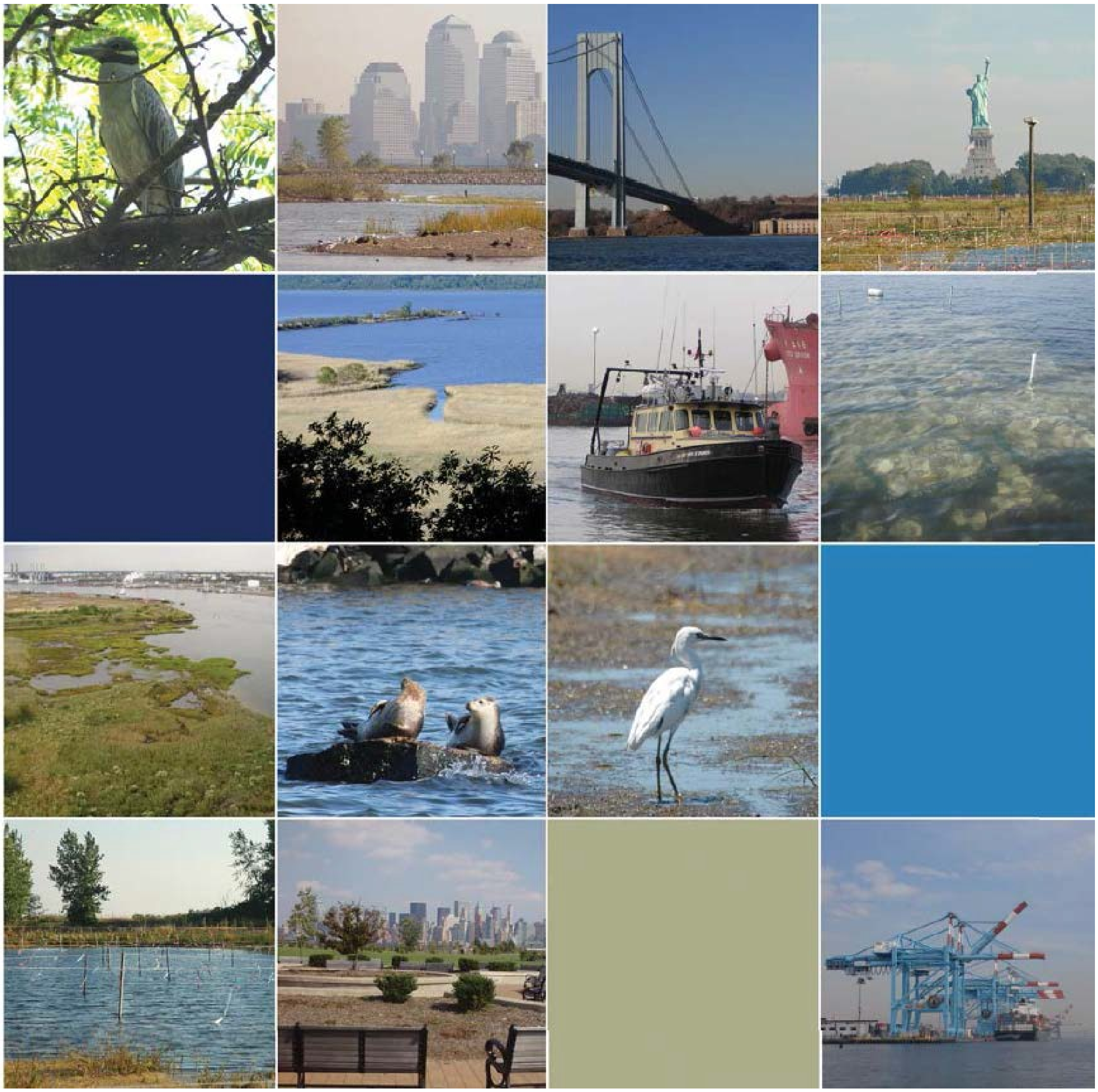
Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

Appendix F
Regulatory Compliance

Final Integrated Feasibility Report & Environmental Assessment

March 2020

Prepared by the New York District
U.S. Army Corps of Engineers



Appendix F1:

Protected Species and Rare Habitats

NMFS Coordination

NOAA FISHERIES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Greater Atlantic Region

US Army Corps of Engineers ®

GARFO ESA Section 7: 2017 NLAA Program Verification Form
(Please submit a signed version of this form, together with any project plans, maps, supporting analyses, etc., to nmfs.gar.esa.section7@noaa.gov with "2017 NLAA Program" in the subject line)

Section 1: General Project Details

Application Number:		Hudson Raritan Estuary Ecosystem Restoration Pro	
Applicant(s):		USACE-New York District	
Permit Type (e.g. NWP, LOP, RGP, IP, Permit Modification):		Civil Works Program	
Anticipated project start date (e.g., 9/1/2017)		09/01/2025	
Anticipated project end date (e.g., 3/14/2018 – if there is no permit expiration date, write "N/A")		09/01/2040	
Project Type/Category (check all that apply to entire action):			
☐	Aquaculture (shellfish) and artificial reef creation	☐	Transportation and development (e.g., culvert construction, bridge repair)
☐	Routine maintenance dredging and disposal/beach nourishment	☑	Mitigation (fish/wildlife enhancement or restoration)
☐	Piers, ramps, floats, and other structures	☑	Bank stabilization and dam maintenance
☐	If other, describe project type/category:		

