush
Iva frutescens	Marsh elder
Morus alba	White mulberry

Herbaceous

Scientific Name	**Common Name**
Amaranthus cannabinus	Water hemp
Artemisia vulgaris	Mugwort
Rumex verticillatus	Swamp dock
Solidago sempervirens	Seaside goldenrod

Grasses, Sedges, and Rushes

Scientific Name	**Common Name**
Eleocharis sp.	Spike rush
Panicum virgatum	Switchgrass
Phragmites australis	Common reed
Scirpus americanus	Chairmakers bulrush
Spartina alterniflora	Smooth cordgrass

Passaic River Terrestrial Vegetation Survey
Reference Site Vegetation List-Scherman-Hoffman Wildlife Sanctuary

Trees, Shrubs, and Woody Vines

Scientific Name	Common Name
Acer rubrum	Red maple
Betula alleghaniensis	Yellow birch
Betula lenta	Sweet birch
Betula nigra	River birch
Berberis thunbergii	Japanese barberry
Carya sp.	Hickory
Carpinus caroliniana	American hornbeam
Cornus florida	Flowering dogwood
Fagus grandifolia	American beech
Fraxinus pennsylvanica	Green ash
Hamamelis virginiana	Witch hazel
Liriodendron tulipifera	Tuliptree
Ostrya virginiana	Hophornbeam
Platanus occidentalis	Sycamore
Polygonum cespitosum	Oriental lady's thumb
Polygonum punctatum	dotted smartweed
Quercus alba	White oak
Quercus prinus	Chestnut oak
Rosa multiflora	Multiflora rose
Sassafras albidum	Sassafras

Herbaceous

Scientific Name	Common Name
Ageratina altissima	White snakeroot
Apocynum medium	Intermediate dogbane
Arisaema triphyllum	Jack in the pulpit
Aster sp.	Aster
Capsella bursa-pastoris	Shepherd's purse
Caulophyllum thalictroides	Blue cohosh
Cryptotaenia canadensis	Honewort
Euthamia graminifolia	Lance leaf goldenrod
Impatiens capensis	Jewelweed
Maianthemum canadense	Canada mayflower
Polygonum arifolium	Halberdleaf tearthumb
Ranunculus abortivus	Little leaf buttercup
Symplocarpus foetidus	Skunk cabbage
Viola sp.	Violet

Grasses, Sedges, and Rushes

Scientific Name	Common Name
Carex sp.	Sedge
Dichanthelium clandestinum	Deer-tongue grass
Microstegium vimineum	Japanese stiltgrass
Phalaris arundinacea	Reed canarygrass
Rhynchospora sp.	Beak rush

Ferns, Mosses, and Allies

Scientific Name	Common Name
Bryophyta	unidentified mosses
Marchantiophyta	unidentified liverworts
Onoclea sensibilis	Sensitive fern
Osmunda cinnamomea	Cinnamon fern
Polystichum acrostichoides	Christmas fern
Thelypteris noveboracensis	New York fern

Passaic River Terrestrial Vegetation Survey
Reference Site Vegetation List - Rancocas Creek at Mill Creek Park

Trees, Shrubs, and Woody Vines

Scientific Name	Common Name
Acer rubrum	Red maple
Acer saccharinum	Silver maple
Alnus incana	Speckled Alder
Amorpha fruticosa	False indigo
Betula nigra	River birch
Carya sp.	Hickory
Cephalanthus occidentalis	Buttonbush
Cornus stolonifera	Red osier dogwood
Fraxinus pennsylvanica	Green ash
Liriodendron tulipifera	Tuliptree
Parthenocissus quinquefolia	Virginia creeper
Quercus alba	White oak
Quercus palustris	Pin oak
Sassafras albidum	Sassafras
Tilia americana	American basswood
Toxidendron radicans	Poison ivy
Viburnum dentatum	Arrowwood
Vitis sp.	Grape vine

Herbaceous

Scientific Name	Common Name
Isoetes riparia	Riverbank quillwort
Nuphar lutea	Yellow pond lily
Peltandra virginica	Arrow arum
Polygonum punctatum	Dotted smartweed
Pontederia cordata	Pickerelweed

Grasses, Sedges, and Rushes

Scientific Name	Common Name
Carex sp.	Sedge
Eleocharis palustris	common spike rush
Phalaris arundinacea	Reed canarygrass
Scirpus americanus	Chairmakers bulrush
Zizania aquatica	Wild rice

APPENDIX C – DATA FORMS

LOWER PASSAIC RIVER VEGETATION DATA

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey

Date: 10/31/2007

Location: RM3.8 - Port Authority Wetland

Plot # 1

GPS Point: RM3.8-1

Harrison, Hudson Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)

Shrubs

Species	Number	% cover
Iva frutescens	11	20.5
Rubus phoenicolasius	1	10
Fraxinus pennsylvanica	2	37

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	40
Rumex verticillatus	2	5
Solidago sempervirens	1	5
Quadrat #2		
Rumex verticillatus	6	5
Solidago sempervirens	2	5
Phragmites australis	1	10
Artemisia vulgaris	37	80

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling area is located on the North side of the river across from Minish Park adjacent to a Port Authority Rail Yard. *Spartina alterniflora* present at site below high tide line.

PHOTOGRAPHS: RM 3.8 1 and RM 3.8 2. Both photos show Spartina alterniflora present below the high tide line.
Site represented by Photo 34 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey

Date: 10/31/2007

Location: RM3.8 - Port Authority Wetland

Plot # 2

GPS Point: RM3.8-2

Harrison, Hudson Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)

Shrubs

Species	Number	% cover
Iva frutescens	16	15
Ailanthus altissima	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Rumex verticillatus	16	45
Phragmites australis	2	10
Artemisia vulgaris	6	30
Atriplex patula	1	5
Quadrat #2		
Phragmites australis		70
Rumex verticillatus	8	10
Solidago sempervirens	2	5
Artemisia vulgaris	2	10

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling area is located on the North side of the river across from Minish Park adjacent to a Port Authority Rail Yard. Spartina alterniflora present at site below high tide line.

PHOTOGRAPHS: RM 3.8 1 and RM 3.8 2. Both photos show Spartina alterniflora present below the high tide line.
Site represented by Photo 34 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey

Date: 10/31/2007

Location: RM3.8 - Port Authority Wetland

Plot # 3

GPS Point: RM3.8-3

Harrison, Hudson Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ailanthus altissima	4.7	17
Ailanthus altissima	6.9	37

Shrubs

Species	Number	% cover
Iva frutescens	3	1.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	100
Quadrat #2		
Polygonum cuspidatum	1	25
Phragmites australis	9	75

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling area is located on the North side of the river across from Minish Park adjacent to a Port Authority Rail Yard. Spartina alterniflora present at site below high tide line.

PHOTOGRAPHS: RM 3.8 1 and RM 3.8 2. Both photos show Spartina alterniflora present below the high tide line.
Site represented by Photo 34 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/26/2007

Location: RM4.3 - Minish Park | **Plot #** 1 | **GPS Point:** RM4.3-1

Newark, Essex Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	8.9	62
Acer platanoides	5.0	20
Ulmus americana	4.9	19
Ulmus americana	15.4	186
Ulmus americana	12.6	125
Ulmus americana	10.3	83
Ulmus americana	21.4	359
Over Hanging Trees		
Fraxinus pennsylvanica	*7.0*	*38*

Shrubs

Species	Number	% cover
Fraxinus pennsylvanica	8	4
Morus alba	1	0.5
Ulmus americana	4	2

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	7	70
Artemisia vulgaris	34	10
Quadrat #2		
Polygonum cuspidatum	5	50
Eupatorium rugosum	1	5
Artemisia vulgaris	1	15

Vines

Species	Number	% cover

SITE DESCRIPTION: Wetland adjacent to Raymond Blvd. in Newark. Bank edge very steep, leveling out to a rocky shoreline covered heavily with debris. The most common salt marsh plant observed was *Iva frutescens*.

PHOTOGRAPHS: RM 4.3 1 to RM 4.3 5; RM 4.3 plot 2.1 to RM 4.3 plot 2.3. Site represented by Photos 35 and 36 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey

Date: 10/26/2007

Location: RM4.3 - Minish Park

Plot # 2

GPS Point: RM4.3-2

Newark, Essex Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	7.8	48

Shrubs

Species	Number	% cover
Iva frutescens	11	7
Ulmus americana	4	3.5
Robinia pseudoacacia	4	2
Cornus amomum	1	0.5
Fraxinus pennsylvanica	3	6
Acer platanoides	4	5
Prunus sp.	2	1
Acer negundo	2	1
Ailanthus altissima	2	2.5
Lonicera sp.	3	2.5

Herbs

Species	Number	% cover
Quadrat #1		
Artemisia vulgaris	26	95
Quadrat #2		
Rumex verticillatus	1	5
Artemisia vulgaris	16	45

Vines

Species	Number	% cover

SITE DESCRIPTION: Wetland adjacent to Raymond Blvd. in Newark. Bank edge very steep, leveling out to a rocky shoreline covered heavily with debris. The most common salt marsh plant observed was Iva frutescens.

PHOTOGRAPHS: RM 4.3 1 to RM 4.3 5; RM 4.3 plot 2.1 to RM 4.3 plot 2.3. Site represented by Photos 35 and 36 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: RM 7.1 Kearny Boat Ramp, Kearny Town, Hudsc | **Plot #** 1 | **GPS Point:**

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	32.2	814
Morus alba	14.8	172
Morus alba	10.5	87
Morus alba	10.2	82
Ailanthus altissima	9.9	77
Robinia pseudoacacia	6.6	34
Fraxinus pennsylvanica	11.6	106
Robinia pseudoacacia	15.5	189
Robinia pseudoacacia	7.1	40

Shrubs

Species	Number	% cover
Acer negundo	1	5
Acer rubrum	1	0.5
Acer rubrum	2	2
Robinia pseudoacac	1	2
Acer rubrum	4	2
Ailanthus altissima	1	2
Ailanthus altissima	2	1
Acer rubrum	2	2.5
Acer negundo	1	5
Rubus phoenicolasiu	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatur	4	35
Allium vineale	1	5
Alliaria petiolata	2	5
Phytolacca americana	1	5
Agrostis sp.		20
Quadrat #2		
Eupatorium rugosum	4	40
Carex vulpinoidea	1	1
Rumex crispus	1	45
Taraxacum officinale	1	1
Allium vineale	1	2

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is at Kearny Boat ramp. Sampled one plot south of the ramp and one plot north of the ramp. Shoreline consists of large concrete debris (north of ramp) and mud and cobble to a deteriorating wooden bulkhead (south of ramp). Several fiddler crab burrows were observed.

PHOTOGRAPHS: RM 7.1 1 to RM 7.1 5; RM 7.1 plot 1 and RM 7.1 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: RM 7.1 Kearny Boat Ramp, Kearny Town, Hudson C | **Plot #** 2 | **GPS Point:**

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	17.5	240
Ulmus americana	10.1	80
Ulmus americana	5.7	26
Morus alba	10.1	80
Morus alba	10.5	87
Morus alba	10.0	79
Morus alba	17.5	240
Acer negundo	7.5	44
Morus alba	30.3	721

Shrubs

Species	Number	% cover
Acer rubrum	1	5
Acer rubrum	10	5
Acer negundo	3	3
Acer negundo	1	2
Acer rubrum	3	2.5
Ailanthus altissima	7	15

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	6	30
Dactylis glomerata		5
Lolium multiflorum		60
Rumex crispus	1	5
Quadrat #2		
Agrostis sp.		25
Rumex crispus		15
Cerastium vulgatum		5

Vines

Species	Number	% cover
Parthenocissus quinquefolia	1	1
Toxicodendron radicans	1	1

SITE DESCRIPTION: Site is at Kearny Boat ramp. Sampled one plot south of the ramp and one plot north of the ramp. Shoreline consists of large concrete debris (north of ramp) and mud and cobble to a deteriorating wooden bulkhead (south of ramp). Several fiddler crab burrows were observed.

PHOTOGRAPHS: RM 7.1 1 to RM 7.1 5; RM 7.1 plot 1 and RM 7.1 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM7.7East - Kearny Riverbank Park | **Plot #** 1 | **GPS Point:** RM7.7E-1

Near Corps field point LP21East - Kearny, Hudson Co.

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Fraxinus pennsylvanica	5.4	23	*Juglans nigra*	3	10.5	Quadrat #1			*Toxicodendron radicans*	3	2
Robinia pseudoacacia	4.5	16	*Acer negundo*	5	13	*Allium vineale*	1	1			
Ulmus americana	4.4	15	*Ulmus americana*	3	4.5	*Polygonum cuspidatum*	5	84			
Ulmus americana	9.4	69	*Euonymus alatus*	1	2						
Fraxinus pennsylvanica	12.1	115	*Fraxinus pennsylvanica*	4	12.5						
			Ulmus americana	1	0.5						
			Acer platanoides	2	12						
			Rosa multiflora	2	1						
			Cornus stolonifera	1	2						
			Toxicodendron radicans	1	5	Quadrat #2					
						Polygonum cuspidatum	2	50			
Over Hanging Trees											
Ulmus americana	*8.7*	*59*									

SITE DESCRIPTION: RM7.7 East is located adjacent to Kearny Riverbank Park. Shoreline is pretty steep with concrete debris. 1/2 of the location sampled is covered with very dense *Polygonum cuspidatum* . Riparian zone narrows from about 10' wide to about 6' wide.

PHOTOGRAPHS: RM 7.7 East plot 1 to RM 7.7 East plot 4. Photos show dense knotweed on half of one of the sampling plots and more native vegetation on the other. Site represented by Photos 25 and 26 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/23/2007

Location: RM7.7East - Kearny Riverbank Park

Plot # 2

GPS Point: RM7.7E-2

Near Corps field point LP21East - Kearny, Hudson Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	4.6	17
Acer negundo	11.2	98
Acer negundo	13.8	149
Acer platanoides	5.6	25
Acer platanoides	12.8	129
Acer platanoides	4.1	13
Acer platanoides	6.1	29
Acer negundo	5.1	20
Over Hanging Trees		
Prunus serotina	*20.9*	*343*
Prunus serotina	*16.8*	*222*
Prunus serotina	*7.9*	*49*
Prunus serotina	*12.1*	*115*

Shrubs

Species	Number	% cover
Acer platanoides	5	2.5
Albizia julibrissin	1	2
Rosa multiflora	1	0.5
Berberis thunbergii	1	0.5
Ulmus americana	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Lonicera japanica	3	60
Eupatorium rugosum	2	5
Quadrat #2		
Polygonum cuspidatum	4	40

Vines

Species	Number	% cover
Celastrus orbiculatus	1	1
Lonicera japanica	1	0.5

SITE DESCRIPTION: RM7.7 East is located adjacent to Kearny Riverbank Park. Shoreline is pretty steep with concrete debris. 1/2 of the location sampled is covered with very dense Polygonum cuspidatum. Riparian zone narrows from about 10' wide to about 6' wide.

PHOTOGRAPHS: RM 7.7 East plot 1 to RM 7.7 East plot 4. Photos show dense knotweed on half of one of the sampling plots and more native vegetation on the other. Site represented by Photos 25 and 26 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM7.7East - Kearny Riverbank Park | **Plot #** 3 | **GPS Point:** RM7.7E-3

Near Corps field point LP21East - Kearny, Hudson Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Over Hanging Trees		
Morus alba	*17.0*	*227*
Ulmus americana	*4.7*	*17*
Ulmus americana	*27.2*	*581*

Shrubs

Species	Number	% cover
Rosa multiflora	1	1

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	1	5
Polygonum cuspidatum	3	95
Quadrat #2		
Eupatorium rugosum	22	65
Phytolacca americana	2	5
Poa sp.		10

Vines

Species	Number	% cover
Toxicodendron radicans	5	6

SITE DESCRIPTION: RM7.7 East is located adjacent to Kearny Riverbank Park. Shoreline is pretty steep with concrete debris. 1/2 of the location sampled is covered with very dense Polygonum cuspidatum. Riparian zone narrows from about 10' wide to about 6' wide.

PHOTOGRAPHS: RM 7.7 East plot 1 to RM 7.7 East plot 4. Photos show dense knotweed on half of one of the sampling plots and more native vegetation on the other. Site represented by Photos 25 and 26 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/23/2007

Location: RM7.7East - Kearny Riverbank Park

Plot # 4

GPS Point: RM7.7E-4

Near Corps field point LP21East - Kearny, Hudson Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer negundo	4.2	14
Ulmus americana	10.0	79
Ulmus americana	17.3	235
Acer negundo	10.9	93
Ulmus americana	9.2	66
Acer negundo	4.3	15
Ulmus americana	11.0	95
Prunus serotina	6.2	30
Acer negundo	7.4	43
Ulmus americana	6.5	33
Over Hanging Trees		
Ulmus americana	*5.2*	*21*
Ulmus americana	*14.1*	*156*

Shrubs

Species	Number	% cover
Acer paltanoides	3	3
Acer negundo	11	15.5
Ulmus americana	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Solanum nigrum	1	5
Eupatorium rugosum	2	5
Toxicodendron radicans	1	5
Poa sp.		5
Quadrat #2		
Eupatorium rugosum	22	30
Geranium sp.	1	50
Poa sp.		5
Taraxacum officionale	1	5

Vines

Species	Number	% cover
Toxicodendron radicans	3	2.5
Lonicera japanica	1	0.5

SITE DESCRIPTION: RM7.7 East is located adjacent to Kearny Riverbank Park. Shoreline is pretty steep with concrete debris. 1/2 of the location sampled is covered with very dense Polygonum cuspidatum. Riparian zone narrows from about 10' wide to about 6' wide.

PHOTOGRAPHS: RM 7.7 East plot 1 to RM 7.7 East plot 4. Photos show dense knotweed on half of one of the sampling plots and more native vegetation on the other. Site represented by Photos 25 and 26 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/29/2007

Location: RM7.7West - Newark, Essex Co.

Plot # 1

GPS Point: RM7.7W-1

Near Corps field point LP21West

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ailanthus altissima	5.2	21
Platanus occidentalis	9.8	75
Ailanthus altissima	6.2	30
Ailanthus altissima	4.9	19
Ailanthus altissima	8.5	57
Ailanthus altissima	4.9	19
Ailanthus altissima	5.2	21
Ailanthus altissima	5.4	23
Ailanthus altissima	5.6	25
Over Hanging Trees		
Prunus serotina	*4.6*	*17*

Shrubs

Species	Number	% cover
Ailanthus altissima	10	26
Quercus palustris	4	15.5
Acer platanoides	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	100
Quadrat #2		
Polygonum cuspidatum	2	60
Toxicodendron radicans		40

Vines

Species	Number	% cover
Toxicodendron radicans	3	2

SITE DESCRIPTION: Sampling site is virtually all invasive species (*Polygonum cuspidatum, Ailanthus altissima*). Located directly adjacent to RT 21, only water access to site. Observed several cormorants on pilings near the site.

PHOTOGRAPHS: RM 7.7 West 1 and RM 7.7 West 2. Site represented by Photo 27 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/29/2007

Location: RM7.7West - Newark, Essex Co.

Plot # 2

GPS Point: RM7.7W-2

Near Corps field point LP21West

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	14.2	158
Morus alba	14.5	165
Morus alba	8.0	50
Acer rubrum	4.6	17
Acer negundo	6.5	33
Ailanthus altissima	6.4	32
Ailanthus altissima	7.5	44
Fraxinus pennsylvanica	4.4	15
Ailanthus altissima	5.2	21
Ailanthus altissima	5.6	25
Ailanthus altissima	4.4	15

Shrubs

Species	Number	% cover
Ailanthus altissima	4	14
Platanus occidentalis	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	100
Quadrat #2		
Polygonum cuspidatum	1	100

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling site is virtually all invasive species (Polygonum cuspidatum, Ailanthus altissima). Located directly adjacent to RT 21, only water access to site. Observed several cormorants on pilings near the site.