Project/Action Description and Purpose (*include town/city/state and water body where project is occurring; relevant permit conditions that aren't captured elsewhere on form*):

The Jamaica Bay (Atlantic Ocean), New York (Queens and Kings County) Marsh Islands Projects restore five remnant salt marsh islands, currently in danger of erosion, sea level rise, continued water quality stressors, and habitat fragmentation. The five sites are as follows:

Stony Creek- the Project site is located in Jamaica Bay in the borough of Brooklyn, New York, NY. The existing condition remnant marsh at Stony Creek is 34 acres, it is well defined and characterized by relatively high elevations compared to the remaining Jamaica Bay marsh islands as whole, however, almost 60 percent of the marsh island has been lost in the past 42

Type of Habitat Modified (e.g., sand, cobble, silt/mud/clay):	Area (acres):
mud	184.30
Project Latitude (e.g., 42.625884)	40.626280
Project Longitude (e.g., -70.646114)	-73.842488

Section 2: ESA-listed species and/or critical habitat in the action area:

☑	Atlantic sturgeon (all DPSs) If not all DPSs, list which here:	☑	Kemp's ridley sea turtle
☐	Atlantic sturgeon critical habitat (proposed or designated) Indicate which DPS (GOM, NYB, Chesapeake Bay DPSs):	☑	Loggerhead sea turtle (NW Atlantic DPS)
☐	Shortnose sturgeon	☑	Leatherback sea turtle
☐	Atlantic salmon (GOM DPS)	☐	North Atlantic right whale
☐	Atlantic salmon critical habitat (GOM DPS)	☐	North Atlantic right whale critical habitat
☑	Green sea turtle (N. Atlantic DPS)	☐	Fin whale

Section 3: NLAA Determination (check all applicable fields):

a) GENERAL PDC	
☑	Yes, my project meets all of the General PDC.
☐	No, my project does not meet all the General PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):
	Information for PDC 8 (if "max extent of stressor" exceeds "width of water body", PDC 8 is NOT met, and a justification in Section 4 is required to proceed with the verification form)

	Width (m) of water body in action area:		Stressor Category (stressor that extends furthest distance into water body – e.g., turbidity plume; sound pressure wave):	Max extent (m) of stressor into the water body:
	250.00		Turbidity Curtain	4.57
☐	1.	No work will individually or cumulatively have an adverse effect on ESA-listed species or designated critical habitat; no work will cause adverse modification or destruction to proposed critical habitat.		
☐	2.	No work will occur in the tidally influenced portion of rivers/streams where Atlantic salmon presence is possible from April 10–November 7.		
☐	3.	No work will occur in Atlantic or shortnose sturgeon spawning grounds as follows: i. New England: April 1–Aug. 31 ii. New York/Philadelphia: March 15–August 31 iii. Baltimore/Norfolk: March 15–July 1 and Sept. 15–Nov. 1		
☐	4.	No work will occur in shortnose sturgeon overwintering grounds as follows: i. New England District: October 15–April 30 ii. New York/Philadelphia: Nov. 1–March 15 iii. Baltimore: Nov. 1–March 15		
☐	5.	Within designated Atlantic salmon critical habitat, no work will affect spawning and rearing areas (PBFs 1-7).		
☐	6.	Within proposed/designated Atlantic sturgeon critical habitat, no work will affect hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0-0.5 parts per thousand) (PBF 1).		
☐	7.	Work will not change temperature, water flow, salinity, or dissolved oxygen levels.		
☐	8.	If it is possible for ESA-listed species to pass through the action area, a zone of passage with appropriate habitat for ESA-listed species (e.g., depth, water velocity, etc.) must be maintained (i.e., physical or biological stressors such as turbidity and sound pressure must not create barrier to passage).		
☐	9.	Any work in designated North Atlantic right whale critical habitat must have no effect on the physical and biological features (PBFs).		
☐	10.	The project will not adversely impact any submerged aquatic vegetation (SAV).		
☐	11.	No blasting will occur.		

b) The following stressors are applicable to the action (check all that apply – use Stressor Category Table for guidance):	
☐	Sound Pressure
☐	Impingement/Entrapment/Capture
☑	Turbidity/Water Quality
☐	Entanglement

☑	Habitat Modification
☑	Vessel Traffic

	Stressor Category					
Activity Category	Sound Pressure	Impingement/ Entrapment/ Capture	Turbidity/ Water Quality	Entanglement	Habitat Mod.	Vessel Traffic
Aquaculture (shellfish) and artificial reef creation	N	N	Y	Y	Y	Y
Routine maintenance dredging and disposal/beach nourishment	N	Y	Y	N	Y	Y
Piers, ramps, floats, and other structures	Y	N	Y	Y	Y	Y
Transportation and development (e.g., culvert construction, bridge repair)	Y	N	Y	N	Y	Y
Mitigation (fish/wildlife enhancement or restoration)	N	N	Y	N	Y	Y
Bank stabilization and dam maintenance	Y	N	Y	N	Y	Y

c) SOUND PRESSURE PDC

☐	Yes, my project meets all of the Sound Pressure PDC below.
☐	No, my project does not meet all the Sound Pressure PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):
	Information for PDC 14 (refer to SOPs for guidance):

	Pile material (e.g., steel pipe, timber, concrete)	Pile diameter/width (inches)	Number of piles	Installation method (e.g., impact hammer, vibratory start and then impact hammer to depth)
a)				
b)				

	c)				
	d)				
☐	12.	If the pile driving is occurring during a time of year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold of those species (please see SOPs), a 20 minute "soft start" is required to allow for animals to leave the project vicinity before sound pressure increases.			
☐	13.	Any new pile supported structure must involve the installation of ≤ 50 piles (below MHW).			
☐	14.	All underwater noise (pressure) is below (<) the physiological/injury noise threshold for ESA-listed species in the action area (if project involves steel piles, or non-steel piles > 24-inches in diameter/width, include noise estimate with this form).			

d) IMPINGEMENT/ENTRAINMENT/CAPTURE PDC			
☐	Yes, my project meets all of the Impingement/Entrainment/Capture PDC below.		
☐	No, my project does not meet all the Impingement/Entrainment/Capture PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):		
	Information for Dredging:		
	If dredging permit/authorization includes multiple years of maintenance, include estimated number of dredging/disposal events:		
	Information for PDC 18 (refer to SOPs for guidance):		
	Mesh screen size (mm) for temporary intake:		
☐	15.	Only mechanical, cutterhead, and low volume hopper (e.g., CURRITUCK) dredges may be used.	
☐	16.	No new dredging in proposed or designated Atlantic sturgeon or Atlantic salmon critical habitat (maintenance dredging still must meet all other PDCs). New dredging outside Atlantic sturgeon or salmon critical habitat is limited to one time dredge events (e.g., burying a utility line) and minor (≤ 2 acres) expansions of areas already subject to maintenance dredging (e.g., marina/harbor expansion).	
☐	17.	Work behind cofferdams, turbidity curtains, and other methods to block access of animals to dredge footprint is required when operationally feasible and ESA-listed species may be present.	
☐	18.	Temporary intakes related to construction must be equipped with appropriate sized mesh screening (as determined by GARFO section 7 biologist and/or according to [Chapter 11 of the NOAA Fisheries Anadromous Salmonid Passage Facility Design]) and must not have greater than 0.5 fps intake velocities, to prevent impingement or entrainment of any ESA-listed species life stage.	
☐	19.	No new permanent intake structures related to cooling water, or any other inflow at facilities (e.g. water treatment plants, power plants, etc.).	
e) TURBIDITY/WATER QUALITY PDC			
☑	Yes, my project meets all of the Turbidity/Water Quality PDC below.		

☐	No, my project does not meet all the Turbidity/Water Quality PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	
☐	20.	Work behind cofferdams, turbidity curtains, or other methods to control turbidity are required when operationally feasible and ESA-listed species may be present.
☐	21.	In-water offshore disposal may only occur at designated disposal sites that have already been consulted on with GARFO.
☐	22.	Any temporary discharges must meet state water quality standards; no discharges of toxic substances.
☐	23.	Only repair of existing discharge pipes allowed; no new construction.
f) ENTANGLEMENT PDC		
☐	Yes, my project meets all of the Entanglement PDC below.	
☐	No, my project does not meet all the Entanglement PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	

Information for Aquaculture Projects:

	Type of Aquaculture (e.g., cage on bottom)	Acreage
a)		
b)		
c)		

☐	24.	Shell on bottom <50 acres with maximum of 4 corner marker buoys;
☐	25.	Cage on bottom with no loose floating lines <5 acres and minimal vertical lines (1 per string of cages, 4 corner marker buoys);
☐	26.	Floating cages in <3 acres in waters and shallower than -10 feet MLLW with no loose lines and minimal vertical lines (1 per string of cages, 4 corner marker buoys);
☐	27.	Floating upweller docks in >10 feet MLLW.
☐	28.	Any in-water lines, ropes, or chains must be made of materials and installed in a manner (properly spaced) to minimize the risk of entanglement by keeping lines taut or using methods to promote rigidity (e.g., sheathed or weighted lines that do not loop or entangle).
g) HABITAT MODIFICATION PDC		
☑	Yes, my project meets all of the Habitat Modification PDC below.	
☐	No, my project does not meet all the Habitat Modification PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	