PHOTOGRAPHS: RM 7.7 West 1 and RM 7.7 West 2. Site represented by Photo 27 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall

Date: 11/2/2007

Location: RM8.5 - Doyle Park

Plot # 1

GPS Point: RM8.5-1

Kearny, Hudson, Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Platanus occidentalis	32.1	809
Acer negundo	4.9	19
Acer negundo	5.5	24
Quercus rubra	4.2	14
Ulmus americana	4.9	19
Celtis occidentalis	5.3	22
Morus alba	4.9	19
Morus alba	6.1	29
Morus alba	8.7	59
Morus alba	12.0	113
Over Hanging Trees		
Acer negundo	*6.9*	*37*
Prunus serotina	*10.9*	*93*
Salix nigra	*36.3*	*1034*
Salix nigra	*45.8*	*1647*
Platanus occidentalis	*18.0*	*254*
Platanus occidentalis	*15.0*	*177*

Shrubs

Species	Number	% cover
Quercus rubra	6	12
Ailanthus altissima	1	2
Rubus sp.	2	1
Celtis occidentalis	1	0.5
Acer negundo	1	5
Acer negundo	4	14
Morus alba	1	2
Prunus serotina	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	60
Quadrat #2		
Polygonum cuspidatum	1	20

Vines

Species	Number	% cover
Toxicodendron radicans	3	15

SITE DESCRIPTION: Site has shoreline of asphalt, curb stones, and concrete debris. Site is a Kearny town park-Doyle Park. Considerable cover of knotweed in portions of riparian zone. Several clumps of a tall *Polygonum s* p. present at or just below high tide line.

PHOTOGRAPHS: RM 8.5 1 and RM 8.5 2; RM 8.5 plot 1 to RM 8.5 plot 5. Site represented by Photos 32 and 33 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall | **Date:** 11/2/2007

Location: RM8.5 - Doyle Park | **Plot #** 2 | **GPS Point:** RM8.5-2

Kearny, Hudson, Co.

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Morus alba	7.4	43	*Rubus* sp.	1	0.5	Quadrat #1					
Acer negundo	6.5	33	*Acer negundo*	2	5.5	*Polygonum cuspidatum*	3	100			
Acer negundo	10.5	87									
Robinia pseudoacacia	21.7	370									
Robinia pseudoacacia	10.5	87									
Robinia pseudoacacia	14.0	154									
						Quadrat #2					
						Polygonum cuspidatum	4	95			
Over Hanging Trees											
Acer saccharinum	31.7	789									

SITE DESCRIPTION: Site has shoreline of asphalt, curb stones, and concrete debris. Site is a Kearny town park-Doyle Park. Considerable cover of knotweed in portions of riparian zone. Several clumps of a tall Polygonum sp. present at or just below high tide line.

PHOTOGRAPHS: RM 8.5 1 and RM 8.5 2; RM 8.5 plot 1 to RM 8.5 plot 5. Site represented by Photos 32 and 33 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall

Date: 11/2/2007

Location: RM8.5 - Doyle Park

Plot # 3

GPS Point: RM8.5-3

Kearny, Hudson, Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	6.5	33
Ulmus americana	5.9	27
Ulmus americana	14.1	156
Ulmus americana	6.0	28
Over Hanging Trees		
Ulmus americana	*12.1*	115
Ulmus americana	*13.9*	152
Morus alba	*5.9*	27
Morus alba	*7.9*	49
Gleditsia triacanthos	*27.5*	594
Gleditsia triacanthos	28.4	633

Shrubs

Species	Number	% cover
Quercus rubra	1	0.5
Acer negundo	3	1.5
Acer saccharinum	1	0.5
Morus alba	1	0.5
Rubus sp.	2	1
Rosa multiflora	3	6

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	3	75
Quadrat #2		
Polygonum cuspidatum	3	80

Vines

Species	Number	% cover

SITE DESCRIPTION: Site has shoreline of asphalt, curb stones, and concrete debris. Site is a Kearny town park-Doyle Park. Considerable cover of knotweed in portions of riparian zone. Several clumps of a tall Polygonum sp. present at or just below high tide line.

PHOTOGRAPHS: RM 8.5 1 and RM 8.5 2; RM 8.5 plot 1 to RM 8.5 plot 5. Site represented by Photos 32 and 33 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall | **Date:** 11/2/2007

Location: RM8.5 - Doyle Park | **Plot #** 4 | **GPS Point:** RM8.5-4

Kearny, Hudson, Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	5.8	26
Acer saccharinum	7.8	48
Acer saccharinum	4.8	18
Acer saccharinum	10.8	92
Acer saccharinum	9.0	64
Acer saccharinum	10.6	88
Acer saccharinum	9.1	65
Acer saccharinum	8.4	55
Quercus rubra	11.9	111
Over Hanging Trees		
Gleditsia triacanthos	*25.7*	518
Ulmus americana	*16.0*	201
Quercus rubra	*5.1*	20
Acer saccharinum	*5.1*	20
Acer saccharinum	*5.6*	25
Acer saccharinum	*6.1*	29
Acer saccharinum	26.0	531

Shrubs

Species	Number	% cover
Ulmus americana	1	0.5
Quercus rubra	4	8
Gleditsia triacanthos	1	0.5
Acer saccharinum	1	0.5
Robinia pseudoacacia	2	1

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	3	100
Quadrat #2		
Polygonum cuspidatum	2	80
Rumex crispus	3	10

Vines

Species	Number	% cover
Lonicera japanica	3	5

SITE DESCRIPTION: Site has shoreline of asphalt, curb stones, and concrete debris. Site is a Kearny town park-Doyle Park. Considerable cover of knotweed in portions of riparian zone. Several clumps of a tall Polygonum sp. present at or just below high tide line.

PHOTOGRAPHS: RM 8.5 1 and RM 8.5 2; RM 8.5 plot 1 to RM 8.5 plot 5. Site represented by Photos 32 and 33 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall | **Date:** 11/2/2007

Location: RM8.5 - Doyle Park | **Plot #** 5 | **GPS Point:** RM8.5-5

Kearny, Hudson, Co.

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Gleditsia triacanthos	9.6	72	*Quercus rubra*	2	1	Quadrat #1					
Gleditsia triacanthos	8.3	54	*Quercus palustris*	1	2	*Polygonum cuspidatum*	2	25			
Gleditsia triacanthos	5.6	25	*Ulmus americana*	5	10	*Oenothera biennis*	1	5			
Gleditsia triacanthos	6.4	32	*Prunus serotina*	1	2						
Gleditsia triacanthos	4.1	13	*Celtis occidentalis*	2	2.5						
Gleditsia triacanthos	25.8	523	*Rubus* sp.	1	0.5						
Fraxinus pennsylvanica	9.7	74	*Fraxinus pennsylvanica*	2	1						
Fraxinus pennsylvanica	7.8	48	*Gleditsia triacanthos*	3	6	Quadrat #2					
Ulmus americana	6.0	28	*Rosa multiflora*	1	5	*Polygonum cuspidatum*	4	60			
Quercus rubra	7.9	49				*Polygonum punctatum*	1	5			
Over Hanging Trees											
Gleditsia triacanthos	*10.5*	87									
Gleditsia triacanthos	*8.5*	57									
Castanea pumila	23.8	445									

SITE DESCRIPTION: Site has shoreline of asphalt, curb stones, and concrete debris. Site is a Kearny town park-Doyle Park. Considerable cover of knotweed in portions of riparian zone. Several clumps of a tall Polygonum sp. present at or just below high tide line.

PHOTOGRAPHS: RM 8.5 1 and RM 8.5 2; RM 8.5 plot 1 to RM 8.5 plot 5. Site represented by Photos 32 and 33 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/21/2008

Location: RM 9.7 Stonewall module, Belleville, Essex Co. | **Plot #** 1 | **GPS Point:**

northern end o fmodule

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Acer platanoides	13.1	135	*Malus coronaria*	1	10	Quadrat #1					
Acer platanoides	15.5	189	*Malus coronaria*	1	2	No herbs					
Ailanthus altissima	4.2	14	*Celtis occidentalis*	1	2						
Quercus palustris	12.7	127	*Lonicera tartarica*	25	77.5						
Ailanthus altissima	9.4	69	*Celtis occidentalis*	5	5.5						
Ailanthus altissima	5.1	20	*Acer platanoides*	1	0.5						
Lonicera tartarica	4.6	17	*Ailanthus altissima*	2	1						
Lonicera tartarica	4.9	19	*Celtis occidentalis*	1	0.5						
Lonicera tartarica	4.1	13	*Acer platanoides*	1	0.5						
Celtis occidentalis	5.7	26	*Robinia pseudoacac*	1	0.5	Quadrat #2					
Robinia pseudoacacia	6.2	30	*Ailanthus altissima*	1	2	*Alliaria petiolata*	4	15			
Over Hanging Trees											
Robinia pseudoacacia	*6.8*										
Ailanthus altissima	*8.1*										
Acer platanoides	*11.6*										
Quercus palustris	*17.1*										

SITE DESCRIPTION: Site is Stonewall module along west shore of Lower Passaic River in Belleville. Entire shoreline of this site is a stone wall. Site is entirely bounded by the river and Rt 21. Plot 1 is north end, plot 2 is south end.

PHOTOGRAPHS: RM 9.7 plot 1 to RM 9.7 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/21/2008

Location: RM 9.7 Stonewall module, Belleville, Essex Co. | **Plot #** 2 | **GPS Point:**

southern end of module

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Gleditsia triacanthos	4.1	13
Robinia pseudoacacia	15.3	184
Ulmus americana	5.5	24
Acer platanoides	4.1	13
Ailanthus altissima	6.1	29
Ailanthus altissima	6.6	34
Ulmus americana	5.1	20
Over Hanging Trees		
Robinia pseudoacacia	*24.1*	
Fraxinus pennsylvanica	*17.7*	
Platanus occidentalis	*23.6*	

Shrubs

Species	Number	% cover
Acer platanoides	34	17
Ailanthus altissima	1	2
Celtis occidentalis	1	0.5
Acer platanoides	1	0.5
Ulmus americana	1	2
Acer platanoides	10	5
Acer platanoides	22	11
Lonicera tartarica	1	2
Celtis occidentalis	1	0.5
Ailanthus altissima	1	2
Ailanthus altissima	1	2
Acer platanoides	15	7.5
Amorpha fruticosa	2	2.5
Ulmus americana	1	0.5
Acer platanoides	1	5

Herbs

Species	Number	% cover
Quadrat #1		
Toxicodendron radicans		5
Lonicera japonica		65
Galium sp.		5
Alliaria petiolata		20
Quadrat #2		
Rumex crispus	4	50
Eupatorium rugosum	5	20
Lonicera japonica		10
Allium vineale		5
Toxicodendron radicans		5
Panicum sp.		5

Vines

Species	Number	% cover
Toxicodendron radicans	1	1

SITE DESCRIPTION: Site is Stonewall module along west shore of Lower Passaic River in Belleville. Entire shoreline of this site is a stone wall. Site is entirely bounded by the river and Rt 21. Plot 1 is north end, plot 2 is south end.

PHOTOGRAPHS: RM 9.7 plot 1 to RM 9.7 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/26/2007

Location: RM9.9 - Riverside Park | **Plot #** 1 | **GPS Point:** RM9.9-1

Near field data point LP19 - N. Arlington, Bergen Co.

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Trees: Species	DBH (in)	Basal Area (in^2)	Shrubs: Species	Number	% cover	Herbs: Species	Number	% cover	Vines: Species	Number	% cover
			Amorpha fruticosa	5	19.5	Quadrat #1					
			Cornus stolonifera	1	0.5	*Iris pseudoacorus*	2	10			
			Betula nigra	3	3	*Rumex obtusifolius*	1	50			
			Rosa multiflora	1	2	*Bidens* sp.	1	10			
			Lonicera sp.	1	0.5	*Oenothera biennis*	1	5			
			Ailanthus altissima	20	13	*Hibiscus palustris*	1	5			
			Ulmus americana	2	1	*Lythrum salicaria*	1	5			
						Quadrat #2					
						Lythrum salicaria	4	40			
						Bidens sp.	1	15			
Over Hanging Trees											
Ulmus americana	*8.5*	*57*									

SITE DESCRIPTION: Sampled from Corps field point LP19 (to LP20) which is located adjacent to Riverside Park in North Arlington south of the PRRA Boathouse. Sampled area has a gently sloping shoreline. Start of sampling area has large concrete boulders, the rest is comprised of a large mudflat area evident at low tide. Large stand of *Phragmites australis* has Transcontinental Gas Pipeline buried under it. Observed a small patch of arrow arum on the mudflat.

PHOTOGRAPHS: RM 9.9 1 to RM 9.9 4; RM 9.9 plot 1 to RM 9.9 plot 5. Photo RM 9.9 2 shows arrow arum on mudflat. Photo RM 9.9 plot 5 shows the mudflat at low tide and stand of Phragmites. Site represented by Photos 22 and 23 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey

Date: 10/26/2007

Location: RM9.9 - Riverside Park

Plot # 2

GPS Point: RM9.9-2

Near field data point LP19 - N. Arlington, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Robinia pseudoacacia	5.8	26
Robinia pseudoacacia	9.7	74
Robinia pseudoacacia	10.0	79
Robinia pseudoacacia	4.8	18
Robinia pseudoacacia	6.8	36
Ulmus americana	16.1	203
Acer negundo	5.8	26
Acer negundo	6.4	32
Over Hanging Trees		
Acer rubrum	*18.9*	*280*
Robinia pseudoacacia	*4.3*	*15*

Shrubs

Species	Number	% cover
Morus alba	1	2
Ulmus americana	3	3
Prunus sp.	3	14
Robinia pseudoacacia	3	8
Quercus palustris	1	12
Ailanthus altissima	5	14
Amorpha fruticosa	1	2
Cornus amomum	1	2
Hibiscus syriacus	1	0.5
Ulmus americana	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Rumex obtusifolius	2	10
Polygonum hydropiperoides	1	10
Viola sp.	3	10
Artemisia vulgaris	1	5
Rumex crispus	4	10
Quadrat #2		
Polygonum punctatum	3	5
Eupatorium rugosum	12	35
Artemisia vulgaris	2	10
Oenothera biennis	1	5

Vines

Species	Number	% cover
Toxicodendron radicans	1	1

SITE DESCRIPTION: Sampled from Corps field point LP19 (to LP20) which is located adjacent to Riverside Park in North Arlington south of the PRRA Boathouse. Sampled area has a gently sloping shoreline. Start of sampling area has large concrete boulders, the rest is comprised of a large mudflat area evident at low tide. Large stand of Phragmites australis has Transcontinental Gas Pipeline buried under it. Observed a small patch of arrow arum on the mudflat.

PHOTOGRAPHS: RM 9.9 1 to RM 9.9 4; RM 9.9 plot 1 to RM 9.9 plot 5. Photo RM 9.9 2 shows arrow arum on mudflat. Photo RM 9.9 plot 5 shows the mudflat at low tide and stand of Phragmites. Site represented by Photos 22 and 23 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/26/2007

Location: RM9.9 - Riverside Park | **Plot #** 3 | **GPS Point:** RM9.9-3

Near field data point LP19 - N. Arlington, Bergen Co.

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Robinia pseudoacacia	4.9	19	*Morus alba*	2	10.5	Quadrat #1					
Robinia pseudoacacia	7.4	43	*Ulmus americana*	5	12	*Polygonum cuspidatum*	3	70			
Ulmus americana	17.1	230	*Rosa multiflora*	3	3	*Alliaria petiolata*	23	5			
Ulmus americana	16.7	219	*Robinia pseudoacacia*	7	12.5						
Populus deltoides	18.5	269	*Acer saccharinum*	4	6.5						
Ulmus americana	14.6	167	*Catalpa bignonioides*	1	15						
Ailanthus altissima	6.1	29	*Ailanthus altissima*	1	5						
Morus alba	10.9	93	*Tilia americana*	1	5	Quadrat #2					
Populus deltoides	18.0	254	*Ulmus americana*	2	4	*Rumex obtusifolius*	5	5			
Acer saccharinum	11.9	111	*Celtis occidentalis*	1	5	*Lolium multiflorum*	1	10			
				27	78.5	*Alliaria petiolata*	11	5			
						Commelina communis	1	5			
Over Hanging Trees											
Morus alba	*6.0*	*28*									
Populus deltoides	*26.8*	*564*									
Robinia pseudoacacia	*13.2*	*137*									

SITE DESCRIPTION: Sampled from Corps field point LP19 (to LP20) which is located adjacent to Riverside Park in North Arlington south of the PRRA Boathouse. Sampled area has a gently sloping shoreline. Start of sampling area has large concrete boulders, the rest is comprised of a large mudflat area evident at low tide. Large stand of Phragmites australis has Transcontinental Gas Pipeline buried under it. Observed a small patch of arrow arum on the mudflat.

PHOTOGRAPHS: RM 9.9 1 to RM 9.9 4; RM 9.9 plot 1 to RM 9.9 plot 5. Photo RM 9.9 2 shows arrow arum on mudflat. Photo RM 9.9 plot 5 shows the mudflat at low tide and stand of Phragmites. Site represented by Photos 22 and 23 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/26/2007

Location: RM9.9 - Riverside Park | **Plot #** 4 | **GPS Point:** RM9.9-4

Near field data point LP19 - N. Arlington, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Populus deltoides	20.6	333
Populus deltoides	23.9	448
Populus deltoides	9.8	75
Populus deltoides	13.1	135
Populus deltoides	19.5	298
Populus deltoides	9.0	64
Morus alba	5.9	27
Morus alba	4.7	17
Morus alba	10.7	90
Morus alba	8.9	62
Ulmus americana	13.9	152
Ulmus americana	17.6	243
Over Hanging Trees		
Populus deltoides	*13.0*	133
Morus alba	*11.3*	100

Shrubs

Species	Number	% cover
Acer platanoides	3	20.5
Ailanthus altissima	14	13
Ulmus americana	1	0.5
Lonicera tartarica	1	0.5
Robinia pseudoacacia	1	0.5
Rosa multiflora	1	0.5
Amorpha fruticosa	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	1	25
Phytolacca americana	1	10
Quadrat #2		
Polygonum cuspidatum	2	20

Vines

Species	Number	% cover
Toxicodendron radicans		15
Celastrus orbiculatus		60

SITE DESCRIPTION: Sampled from Corps field point LP19 (to LP20) which is located adjacent to Riverside Park in North Arlington south of the PRRA Boathouse. Sampled area has a gently sloping shoreline. Start of sampling area has large concrete boulders, the rest is comprised of a large mudflat area evident at low tide. Large stand of Phragmites australis has Transcontinental Gas Pipeline buried under it. Observed a small patch of arrow arum on the mudflat.

PHOTOGRAPHS: RM 9.9 1 to RM 9.9 4; RM 9.9 plot 1 to RM 9.9 plot 5. Photo RM 9.9 2 shows arrow arum on mudflat. Photo RM 9.9 plot 5 shows the mudflat at low tide and stand of Phragmites. Site represented by Photos 22 and 23 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/26/2007

Location: RM9.9 - Riverside Park | **Plot #** 5 | **GPS Point:** RM9.9-5

Near field data point LP19 - N. Arlington, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	8.4	55
Acer saccharinum	21.8	373
Fraxinus pennsylvanica	6.9	37
Fraxinus pennsylvanica	5.3	22
Over Hanging Trees		
Morus alba	*13.3*	139
Gleditsia triacanthos	*12.6*	125
Fraxinus pennsylvanica	*8.3*	54

Shrubs

Species	Number	% cover
Rosa multiflora	5	2.5
Robinia pseudoacacia	1	0.5
Prunus sp.	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Phragmites australis		100
Quadrat #2		
Impatiens capensis	1	5
Phragmites australis		95

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampled from Corps field point LP19 (to LP20) which is located adjacent to Riverside Park in North Arlington south of the PRRA Boathouse. Sampled area has a gently sloping shoreline. Start of sampling area has large concrete boulders, the rest is comprised of a large mudflat area evident at low tide. Large stand of Phragmites australis has Transcontinental Gas Pipeline buried under it. Observed a small patch of arrow arum on the mudflat.