☐	29.	No conversion of habitat type (soft bottom to hard, or vice versa) for aquaculture or reef creation.	
h) VESSEL TRAFFIC PDC			
☑	Yes, my project meets all of the Vessel Traffic PDC below.		
☐	No, my project does not meet all the Vessel Traffic PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):		
	Information for PDC 33 (refer to SOPs for guidance):		
		Temporary Project Vessel Type (e.g., work barge, tug, scow, etc.)	Number of Vessels
	a)	Hopper Scow	1
	b)	Tug for Scow	1
	c)		
		Type of Non-Commercial Vessels Added (e.g., 20' recreational motor boat *– only include if there is a net increase directly/indirectly resulting from project*)	Number of Vessels (*if sum > 2, PDC 33 is not met and justification required in Section 4*)
	a)	<20' motor boat	1
	b)		
		Type of Commercial Vessels Added (*only include if there is a net increase directly/indirectly resulting from project*)	Number of Vessels (*if > 0, PDC 33 is not met and justification required in Section 4*)
	a)		
	b)		
☐	30.	Speed limits below 10 knots for project vessels with buffers of 150 feet for all listed species (1,500 feet for right whales).	
☐	31.	While dredging, dredge buffers of 300 feet in the vicinity of any listed species (1,500 feet for right whales), with speeds of 4 knots maximum.	
☐	32.	The number of project vessels must be limited to the greatest extent possible, as appropriate to size and scale of project.	
☐	33.	The permanent net increase in vessels resulting from a project (e.g., dock/float/pier/boating facility) must not exceed two non-commercial vessels. A project must not result in the permanent net increase of any commercial vessels (e.g., a ferry terminal).	

Section 4: Justification for Review under the 2017 NLAA Program

If the action is not in compliance with all of the General PDC and appropriate stressor PDC, but you can provide justification and/or special conditions to demonstrate why the project still meets the NLAA determination and is consistent with the aggregate effects considered in the programmatic consultation, you may still certify your project through the NLAA program using this verification form. Please identify which PDC your project does not meet (e.g., PDC 9, PDC 15, PDC 22, etc.) and provide your rationale and justification for why the project is still eligible for the verification form.

To demonstrate that the project is still NLAA, you must explain why the effects on ESA-listed species or critical habitat are **insignificant** (i.e., too small to be meaningfully measured or detected) or **discountable** (i.e., extremely unlikely to occur). Please use this language in your justification.

PDC#	Justification

Section 5: USACE Verification of Determination

☑	In accordance with the 2017 NLAA Programmatic Consultation, the Corps has determined that the action complies with all applicable PDC and is not likely to adversely affect listed species.
☐	In accordance with the 2017 NLAA Programmatic Consultation, the Corps has determined that the action is not likely to adversely affect listed species per the justification and/or special conditions provided in Section 4.

USACE Signature:	Date:
WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:59:44 -04'00'	10/25/2019

Section 6: GARFO Concurrence

☑	In accordance with the 2017 NLAA Program, GARFO PRD concurs with USACE's determination that the action complies with all applicable PDC and is not likely to adversely affect listed species or critical habitat.
☐	In accordance with the 2017 NLAA Program, GARFO PRD concurs with USACE's determination that the action is not likely to adversely affect listed species or critical habitat per the justification and/or special conditions provided in Section 4.
☐	GARFO PRD does not concur with USACE's determination that the action complies with the applicable PDC (with or without justification), and recommends an individual Section 7 consultation to be completed independent from the 2017 NLAA Program.

GARFO Signature:	Date:
CARSON-SUPINO.EDITH.ELEANOR.1404702722 Digitally signed by CARSON-SUPINO.EDITH.ELEANOR.1404702722 Date: 2019.10.29 11:05:11 -04'00'	10/29/2019

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

October 10, 2019

Mr. Mark Murray- Brown
Protected Resources
NMFS Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

Subject: Hudson Raritan Estuary Ecosystem Restoration Project

Dear Mr. Murray- Brown:

The New York District Corps of Engineers (District), along with our partners, are currently finalizing the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report and Environmental Assessment. The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural conditions. At this time, the District is following up on our initial coordination regarding threatened and endangered species to fulfill Section 7 consultation under the ESA of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq) in the Hudson Raritan Estuary in the vicinity of the proposed restoration actions {Jamaica Bay Perimeter sites (3), Jamaica Bay Marsh Islands (5), Bronx River sites (5), Flushing Creek, Lower Passaic River (2), Hackensack River (2), and an Oyster Reefs (3)}.

With the exception of the Jamaica Bay Marsh Islands, the District has determined a “No Effect” on the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp’s ridley, and leatherback sea turtles and the threatened and endangered adult and sub-adult Atlantic sturgeon from New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS, as well as shortnose sturgeon. The District has determined that construction of the Jamaica Bay Marsh Islands “May Affect but Is Not Likely to Adversely Affect” the above listed species. A complete determination analysis is enclosed. Additionally, a NLAA Program Verification Form has been submitted to the NMFS for the Jamaica Bay Marsh Islands. The District seeks the Service’s concurrence on these determinations.

Should you have any questions regarding this action or the above requests please contact the project biologist, Diana Kohtio, by phone (917) 790-8619, or by email at Diana.M.Kohtio@usace.army.mil.

Sincerely,

WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.10 13:10:48 -04'00'

Peter Weppler, Chief
Environmental Analysis Branch

cc: Greene – NMFS; Sandy Hook

HUDSON RARITAN ESTUARY ECOSYSTEM RESTORATION REPORT

ENDANGERED SPECIES ACT
EFFECTS DETERMINATION
FOR
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE

US ARMY CORPS OF ENGINEERS

NEW YORK DISTRICT

OCTOBER 2019

Table of Contents

Appendices

Appendix A- Feasibility Level Engineering Designs

I. NOAA Resources and Species Information

Sea Turtles- Four species of ESA listed threatened or endangered sea turtles under the jurisdiction of National Marine Fisheries Service are seasonally present off the south shore of Long Island, including its bays and tributaries: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead (*Caretta caretta*), the threatened North Atlantic DPS of green (*Chelonia mydas*), and the endangered Kemp's ridley (*Lepidochelys kempii*) and leatherback sea turtles (*Dermochelys coriacea*) .

Atlantic Sturgeon (*Acipenser oxyrinchus*)- Atlantic sturgeon are present in the waters of Long Island and its adjacent tributaries. The New York Bight, Chesapeake Bay, South Atlantic and Carolina DPS of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Adult and subadult Atlantic sturgeon originating from any of these DPS could occur in the proposed project areas. As young remain in their natal river/estuary until approximately age 2, and early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile Atlantic sturgeon will occur within the water of Long Island and its adjacent bays and tributaries.

Shortnose Sturgeon (*Acipenser brevirostrum*)- Shortnose sturgeon are present in the waters of the Hudson and East Rivers and could occur in their adjacent bay and tributaries. As early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile shortnose sturgeon will occur within the saline waters of the Hudson and East Rivers and their adjacent bays and tributaries.

II. Planning Regions

A. Jamaica Bay Planning Region

Jamaica Bay Perimeter Sites – Proposed Plans

Dead Horse Bay- The project area is under the jurisdiction of the National Park Service (within the boundaries of Gateway National Recreation Area) and is adjacent to Floyd Bennett Field in Kings County, NY. Extensive historic landfilling activities across the entire site have resulted in marsh loss and a high proportion of invasive species. Erosion is claiming the western peninsula and exposing the solid waste landfill.

The recommended plan maximizes marsh habitat by creating a tidal channel in the northern portion of the site and re-grading the existing upland *Phragmites* stand to salt marsh elevations to create a 31 acre tidal marsh system. On the southern point, the landfill at the shoreline will be removed and replaced with clean fill and sand from the northern portion of the site. By the removal action, the fringe marsh will be able to support native wetland plant species with high habitat value. This measure will serve as the least cost placement for the approximately 669,000 cubic yards that must be excavated to create the northern marsh. Additionally, the fill and sand will be planted with maritime plants and trees to achieve multiple benefits: 1) to stabilize the excavated fill, which is placed on site over 61 acres as the least cost placement option; 2) to act as a protective buffer for intertidal habitat (37 out of 61 acres, when counting to 300 ft. out from the intertidal habitat); and 3) adding additional habitat values associated with maritime forests, a major historical feature within the bay and integral to a fully functioning ecosystem to support species.

Landfill materials will be excavated from the water's edge and reused on site to the extent possible, creating dunes further inland that are capped by clean sand. Excavated materials that cannot be reused onsite will be removed and processed at a registered landfill facility. In total this plan restores 130.7 acres which includes 31 acres of low marsh, 7 acres of high marsh, 4 acres of creek, and 27.7 acres of dunes.

Fresh Creek- The project area, under the jurisdiction of NYC Parks, is located in and along the tidal wetlands and adjacent upland bordering Fresh Creek, a tributary to Jamaica Bay, in Kings County, NY. The site includes beach, mudflat, salt marsh, coastal scrub/shrub forest, mature woodlands, and invasive plant species; it is surrounded by dense urban development and subject to combined sewer overflow (CSO) and stormwater outfalls.

The recommended plan creates a tidal marsh system continuous around the basin and includes basin filling and re-contouring to improve water quality and low quality benthic habitat resulting from past dredging and fill activities, existing CSOs, and untreated stormwater runoff. Excavation of 193,220 cubic yards of material from the channel, intertidal, and upland will be redistributed on site and capped with clean fill to create valuable upland scrub shrub and maritime forest habitat. This plan includes restoration of 16.1 acres of low marsh, 4.4 acres of high marsh, 3.6 acres of coastal scrub shrub, 10.7 acres of maritime forest, and restoration to 45.8 acres of tidal channels and pools. Recommended actions will complement NYC Parks' small-scale restoration efforts and NYCDEP's salt marsh mitigation along the creek.

Brant Point- The project area is located in the southern portion of Jamaica Bay in Queens County, NY and is under the jurisdiction of New York City Parks and Recreation (NYC Parks). A grounded barge located offshore has acted as an erosion control device and created high quality benthic habitat behind the structure. However, the site still suffers from shoreline erosion and loss of wetlands and has a high proportion of invasive plant species. Excessive dumping of soil, trash, and other debris and the covering of the historic marsh with fill material has compromised the natural habitat.

The recommended plan at Brant Point would preserve coastal marsh, and restore low marsh, high marsh, upland meadow, and maritime forest. Excavation of 29,520 cubic yards to create the marsh habitat will be re-distribution on site and capped with clean fill for meadow and maritime forest creation. Three offshore stone breakwaters and a rock revetment would be constructed along a portion of the shoreline to protect the point from ongoing erosion. Restoration will complement the floating islands adjacent the site that were constructed by NYCDEP. This plan includes the restoration of 2.9 acres of low marsh, 0.74 acres of high marsh, 1.5 acres of maritime forest, 2.6 acres of meadow restoration, and construction of tidal channels.