PHOTOGRAPHS: RM 9.9 1 to RM 9.9 4; RM 9.9 plot 1 to RM 9.9 plot 5. Photo RM 9.9 2 shows arrow arum on mudflat. Photo RM 9.9 plot 5 shows the mudflat at low tide and stand of Phragmites. Site represented by Photos 22 and 23 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Peg McBrien, Tom Shinskey, Michelle Verdugo

Date: 10/18/2007

Location: RM10.3 - Riverside Park

Plot # 1

GPS Point: RM10.3-1

Near Corps field point LP18 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	11.2	98
Morus alba	14.1	156
Morus alba	12.3	119
Over Hanging Trees		
Acer negundo	*19.9*	*311*
Salix nigra	*5.3*	*22*
Salix nigra	*6.8*	*36*
Ailanthus altissima	*16.4*	*211*
Morus alba	*25.6*	*514*

Shrubs

Species	Number	% cover
Robinia pseudoacacia	2	2
Fraxinus pennsylvanica	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	6	60
Quadrat #2		
Polygonum cuspidatum	2	15
Eupatorium rugosum	38	50
Geranium sp.	1	5

Vines

Species	Number	% cover
Celastrus orbiculatus	1	1
Toxicodendron radicans	1	1

SITE DESCRIPTION: RM10.3 is located north of the Passaic River Rowing Association Boathouse. Herbaceous vegetation at sampling points RM10.3-1 and RM10.3-2 was almost exclusively *Polygonum cuspidatum* . Area near sampling point RM10.3-3 appears to be where the park discards woody debris, picnic tables, etc. RM10.3-4 has more native vegetation and less *Polygonum cuspidatum* , riparian zone was greater than 30'. Area south of the boat house is landscaped to the top of bank.

PHOTOGRAPHS: RM 10.3 1 to RM 10.3 4; RM 10.3 plot 1 to RM 10.3 plot 3. Lower Passaic 001 - 009; Photo RM 10.3 1shows dense knotweed along the shoreline. Photo RM 10.3 plot 4 shows sampling plot 4 where vegetation is more native. Site represented in Photos 20 and 21 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Peg McBrien, Tom Shinskey, Michelle Verdugo

Date: 10/18/2007

Location: RM10.3 - Riverside Park

Plot # 2

GPS Point: RM10.3-2

Near Corps field point LP18 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Robinia pseudoacacia	43.1	1,458	*Morus alba*	9	12	Quadrat #1			*Toxicodendron radicans*	1	2
Morus alba	5.5	24	*Acer platanoides*	1	2	*Polygonum cuspidatum*	7	50			
Fraxinus pennsylvanica	20.8	340	*Ulmus americana*	1	2						
Morus alba	10.4	85	*Fraxinus pennsylvanica*	4	8						
Morus alba	10.9	93	*Ailanthus altissima*	1	2						
Morus alba	17.3	235									
Robinia pseudoacacia	13.1	135									
						Quadrat #2					
						Polygonum cuspidatum	16	70			
Over hanging Trees											
Fraxinus pennsylvanica	*10.2*	82									
Fraxinus pennsylvanica	*5.5*	24									
Robinia pseudoacacia	*16.7*	219									
Morus alba	*4.1*	13									
Robinia pseudoacacia	*7.8*	*48*									
Robinia pseudoacacia	*8.2*	*53*									

SITE DESCRIPTION: RM10.3 is located north of the Passaic River Rowing Association Boathouse. Herbaceous vegetation at sampling points RM10.3-1 and RM10.3-2 was almost exclusively Polygonum cuspidatum. Area near sampling point RM10.3-3 appears to be where the park discards woody debris, picnic tables, etc. RM10.3-4 has more native vegetation and less Polygonum cuspidatum, riparian zone was greater than 30'. Area south of the boat house is landscaped to the top of bank.

PHOTOGRAPHS: RM 10.3 1 to RM 10.3 4; RM 10.3 plot 1 to RM 10.3 plot 3. Lower Passaic 001 - 009; Photo RM 10.3 1shows dense knotweed along the shoreline. Photo RM 10.3 plot 4 shows sampling plot 4 where vegetation is more native. Site represented in Photos 20 and 21 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Peg McBrien, Tom Shinskey, Michelle Verdugo

Date: 10/18/2007

Location: RM10.3 - Riverside Park

Plot # 3

GPS Point: RM10.3-3

Near Corps field point LP18 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Salix nigra	16.1	203
Salix nigra	13.0	133
Salix nigra	14.0	154
Robinia pseudoacacia	4.5	16
Robinia pseudoacacia	9.1	65
Salix nigra	19.6	302
Salix nigra	19.5	298
Salix nigra	37.9	1,128
Over hanging Trees		
Salix nigra	*53.8*	*2,272*
Fraxinus pennsylvanica	*15.9*	*198*
Robinia pseudoacacia	*15.4*	*186*
Robinia pseudoacacia	*22.7*	*405*
Morus alba	*4.5*	*16*

Shrubs

Species	Number	% cover
Acer platanoides	1	2
Morus alba	1	2
Ailanthus altissima	1	2
Tilia americana	3	6
Fraxinus pennsylvanica	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Phytolacca americana	3	25
Eupatorium rugosum	14	50
Quadrat #2		
Eupatorium rugosum	13	30
Trifolium sp.	1	5
Polygonum sp.	3	5
Phytolacca americana	3	10

Vines

Species	Number	% cover
Toxicodendron radicans		5

SITE DESCRIPTION: RM10.3 is located north of the Passaic River Rowing Association Boathouse. Herbaceous vegetation at sampling points RM10.3-1 and RM10.3-2 was almost exclusively Polygonum cuspidatum. Area near sampling point RM10.3-3 appears to be where the park discards woody debris, picnic tables, etc. RM10.3-4 has more native vegetation and less Polygonum cuspidatum, riparian zone was greater than 30'. Area south of the boat house is landscaped to the top of bank.

PHOTOGRAPHS: RM 10.3 1 to RM 10.3 4; RM 10.3 plot 1 to RM 10.3 plot 3. Lower Passaic 001 - 009; Photo RM 10.3 1shows dense knotweed along the shoreline. Photo RM 10.3 plot 4 shows sampling plot 4 where vegetation is more native. Site represented in Photos 20 and 21 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Peg McBrien, Tom Shinskey, Michelle Verdugo

Date: 10/18/2007

Location: RM10.3 - Riverside Park

Plot # 4

GPS Point: RM10.3-4

Near Corps field point LP18 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Robinia pseudoacacia	7.1	40
Robinia pseudoacacia	4.8	18
Robinia pseudoacacia	8.2	53
Robinia pseudoacacia	4.7	17
Morus alba	6.6	34
Morus alba	14.0	154
Morus alba	4.7	17
Robinia pseudoacacia	8.6	58
Morus alba	4.0	13
Morus alba	7.3	42
Fraxinus pennsylvanica	7.6	45
Robinia pseudoacacia	4.3	15
Morus alba	4.5	16
Morus alba	8.7	59
Juglans nigra	11.6	106
Ailanthus altissima	8.6	58
Over hanging Trees		
Robinia pseudoacacia	*8.0*	50
Robinia pseudoacacia	*4.2*	14
Sycamore	*21.5*	363
Sycamore	*21.2*	353

Shrubs

Species	Number	% cover
Rosa multiflora	3	1.5
Quercus palustris	1	2
Robinia pseudoacacia	3	6
Fraxinus pennsylvanica	3	10
Morus alba	6	15
Juglans nigra	1	5
Prunus sp.	10	15

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	19	90
Quadrat #2		
Eupatorium rugosum	6	25
Toxicodendron radicans	1	30

Vines

Species	Number	% cover
Toxicodendron radicans		10

SITE DESCRIPTION: RM10.3 is located north of the Passaic River Rowing Association Boathouse. Herbaceous vegetation at sampling points RM10.3-1 and RM10.3-2 was almost exclusively Polygonum cuspidatum. Area near sampling point RM10.3-3 appears to be where the park discards woody debris, picnic tables, etc. RM10.3-4 has more native vegetation and less Polygonum cuspidatum, riparian zone was greater than 30'. Area south of the boat house is landscaped to the top of bank.

PHOTOGRAPHS: RM 10.3 1 to RM 10.3 4; RM 10.3 plot 1 to RM 10.3 plot 3. Lower Passaic 001 - 009; Photo RM 10.3 1shows dense knotweed along the shoreline. Photo RM 10.3 plot 4 shows sampling plot 4 where vegetation is more native. Site represented in Photos 20 and 21 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: RM 10.7 Nutley Boat Ramp, Nutley, Essex Co. | **Plot #** 1 | **GPS Point:** RM 10.7-1

northern plot

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	8.3	54
Fraxinus pennsylvanica	8.1	52
Fraxinus pennsylvanica	5.9	27
Fraxinus pennsylvanica	15.5	189
Fraxinus pennsylvanica	10.7	90
Platanus occidentalis	7.0	38
Platanus occidentalis	5.2	21
Populus deltoides	34.5	934
Populus deltoides	18.2	260
Ulmus americana	6.2	30
Ulmus americana	12.0	113

Shrubs

Species	Number	% cover
Acer platanoides	7	8
Rosa multiflora	4	6.5
Salix nigra	2	4
Quercus rubra	4	2
Quercus bicolor	1	0.5
Amorpha fruticosa	4	2
Lonicera tartarica	1	2
Prunus seritona	2	2.5
Fraxinus pennsylvan	2	10
Tilia americana	1	10

Herbs

Species	Number	% cover
Quadrat #1		
Rumex crispus		10
Alliaria petiolata		15
Panicum sp.		15
Galium sp.		1
Oenothera biennis		5
Trifolium sp.		5
Viola sp.		10
Quadrat #2		
Taraxacum officinale	1	5
Rumex crispus	2	20
Lythrum salicaria	1	5
Bryophyta		10

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is Nutley Boat Ramp module along west shore of Lower Passaic River in Belleville. Shoreline of this site is sheetpile buklhead and concrete.

PHOTOGRAPHS: RM 10.7 plot 1 to RM 10.7 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: RM 10.7 Nutley Boat Ramp, Nutley, Essex Co. | **Plot #** 2 | **GPS Point:** RM 10.7-2

southern plot

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Quercus palustris	6.4	32	*Rosa multiflora*	2	1	Quadrat #1					
Populus deltoides	7.5	44	*Prunus seritona*	1	0.5	*Lolium multiflorum*		80			
Populus deltoides	10.9	93	*Robinia pseudoacacia*	3	1.5	*Agrostis alba*		20			
Populus deltoides	14.0	154	*Amorpha fruticosa*	2	1						
Populus deltoides	10.5	87									
Populus deltoides	11.2	98									
Populus deltoides	13.4	141									
						Quadrat #2					
						Panicum sp.		10			
						Iris psuedacorus		70			
						Iris sp.	5	20			
Over Hanging Trees											
Populus deltoides	*18.3*	*263*									
Morus alba	*14.0*	*154*									

SITE DESCRIPTION: Site is Nutley Boat Ramp module along west shore of Lower Passaic River in Belleville. Shoreline of this site is sheetpile buklhead and concrete.

PHOTOGRAPHS: RM 10.7 plot 1 to RM 10.7 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/19/2007

Location: RM10.9 - Riverside Park | **Plot #** 1 | **GPS Point:** RM10.9-1

Near Corps field point LP17 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	15.9	198
Acer saccharinum	19.3	292
Over Hanging Trees		
Ulmus americana	*17.6*	*243*

Shrubs

Species	Number	% cover
Rosa multiflora	3	2
Ailanthus altissima	1	2
Gleditsia triacanthos	8	10
Quercus palustris	1	0.5
Ulmus americana	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Phragmites australis		85
Artemisia vulgaris	10	5
Poa sp.	1	5
Impatiens capensis	2	5
Quadrat #2		
Phragmites australis		90
Artemisia vulgaris	1	5
Poa sp.	1	5

Vines

Species	Number	% cover
Celastrus orbiculatus	1	1
Toxicodendron radicans	1	1

SITE DESCRIPTION: RM10.9 is adjacent to Riverside Park in Lyndhurst/North Arlington. Several stands of *Phragmites australis* occur in the area sampled. Much of the vegetation is dense shrubs (*Rosa multiflora*) covered with vines.

PHOTOGRAPHS: RM 10.9 1 to RM 10.9 4; RM 10.9 plot 1 to RM 10.9 plot 4; RM 10.9 biobenchmarks 1 and RM 10.9 biobenchmarks 2; RM 10.9 arrow arum 1 and RM 10.9 arrow arum 2. Site represented by Photo 19 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/19/2007

Location: RM10.9 - Riverside Park | **Plot #** 2 | **GPS Point:** RM10.9-2

Near Corps field point LP17 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	6.5	33
Ulmus americana	9.4	69
Salix nigra	46.0	1,661
Over Hanging Trees		
Acer negundo	*8.2*	*53*
Morus alba	*4.4*	*15*

Shrubs

Species	Number	% cover
Ulmus americana	1	2
Ailanthus altissima	1	2
Rosa multiflora	16	8
Morus alba	2	4
Acer negundo	1	1

Herbs

Species	Number	% cover
Quadrat #1		
Arctium minus	3	10
Poa sp.	1	10
Quadrat #2		
Taraxacum officinale	1	5

Vines

Species	Number	% cover
Celastrus orbiculatus	1	1

SITE DESCRIPTION: RM10.9 is adjacent to Riverside Park in Lyndhurst/North Arlington. Several stands of Phragmites australis occur in the area sampled. Much of the vegetation is dense shrubs (Rosa multiflora) covered with vines.

PHOTOGRAPHS: RM 10.9 1 to RM 10.9 4; RM 10.9 plot 1 to RM 10.9 plot 4; RM 10.9 biobenchmarks 1 and RM 10.9 biobenchmarks 2; RM 10.9 arrow arum 1 and RM 10.9 arrow arum 2. Site represented by Photo 19 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/19/2007

Location: RM10.9 - Riverside Park | **Plot #** 3 | **GPS Point:** RM10.9-3

Near Corps field point LP17 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	18.9	280
Acer saccharinum	14.5	165
Over Hanging Trees		
Ulmus americana	*13.6*	*145*
Ulmus americana	*13.0*	*133*
Platanus occidentalis	*25.6*	*514*

Shrubs

Species	Number	% cover
Rosa multiflora	10	20
Hibiscus syriacus	1	0.5
Cornus sp.	1	2

Herbs

Species	Number	% cover
Quadrat #1		
No herbaceous		
Quadrat #2		
Phragmites australis		50
Poa sp.		10

Vines

Species	Number	% cover

SITE DESCRIPTION: RM10.9 is adjacent to Riverside Park in Lyndhurst/North Arlington. Several stands of Phragmites australis occur in the area sampled. Much of the vegetation is dense shrubs (Rosa multiflora) covered with vines.

PHOTOGRAPHS: RM 10.9 1 to RM 10.9 4; RM 10.9 plot 1 to RM 10.9 plot 4; RM 10.9 biobenchmarks 1 and RM 10.9 biobenchmarks 2; RM 10.9 arrow arum 1 and RM 10.9 arrow arum 2. Site represented by Photo 19 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/19/2007

Location: RM10.9 - Riverside Park | **Plot #** 4 | **GPS Point:** RM10.9-4

Near Corps field point LP17 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Prunus virginiana	8.6	58	*Acer negundo*	1	2	Quadrat #1					
			Rosa multiflora	3	6	*Phragmites australis*		80			
			Ulmus americana	1	2	*Humulus japonicus*	1	10			
						Toxicodendron radicans	1	10			
						Quadrat #2					
						Phragmites australis		85			
						Toxicodendron radicans	1	5			
						Humulus japonicus	1	10			

SITE DESCRIPTION: RM10.9 is adjacent to Riverside Park in Lyndhurst/North Arlington. Several stands of Phragmites australis occur in the area sampled. Much of the vegetation is dense shrubs (Rosa multiflora) covered with vines.

PHOTOGRAPHS: RM 10.9 1 to RM 10.9 4; RM 10.9 plot 1 to RM 10.9 plot 4; RM 10.9 biobenchmarks 1 and RM 10.9 biobenchmarks 2; RM 10.9 arrow arum 1 and RM 10.9 arrow arum 2. Site represented by Photo 19 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/30/2007

Location: RM11.0 - Riverside Park | **Plot #** 1 | **GPS Point:** RM11.0-1

South of Corp field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Robinia pseudoacacia	7.5	44
Robinia pseudoacacia	4.1	13
Acer platanoides	6.1	29
Robinia pseudoacacia	7.5	44
Robinia pseudoacacia	5.3	22
Robinia pseudoacacia	5.5	24
Ulmus americana	8.6	58
Acer saccharinum	18.1	257
Acer platanoides	4.9	19
Prunus serotina	5.2	21
Prunus serotina	7.2	41
Ulmus americana	11.2	98
Acer saccharinum	4.5	16
Over Hanging Trees		
Acer saccharinum	*10.9*	*93*
Salix nigra	*17.3*	*235*
Salix nigra	*20.1*	*317*
Salix nigra	*19.1*	*286*
Salix nigra	*25.6*	*514*

Shrubs

Species	Number	% cover
Cornus stolonifera	1	5
Prunus serotina	1	5
Rosa multiflora	9	10
Tilia americana	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Alliaria petiolata	2	5
Bidens sp.	1	10
Eupatorium rugosum	2	5
Oenothera biennis	1	5
Impatiens capensis	1	10
Taraxacum officinale	2	5
Trifolium sp.	1	5
Heteranthera reniformis	7	10
Quadrat #2		
Allium vineale	1	5

Vines

Species	Number	% cover
Celastrus orbiculatus		10

SITE DESCRIPTION: Sampling location at RM11.0 and adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'. Large mudflat extending out from this area, substrate sandy.

PHOTOGRAPHS: RM 11.0 plot 2 to RM 11.0 plot 4. Photo RM 11.0 plot 2.1 shows typical riparian vegetation and exposed mudflat. Site represented by Photos 30 and 31 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/31/2007

Location: RM11.0 - Riverside Park | **Plot #** 2 | **GPS Point:** RM11.0-2

South of Corp field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Quercus palustris	5.3	22
Acer platanoides	4.1	13
Acer platanoides	5.0	20
Quercus palustris	9.6	72
Quercus palustris	4.1	13
Quercus palustris	6.5	33
Over Hanging Trees		
Ulmus americana	*8.5*	*57*
Platanus occidentalis	*7.0*	*38*

Shrubs

Species	Number	% cover
Amorpha fruticosa	4	9.5
Quercus palustris	6	16.5
Ailanthus altissima	1	5
Ulmus americana	3	7
Prunus sp.	1	0.5
Rosa multiflora	3	6
Cornus stolonifera	1	2
Hibiscus syriacus	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Iris pseudacorus	2	10
Boehmeria cylindrica	5	20
Plantango lanceolata	1	5
Oenothera biennis	1	5
Poa sp.		5
Carex sp.		5
Heteranthera reniformis	1	5
Quadrat #2		
Phalaris arundinacea	2	60
Bidens sp.	1	5
Boehmeria cylindrica	1	10
Iris pseudacorus	1	10

Vines

Species	Number	% cover
Celastrus orbiculatus	1	1

SITE DESCRIPTION: Sampling location at RM11.0 and adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'. Large mudflat extending out from this area, substrate sandy.

PHOTOGRAPHS: RM 11.0 plot 2 to RM 11.0 plot 4. Photo RM 11.0 plot 2.1 shows typical riparian vegetation and exposed mudflat. Site represented by Photos 30 and 31 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/31/2007

Location: RM11.0 - Riverside Park

Plot # 3

GPS Point: RM11.0-3

South of Corp field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	22.3	390
Ulmus americana	4.0	13
Quercus palustris	6.8	36
Acer saccharinum	6.1	29
Acer saccharinum	6.2	30
Acer saccharinum	6.5	33
Ulmus americana	6.2	30
Over Hanging Trees		
Quercus palustris	*28.3*	*629*
Quercus palustris	*7.6*	*45*
Ulmus americana	*13.2*	*137*

Shrubs

Species	Number	% cover
Quercus palustris	3	6
Amorpha fruticosa	2	4
Cornus stolonifera	1	5
Rosa multiflora	1	2
Acer platanoides	1	2
Rubus sp.	1	0.5
Hibiscus syriacus	1	0.5
Robinia pseudoacacia	2	2.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	4	45
Bidens sp.	1	5
Phalaris arundinacea	5	35
Trifolium sp.	1	5
Quadrat #2		
Iris pseudacorus	10	40
Phalaris arundinacea	9	30
Carex sp.	2	5
Lythrum salicaria	1	5
Bidens sp.	2	10

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling location at RM11.0 and adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'. Large mudflat extending out from this area, substrate sandy.