Jamaica Bay Perimeter Sites – Determination

Sea Turtles

In a letters dated April 7, 2016 your office advised us of the possible occurrence of four species of threatened or endangered sea turtles in the vicinity of the recommended projects: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp's ridley, and leatherback sea turtles.

According to USFWS (1997), the noted species of sea turtles regularly occur in the New York Bight, including the New York Harbor, during the summer and fall, and the loggerhead has occasionally been reported in the Jamaica Bay area. NYSDEC has reported that Kemp's Ridley may occasionally be found in Jamaica Bay. Use of the Jamaica Bay would primarily be limited to foraging, as there is little habitat for nesting. The District notes that no individuals were observed during the Summer or Fall 2003 surveys conducted by AE firms for the previous Jamaica Bay Marsh Island projects, nor were any reported during the JBERRT (2002) or USACE (2002) surveys.

Construction of the Dead Horse Bay site will be primarily land based and within the tidal zone, outside of the preferred shallow water foraging habitat for sea turtles. Fresh Creek is a dead end tributary along the northern perimeter of Jamaica Bay and it is unlikely that a sea turtle would venture up into the tributary. The District has determined that construction of Dead Horse Bay and Fresh Creeks site will have no effect on sea turtles.

Construction of off shore breakwaters at Brant Point will require some minimally invasive in water construction for the placement of material. However, planned in water construction activities will follow best management practices and occur outside the months when sea turtles may be present (May- mid November); therefore, the District has determined that construction activities at Brant Point will have no effect on sea turtles.

Atlantic and Shortnose Sturgeon

Initial ESA coordination with NMFS also indicated that threatened and endangered adult and sub adult Atlantic sturgeon from New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS as well as shortnose sturgeon may occur in the proposed project areas. The New York Natural Heritage Program and the NYSDEC indicate on their websites that the range for the Atlantic and shortnose sturgeon, in the vicinity of the proposed projects, includes the Hudson River to the dam at Troy. Although Atlantic and shortnose sturgeon that spawn in the Hudson River out migrate to surrounding coastal waters near the project area, there is a lack of data linking sturgeon with Jamaica Bay. Due to salinity ranges, water quality, and size of the water body, it is unlikely that sturgeon would be found in the Fresh Creek project area. Brant Point does require some in water construction activities; however, these activities will employ BMPs and do not require in water dredging or pile driving. Construction of Dead Horse Bay is primarily land based or within the tidal zone, outside of the known habit of adult and sub adult Atlantic or shortnose sturgeon. The District has determined that construction activities at Brant Point and Dead Horse Bay will have no effect on Atlantic and shortnose sturgeon.

Jamaica Bay Marsh Islands – Proposed Plans

Duck Point- The elevations at Duck Point represent approximately 17 acres, more than half of which are at the lower end of the low marsh range. The recommended alternative includes delivering 213,776 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 62.6 acres, 38.6 acres of which would be marsh. Of the marsh habitat, 22.5 acres are low marsh, 13.9 acres are high marsh, and 2.2 acres are scrub.

Stony Creek- The existing condition remnant marsh at Stony Creek is 34 acres, it is well defined and characterized by relatively high elevations compared to the remaining Jamaica Bay marsh islands as whole, however, almost 60 percent of the marsh island has been lost in the past 42 years. The recommended alternative involves delivering 151,360 cubic yards of clean fill to the island and grading the sediment. This would make the total footprint of the island 69.6 acres, 52 acres of which would be marsh. Of the marsh habitat, 26 acres are low marsh, 25.3 acres are high marsh, and 0.7 acres are scrub.

Pumpkin Patch West- Currently approximately 4 acres. The recommended alternative includes delivering 327,686 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 32.9 acres, 23.2 acres of which would be marsh. Of the marsh habitat, 13.7 acres are low marsh, 8.6 acres are high marsh, and 0.9 acres are scrub.

Pumpkin Patch East- Pumpkin Patch East is currently approximately 8 acres. The recommended alternative includes delivering 351,952 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 40.5 acres, 28.8 acres of which would be marsh. Of the marsh habitat, 15.6 are low marsh, 10.1 acres are high marsh, and 3.1 acres are scrub.

Elders Center- Elders Point Marsh was historically one island but marsh loss in the center of the island created two distinct islands separated by a mud flat. When the restoration of Elders Point East and Elders Point West were planned and implemented, it was infeasible to restore Elders Point Center based on the depth of the substrate in that area. The restoration was limited to an increase in size of 40 acres of new marsh at Elders Point East (2007) and 43 acres of new marsh at Elders Point West (2010). Presently, no marsh island exists above water between the two islands The recommended alternative includes delivering 284,891 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 41.7 acres, 27.5 acres of which would be marsh. Of the marsh habitat, 15.2 acres are low marsh, 10.9 acres are high marsh, and 1.4 acres scrub.

Jamaica Bay Marsh Islands – Determination

Sea Turtles

In a letters dated April 7, 2016 your office advised us of the possible occurrence of four species of threatened or endangered sea turtles in the vicinity of the recommended projects: the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp's ridley, and leatherback sea turtles. According to USFWS (1997), the noted species of sea turtles regularly occur in the New York Bight, including the New York Harbor, during the summer and fall, and the loggerhead has occasionally been reported in the Jamaica Bay area. NYSDEC has reported that Kemp's Ridley may occasionally be found in Jamaica Bay. Use of the Jamaica Bay be the notes species of sea turtle would primarily be limited to foraging, as there is little habitat for nesting. The District notes that no individuals were observed during the Summer or Fall 2003 surveys conducted by AE firms for the previous Jamaica Bay Marsh Island projects, nor were any reported during the JBERRT (2002) or USACE (2002) surveys. However, in a rare occurrence in October 2018, 96 Kemp's ridley sea turtles hatched on the Atlantic shoreline of the Rockaway Peninsula.

Atlantic and Shortnose Sturgeon

Through Initial coordination, NMFS has also indicated that threatened and endangered adult and sub-adult Atlantic sturgeon from New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS may occur in the proposed project areas. The New York Natural Heritage Program and the NYSDEC indicate on their websites that the range for the Atlantic sturgeon, in the vicinity of the proposed projects, includes the Hudson River to the dam at Troy. Although Atlantic sturgeon that spawn in the Hudson River out migrate to surrounding coastal waters near the project area, there is a lack of information linking Atlantic sturgeon with Jamaica Bay.

There are several construction methods available for the movement of material from the stockpile location to the marsh islands. The likely scenario, which was used in previous marsh island construction, is through the use of a hopper system and a series of booster pumps to re-slurry the material and deposit it on the existing footprint, where it would be re-graded to the desired elevation.

In order to effectively place the material being used for marsh restoration, geotextile tubes, as well as other methods (including hay bales and silt curtains) will be employed to serve as an initial containment of the sediment water slurry. By installing geotextile tubes, the slurry is isolated from the wave and current forces, allowing the construction contractor to pump the sediment in a more efficient manner. In addition to providing a barrier to external forces, the tubes will serve to prevent large portions of the slurry from entering the surrounding water column, which would increase turbidity and pose a threat to the native species.

Given the nature of the construction methods and the placement of the slurry pumps in open water, there is the possibility for entrainment during construction operations. However, considering the low probability of occurrence in the bay along with the use of construction best management practices, the District has determined that construction of the Jamaica Bay Marsh Islands may affect but is not likely to adversely affect threatened and endangered sea turtles and Atlantic sturgeon.

B. Harlem River/ East River/ Western Long Island Sound

Harlem River/ East River/ Western Long Island Sound *Sites – Proposed Plans*

Bronx River – Proposed Plans

Bronx Zoo and Dam- The project area is located adjacent to the Bronx Zoo in Bronx County, NY. The site is an over-widened channel that experiences stagnation and constricted flow made worse by the two dams within the channel. Sewage sources and runoff from the Bronx Zoo contribute to the waste infiltration and distinct sewage odor of the water. The wetlands and upland woodlands within the site are relegated to thin strips of land dominated by invasive species.

The recommended plan for the Bronx Zoo and Dam site will improve aquatic habitat and water quality. Approximately 0.28 acres of invasive vegetation along both banks and on the upland island upstream of dams will be removed and 0.28 acres of native vegetation will be planted in these locations and an additional location downstream of the dams. Fish ladder installation will link area upstream of the dams to the river channel below the dams and open Bronx River access to anadromous fish. Creation of 1.14 acres of emergent wetlands along both banks upstream of the dams and along the west bank downstream of the dams will provide habitat for migratory birds and flood control. Creation of 0.48 acres of forested wetlands created along the east bank upstream of the dams may provide potential habitat for endangered bat species, if present. In total, 3,320 CY of material will be excavated during clearing and grubbing activities and to reach grade for the recommended habitats, excavated material will be beneficially reused on site to the extent possible. Additional restoration measures include removal of debris between dams, sediment trap installation to reduce sediment loads reaching the river, installation of 750 linear feet rock wall upstream of the river, and improved public access to the site. Duration of construction is estimated at 11 months and is expected to begin in 2024.

Stone Mill Dam- The project area is within a steep valley in the New York Botanical Garden in Bronx County, NY. Wetlands are practically non-existent in the site and consist of few, very small (less than 5 square feet) discontinuous pockets of emergent vegetation. River samples often contain high levels of coliform bacteria and poor water quality due to illegal CSOs. The extreme channel habitats, including sediment laden pond, fast moving rocky channel and dam, impede fish movement and provide low to moderate fish and wildlife habitat.

The recommended plan for Stone Mill Dam increases and improves tributary connections, shoreline and shallows, and habitats for fish, crab, and lobsters. Fish ladder installation at this site is a critical component of the fish passage projects along the Bronx River and links the slow-flowing pool upstream of dam and the faster-flowing channel downstream of the dam. This measure will open up additional upstream habitat for anadromous fish. Approximately 0.027 acres of native vegetation will be planted along the east bank of the river, abutting the fish ladder. Invasive vegetation will be removed from 0.005 acres along the west bank, downstream of the dam, and planted with native vegetation. Duration of construction is estimated at 8 months and is expected to begin in 2026.