PHOTOGRAPHS: RM 11.0 plot 2 to RM 11.0 plot 4. Photo RM 11.0 plot 2.1 shows typical riparian vegetation and exposed mudflat. Site represented by Photos 30 and 31 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/31/2007

Location: RM11.0 - Riverside Park

Plot # 4

GPS Point: RM11.0-4

South of Corp field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Quercus palustris	8.6	58
Ulmus americana	5.5	24
Ulmus americana	17.8	249
Over Hanging Trees		
Ulmus americana	*14.6*	*167*
Platanus occidentalis	*5.3*	*22*

Shrubs

Species	Number	% cover
Cornus stolonifera	7	14.6
Amorpha fruticosa	4	9.5
Rosa multiflora	10	26
Ailanthus altissima	1	10
Quercus palustris	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
No herbaceous		
Quadrat #2		
Rumex crispus	1	5
Bidens sp.	1	10
Carex lurida	2	10
Carex scoparia	4	65

Vines

Species	Number	% cover
Celastrus orbiculatus	2	10

SITE DESCRIPTION: Sampling location at RM11.0 and adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'. Large mudflat extending out from this area, substrate sandy.

PHOTOGRAPHS: RM 11.0 plot 2 to RM 11.0 plot 4. Photo RM 11.0 plot 2.1 shows typical riparian vegetation and exposed mudflat. Site represented by Photos 30 and 31 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/19/2007

Location: RM11.3 - Riverside Park, North of Dejessa Bridge

Plot # 1

GPS Point: RM11.3-1

Near Corps field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Robinia pseudoacacia	30.2	716
Robinia pseudoacacia	14.6	167
Robinia pseudoacacia	20.9	343
Populus deltoides	16.9	224
Over Hanging Trees		
Juglans nigra	*7.2*	*41*
Robinia pseudoacacia	*17.8*	*249*
Robinia pseudoacacia	*15.5*	*189*

Shrubs

Species	Number	% cover
Fraxinus pennsylvanica	2	5
Ailanthus altissima	2	5
Robinia pseudoacacia	3	1.5
Rosa multiflora	1	2
Acer platanoides	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	4	100
Quadrat #2		
Eupatorium rugosum	7	80
Lonicera japonica		5

Vines

Species	Number	% cover
Celastrus orbiculatus	1	1

SITE DESCRIPTION: RM11.3 is located adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'.

PHOTOGRAPHS: RM 11.3 1 to RM 11.3 4 (western shore); RM 11.3.plot 2 to RM 11.3.plot 5. Photo RM 11.3.plot 5.1 shows typical riparian vegetation, Photo RM 11.3.plot 5.4 shows the shoreline. Represented by Photos 17 and 18 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/19/2007

Location: RM11.3 - Riverside Park, North of Dejessa Bridge | **Plot #** 2 | **GPS Point:** RM11.3-2

Near Corps field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Prunus serotina	23.2	423
Morus alba	8.0	50
Ulmus americana	14.0	154
Ulmus americana	8.0	50
Acer negundo	9.0	64
Acer negundo	8.3	54
Fraxinus pennsylvanica	4.7	17
Acer platanoides	4.2	14
Morus alba	6.0	28
Over Hanging Trees		
Platanus occidentalis	*27.0*	*572*
Ulmus americana	*27.1*	*577*
Salix nigra	*21.5*	*363*
Salix nigra	*15.9*	*198*
Acer negundo	*5.8*	*26*
Ulmus americana	*13.2*	*137*
Ulmus americana	*12.4*	*121*

Shrubs

Species	Number	% cover
Ulmus americana	1	0.5
Tilia americana	1	0.5
Morus alba	2	4
Fraxinus pennsylvanica	2	4
Rosa multiflora	3	1.5
Prunus serotina	1	2
Carya sp.	1	0.5
Rubus sp.	6	3
Acer platanoides	3	4.5
Ailanthus altissima	1	2
Ulmus americana	6	12
Robinia pseudoacacia	5	10
Cornus amomum	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Phytolacca americana	1	5
Eupatorium rugosum	42	30
Alliaria petiolata	1	5
Quadrat #2		
Eupatorium rugosum	6	70
Alliaria petiolata	8	5
Trifolium sp.	1	5
Elymus virginicus	7	15

Vines

Species	Number	% cover
Toxicodendron radicans		1
Celastrus orbiculatus		2

SITE DESCRIPTION: RM11.3 is located adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'.

PHOTOGRAPHS: RM 11.3 1 to RM 11.3 4 (western shore); RM 11.3.plot 2 to RM 11.3.plot 5. Photo RM 11.3.plot 5.1 shows typical riparian vegetation, Photo RM 11.3.plot 5.4 shows the shoreline. Represented by Photos 17 and 18 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/19/2007

Location: RM11.3 - Riverside Park, North of Dejessa Bridge

Plot # 3

GPS Point: RM11.3-3

Near Corps field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	8.8	61
Morus alba	10.6	88
Morus alba	7.0	38
Morus alba	6.8	36
Ulmus americana	5.3	22
Robinia pseudoacacia	27.2	581
Fraxinus pennsylvanica	44.0	1,520
Ulmus americana	12.3	119
Ulmus americana	11.4	102
Over Hanging Trees		
Acer saccharinum	*10.0*	*79*
Morus alba	*10.8*	*92*
Morus alba	*17.3*	*235*
Morus alba	*22.0*	*380*
Morus alba	*10.1*	*80*

Shrubs

Species	Number	% cover
Ulmus americana	7	17
Acer negundo	1	2
Prunus serotina	1	2
Fraxinus pennsylvanica	5	7.5
Cornus amomum	1	0.5
Acer platanoides	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Unidentified flower	1	5
Eupatorium rugosum	17	45
Quadrat #2		
Unidentified flower	8	20
Eupatorium rugosum	14	50
Poa sp.	2	5

Vines

Species	Number	% cover

SITE DESCRIPTION: RM11.3 is located adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'.

PHOTOGRAPHS: RM 11.3 1 to RM 11.3 4 (western shore); RM 11.3.plot 2 to RM 11.3.plot 5. Photo RM 11.3.plot 5.1 shows typical riparian vegetation, Photo RM 11.3.plot 5.4 shows the shoreline. Represented by Photos 17 and 18 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/18/2007

Location: RM11.3 - Riverside Park, North of Dejessa Bridge

Plot # 4

GPS Point: RM11.3-4

Near Corps field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	6.5	33
Fraxinus pennsylvanica	9.9	77
Ailanthus altissima	9.1	65
Morus alba	9.5	71
Morus alba	12.1	115
Morus alba	8.4	55
Morus alba	8.8	61
Morus alba	7.8	48
Over Hanging Trees		
Platanus occidentalis	*46.2*	*1,676*
Morus alba	*9.2*	*66*
Morus alba	*13.5*	*143*

Shrubs

Species	Number	% cover
Cornus amomum	4	6.5
Acer platanoides	1	2
Rosa multiflora	1	2
Populus deltoides	1	5
Ulmus americana	1	2
Ailanthus altissima	4	6.5
Prunus virginiana	1	5
Acer negundo	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	7	80
Poa sp.	3	5
Trifolium sp.	2	5
Quadrat #2		
unidentifed flower	8	15
Artemisia vulgaris	1	10
Eupatorium rugosum	4	35
Trifolium sp.	1	5
Poa sp.	3	20
Iris pseudacorus	1	5

Vines

Species	Number	% cover
Vitis sp.		2
Toxicodendron radicans		1

SITE DESCRIPTION: RM11.3 is located adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'.

PHOTOGRAPHS: RM 11.3 1 to RM 11.3 4 (western shore); RM 11.3.plot 2 to RM 11.3.plot 5. Photo RM 11.3.plot 5.1 shows typical riparian vegetation, Photo RM 11.3.plot 5.4 shows the shoreline. Represented by Photos 17 and 18 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/18/2007

Location: RM11.3 - Riverside Park, North of Dejessa Bridge

Plot # 5

GPS Point: RM11.3-5

Near Corps field point LP16 - Lyndhurst, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	34.9	956
Ulmus americana	5.2	21
Over Hanging Trees		
Salix nigra	*14.0*	*154*
Acer platanoides	*18.5*	*269*
Morus alba	*4.5*	*16*

Shrubs

Species	Number	% cover
Acer negundo	1	2
Morus alba	2	4
Acer saccharinum	1	0.5
Ulmus americana	2	1
Rosa multiflora	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	7	90
Quadrat #2		
Unidentified flower	2	5
Polygonum sp.	3	5
Microstegium vimineum	2	5
Eupatorium rugosum	5	10

Vines

Species	Number	% cover

SITE DESCRIPTION: RM11.3 is located adjacent to Riverside Park in Lyndhurst/North Arlington. Relatively natural, gently sloping shoreline with some concrete debris. Riparian zone is less than 20' wide narrowing to less than 10'.

PHOTOGRAPHS: RM 11.3 1 to RM 11.3 4 (western shore); RM 11.3.plot 2 to RM 11.3.plot 5. Photo RM 11.3.plot 5.1 shows typical riparian vegetation, Photo RM 11.3.plot 5.4 shows the shoreline. Represented by Photos 17 and 18 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/29/2007

Location: RM11.6 - Clifton, Passaic County | **Plot #** 1 | **GPS Point:** RM11.6-1

Near Corps field point LP15

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Robinia pseudoacacia	15.0	177
Robinia pseudoacacia	16.4	211
Robinia pseudoacacia	7.6	45
Morus alba	4.4	15
Populus deltoides	15.8	196
Robinia pseudoacacia	7.8	48
Populus deltoides	19.4	295
Morus alba	9.3	68
Robinia pseudoacacia	9.2	66
Robinia pseudoacacia	8.1	52
Morus alba	4.4	15
Morus alba	5.5	24
Robinia pseudoacacia	6.5	33
Over Hanging Trees		
Populus deltoides	*18.5*	*269*
Populus deltoides	*15.3*	*184*
Populus deltoides	*9.6*	*72*
Robinia pseudoacacia	*8.4*	*55*
Robinia pseudoacacia	*10.6*	*88*
Morus alba	*5.7*	*26*

Shrubs

Species	Number	% cover
Robinia pseudoacacia	3	9
Crataegus sp.	2	4
Quercus palustris	1	0.5
Prunus sp.	4	9.5
Lonicera tartarica	1	2
Ailanthus altissima	1	0.5
Morus alba	2	2.5
Ulmus americana	1	0.8

Herbs

Species	Number	% cover
Quadrat #1		
Bidens sp.	1	15
Allium vineale	2	50
Eupatorium rugosum	1	5
Portulaca sp.	1	5
Quadrat #2		
Eupatorium rugosum	11	60
Trifolium sp.	2	5
Alliaria petiolata	6	5
Boehmeria cylindrica	1	5
Artemisia vulgaris	1	5
Solanum nigrum	1	5
Solidago sp.	1	5

Vines

Species	Number	% cover
Toxicodendron radicans	2	5

SITE DESCRIPTION: RM11.6 has a nice riparian habitat with native vegetation and good bird habitat. The shoreline has a lot of exposed tree roots, overhanging and downed trees, gravel/cobble and old pilings which provide good benthic and fish habitat. Large mudflat area (somewhat sandy) visible at low tide. Site is located on the west bank adjacent to RT 21 and cannot be accessed by land.

PHOTOGRAPHS: RM 11.6 1 and RM 11.6 2; RM 11.6 plot 1 to RM 11.6 plot 3. Photo RM 11.6 3 shows the mudflat and overhanging trees and snags. Photo RM 11.6 1 shows old pilings half exposed by the tide. Site represented by Photos 15 and 16 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/29/2007

Location: RM11.6 - Clifton, Passaic County

Plot # 2

GPS Point: RM11.6-2

Near Corps field point LP15

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Platanus occidentalis	23.2	423
Morus alba	8.0	50
Populus deltoides	14.0	154
Quercus bicolor	8.0	50
Quercus bicolor	9.0	64
Quercus bicolor	8.3	54
Fraxinus pennsylvanica	4.7	17
Juglans nigra	4.2	14
Prunus serotina	6.0	28
Prunus serotina	6.3	31
Prunus serotina	4.8	18
Prunus serotina	7.0	38
Prunus serotina	14.4	163
Acer negundo	14.7	170
Over Hanging Trees		
Juglans nigra	*20.2*	*320*
Robinia pseudoacacia	*6.2*	*30*
Juglans nigra	*10.5*	*87*
Morus alba	*7.5*	*44*
Acer platanoides	*4.0*	*13*

Shrubs

Species	Number	% cover
Ulmus americana	1	0.5
Rubus sp.	1	0.5
Morus alba	1	0.5
Fraxinus pennsylvanica	4	16
Lindera benzoin	1	5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonatum canaliculatum	1	5
Eupatorium rugosum	3	20
Allium vineale	1	5
Quadrat #2		
Polygonum cuspidatum	3	40
Eupatorium rugosum	3	25
Toxicodendron radicans		15

Vines

Species	Number	% cover
Toxicodendron radicans		15
Parthenocissus quinquefolia		20
Celastrus orbiculatus		20

SITE DESCRIPTION: RM11.6 has a nice riparian habitat with native vegetation and good bird habitat. The shoreline has a lot of exposed tree roots, overhanging and downed trees, gravel/cobble and old pilings which provide good benthic and fish habitat. Large mudflat area (somewhat sandy) visible at low tide. Site is located on the west bank adjacent to RT 21 and cannot be accessed by land.

PHOTOGRAPHS: RM 11.6 1 and RM 11.6 2; RM 11.6 plot 1 to RM 11.6 plot 3. Photo RM 11.6 3 shows the mudflat and overhanging trees and snags. Photo RM 11.6 1 shows old pilings half exposed by the tide. Site represented by Photos 15 and 16 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/29/2007

Location: RM11.6 - Clifton, Passaic County | **Plot #** 3 | **GPS Point:** RM11.6-3

Near Corps field point LP15

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	13.2	137
Quercus bicolor	24.5	471
Prunus serotina	5.0	20
Prunus serotina	7.6	45
Over Hanging Trees		
Fraxinus pennsylvanica	*16.5*	*214*
Tilia americana	*21.7*	*370*
Tilia americana	*7.8*	*48*
Tilia americana	*13.8*	*149*
Tilia americana	*35.9*	*1,012*
Morus alba	*21.8*	*373*

Shrubs

Species	Number	% cover
Prunus serotina	3	17
Lindera benzoin	3	7.5
Viburnum dentatum	5	13
Celtis occidentalis	14	47.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	6	75
Allium vineale	2	10
Quadrat #2		
Polygonum cuspidatum	1	5

Vines

Species	Number	% cover

SITE DESCRIPTION: RM11.6 has a nice riparian habitat with native vegetation and good bird habitat. The shoreline has a lot of exposed tree roots, overhanging and downed trees, gravel/cobble and old pilings which provide good benthic and fish habitat. Large mudflat area (somewhat sandy) visible at low tide. Site is located on the west bank adjacent to RT 21 and cannot be accessed by land.

PHOTOGRAPHS: RM 11.6 1 and RM 11.6 2; RM 11.6 plot 1 to RM 11.6 plot 3. Photo RM 11.6 3 shows the mudflat and overhanging trees and snags. Photo RM 11.6 1 shows old pilings half exposed by the tide. Site represented by Photos 15 and 16 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/25/2007

Location: RM12.0 - Westfield Boat Club

Plot # 1

GPS Point: RM12.0-1

Near Corps field point LP14 - Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Juglans nigra	4.7	17
Over Hanging Trees		
Populus deltoides	*29.4*	*679*

Shrubs

Species	Number	% cover
Robinia pseudoacacia	5	7
Cornus amomum	1	2
Ailanthus altissima	1	0.5
Rosa multiflora	3	4.5
Acer saccharinum	1	10
Rubus sp.	3	1.5
Acer platanoides	1	2
Prunus sp.	1	2
Ulmus americana	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	3	100
Quadrat #2		
Eupatorium rugosum	1	10

Vines

Species	Number	% cover
Celastrus orbiculatus	2	5.5
Parthenocissus quinquefolia	1	0.5

SITE DESCRIPTION: RM12.0 is located at the Westfield High School Boat Club. The area sampled within the fenced in Boat Club did not have much vegetation, consisting of some weedy herbaceou sspecies and two trees. Most of the site was covered with mulch. The area just south of the boat club is dominated by the invasives *Polygonum cuspidatum* and *Celastrus orbiculatus* .

PHOTOGRAPHS: RM 12.0 1 to RM 12.0 3; RM 12.0 plot 1 to RM 12.0 plot 2. Photo RM 12.0 plot 1.2 shows vegetation sampled just south of the Boat Club, RM 12.0 2 shows the shoreline adjacent to the boat club. Site represented by Photos 13 and 14 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/25/2007

Location: RM12.0 - Westfield Boat Club

Plot # 2

GPS Point: RM12.0-2

Near Corps field point LP14 - Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Over Hanging Trees		
Populus deltoides	*19.9*	*311*
Ulmus americana	*10.5*	*87*

Shrubs

Species	Number	% cover
Lonicera tartarica	1	0.5
Unidentified Ornamental	1	0.5
Robinia pseudoacacia	1	0.5
Acer saccharinum	1	2
Ailanthus altissima	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	1	5
Solanum nigrum	1	35
Polygonum cuspidatum	2	45
Phytolacca americana	1	5
Quadrat #2		
Lythrum salicaria	1	5
Oenothera biennis	12	70
Polygonum cuspidatum	1	5
Phytolacca americana	3	10

Vines

Species	Number	% cover

SITE DESCRIPTION: RM12.0 is located at the Westfield High School Boat Club. The area sampled within the fenced in Boat Club did not have much vegetation, consisting of some weedy herbaceou sspecies and two trees. Most of the site was covered with mulch. The area just south of the boat club is dominated by the invasives Polygonum cuspidatum and Celastrus orbiculatus.

PHOTOGRAPHS: RM 12.0 1 to RM 12.0 3; RM 12.0 plot 1 to RM 12.0 plot 2. Photo RM 12.0 plot 1.2 shows vegetation sampled just south of the Boat Club, RM 12.0 2 shows the shoreline adjacent to the boat club. Site represented by Photos 13 and 14 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/25/2007

Location: RM12.3 – Van Winkle Park | **Plot #** 1 | **GPS Point:** RM12.3-1

Near Corps field point LP13 - Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	9.7	74
Ulmus americana	8.0	50
Ulmus americana	6.0	28
Ulmus americana	5.8	26
Over Hanging Trees		
Quercus palustris	*27.5*	*594*
Quercus palustris	*29.9*	*702*
Ulmus americana	*8.8*	*61*

Shrubs

Species	Number	% cover
Ulmus americana	8	4
Ailanthus altissima	1	0.5
Quercus palustris	1	0.5
Robinia pseudoacacia	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Viola sp.	2	5
Trifolium sp.	3	5
Quadrat #2		
Urtica dioica	3	5

Vines

Species	Number	% cover
Parthenocissus quinquefolia	1	0.5

SITE DESCRIPTION: RM12.3 is adjacent to Van Winkle park. There is no riparian vegetation and the stone retaining wall is collapsing in several places. There is evidence that that site is used for fishing. This site has potential for public water access although currently there is no parking lot. A stand of knotweed along the river has been treated with herbicide but some appears to be persisting.

PHOTOGRAPHS: RM 12.3 1; RM 12.3 plot 1 to RM 12.3 plot 2. Photos show the condition of the deteriorating retaining wall and lack of riparian vegetation. Site represented by Photos 11 and 12 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/25/2007

Location: RM12.3 – Van Winkle Park | **Plot #** 2 | **GPS Point:** RM12.3-2

Near Corps field point LP13 - Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	9.3	68
Ulmus americana	9.5	71
Over Hanging Trees		
Morus alba	*4.5*	16
Morus alba	*5.9*	27
Ulmus americana	*23.3*	426
Quercus palustris	*27.3*	*585*
Tilia americana	*25.0*	*491*
Platanus occidentalis	*38.8*	*1,182*

Shrubs

Species	Number	% cover
Ulmus americana	4	2
Acer negundo	2	1
Morus alba	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum		15
Quadrat #2		
Paspalum dilatatum		5
Trifolium sp.		5
Glechoma hederacea		5
Polygonum cuspidatum		5

Vines

Species	Number	% cover

SITE DESCRIPTION: RM12.3 is adjacent to Van Winkle park. There is no riparian vegetation and the stone retaining wall is collapsing in several places. There is evidence that that site is used for fishing. This site has potential for public water access although currently there is no parking lot. A stand of knotweed along the river has been treated with herbicide but some appears to be persisting.

PHOTOGRAPHS: RM 12.3 1; RM 12.3 plot 1 to RM 12.3 plot 2. Photos show the condition of the deteriorating retaining wall and lack of riparian vegetation. Site represen

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/30/2007

Location: RM12.8 - Rutherford, Bergen Co. | **Plot #** 1 | **GPS Point:** RM12.8-1

Near Corps field point LP10

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	8.2	53
Quercus palustris	21.0	346
Acer platanoides	10.6	88
Ulmus americana	7.0	38
Populus deltoides	24.3	464
Quercus palustris	23.3	426
Ulmus americana	9.6	72
Acer saccharinum	21.6	366
Acer saccharinum	19.3	292
Acer saccharinum	7.7	47
Acer saccharinum	8.5	57
Ulmus americana	4.6	17
Over Hanging Trees		
Fraxinus pennsylvanica	*19.8*	*308*
Fraxinus pennsylvanica	*8.4*	*55*

Shrubs

Species	Number	% cover
Ulmus americana	2	2.5
Celtis occidentalis	2	7
Juglans nigra	1	5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	90
Quadrat #2		
Polygonum cuspidatum	2	85

Vines

Species	Number	% cover
Toxicodendron radicans	2	1
Parthenocissus quinquefolia		10

SITE DESCRIPTION: Approximately 1/3 of RM12.8 is vertical wall of concrete or stone, with no riparian vegetation. Entire area is residential, with no public access.

PHOTOGRAPHS: RM 12.8 1 and RM 12.8 2; RM 12.8 plot 2 and RM 12.8 plot 3. Photo RM 12.8 1 shows an example of the stonewalls along the shoreline, other photos are areas where vegetation was sampled. Represented by Photos 8 & 9 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/30/2007

Location: RM12.8 - Rutherford, Bergen Co.

Plot # 2

GPS Point: RM12.8-2

Near Corps field point LP10

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Pinus strobus	5.5	24
Platanus occidentalis	34.0	907
Ulmus americana	5.5	24
Ulmus americana	7.8	48
Ulmus americana	6.1	29
Quercus palustris	20.8	340
Ulmus americana	4.3	15
Ulmus americana	5.8	26
Ulmus americana	13.0	133
Over Hanging Trees		
Ulmus americana	*7.4*	43
Ulmus americana	*5.9*	27
Ulmus americana	*7.9*	49
Quercus palustris	*28.0*	*615*

Shrubs

Species	Number	% cover
Malus coronaria	2	10
Celtis occidentalis	2	12
Ulmus americana	6	7.5
Rosa multiflora	4	2
Acer platanoides	5	10.5
Morus alba	1	5
Acer palmatum	1	0.5
Ulmus americana	2	10.5

Herbs

Species	Number	% cover
Quadrat #1		
Lonicera japonica		95
Quadrat #2		
Lonicera japonica		5
Rosa multiflora	1	5

Vines

Species	Number	% cover
Toxicodendron radicans	2	1
Lonicera japonica	1	5

SITE DESCRIPTION: Approximately 1/3 of RM12.8 is vertical wall of concrete or stone, with no riparian vegetation. Entire area is residential, with no public access.

PHOTOGRAPHS: RM 12.8 1 and RM 12.8 2; RM 12.8 plot 2 and RM 12.8 plot 3. Photo RM 12.8 1 shows an example of the stonewalls along the shoreline, other photos are areas where vegetation was sampled. Represented by Photos 8 & 9 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/30/2007

Location: RM12.8 - Rutherford, Bergen Co. | **Plot #** 3 | **GPS Point:** RM12.8-3

Near Corps field point LP10

Trees (over 4"DBH and 4' tall) **Shrubs** **Herbs** **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Acer saccharinum	30.1	711	*Sambucus canadensis*	1	5	Quadrat #1			*Parthenocissus quinquefolia*	5	10
Acer saccharinum	15.2	181	*Ulmus americana*	3	4.5	*Urtica* sp.	4	70	*Lonicera japonica*	2	1
			Acer platanoides	1	10	*Lythrum salicaria*	3	30			
			Lonicera sp.	3	6						
						Quadrat #2					
						Polygonum cuspidatum	1	20			
						Rumex obtusifolius	1	20			
						Urtica sp.	4	40			
Over Hanging Trees											
Juglans nigra	*10.0*	*79*									

SITE DESCRIPTION: Approximately 1/3 of RM12.8 is vertical wall of concrete or stone, with no riparian vegetation. Entire area is residential, with no public access.

PHOTOGRAPHS: RM 12.8 1 and RM 12.8 2; RM 12.8 plot 2 and RM 12.8 plot 3. Photo RM 12.8 1 shows an example of the stonewalls along the shoreline, other photos are areas where vegetation was sampled. Represented by Photos 8 & 9 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Peg McBrien, Tom Shinskey & Michelle Verdugo | **Date:** 10/30/2007

Location: RM12.9 - Clifton, Passaic Co. | **Plot #** 1 | **GPS Point:** RM12.9-1

Near Corps field point LP11

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Ulmus americana	6.9	37	*Quercus* sp.	2	1	Quadrat #1					
Fraxinus pennsylvanica	9.0	64	*Hibiscus syriacus*	1	0.5	*Polygonum cuspidatum*	3	95			
Prunus serotina	12.7	127	*Rosa multiflora*	2	20						
Prunus serotina	6.5	33	*Acer platanoides*	1	0.5						
Morus alba	7.2	41	*Ulmus americana*	2	1						
Ailanthus altissima	5.4	23	*Rubus* sp.	1	0.5						
Celtis occidentalis	4.7	17									
Ailanthus altissima	9.4	69				Quadrat #2					
Ailanthus altissima	9.5	71				*Trifolium* sp.	2	10			
Morus alba	14.7	170				*Eupatorium rugosum*	6	60			
Celtis occidentalis	22.5	397				*Allium vineale*	3	5			
Ailanthus altissima	4.1	13									
Over Hanging Trees											
Catalpa bignonioides	*7.4*	43									

SITE DESCRIPTION: Small site on western shore adjacent to a commercial property, there is no public access. Shoreline in this area contains an old wooden bulkhead, also an outfall pipe outlet at this site.

PHOTOGRAPHS: RM 12.9 1 to RM 12.9 4; RM 12.9 plot 1 to RM 12.9 plot 2. Photo RM 12.9 4 shows typical vegetation at the site, while photo RM 12.9 1 shows the outfall pipe. Site represented by Photo 10 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Peg McBrien, Tom Shinskey & Michelle Verdugo | **Date:** 10/30/2007

Location: RM12.9 - Clifton, Passaic Co. | **Plot #** 2 | **GPS Point:** RM12.9-2

Near Corps field point LP11

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	8.1	52
Acer saccharinum	4.7	17
Ulmus americana	7.9	49
Platanus occidentalis	12.5	123
Platanus occidentalis	9.9	77
Platanus occidentalis	10.5	87
Platanus occidentalis	8.9	62
Platanus occidentalis	6.2	30
Platanus occidentalis	9.9	77
Ulmus americana	5.4	23
Acer saccharinum	6.3	31
Acer saccharinum	7.4	43
Acer saccharinum	5.6	25
Ulmus americana	12.1	115
Ulmus americana	8.5	57
Ulmus americana	8.0	50
Ulmus americana	11.7	107
Over Hanging Trees		
Acer saccharinum	*7.8*	*48*
Acer saccharinum	*9.7*	*74*
Acer saccharinum	*4.9*	*19*
Acer saccharinum	*4.2*	*14*
Robinia pseudoacacia	*5.6*	*25*
Juglans nigra	*6.6*	*34*

Shrubs

Species	Number	% cover
Acer saccharinum	1	2
Ulmus americana	6	21.5
Rosa multiflora	1	2
Acer platanoides	1	5
Quercus palustris	1	0.5
Rubus sp.	1	0.5
Quercus sp.	1	0.5
Juglans nigra	1	2
Ailanthus altissima	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	4	15
Allium vineale	2	10
Trifolium sp.	1	5
Quadrat #2		
Eupatorium rugosum	3	10
Allium vineale	2	15
Polytrichum sp.		2.5
Poa sp.		2.5
Toxicodendron radicans	5	20

Vines

Species	Number	% cover
Parthenocissus quinquefolia		15
Toxicodendron radicans		10
Celastrus orbiculatus		10

SITE DESCRIPTION: Small site on western shore adjacent to a commercial property, there is no public access. Shoreline in this area contains an old wooden bulkhead, also an outfall pipe outlet at this site.

PHOTOGRAPHS: RM 12.9 1 to RM 12.9 4; RM 12.9 plot 1 to RM 12.9 plot 2. Photo RM 12.9 4 shows typical vegetation at the site, while photo RM 12.9 1 shows the outfall pipe Site represented by Photo 10 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM13.6 – Memorial Park | **Plot #** 1 | **GPS Point:** RM13.6-1

Near Corps field point LP9 - E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Populus candicans	8.0	50
Populus candicans	10.9	93
Populus candicans	5.7	26
Populus candicans	6.4	32
Populus candicans	12.0	113
Populus candicans	5.5	24
Populus candicans	11.1	97
Populus candicans	6.2	30
Populus candicans	10.6	88
Populus candicans	4.0	13
Over Hanging Trees		
Salix babylonica	*23.6*	*437*
Populus candicans	*23.9*	*448*
Populus candicans	*6.0*	*28*
Populus candicans	*11.5*	*104*

Shrubs

Species	Number	% cover
Catalpa bignonioides	1	0.5
Quercus rubra	2	1.5
Ulmus americana	2	1
Ailanthus altissima	1	0.5
Acer platinoides	1	2
Populus candicans	3	5
Ulmus americana	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	5	40
Quadrat #2		
Eupatorium rugosum	5	70
Allium vineale	1	5

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling area adjacent to large recreational park in Rutherford. There is essentially no riparian zone along entire area sampled. Shoreline i a concrete stabilization wall. Vegetation along the top of the wall is mostly small trees and shrubs.

PHOTOGRAPHS: RM 13.6 1 to RM 13.6 3; RM 13.6 plot 1 to RM 13.6 plot 4. Photo RM 13.6 1 shows a view of the shoreline. Photo RM 13.6 plot 2.2 shows the typical vegetation in the area sampled. Site represented by Photos 6 and 7 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM13.6 – Memorial Park | **Plot #** 2 | **GPS Point:** RM13.6-2

Near Corps field point LP9 - E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Celtis occidentalis	5.9	27
Prunus serotina	7.2	41
Ailanthus altissima	6.9	37
Ailanthus altissima	6.3	31
Celtis occidentalis	4.6	17
Morus alba	6.5	33
Morus alba	12.1	115
Prunus serotina	9.6	72
Prunus serotina	17.6	243
Over Hanging Trees		
Quercus palustris	*23.6*	437
Ulmus americana	*11.1*	97
Acer platinoides	*5.1*	*20*

Shrubs

Species	Number	% cover
Ailanthus altissima	9	5.5
Cornus stolonifera	2	2.5
Quercus rubra	1	0.5
Robinia pseudoacacia	1	0.5
Acer platinoides	4	6.5
Ulmus americana	7	3.5
Rosa multiflora	4	5
Lonicera sp.	1	2
Crataegus sp.	1	2
Celtis occidentalis	3	2.5
Prunus serotina	13	12
Morus alba	1	2
Taxus baccata	2	1
Fraxinus pennsylvanica	6	10.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	5	55
Elymus virginicus		15
Quadrat #2		
Alliaria petiolata		10

Vines

Species	Number	% cover
Toxicodendron radicans	1	0.5
Celastrus orbiculatus	1	0.5

SITE DESCRIPTION: Sampling area adjacent to large recreational park in Rutherford. There is essentially no riparian zone along entire area sampled. Shoreline is a concrete stabilization wall. Vegetation along the top of the wall is mostly small trees and shrubs.

PHOTOGRAPHS: RM 13.6 1 to RM 13.6 3; RM 13.6 plot 1 to RM 13.6 plot 4. Photo RM 13.6 1 shows a view of the shoreline. Photo RM 13.6 plot 2.2 shows the typical vegetation in the area sampled. Site represented by Photos 6 and 7 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM13.6 – Memorial Park | **Plot #** 3 | **GPS Point:** RM13.6-3

Near Corps field point LP9 - E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	4.6	17
Ulmus americana	6.0	28
Ulmus americana	5.8	26
Ulmus americana	4.5	16
Populus deltoides	22.0	380
Populus deltoides	22.0	380
Populus deltoides	22.0	380
Fraxinus pennsylvanica	6.4	32
Populus candicans	7.4	43
Over Hanging Trees		
Populus candicans	*23.8*	*445*
Pyrus calleryana	*19.6*	*302*
Ulmus americana	*6.1*	*29*

Shrubs

Species	Number	% cover
Acer platinoides	10	6.5
Celtis occidentalis	4	2.5
Quercus palustris	3	6
Prunus sp.	12	12
Populus candicans	1	0.5
Hibiscus syriacus	2	1
Crataegus sp.	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Elymus virginicus		60
Quadrat #2		
Eupatorium rugosum	1	5
Elymus virginicus		40

Vines

Species	Number	% cover
Toxicodendron radicans	1	1

SITE DESCRIPTION: Sampling area adjacent to large recreational park in Rutherford. There is essentially no riparian zone along entire area sampled. Shoreline is a concrete stabilization wall. Vegetation along the top of the wall is mostly small trees and shrubs.

PHOTOGRAPHS: RM 13.6 1 to RM 13.6 3; RM 13.6 plot 1 to RM 13.6 plot 4. Photo RM 13.6 1 shows a view of the shoreline. Photo RM 13.6 plot 2.2 shows the typical vegetation in the area sampled. Site represented by Photos 6 and 7 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM13.6 – Memorial Park | **Plot #** 4 | **GPS Point:** RM13.6-4

Near Corps field point LP9 - E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer platinoides	8.2	53
Populus deltoides	30.8	745
Acer platinoides	7.4	43
Over Hanging Trees		
Pyrus calleryana	*19.7*	*305*
Acer platinoides	*5.0*	*20*

Shrubs

Species	Number	% cover
Acer platinoides	5	14.5
Prunus virginiana	1	2
Celtis occidentalis	3	3
Quercus sp.	2	1.5
Lonicera sp.	1	0.5
Quercus rubra	1	0.5
Pyrus calleryana	2	10
Robinia pseudoacacia	1	0.5
Prunus sp.	16	24.5
Ailanthus altissima	1	2
Cornus amomum	1	10

Herbs

Species	Number	% cover
Quadrat #1		
No herbaceous		
Qaudrat #2		
Eupatorium rugosum	2	10

Vines

Species	Number	% cover
Toxicodendron radicans	1	2

SITE DESCRIPTION: Sampling area adjacent to large recreational park in Rutherford. There is essentially no riparian zone along entire area sampled. Shoreline is a concrete stabilization wall. Vegetation along the top of the wall is mostly small trees and shrubs.

PHOTOGRAPHS: RM 13.6 1 to RM 13.6 3; RM 13.6 plot 1 to RM 13.6 plot 4. Photo RM 13.6 1 shows a view of the shoreline. Photo RM 13.6 plot 2.2 shows the typical vegetation in the area sampled. Site represented by Photos 6 and 7 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/23/2007

Location: RM13.6 – Memorial Park | **Plot #** 5 | **GPS Point:** RM13.6-5

Near Corps field point LP9 - E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Gleditsia triacanthos	11.8	109
Gleditsia triacanthos	13.6	145
Pyrus calleryana	4.0	13
Fraxinus pennsylvanica	8.3	54
Quercus palustris	5.5	24
Acer platinoides	13.5	143
Over Hanging Trees		
Ailanthus altissima	*6.8*	*36*

Shrubs

Species	Number	% cover
Fraxinus pennsylvanica	2	1
Ulmus americana	5	4
Hibiscus syriacus	2	2.5
Quercus rubra	1	0.5
Ailanthus altissima	1	0.5
Cornus amomum	2	1
Acer platinoides	3	3
Rosa multiflora	1	2
Prunus sp.	2	7
Acer negundo	1	0.5
Rubus sp.	1	0.5
Gleditsia triacanthos	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Aster sp.	3	10
Eupatorium rugosum	2	10
Alliaria petiolata	1	10
Poa sp.		10
Quadrat #2		
Eupatorium rugosum	3	25
Oenothera biennis	3	10
Poa sp.		65

Vines

Species	Number	% cover

SITE DESCRIPTION: Sampling area adjacent to large recreational park in Rutherford. There is essentially no riparian zone along entire area sampled. Shoreline is a concrete stabilization wall. Vegetation along the top of the wall is mostly small trees and shrubs.

PHOTOGRAPHS: RM 13.6 1 to RM 13.6 3; RM 13.6 plot 1 to RM 13.6 plot 4. Photo RM 13.6 1 shows a view of the shoreline. Photo RM 13.6 plot 2.2 shows the typical vegetation in the area sampled. Site represented by Photos 6 and 7 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/31/2007

Location: RM13.8 - Passaic City, Passaic Co. | **Plot #** 1 | **GPS Point:** RM13.8-1

Between Corps field points LP7 and LP8

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	11.3	100
Acer platanoides	26.9	568
Morus alba	11.1	97
Morus alba	13.1	135
Morus alba	7.1	40
Morus alba	10.7	90
Morus alba	9.5	71
Morus alba	5.9	27
Ailanthus altissima	7.2	41
Ulmus americana	4.3	15
Ulmus americana	14.5	165
Ulmus americana	14.5	165
Ulmus americana	6.9	37
Acer platanoides	4.7	17
Ailanthus altissima	5.7	26
Ailanthus altissima	7.3	42
Over Hanging Trees		
Acer rubrum	*9.0*	*64*
Acer rubrum	*4.1*	*13*
Acer platanoides	*6.6*	*34*
Populus deltoides	*10.8*	*92*

Shrubs

Species	Number	% cover
Rosa multiflora	7	11
Acer platanoides	17	50
Morus alba	1	2
Cornus amomum	1	2
Ailanthus altissima	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Allium vineale	2	10
Quadrat #2		
Cypripedium acaule	1	10
Lemna sp.	mat	5

Vines

Species	Number	% cover
Toxicodendron radicans	3	5
Vitis sp.	5	10

SITE DESCRIPTION: Sampled between the Corps field points LP7 and LP8 along the western shoreline of the river. Fairly natural, sloping, rocky shoreline. Mostly woody vegetation. Several low hanging trees along the shoreline which provide good fish/benthos habitat at high tide.

PHOTOGRAPHS: RM 13.8 plot 1 through RM 13.8 plot 2 (photos all taken from boat).
Represented by Photo 5 in the Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/31/2007

Location: RM13.8 - Passaic City, Passaic Co. | **Plot #** 2 | **GPS Point:** RM13.8-2

Between Corps field points LP7 and LP8

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer platanoides	10.3	83
Morus alba	7.8	48
Morus alba	7.8	48
Morus alba	10.1	80
Fraxinus pennsylvanica	13.0	133
Robinia pseudoacacia	7.8	48
Robinia pseudoacacia	6.0	28
Robinia pseudoacacia	4.8	18
Robinia pseudoacacia	6.7	35
Robinia pseudoacacia	4.6	17
Robinia pseudoacacia	4.0	13
Robinia pseudoacacia	9.0	64
Robinia pseudoacacia	8.4	55
Robinia pseudoacacia	4.2	14
Robinia pseudoacacia	7.8	48
Over Hanging Trees		
Acer platanoides	*9.7*	*74*
Acer platanoides	*11.8*	*109*
Robinia pseudoacacia	*6.0*	*28*
Acer platanoides	*11.4*	*102*

Shrubs

Species	Number	% cover
Rosa multiflora	5	14.5
Robinia pseudoacacia	1	2
Ailanthus altissima	5	4
Acer platanoides	8	13
Lonicera tatarica	1	0.5
Ulmus americana	2	2
Carya sp.	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Allium vineale	2	5
Polytrichum sp.	(mat)	5
Quadrat #2		
Eupatorium rugosum	2	20
Allium vineale	2	5

Vines

Species	Number	% cover
Parthenocissus quinquefolia	1	10
Toxicodendron radicans	13	40
Lonicera japonica	1	5

SITE DESCRIPTION: Sampled between the Corps field points LP7 and LP8 along the western shoreline of the river. Fairly natural, sloping, rocky shoreline. Mostly woody vegetation. Several low hanging trees along the shoreline which provide good fish/benthos habitat at high tide.

PHOTOGRAPHS: RM 13.8 plot 1 through RM 13.8 plot 2 (photos all taken from boat).
Represented by Photo 5 in the Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Kate Mulvey | **Date:** 10/31/2007

Location: RM13.8 - Passaic City, Passaic Co. | **Plot #** 3 | **GPS Point:** RM13.8-3

Between Corps field points LP7 and LP8

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Populus deltoides	10.5	87
Populus deltoides	15.2	181
Populus deltoides	20.0	314
Ulmus americana	8.3	54
Ulmus americana	4.8	18
Ulmus americana	5.4	23
Ulmus americana	12.0	113
Over Hanging Trees		
Fraxinus pennsylvanica	*15.9*	*198*
Quercus palustris	*10.3*	*83*
Morus alba	*4.8*	*18*

Shrubs

Species	Number	% cover
Rosa multiflora	7	9.5
Cornus stolonifera	3	4.5
Acer rubrum	1	2
Acer platanoides	6	13.5
Tilia americana	1	0.5
Quercus palustris	8	5.5
Rhus glabra	8	14.5
Ailanthus altissima	3	17
Prunus serotina	5	10
Juniperus virginiana	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	7	20
Bidens sp.	8	25
Oenothera biennis	1	5
Allium vineale	1	5
Heteranthera reniformis	5	5
Quadrat #2		
Smilax rotundifolia	1	15

Vines

Species	Number	% cover
Lonicera japonica	1	15
Toxicodendron radicans	8	25

SITE DESCRIPTION: Sampled between the Corps field points LP7 and LP8 along the western shoreline of the river. Fairly natural, sloping, rocky shoreline. Mostly woody vegetation. Several low hanging trees along the shoreline which provide good fish/benthos habitat at high tide.

PHOTOGRAPHS: RM 13.8 plot 1 through RM 13.8 plot 2 (photos all taken from boat).
Represented by Photo 5 in the Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/24/2007

Location: RM14.1 - Liberty Crossing Park

Plot # 1

GPS Point: RM14.1-1

Near Corps field point LP6, E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Platanus occidentalis	23.4	430

Shrubs

Species	Number	% cover
Acer platanoides	1	0.5
Rosa multiflora	5	4
Ailanthus altissima	3	5.5
Ulmus americana	1	2
Quercus sp.	1	0.5
Acer saccharinum	1	10
Platanus occidentalis	1	0.5
Fraxinus pennsylvanica	1	10
*Spiraea japonica**	6	3
*Juniperus chinensis**	5	2.5
*Juniper horizantalis**	4	2
*Pinus banksiana**	1	0.5
Rhododendron sp.*	3	1.5
Betula sp.*	1	0.5
*Berberis thunbergeii**	2	1

Herbs

Species	Number	% cover
Quadrat #1		
Cyperus strigosus	11	5
Polygonum punctatum	1	10
Polygonum hydropiperoides	1	40
Polygonum convolvulus	1	10
Eupatorium rugosum	1	20
Daucus carota	11	1
Trifolium sp.	2	2.5
Setaria pumilia	1	2.5
Digitaria sp.	1	1
Quadrat #2		
Polygonum cuspidatum	1	15
Phytolacca americana	1	60
Eupatorium rugosum	1	5
Humulus japonicus	1	10

Vines

Species	Number	% cover
Celastrus orbiculatus		20
Parthenocissus quinquefo	2	1
Toxicodendron radicans	2	1

SITE DESCRIPTION: *designates a landscape plant. Sampling location falls between RM14.1 and RM13.8 on the east side of the river. The river bank is extremely steep. Plots 1 and 2 are adjacent to the new Liberty Memorial Park (dedicated October 20,2007) just south of the Aquanacock Bridge. Park is landscaped all the way to the top of slope, where there is a chain link fence. Plots 3 and 4 are adjacent to the Rutherford War Memorial Park and the vacant lot south of it. Vegetation adjacent to this park is dominated by very dense growth of *Polygonum cuspidatum* , *Rosa multiflora* and *Celastrus orbiculatus* .

PHOTOGRAPHS: RM 14.1 1 to RM 14.1 7; RM 14.1 plot 1 to RM 14.1 plot 4. Photo RM 14.1 plot 1 shows the steep slope and vegetation, Photo RM 14.1 plot 4 shows the shoreline adjacent to the empty lot at the south end of the site. Photo RM 14.1 8 shows the vegetation adjacent to the War Memorial Park. Site represented by Photos 3 and 4 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/24/2007

Location: RM14.1 - Liberty Crossing Park | **Plot #** 2 | **GPS Point:** RM14.1-2

Near Corps field point LP6, E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Ailanthus altissima	10.3	83	*Ailanthus altissima*	29	14.5	Quadrat #1					
			Paulownia tomentosa	2	1	*Phytolacca americana*	1	35			
			Populus sp.	1	0.5	*Portulaca* sp.	(mat)	7.5			
			Rosa multiflora	1	0.5	*Cirsium* sp.	1	2.3			
						Polygonum cuspidatum	2	45			
						Abutilon theophrasti	1	5			
						Cyperus strigosus	2	5			
						Quadrat #1					
						Polygonum cuspidatum	1	45			
						Eupatorium rugosum	2	5			

SITE DESCRIPTION: *designates a landscape plant. Sampling location falls between RM14.1 and RM13.8 on the east side of the river. The river bank is extremely steep. Plots 1 and 2 are adjacent to the new Liberty Memorial Park (dedicated October 20,2007) just south of the Aquanacock Bridge. Park is landscaped all the way to the top of slope, where there is a chain link fence. Plots 3 and 4 are adjacent to the Rutherford War Memorial Park and the vacant lot south of it. Vegetation adjacent to this park is dominated by very dense growth of Polygonum cuspidatum, Rosa multiflora and Celastrus orbiculatus.
There is evidence of stream erosion at this plot.

PHOTOGRAPHS: RM 14.1 1 to RM 14.1 7; RM 14.1 plot 1 to RM 14.1 plot 4. Photo RM 14.1 plot 1 shows the steep slope and vegetation, Photo RM 14.1 plot 4 shows the shoreline adjacent to the empty lot at the south end of the site. Photo RM 14.1 8 shows the vegetation adjacent to the War Memorial Park. Site represented by Photos 3 and 4 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/24/2007

Location: RM14.1 - Liberty Crossing Park

Plot # 3

GPS Point: RM14.1-3

Near Corps field point LP6, E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Robinia pseudoacacia	6.2	30
Robinia pseudoacacia	4.0	13
Ulmus americana	9.9	77
Ulmus americana	10.2	82
Pyrus calleryana	5.7	26
Over Hanging Trees		
Fraxinus pennsylvanica	*43.4*	1479
Ailanthus altissima	*5.6*	*25*
Robinia pseudoacacia	*6.9*	*37*
Robinia pseudoacacia	*6.0*	*28*

Shrubs

Species	Number	% cover
Acer platanoides	19	23
Quercus sp.	1	0.5
Ailanthus altissima	4	9.5
Morus alba	1	2
Rosa multiflora	8	4.5

Herbs

Species	Number	% cover
Quadrat #1		
Ampelopsis brevipendunculata	1	10
Sicyos angulatus	1	5
Quadrat #2		
Solanum nigrum	2	10
Phytolacca americana	1	50
Alliaria petiolata	4	20
Trifolium sp.	1	1
Verbascum thapsus	1	10

Vines

Species	Number	% cover
Parthenocissus quinquefolia	4	20
Toxicodendron radicans	2	10
Celastrus orbiculatus	5	25

SITE DESCRIPTION: *designates a landscape plant. Sampling location falls between RM14.1 and RM13.8 on the east side of the river. The river bank is extremely steep. Plots 1 and 2 are adjacent to the new Liberty Memorial Park (dedicated October 20,2007) just south of the Aquanacock Bridge. Park is landscaped all the way to the top of slope, where there is a chain link fence. Plots 3 and 4 are adjacent to the Rutherford War Memorial Park and the vacant lot south of it. Vegetation adjacent to this park is dominated by very dense growth of Polygonum cuspidatum, Rosa multiflora and Celastrus orbiculatus.

PHOTOGRAPHS: RM 14.1 1 to RM 14.1 7; RM 14.1 plot 1 to RM 14.1 plot 4. Photo RM 14.1 plot 1 shows the steep slope and vegetation, Photo RM 14.1 plot 4 shows the shoreline adjacent to the empty lot at the south end of the site. Photo RM 14.1 8 shows the vegetation adjacent to the War Memorial Park. Site represented by Photos 3 and 4 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/24/2007

Location: RM14.1 - Liberty Crossing Park

Plot # 4

GPS Point: RM14.1-4

Near Corps field point LP6, E. Rutherford, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)

Shrubs

Species	Number	% cover
Paulownia tomentosa	6	3.5
Rosa multiflora	4	8
Ailanthus altissima	1	2
Cottonwood	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Solanum nigrum	3	10
Polygonum punctatum	2	5
Rumex obtusifolius	10	50
Paspalum dilatatum		5
Phytolacca americana	1	10
Digitaria sp.		10
Unidentified herb	2	10
Quadrat #2		
Rumex obtusifolius	5	15
Aster sp.	1	15
Oenothera biennis	2	10
Phytolacca americana	1	30
Digitaria sp.		5
Setaria pumilia		5
Convolvulus sepium	1	5
Solanum nigrum	2	10
Trifolium sp.	1	5

Vines

Species	Number	% cover
Parthenocissus quinquefolia		100
Toxicodendron radicans		10
Lonicera japonica		5

SITE DESCRIPTION: *designates a landscape plant. Sampling location falls between RM14.1 and RM13.8 on the east side of the river. The river bank is extremely steep. Plots 1 and 2 are adjacent to the new Liberty Memorial Park (dedicated October 20,2007) just south of the Aquanacock Bridge. Park is landscaped all the way to the top of slope, where there is a chain link fence. Plots 3 and 4 are adjacent to the Rutherford War Memorial Park and the vacant lot south of it. Vegetation adjacent to this park is dominated by very dense growth of Polygonum cuspidatum, Rosa multiflora and Celastrus orbiculatus.

PHOTOGRAPHS: RM 14.1 1 to RM 14.1 7; RM 14.1 plot 1 to RM 14.1 plot 4. Photo RM 14.1 plot 1 shows the steep slope and vegetation, Photo RM 14.1 plot 4 shows the shoreline adjacent to the empty lot at the south end of the site. Photo RM 14.1 8 shows the vegetation adjacent to the War Memorial Park. Site represented by Photos 3 and 4 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo

Date: 10/24/2007

Location: RM15.2 - General Pulaski Memorial Park

Plot # 1

GPS Point: RM15.2-1

Near Corps field point LP2, Wallington, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	8.1	52
Ulmus americana	14.4	163
Acer saccharinum	8.3	54
Acer saccharinum	7.1	40
Ulmus americana	13.8	149
Ulmus americana	10.3	83
Ulmus americana	9.5	71
Ulmus americana	9.2	66
Ulmus americana	8.9	62
Over Hanging Trees		
Ulmus americana	*18.3*	263
Ulmus americana	*13.6*	145

Shrubs

Species	Number	% cover
Catalpa bignonioides	1	10
Ailanthus altissima	1	0.5
Prunus sp.	5	2.5
Cornus amomum	3	3
Quercus sp.	1	0.5
Acer saccharinum	1	10

Herbs

Species	Number	% cover
Quadrat #1		
Solanum nigrum	2	10
Eupatorium rugosum	6	15
Quadrat #2		
Polygonum cuspidatum	3	50

Vines

Species	Number	% cover

SITE DESCRIPTION: Upland along shoreline is General Pulaski Memorial Park in Wallington. Site has steep slopes with a 3' wide riparian zone. Park is fenced almost to the top of the slope. There is not much herbaceous vegetation except for a few clumps of *Polygonum cuspidatum*. Shoreline is rocky/concrete debris. There is a winged box culvert located at sampling point RM15.2-2.

PHOTOGRAPHS: RM 15.2 plot 1 through RM 15.2 plot 3. Photo RM 15.2 plot 3.1 is a good depiction of the shoreline at this location. Represented by Photos 1 and 2 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 10/24/2007

Location: RM15.2 - General Pulaski Memorial Park | **Plot #** 2 | **GPS Point:** RM15.2-2

Near Corps field point LP2, Wallington, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Ulmus americana	24.9	487
Platanus occidentalis	14.0	154
Ulmus americana	5.2	21
Ulmus americana	10.8	92
Over Hanging Trees		
Fraxinus pennsylvanica	*7.6*	45
Prunus sp.	*11.5*	*104*

Shrubs

Species	Number	% cover
Cornus stolonifera	23	30.5
Acer platanoides	5	2.5
Quercus rubra	1	0.5
Ulmus americana	1	0.5
Ailanthus altissima	2	1
Acer negundo	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	6	40
Quadrat #2		
Polygonum cuspidatum	1	45
Eupatorium rugosum	2	5

Vines

Species	Number	% cover
Toxicodendron radicans	2	5.5

SITE DESCRIPTION: Upland along shoreline is General Pulaski Memorial Park in Wallington. Site has steep slopes with a 3' wide riparian zone. Park is fenced almost to the top of the slope. There is not much herbaceous vegetation except for a few clumps of Polygonum cuspidatum. Shoreline is rocky/concrete debris. There is a winged box culvert located at sampling point RM15.2-2.

PHOTOGRAPHS: RM 15.2 plot 1 through RM 15.2 plot 3. Photo RM 15.2 plot 3.1 is a good depiction of the shoreline at this location. Represented by Photos 1 and 2 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey & Michelle Verdugo | **Date:** 11/2/2007

Location: RM15.2 - General Pulaski Memorial Park | **Plot #** 3 | **GPS Point:** RM15.2-3

Near Corps field point LP2, Wallington, Bergen Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Platanus occidentalis	14.2	158
Ailanthus altissima	4.4	15
Ulmus americana	5.0	20
Ulmus americana	8.4	55
Ulmus americana	18.6	272
Over Hanging Trees		
Acer saccharinum	*10.5*	87
Acer saccharinum	*4.7*	*17*
Acer saccharinum	*13.6*	*145*
Morus alba	*4.6*	*17*

Shrubs

Species	Number	% cover
Cornus stolonifera	3	12
Ailanthus altissima	1	0.5
Ulmus americana	1	0.5
Berberis thunbergii	1	0.5
Hibiscus syriacus	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	10	60
Convolvulus sepium	1	5
Hedera helix	1	5
Quadrat #2		
Eupatorium rugosum	12	20

Vines

Species	Number	% cover

SITE DESCRIPTION: Upland along shoreline is General Pulaski Memorial Park in Wallington. Site has steep slopes with a 3' wide riparian zone. Park is fenced almost to the top of the slope. There is not much herbaceous vegetation except for a few clumps of Polygonum cuspidatum. Shoreline is rocky/concrete debris. There is a winged box culvert located at sampling point RM15.2-2.

PHOTOGRAPHS: RM 15.2 plot 1 through RM 15.2 plot 3. Photo RM 15.2 plot 3.1 is a good depiction of the shoreline at this location. Represented by Photos 1 and 2 in the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall

Date: 11/2/2007

Location: RM17.6 - Dundee Island

Plot # 1

GPS Point: RM17.6-1

Clifton, Passaic Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Platanus occidentalis	20.1	317
Platanus occidentalis	15.8	196
Salix nigra	30.0	707
Acer negundo	11.0	95
Fraxinus pennsylvanica	4.0	13
Fraxinus pennsylvanica	4.1	13
Fraxinus pennsylvanica	27.2	581
Acer saccharinum	12.0	113
Acer saccharinum	16.0	201
Over Hanging Trees		
Robinia pseudoacacia	*17.3*	235
Populus deltoides	*26.3*	543

Shrubs

Species	Number	% cover
Acer rubrum	2	12
Cornus alternifolia	1	2
Tilia americana	1	0.5
Cornus amomum	2	2.5
Betula nigra	1	5
Fraxinus pennsylvanica	2	10
Platanus occidentalis	1	5

Herbs

Species	Number	% cover
Quadrat #1		
Eupatorium rugosum	3	10
Polygonum cuspidatum	1	5
Quadrat #2		
Polygonum cuspidatum	5	80

Vines

Species	Number	% cover
Toxidendron radicans	4	9.5

SITE DESCRIPTION: Site has natural cobble/gravel shoreline, and the river here is shallow and has riffles. Site is about 200 yards south of the Dundee Dam. Site is forested, but much of understory has been recently cleared and chipped, and a stone dust trail has been created. South end of site (near plot 5) consists of large mounds of concrete debris. The site is currently gated and locked. There is a severe porcelainberry problem along the trail to the gate, and *Polygonum cuspidatum* was quickly growing back along the river following landscaping activities.

PHOTOGRAPHS: RM 17.6 1 to RM 17.6 6. RM 17.6 plot 1 through RM 17.6 plot 5. Photo RM 17.6 plot 4.2 shows remains of a Native American fish wier in the river. Site represented by Photos 28 and 29 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall

Date: 11/2/2007

Location: RM17.6 - Dundee Island

Plot # 2

GPS Point: RM17.6-2

Clifton, Passaic Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	6.5	33
Robinia pseudoacacia	12.0	113
Betula nigra	10.1	80
Acer platanoides	9.1	65
Acer saccharinum	9.0	64
Acer saccharinum	15.6	191
Acer saccharinum	30.8	745
Acer saccharinum	5.7	26
Acer saccharinum	9.9	77
Acer saccharinum	12.7	127
Acer saccharinum	9.9	77
Platanus occidentalis	6.3	31
Platanus occidentalis	12.0	113
Over Hanging Trees		
Acer saccharinum	*15.0*	177
Acer saccharinum	*23.1*	419
Robinia pseudoacacia	*18.0*	254
Robinia pseudoacacia	*15.0*	177
Betula nigra	13.2	137

Shrubs

Species	Number	% cover
Viburnum dentatum	2	5.5
Robinia pseudoacacia	1	0.5
Fraxinus pennsylvanica	2	1.5
Acer negundo	1	0.5
Rubus sp.	1	0.5
Quercus sp.	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	45
Allium vineale	1	5
Eupatorium rugosum	1	10
Alliaria petiolata	1	5
Quadrat #2		
Alliaria petiolata	1	5
Eupatorium rugosum	3	5
Allium vineale	1	5

Vines

Species	Number	% cover
Toxidendron radicans	2	5.5

SITE DESCRIPTION: Site has natural cobble/gravel shoreline, and the river here is shallow and has riffles. Site is about 200 yards south of the Dundee Dam. Site is forested, but much of understory has been recently cleared and chipped, and a stone dust trail has been created. South end of site (near plot 5) consists of large mounds of concrete debris. The site is currently gated and locked. There is a severe porcelainberry problem along the trail to the gate, and Polygonum cuspidatum was quickly growing back along the river following landscaping activities.

PHOTOGRAPHS: RM 17.6 1 to RM 17.6 6. RM 17.6 plot 1 through RM 17.6 plot 5. Photo RM 17.6 plot 4.2 shows remains of a Native American fish wier in the river. Site represented by Photos 28 and 29 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall

Date: 11/2/2007

Location: RM17.6 - Dundee Island

Plot # 3

GPS Point: RM17.6-3

Clifton, Passaic Co.

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Species	DBH (in)	Basal Area (in^2)	Species	Number	% cover	Species	Number	% cover	Species	Number	% cover
Acer saccharinum	9.0	64	*Betula nigra*	1	5	Quadrat #1					
Acer saccharinum	16.4	211				*Polygonum cuspidatum*	8	20			
Acer saccharinum	20.8	340									
Betula nigra	8.9	62									
Betula nigra	4.0	13									
Betula nigra	4.0	13									
Betula nigra	6.5	33									
Betula nigra	16.6	216				Quadrat #2					
Betula nigra	5.0	20				*Polygonum cuspidatum*	9	15			
Pyrus calleryana	9.2	66									
Pyrus calleryana	8.0	50									
Over Hanging Trees											
Acer saccharinum	*15.4*	186									
Acer saccharinum	*18.7*	275									
Acer saccharinum	*13.4*	141									
Acer saccharinum	*6.0*	28									
Fraxinus pennsylvanica	13.2	137									

SITE DESCRIPTION: Site has natural cobble/gravel shoreline, and the river here is shallow and has riffles. Site is about 200 yards south of the Dundee Dam. Site is forested, but much of understory has been recently cleared and chipped, and a stone dust trail has been created. South end of site (near plot 5) consists of large mounds of concrete debris. The site is currently gated and locked. There is a severe porcelainberry problem along the trail to the gate, and Polygonum cuspidatum was quickly growing back along the river following landscaping activities.

PHOTOGRAPHS: RM 17.6 1 to RM 17.6 6. RM 17.6 plot 1 through RM 17.6 plot 5. Photo RM 17.6 plot 4.2 shows remains of a Native American fish wier in the river. Site represented by Photos 28 and 29 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall

Date: 11/2/2007

Location: RM17.6 - Dundee Island

Plot # 4

GPS Point: RM17.6-4

Clifton, Passaic Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Betula nigra	15.8	196
Betula nigra	19.2	289
Acer saccharinum	16.3	209
Acer saccharinum	20.3	323
Acer saccharinum	6.2	30
Acer saccharinum	4.8	18
Acer saccharinum	13.0	133
Salix nigra	32.6	834
Salix nigra	43.2	1465
Salix nigra	33.0	855
Over Hanging Trees		
Acer saccharinum	15.0	177

Shrubs

Species	Number	% cover
Viburnum dentatum	1	0.5
Paulownia tomentosa	2	2.5
Cornus stolonifera	3	7.5
Cephalanthus occidentalis	2	10

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	12	25
Quadrat #2		
Onoclea sensibilis	1	5
Hibiscus palustris	1	5
Polygonum cuspidatum	1	5
Rumex verticillatus	3	10
Hydrocotyle sp.	creeping	25
Lythrum salicaria	4	10

Vines

Species	Number	% cover
Toxidendron radicans	2	15.5

SITE DESCRIPTION: Site has natural cobble/gravel shoreline, and the river here is shallow and has riffles. Site is about 200 yards south of the Dundee Dam. Site is forested, but much of understory has been recently cleared and chipped, and a stone dust trail has been created. South end of site (near plot 5) consists of large mounds of concrete debris. The site is currently gated and locked. There is a severe porcelainberry problem along the trail to the gate, and Polygonum cuspidatum was quickly growing back along the river following landscaping activities.

PHOTOGRAPHS: RM 17.6 1 to RM 17.6 6. RM 17.6 plot 1 through RM 17.6 plot 5. Photo RM 17.6 plot 4.2 shows remains of a Native American fish wier in the river. Site represented by Photos 28 and 29 of the Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinsky, Michelle Verdugo, Tricia Aspinwall | **Date:** 11/2/2007

Location: RM17.6 - Dundee Island | **Plot #** 5 | **GPS Point:** RM17.6-5

Clifton, Passaic Co.

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	13.5	143
Acer saccharinum	20.3	323
Acer saccharinum	12.2	117
Platanus occidentalis	15.3	184
Platanus occidentalis	5.9	27
Platanus occidentalis	11.7	107
Betula nigra	5.8	26
Betula nigra	7.9	49
Betula nigra	5.0	20
Betula nigra	4.1	13
Over Hanging Trees		
Acer saccharinum	*7.0*	38
Acer saccharinum	*9.2*	66
Acer saccharinum	*21.9*	376
Acer saccharinum	12.8	129

Shrubs

Species	Number	% cover
Cornus stolonifera	9	37
Viburnum dentatum	1	0.5
Rubus sp.	1	0.5
Betula nigra	3	20

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	75
Quadrat #2		
Eupatorium serotinum	1	5
Polygonum punctatum	3	5
Polygonum hydropiperoides	3	10
Viola sp.	5	5

Vines

Species	Number	% cover
Parthenocissus quinquefolia	1	1

SITE DESCRIPTION: Site has natural cobble/gravel shoreline, and the river here is shallow and has riffles. Site is about 200 yards south of the Dundee Dam. Site is forested, but much of understory has been recently cleared and chipped, and a stone dust trail has been created. South end of site (near plot 5) consists of large mounds of concrete debris. The site is currently gated and locked. There is a severe porcelainberry problem along the trail to the gate, and Polygonum cuspidatum was quickly growing back along the river following landscaping activities.

PHOTOGRAPHS: RM 17.6 1 to RM 17.6 6. RM 17.6 plot 1 through RM 17.6 plot 5. Photo RM 17.6 plot 4.2 shows remains of a Native American fish wier in the river. Site represented by Photos 28 and 29 of the Photo Appendix.

TRIBUTARY VEGETATION DATA

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/21/2008

Location: SR 5-Toney's Brook, Glen Ridge, Essex Co. | **Plot #** 1 | **GPS Point:** SR5-1

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer platanoides	9.7	74
Quercus palustris	16.2	206
Over Hanging Trees		
Quercus palustris	20.6	333
Acer platanoides	5.9	27
Acer platanoides	5.9	27
Acer platanoides	9.7	74
Acer platanoides	6.8	36
Acer platanoides	6.5	33
Quercus palustris	24.5	471
Carya sp.	5.6	25
Carya sp.	7.5	44

Shrubs

Species	Number	% cover
Lindera benzoin	12	33.5
Viburnum dentatum	7	3.5
Sassafras albidum	1	0.5
Lonicera tartarica	2	2.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	4	40
Quadrat #2		
Polygonum cuspidatum	3	70
Impatiens capensis	1	10

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is downstream portion of Toney's Brook in Glenfield Park, between NJ Transit retaining wall and spillway. Both plots are on eastern shore of brook.

PHOTOGRAPHS: SR5 plot 1 to SR5 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/21/2008

Location: SR 5-Toney's Brook, Glen Ridge, Essex Co. | **Plot #** 2 | **GPS Point:** SR5-2

southern plot

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Over Hanging Trees		
Quercus prinus	*33.3*	*870*
Quercus prinus	*20.6*	*333*
Betula lenta	*6.2*	*30*

Shrubs

Species	Number	% cover
Lindera benzoin	3	1.5
Quercus prinus	7	3.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum		65
Impatiens capensis	1	5
Viola sp.	1	5
Parthenocissus quinquefolia		5
Eupatorium rugosum	3	10
Quadrat #2		
Polygonum cuspidatum		80
Viola sp.	3	10
Impatiens capensis	2	5

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is downstream portion of Toney's Brook in Glenfield Park, between NJ Transit retaining wall and spillway. Both plots are on eastern shore of brook.

PHOTOGRAPHS: SR5 plot 1 to SR5 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: TR3, behind Glendale Cemetery/ Forest Hill Golf | **Plot #** 1 | **GPS Point:** TR3-1

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	6.7	35
Fraxinus pennsylvanica	12.0	113
Fraxinus pennsylvanica	16.7	219
Fraxinus pennsylvanica	5.5	24
Fraxinus pennsylvanica	4.5	16
Fraxinus pennsylvanica	5.2	21
Fraxinus pennsylvanica	16.3	209
Quercus rubra	23.1	419
Acer rubrum	33.9	902
Over Hanging Trees		
Quercus palustris	*30.4*	*725*
Morus alba	*6.2*	*30*

Shrubs

Species	Number	% cover
Fraxinus pennsylvan	3	15
Ulmus americana	1	2
Acer negundo	2	2.5
Quercus sp.	4	2
Acer rubrum	1	0.5
Quercus rubra	3	2.5
Rosa multiflora	1	0.5
Lindera benzoin	3	12
Prunus serotina	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatur	3	15
Viola sp.	9	40
Quadrat #2		
Polygonum cuspidatur	1	5
Viola sp.		40
Hibiscus palustris	6	25
Agrostis sp.		30

Vines

Species	Number	% cover
Parthenocissus quinquefo	1	1
Toxidendron radicans	2	1

SITE DESCRIPTION: Site is along eastern shoreline of Third River, behind the Glendale Cemetery and across the river from the Forest Hill Field Club.

PHOTOGRAPHS: TR3 plot 1 and TR3 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: TR3, behind Glendale Cemetery/ Forest Hill Golf Co | **Plot #** 2 | **GPS Point:** TR3-2

southern plot

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	25.3	502
Acer saccharinum	13.1	135
Acer saccharinum	21.4	359
Fraxinus pennsylvanica	7.6	45
Acer negundo	8.8	61
Morus alba	6.2	30
Morus alba	8.6	58
Prunus serotina	7.8	48
Over Hanging Trees		
Fraxinus pennsylvanica	*9.9*	*77*

Shrubs

Species	Number	% cover
Lindera benzoin	1	5
Fraxinus pennsylvanica	7	10.5
Viburnum dentatum	2	4
Catalpa bignonioides	1	0.5
Morus alba	1	5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	2	55
Viola sp.	1	5
Phalaris arundinacea		10
Toxidendron radicans		15
Symplocarpus foetidus	1	5
Quadrat #2		
Polygonum cuspidatum	5	80
Viola sp.		20

Vines

Species	Number	% cover
Toxidendron radicans	4	10

SITE DESCRIPTION: Site is along eastern shoreline of Third River, behind the Glendale Cemetery and across the river from the Forest Hill Field Club.

PHOTOGRAPHS: TR3 plot 1 and TR3 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 5/20/2008

Location: TR2, behind condominiums on River Road/Oak

Plot # 1

GPS Point: TR2-1

Trees (over 4"DBH and 4' tall) Species	DBH (in)	Basal Area (in^2)	Shrubs Species	Number	% cover	Herbs Species	Number	% cover	Vines Species	Number	% cover
Ulmus americana	4.2	14	*Ulmus americana*	1	2	Quadrat #1			*Vitis* sp.	6	3
			Ailanthus altissima	7	3.5	*Polygonum cuspidatu*	3	86			
			Acer negundo	2	1	*Polygonum punctatum*	2	1			
			Quercus sp.	2	1	*Viola* sp.		5			
			Acer rubrum	3	1.5	*Allium vineale*	2	0.5			
						Impatiens capensis	2	1			
						Artemisia vulgaris	1	0.5			
						Trifolium sp.		1			
						Phytolacca americana	3	5			
						Quadrat #2					
						Polygonum cuspidatu	2	81.5			
						Viola sp.		2			
						Polygonum punctatum	2	1			
						Trifolium sp.	1	0.5			
						Eupatorium rugosum	8	5			
						Phytolacca americana	25	10			
Over Hanging Trees											
Ulmus americana	*5.2*	*21*									

SITE DESCRIPTION: Site is along the Third River between Route 3 and a condominium complex. Sampling was conducted on the eastern shoreline of the river. The opposite shoreline of the river is a vertical, eroding bank.

PHOTOGRAPHS: TR2 1, TR2 2, TR2 plot 1, and TR2 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: TR2, behind condominiums on River Road/Oak Stre | **Plot #** 2 | **GPS Point:** TR2-2

southern plot

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	8.5	57
Acer saccharinum	9.0	64
Acer saccharinum	9.8	75
Catalpa bignonioides	5.7	26
Over Hanging Trees		
Morus alba	*4.1*	*13*
Morus alba	*7.3*	*42*
Robinia pseudoacacia	*7.1*	*40*
Malus sp.	*8.0*	*50*
Acer rubrum	*18.1*	*257*

Shrubs

Species	Number	% cover
Cornus amomum	3	9
Catalpa bignonioides	2	4
Ailanthus altissima	1	5
Acer rubrum	2	15

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	4	97
Viola sp.	1	1
Allium vineale	1	1
Eupatorium rugosum	1	1
Quadrat #2		
Polygonum cuspidatum	4	53
Eupatorium rugosum	1	2
Phytolacca americana	4	5

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is along the Third River between Route 3 and a condominium complex. Sampling was conducted on the eastern shoreline of the river. The opposite shoreline of the river is a vertical, eroding bank.

PHOTOGRAPHS: TR2 1, TR2 2, TR2 plot 1, and TR2 plot 2.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: SaR2, between St. Michael's Cemetery and Felic | **Plot #** 1 | **GPS Point:** SaR2-1

southern plot

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	6.2	30
Acer saccharinum	15.0	177
Acer saccharinum	18.3	263
Acer saccharinum	19.3	292
Acer saccharinum	5.1	20
Acer saccharinum	10.4	85
Acer saccharinum	13.6	145
Acer saccharinum	7.0	38
Acer saccharinum	10.5	87
Acer saccharinum	5.8	26
Acer saccharinum	11.7	107
Acer negundo	7.6	45
Acer negundo	4.4	15
Acer negundo	5.4	23
Over Hanging Trees		
Acer negundo	*5.5*	*24*

Shrubs

Species	Number	% cover
Acer platanoides	4	5
Acer negundo	3	12
Acer saccharinum	5	17.5

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	4	35
Viola sp.		10
Impatiens capensis	2	5
Quadrat #2		
Polygonum cuspidatum	1	55
Solanum nigrum	1	5
Polygonum punctatum		5
Urtica dioica		35

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is between St. Michael's Cemetery and Felician College along eastern shoreline of the Saddle River. Soil along riverbank is silty sand with significant amounts of wrack present. The river itself contains old tires, shopping carts etc.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 5/20/2008

Location: SaR2, between St. Michael's Cemetery and Felician northern plot | **Plot #** 2 | **GPS Point:** SaR2-2

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Acer saccharinum	6.2	30
Acer saccharinum	15.6	191
Acer saccharinum	12.4	121
Acer saccharinum	10.5	87
Acer saccharinum	12.6	125
Acer saccharinum	4.5	16
Acer saccharinum	12.1	115
Acer negundo	5.1	20
Acer negundo	4.2	14
Acer negundo	5.0	20
Over Hanging Trees		
Acer saccharinum	*22.0*	*380*
Acer negundo	*7.2*	*41*

Shrubs

Species	Number	% cover
Acer negundo	5	13
Acer saccharinum	10	18
Carya sp.	1	0.5
Sambucus canadensis	1	2

Herbs

Species	Number	% cover
Quadrat #1		
Polygonum cuspidatum	3	90
Urtica dioica	1	5
Quadrat #2		
Polygonum cuspidatum	2	50
Urtica dioica		35
Echinocystis lobata		5

Vines

Species	Number	% cover

SITE DESCRIPTION: Site is between St. Michael's Cemetery and Felician College along eastern shoreline of the Saddle River. Soil along riverbank is silty sand with significant amounts of wrack present. The river itself contains old tires, shopping carts etc.

REFERENCE SITES VEGETATION DATA

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 6/25/2008

Location: Harrison Reference Wetland - RM3.9 | **Plot #** 1 | **GPS Point:** RM3.9-1

Harrison, Hudson County

Trees (over 4"DBH and 4' tall) | **Shrubs** | **Herbs** | **Vines**

Trees: Species	DBH (in)	Basal Area (in^2)	Shrubs: Species	Number	% cover	Herbs: Species	Number	% cover	Vines: Species	Number	% cover
			Iva fructescens	14	22	Quadrat #1					
			Amorpha fruticosa	8	4	*Scirpus americanus*		45			
			Aronia sp.	1	2	*Amaranthus cannabin*	15				
			Ailanthus altissima	3	1.5						
						Quadrat #2					
						Solidago sempervirens	1	25			
						Scirpus americanus		25			

SITE DESCRIPTION: Harrison side of the Passaic River across from Minish Wetland Restoration Site. Just north of RM 3.8 (Port Authority Wetland). Observed killdeer, gulls, great egret at site. Fiddler crab burrows present near Plot 4.

PHOTOGRAPHS: Harrison reference plot 1 1 through Harrison reference plot 4 5. Photos 5 and 6 in the Reference Site Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 6/25/2008

Location: Harrison Reference Wetland - RM3.9

Plot # 2

GPS Point: RM3.9-2

Harrison, Hudson County

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	6.1	29

Shrubs

Species	Number	% cover
Iva fructescens	10	22.5
Amorpha fruticosa	1	10

Herbs

Species	Number	% cover
Quadrat #1		
Scirpus americanus		80
Amaranthus cannabinus		10
Panicum virgatum	1	5
Quadrat #2		
Solidago sempervirens		1
Spartina alternifolia		35
Eleocaris sp.		15
Amaranthus cannabinus		5

Vines

Species	Number	% cover

SITE DESCRIPTION: Harrison side of the Passaic River across from Minish Wetland Restoration Site. Just north of RM 3.8 (Port Authority Wetland). Observed killdeer, gulls, great egret at site. Fiddler crab burrows present near Plot 4.

PHOTOGRAPHS: Harrison reference plot 1 1 through Harrison reference plot 4 5. Photos 5 and 6 in the Reference Site Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 6/25/2008

Location: Harrison Reference Wetland - RM3.9

Plot # 3

GPS Point: RM3.9-3

Harrison, Hudson County

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Morus alba	6.1	29

Shrubs

Species	Number	% cover
Ailanthus altissima	2	1
Iva fructescens	15	22.5

Herbs

Species	Number	% cover
Quadrat #1		
Eleocaris sp.		5
Amaranthus cannabinus		5
Spartina alternifolia		65
Quadrat #2		
Eleocaris sp.		1
Amaranthus cannabinus		5
Spartina alternifolia		84

Vines

Species	Number	% cover

SITE DESCRIPTION: Harrison side of the Passaic River across from Minish Wetland Restoration Site. Just north of RM 3.8 (Port Authority Wetland). Observed killdeer, gulls, great egret at site. Fiddler crab burrows present near Plot 4.

PHOTOGRAPHS: Harrison reference plot 1 1 through Harrison reference plot 4 5. Photos 5 and 6 in the Reference Site Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 6/25/2008

Location: Harrison Reference Wetland - RM3.9 | **Plot #** 4 | **GPS Point:** RM3.9-4

Harrison, Hudson County

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	6.9	37

Shrubs

Species	Number	% cover
Alnus rugosa	2	1
Cornus sericea	2	1
Viburnum dentatum	2	1

Herbs

Species	Number	% cover
Quadrat #1		
Amaranthus cannabinus	1	5
Spartina alternifolia		65
Quadrat #2		
Solidago sempervirens	1	5
Spartina alternifolia		35
Amaranthus cannabinus	2	5

Vines

Species	Number	% cover
UID Vine		2

SITE DESCRIPTION: Harrison side of the Passaic River across from Minish Wetland Restoration Site. Just north of RM 3.8 (Port Authority Wetland). Observed killdeer, gulls, great egret at site. Fiddler crab burrows present near Plot 4.

PHOTOGRAPHS: Harrison reference plot 1 1 through Harrison reference plot 4 5. Photos 5 and 6 in the Reference Site Photo Appendix.

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 6/24/2008

Location: Rancocas Creek - Mill Creek Park

Willingsboro, NJ

Plot # 1

GPS Point: Rancocas Creek 1

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Betula nigra	5.8	26
Betula nigra	4.5	16
Betula nigra	4.7	17
Betula nigra	5.2	21
Betula nigra	16.1	203
Liriodendron tulipifera	16.4	211
Tilia americana	17.2	232
Quercus alba	17.5	240
Acer saccharinum	*10.5*	87

Shrubs

Species	Number	% cover
Cornus sericea	3	25
Viburnum dentatum	1	2
Amorpha fruticosa	1	0.5
Sassafras albidum	11	14.5
Carya sp.	2	1

Herbs

Species	Number	% cover
Quadrat #1		
Zizania aquatica	4	5
Nuphar lutea	2	20
Polygonum punctatum	1	2
Isoetes riparia	5	2
Quadrat #2		
Nuphar lutea	3	15
Isoetes riparia	2	5

Vines

Species	Number	% cover
Parthenocissus quinquefo	2	1
Toxicodendron radicans	6	3.5
Vitis sp.	1	1

SITE DESCRIPTION: Site is the shoreline of Rancocas Creek, east of the confluence of Mill Creek, and adjacent to Mill Creek Park, town of Willingboro, NJ. Shoreline substrate is variable, with some areas muddy, some sandy, and areas of gravel.

PHOTOGRAPHS: Rancocas 11.07.07 001 through Rancocas 11.07.07 038; Rancocas Creek reference site 1 through Rancocas Creek reference site 7; Rancocas reference plot 1 1 to Rancocas reference plot 3 5. Photos 1 - 4 in the Reference Site Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 6/24/2008

Location: Rancocas Creek - Mill Creek Park

Plot # 2

GPS Point: Rancocas Creek 2

Willingsboro, NJ

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Carya sp.	7.5	44
Acer rubrum	25.5	510
Acer rubrum	7.5	44
Acer rubrum	14.0	154
Over Hanging Trees		
Fraxinus pennsylvanica	14.9	174
Quercus palustris	19.9	311
Acer rubrum	4.3	15
Acer rubrum	4.0	13

Shrubs

Species	Number	% cover
Alnus rugosa	1	10
Cornus sericea	1	2
Viburnum dentatum	7	57.5
Acer saccharinum	1	2
Cephalanthus occidenta	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Scirpus americanus		10
Eleocharis palustris		15
Peltandra virginica		5
Isoetes riparia		2
Polygonum punctatum		5
Quadrat #2		
Peltandra virginica	2	35
Phalaris arundinacea	1	5
Scirpus americanus	2	5
Polygonum punctatum	2	2

Vines

Species	Number	% cover
Parthenocissus quinquefolia		1
Vitis sp.		2

SITE DESCRIPTION: Site is the shoreline of Rancocas Creek, east of the confluence of Mill Creek, and adjacent to Mill Creek Park, town of Willingboro, NJ. Shoreline substrate is variable, with some areas muddy, some sandy, and areas of gravel.

PHOTOGRAPHS: Rancocas 11.07.07 001 through Rancocas 11.07.07 038; Rancocas Creek reference site 1 through Rancocas Creek reference site 7; Rancocas reference plot 1 1 to Rancocas reference plot 3 5. Photos 1 - 4 in the Reference Site Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 6/24/2008

Location: Rancocas Creek - Mill Creek Park

Willingsboro, NJ

Plot # 3

GPS Point: Rancocas Creek 3

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Fraxinus pennsylvanica	6.9	37

Shrubs

Species	Number	% cover
Alnus rugosa	2	1
Cornus sericea	2	1
Viburnum dentatum	2	1

Herbs

Species	Number	% cover
Quadrat #1		
Nuphar lutea	3	30
Pontederia cordata	2	5
Peltandra virginica	4	55
Polygonum punctatum	5	5
Quadrat #2		
Nuphar lutea	5	25
Polygonum punctatum	4	5
Carex sp.		5

Vines

Species	Number	% cover
Vitis sp.	2	1

SITE DESCRIPTION: Site is the shoreline of Rancocas Creek, east of the confluence of Mill Creek, and adjacent to Mill Creek Park, town of Willingboro, NJ. Shoreline substrate is variable, with some areas muddy, some sandy, and areas of gravel.

PHOTOGRAPHS: Rancocas 11.07.07 001 through Rancocas 11.07.07 038; Rancocas Creek reference site 1 through Rancocas Creek reference site 7; Rancocas reference plot 1 1 to Rancocas reference plot 3 5. Photos 1 - 4 in the Reference Site Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo

Date: 6/6/2008

Location: Scherman Hoffman Wildlife Sanctuary

Plot # 1

GPS Point: SH-1

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Platanus occidentalis	4.5	16
Platanus occidentalis	4.0	13
Quercus alba	15.9	198
Betula lenta	5.2	21
Ostrya virginiana	5.6	25
Platanus occidentalis	11.6	106
Over Hanging Trees		
Betula nigra	9.2	
Fagus grandifolia	9.0	
Acer rubrum	13.2	
Liriodendron tulipifera	57.3	2577
Fagus grandifolia	*8.1*	*52*

Shrubs

Species	Number	% cover
Acer rubrum	2	10
Cornus florida	1	5
Sassafras albidum	1	0.5
Fagus grandifolia	1	5
Berberis thunbergii	7	3.5
Rosa multiflora	4	2
Quercus alba	4	2
Ostrya virginiana	2	1
Celastrus orbiculatus	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Carex sp.		65
Impatiens capensis	1	5
Polygonum arifolium	1	5
Polygonum punctatum	1	5
Aster sp.	3	5
Cryptotaenia canaden	1	5
Quadrat #2		
Carex sp.	1	40
Euthamia graminifolia	3	5
Viola sp.	2	5
Dichanthelium clandestinum		5
Bryophyta		10
Aster sp.	1	5
Polygonum punctatum	1	5
Microstegium vimineum		5
Ranunculus abortivus	2	5

Vines

Species	Number	% cover

SITE DESCRIPTION: Headwaters of Passaic River. Site is a New Jersey Audubon Wildlife Sanctuary, and is generally undisturbed.

PHOTOGRAPHS: sh plot 1.jpg through sh plot 3.4.jpg. Photos 7 and 8 of the Reference Site Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 6/6/2008

Location: Scherman Hoffman Wildlife Sanctuary | **Plot #** 2 | **GPS Point:** SH-2

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Carya sp.	7.5	44
Quercus alba	25.5	510
Fraxinus pennsylvanica	7.5	44
Betula nigra	14.0	154
Liriodendron tulipifera	50.5	2002
Acer rubrum	9.9	77
Acer rubrum	9.3	68
Over Hanging Trees		
Fagus grandifolia	14.2	158
Fagus grandifolia	4.8	18
Fraxinus pennsylvanica	15.7	193
Betula nigra	7.9	49
Acer rubrum	12.4	121
Liriodendron tulipifera	30.1	711
Acer rubrum	5.2	21
Fraxinus pennsylvanica	7.2	41
Fagus grandifolia	8.0	50

Shrubs

Species	Number	% cover
Hamamelis virginiana	6	21
Cornus florida	1	2
Quercus prinus	1	5
Sassafras albidum	1	2
Platanus occidentalis	1	2
Fagus grandifolia	7	29
Betula lenta	1	2
Fraxinus pennsylvanica	1	5

Herbs

Species	Number	% cover
Quadrat #1		
Cryptotaenia canadens	4	20
Euthamia graminifolia	5	10
Aster sp.	3	5
Bryophyta		15
Viola sp.	1	5
Liverwort		10
Apocynum medium	1	20
Rhynchospora sp.		5
Quadrat #2		
Symplocarpus foetidus	2	40
Aster sp.	3	10
Liverwort		45
Microstegium vimineum		5

Vines

Species	Number	% cover

SITE DESCRIPTION: Headwaters of Passaic River. Site is a New Jersey Audubon Wildlife Sanctuary, and is generally undisturbed.

PHOTOGRAPHS: sh plot 1.jpg through sh plot 3.4.jpg. Photos 7 and 8 of the Reference Site Photo Appendix

Passaic River Terrestrial Vegetation Survey

Assessment Team: Tom Shinskey, Michelle Verdugo | **Date:** 6/6/2008

Location: Scherman Hoffman Wildlife Sanctuary | **Plot #** 3 | **GPS Point:** SH-3

Trees (over 4"DBH and 4' tall)

Species	DBH (in)	Basal Area (in^2)
Carya sp.	5.2	21
Fagus grandifolia	15.1	179
Fagus grandifolia	5.0	20
Fagus grandifolia	12.8	129
Fagus grandifolia	9.7	74
Over Hanging Trees		
Liriodendron tulipifera	*30.4*	725
Liriodendron tulipifera	*20.9*	343
Quercus alba	*9.8*	*75*

Shrubs

Species	Number	% cover
Fagus grandifolia	8	15.5
Betula nigra	1	5
Quercus alba	1	0.5
Berberis thunbergii	1	0.5

Herbs

Species	Number	% cover
Quadrat #1		
Caulophyllum thalictroid	1	5
Liverwort	1	5
Bryophyta		15
Polygonum cespitosum	1	5
Symplocarpus foetidus	1	15
Polystichum acrostichoi	1	5
Quadrat #2		
Bryophyta		10
Aster sp.	3	15
Microstegium vimineum		10
Polygonum cespitosum	1	5
Caulophyllum thalictroid	1	5
Impatiens capensis	2	5

Vines

Species	Number	% cover

SITE DESCRIPTION: Headwaters of Passaic River. Site is a New Jersey Audubon Wildlife Sanctuary, and is generally undisturbed.

PHOTOGRAPHS: sh plot 1.jpg through sh plot 3.4.jpg. Photos 7 and 8 of the Reference Site Photo Appendix

DELINEATION DATA FORMS

FIELD DATA FORM

Job Number: JR2789
Field Investigators: Tom Shinskey and Jerry Bolton
Project/Site: Riverside County Park - River Mile 10.9
Applicant/Owner: USACE - NY District

Nearest Wetland Flag: WF RM 10.9 25
Date: 5/13/08
County: Bergen
State: New Jersey

Wetland: SP- 1

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	Herb	FACW
2	*Peltandra virginica*	Herb	OBL
3	*Amorpha fruticosa*	Shrub	FACW
4	*Quercus palustris*	Tree	FACW
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: ___
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2	10YR3/3			sand
2-18	10YR4/2	10YR3/6	10	silty sand

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)
___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma colors, mottling

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---
Soil Saturated? Yes Depth to Saturation (Inches): surface
Depth to Free-standing Water in Probe Hole (Inches): 6"
Field Evidence of Hydrology: saturation , drift lines

Note: surface not inundated at time of sampling but is tidal

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)
___ No (Wetland Hydrology Criterion Not Met)

Upland: SP- 2

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Rosa multiflora*	Shrub	FACU
2	*Quercus palustris*	Tree	FACW
3	*Poa pratensis*	Gram	FACU
4	*Ulmus americana*	Tree	FACW-
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: ___
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2	10YR2/2			silty loam
2-10	10YR3/3			silty loam
10-				auger refusal

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)
✓ No (Hydric Soil Criterion Not Met)

Rationale: ___

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): N/A
Soil Saturated? No Depth to Saturation (Inches): >18"
Depth to Free-standing Water in Probe Hole (Inches): N/A
Field Evidence of Hydrology: No field evidence of hydrology

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)
✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments: ___

FIELD DATA FORM

Job Number: JR2789
Field Investigators: Tom Shinskey and Jerry Bolton
Project/Site: Kearny Riverbank Park - River Mile 7.7
Applicant/Owner: USACE - NY District

Nearest Wetland Flag: WF RM 7.7 15
Date: 5/13/08
County: Hudson
State: New Jersey

Wetland: SP- 1

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Bidens* sp.	Herb	
2	*Polygonum hydropiperoides*	Herb	OBL
3	*Rumex verticillatus*	Herb	OBL
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: ___
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-18	10YR6/2			silty sand

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)
___ No (Hydric Soil Criterion Not Met)

Rationale: ___

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): ___
Soil Saturated? Yes Depth to Saturation (Inches): surface
Depth to Free-standing Water in Probe Hole (Inches): ___
Field Evidence of Hydrology: saturation

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)
___ No (Wetland Hydrology Criterion Not Met)

Upland: SP- 2

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Acer platanoides*	Tree	NL
2	*Toxicodendron radicans*	Vine	FAC
3	*Ulmus americana*	Tree	FACW-
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: ___
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-8	10YR3/3			silty loam
8-				auger refusal

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)
✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma colors
note: park is fill material below grade

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): N/A
Soil Saturated? No Depth to Saturation (Inches): >18"
Depth to Free-standing Water in Probe Hole (Inches): N/A
Field Evidence of Hydrology: No field evidence of hydrology

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)
✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments: ___

FIELD DATA FORM

Job Number: JR2789
Field Investigators: Tom Shinskey and Jerry Bolton
Project/Site: Harrison
Applicant/Owner: USACE - NY District

Nearest Wetland Flag: WF HW 20
Date: 5/14/08
County: Hudson
State: New Jersey

Wetland: SP- 1

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Iva frutescens*	Shrub	FACW+
2	*Amorpha fruticosa*	Shrub	FACW
3	*Solidago sempervirens*	Herb	FACW
4	*Phragmites australis*	Gram	FACW
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: ___
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-6	10YR2/2			silt
6-10	10YR2/2			silt/gravel
10-				auger refusal

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)
___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma colors in the top 10"

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---
Soil Saturated? Yes Depth to Saturation (Inches): surface
Depth to Free-standing Water in Probe Hole (Inches): surface
Field Evidence of Hydrology: saturation , drift lines

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)
___ No (Wetland Hydrology Criterion Not Met)

Upland: SP- 2

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Polygonum cuspidatum*	Herb	FACU-
2	*Ailanthus altissima*	Tree	NI
3	*Artemisia vulgaris*	Herb	NL
4	*Ulmus americana*	Tree	FACW-
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? No

___ Yes (Hydrophytic Vegetation Criterion Met)
✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: ___
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)
✓ No (Hydric Soil Criterion Not Met)

Rationale: upland soil point not taken, substrate was all fill/ gravel

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): N/A
Soil Saturated? No Depth to Saturation (Inches): >18"
Depth to Free-standing Water in Probe Hole (Inches): N/A
Field Evidence of Hydrology: No field evidence of hydrology

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)
✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments: ___

FIELD DATA FORM

Job Number: JR2789
Field Investigators: Tom Shinskey and Jerry Bolton
Project/Site: Glenfield Park - Toney's Brook
Applicant/Owner: USACE - NY District

Nearest Wetland Flag: WF SR5 25
Date: 5/13/08
County: Essex
State: New Jersey

Wetland: SP- 1

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Impatiens capensis*	Herb	FACW
2	*Polygonum cuspidatum*	Herb	FACU-
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase:
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-6	10YR2/2			sand/organic
6-10	10YR3/2			sand
10-				auger refusal

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)
___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma colors in the top 10"

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---
Soil Saturated? Yes Depth to Saturation (Inches): surface
Depth to Free-standing Water in Probe Hole (Inches): surface
Field Evidence of Hydrology: drainage patterns, drift lines, drainage patterns

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)
___ No (Wetland Hydrology Criterion Not Met)

Upland: SP- 2

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Fraxinus pennsylvanica*	Tree	FACW
2	*Polygonum cuspidatum*	Herb	FACU-
3	*Hamamelis virginiana*	Shrub	FAC-
4	*Ulmus americana*	Tree	FACW-
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3? Yes

✓ Yes (Hydrophytic Vegetation Criterion Met)
___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase:
Is the Soil Listed as Hydric? ___

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-1	10YR2/2			sandy loam
1-4	10YR3/3			sandy loam
4-18	10YR3/6			sandy loam

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)
✓ No (Hydric Soil Criterion Not Met)

Rationale:

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): N/A
Soil Saturated? No Depth to Saturation (Inches): >18"
Depth to Free-standing Water in Probe Hole (Inches): N/A
Field Evidence of Hydrology: No field evidence of hydrology

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)
✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments:

APPENDIX D – SITE PHOTOGRAPHS

LOWER PASSAIC RIVER AND TRIBUTARY PHOTOGRAPHS

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 1. View of shoreline at RM15.2 (General Pulaski Memorial Park).

Photo 2. Representative vegetation sampled at RM15.2 (General Pulaski Memorial Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 3. Representative vegetation at north portion of RM14.1 (Liberty Crossing Park). Note shoreline erosion.

Photo 4. Shoreline and vegetation at south end of RM14.1 (Liberty Crossing Park). Shoreline very steep and no woody vegetation present.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 5. Shoreline and vegetation at RM13.8; located on the west bank.
Low hanging branches and fallen trees create good fish/benthic habitat.

Photo 6. Concrete stabilization wall at RM13.6 (Memorial Park).
Wall extends along the entire area sampled.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 7. Representative vegetation sampled at RM13.6 (Memorial Park).

Photo 8. Most of the shoreline along RM12.8 consists of concrete or stone walls bordering residential areas.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 9. Photo of a sampling point at RM12.8.

Photo 10. Representative vegetation sampled at RM12.9.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 11. Retaining wall along RM12.3 (Van Winkle Park) crumbling in several places.

Photo 12. Shows lack of riparian vegetation at RM12.3 (Van Winkle Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 13. View of shoreline at RM12.0 (Westfield High School Boat Launch).

Photo 14. Vegetation sampled at the south end of RM12.0 (Westfield High School Boat Launch).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 15. Pilings observed along the shoreline of RM11.6.

Photo 16. Mudflat at RM11.6 exposed at low tide.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 17. Representative vegetation sampled at RM11.3 (Riverside County Park).

Photo 18. View of shoreline at RM11.3 (Riverside County Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 19. Representative vegetation sampled at RM10.9 (Riverside County Park).

Photo 20. View of shoreline and dense Japanese knotweed along the northern portion of RM10.3 (Riverside County Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 21. Southern portion of RM10.3 (Riverside County Park) where more native vegetation was present.

Photo 22. View of shoreline at RM9.9 (Riverside County Park). Also visible in photo is the large mudflat that exists at this location.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 23. Large stand of *Phragmites australis* at the south end of RM9.9 (Riverside County Park).

Photo 24. Arrow arum observed growing near the south end of RM9.9 (Riverside County Park)

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 25. View of shoreline at RM7.7East (Kearny Riverbank Park).

Photo 26. Vegetation at RM7.7East (Kearny Riverbank Park), half of the site was densely covered with Japanese knotweed, the other half had more native herbaceous vegetation.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 27. Representative vegetation sampled at RM7.7 West.

Photo 28. RM17.6 – Dundee Island Park. Most of the site appears to have been recently cleared, except for the larger trees.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photos 29. View of shoreline and riparian vegetation at RM17.6 (Dundee Island Park). Dundee Dam can be seen in background.

Photo 30. View of shoreline and riparian vegetation located at RM11.0 (Riverside County Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 31. View of mudflat at RM11.0 (Riverside County Park) exposed at low tide.

Photo 32. Representative vegetation sampled at RM8.5 (Doyle Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 33. View of shoreline at RM8.5 (Doyle Park).

Photo 34. RM3.8 – Wetland sampled across from Minish Park.
Note *Spartina alterniflora* growing below the high tide line.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Fall 2007

Photo 35. Riparian vegetation present at RM4.3 – Minish Park.

Photo 36. One small clump of *Panicum virgatum* observed at RM4.3 (Minish Park).

Passaic River Terrestrial Vegetation Survey
Site Photographs – Spring 2008

Photo 37. RM7.1 – Kearny Boat Ramp Module. Dense Japanese knotweed in the riparian zone. Sparse vegetation below the high tide line, including *Polygonum hydropiperoides.*

Photo 38. RM 9.7 – Stonewall Module. Parts of this site consist of dense shrub cover of non-native honeysuckle.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Spring 2008

Photo 39. RM9.7 – Stonewall Module. Herbaceous vegetation including *Rumex crispus* and *Eupatorium rugosum*.

Photo 40. RM10.7 – Nutley Boat Ramp Module. Herbaceous vegetation included several Iris species.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Spring 2008

Photo 41. SR5 – Toney's Brook tributary site. Herbaceous cover dominated by Japanese knotweed, also *Impatiens capensis* and *Eupatorium rugosum.*

Photo 42. TR2 – Third River tributary site located behind condominiums and adjacent to Route 3 in Clifton.

Passaic River Terrestrial Vegetation Survey
Site Photographs – Spring 2008

Photo 43. TR3 – Third River tributary site between the Glendale Cemetery and the Forest Hills Golf Course in Belleville.

Photo 44. SaR2 - Saddle River tributary site between St. Michael's Cemetery and Felician College in South Hackensack.

BIO-BENCHMARK AND WETLAND DELINEATION LOCATION PHOTOGRAPHS

Passaic River Terrestrial Vegetation Survey
Bio-benchmark and Wetland Delineation Location Photographs –Spring 2008

Photo 1. RM7.7 Bio-benchmark studies measuring lowest elevation of vegetation and lowest elevation of invasive species growth.

Photo 2. RM7.7 Second bio-benchmark studies location measuring lowest elevation of vegetation, lowest elevation of invasive species growth, and location of unvegetated mudflat.

Photo 3. RM10.9 Bio-benchmark studies measuring lowest elevation of vegetation and lowest elevation of invasive species growth.

Photo 4. RM10.9 Second bio-benchmark studies location measuring lowest elevation of vegetation, lowest elevation of invasive species growth, and location of unvegetated mudflat.

Photo 5. Location of wetland delineation conducted at the Harrison Wetland (RM 3.9).

Photo 6. Location of wetland delineation conducted at the Harrison Wetland (RM 3.9).

REFERENCE SITE PHOTOGRAPHS

Passaic River Terrestrial Vegetation Survey
Reference Site Photographs – Fall 2007 and Summer 2008

Photo 1. Rancocas Creek reference site (Fall 2007) marsh fringe/mudflat.

Photo 2. Rancocas Creek reference site (Fall 2007),
close up of mudflat and *Nuphar lutea.*

Photo 3. Rancocas Creek reference site (Summer 2008), fringe marsh dominated by *Nuphar lutea* and arrow arum (*Peltandra virginica*).

Photo 4. Rancocas Creek reference site (Summer 2008), *Scirpus americanus.*

Photo 5. Harrison Wetland Reference Site (RM3.9);
note *Spartina alterniflora* growing at this site.

Photo 6. Harrison Wetland Reference Site; emergent vegetation including
Scirpus americanus and water hemp (*Amaranthus cannabinus*).

Photo 7. Scherman-Hoffman Wildlife Sanctuary; near headwaters of the Passaic River; lush herbaceous ground cover including *Carex* sp., jewelweed, and smartweed.

Photo 8. Scherman-Hoffman Wildlife Sanctuary; steep banks at this vegetation sampling plot; Native woody vegetation and sparse herbaceous layer including skunk cabbage.