Shoelace Park- Shoelace Park: The project area is adjacent to the Bronx River Parkway in Bronx County, NY. The site currently provides limited fish and wildlife habitat due to nearby urban development, significant habitat fragmentation, sedimentation issues, and dense growth of invasive species.

The recommended plan increases and improves wetlands, public access, shoreline and shallows, and mudflat habitat. Native upland trees and shrubs will be planted along almost the entire length of the Bronx River Parkway roadway embankment along the west side of the site and on the steep slope along the east bank of the river. Forested and scrub/shrub wetlands totaling 1.1 acres will be created along two segments of the river on both banks. In stream work includes 5.7 acres of channel realignment using instream cross vanes and J-hooks. Between the forested wetland areas near the southern end of the site, 2.09 acres of banks will be stabilized using stacked rock walls with brush layers or crib walls and the river bottom will be excavated, bed material replaced, and cross vanes constructed. Invasive species removal with native plantings along 7.89 acres will provide a wooded riparian corridor along the banks of the entire reach. Riparian woodlands and created forested wetlands would provide habitat resources that are currently very limited in the Bronx urban environment.

Additional restoration measures at Shoelace Park include installation of 2.07 acres of vegetation swales, bioretention basins, raingardens along the east bank to reduce sediment loads reaching the river, and shoreline softening along 0.012 acres of the west bank at the southern end of site using a stacked rock wall with brush layers.

In total 40, 430 CY of material will be excavated during construction. 3,440 CY of material will be excavated during invasive species removal and select native plantings; 1, 010 CY will be excavated from the streambed and banks for construction of j-hooks and rock vanes; 8,910 CY will be excavated from the from the channel for in channel modifications and installation of an stone bottom; 18,400 CY will be excavated for sediment load reduction; 8,670 CY will be excavated during installation of the stepped rock wall. To the extent possible, this material will be reused onsite for habitat creation. Duration of construction is estimated at 13.5 months and is expected to begin in 2030.

Bronxville Lake- The project area is within a park that is part of the Bronx River Parkway Reservation in Westchester County, NY. The site is subject to nutrient-enriched runoff from the park and several drainage pipes that empty into the lake from the parkway and upland areas.

The recommended plan for Bronxville Lake will improve aquatic habitat, water quality, and flow regime. Native upland trees and shrubs will be planted in 1.36 acres in the northwest portion of the site along the Bronx River Parkway and in a small area along the southeast portion of the lake. Removal of 0.03 acres of invasive species will be replanted with native plants. Narrow strips of emergent vegetation will be created along 0.59 acres of the lake banks. Sections of the lake bottom will be filled and 2.49 acres of forested and scrub/shrub wetlands will be created in these areas; the remainder of the lake bottom will be retained in open water habitat. Sediment within two sections of the channel and adjacent lake bottom will be dredged. The bed of the channel will be restored by excavating the bottom and installing 250 tons of bedding stone. Rip rap forebay will be constructed in the river channel upstream of the lake to cause sediment to settle out of flow. The existing rock weir at the southern end of the lake will be modified to facilitate fish passage, opening new habitat in the Bronx River to anadromous and catadromous fish. Due to the proximity of major arterial infrastructure, shorelines were engineered with excessive armor of concrete.

Additional restoration measures for Bronxville Lake site include installation of vegetated swales, bioretention basins, raingardens at three locations to reduce sediment load to river, and improved public access.

In total 56,200 CY of material will be excavated during construction. 28,100 CY of material will be excavated from the shoreline, 21, 900 CY of material will be excavated during channel realignment; this material will beneficially reused on site to the extent possible. 4,100 CY of material excavated in clearing and grubbing activities for the forested scrub/shrub wetland and emergent wetland; similarly, 2, 100 CY of material will be removed during clearing and grubbing of invasive species and native plantings activities throughout the site, these materials will be removed from the site. Duration of construction is estimated at 12.5 months and is expected to begin in 2030.

Garth Harney- The project area is located north of Harney Road in Westchester County, NY and is bordered to the east and west by the Bronx River Parkway. The site contains thin strips of sparsely vegetated wetlands at Garth Woods and at Harney Road wetlands, often less than two feet wide. The broad and shallow channel and narrow wetland areas provide limited habitat for aquatic species.

At the Harney Road site, 0.85 acres of the river channel will be modified upstream of Harney Road and a short off-site section of the river channel downstream of the weir by replacing bed material and constructing instream cross vanes. Modification of the existing weir at the southern end of site, removing 30 cubic yards of concrete, will promote fish passage and provide new habitat for catadromous and anadromous fish species between Harney Road and Kensico Dam. 0.03 acres of the west bank downstream of the weir will be softened by constructing a stacked rock wall with brush layer. Along both shores of the river, 0.79 acres of emergent wetlands will be created containing a wet meadow. Between the emergent wetlands on the east shore and the paved path, 1.43 acres of native upland trees and shrubs will be planted. Invasives species along 0.03 acres of the west bank of the river will be removed and planted with native, upland or wetland shrubs and herbaceous vegetation. Installation of a raingarden/bioretention area at the upstream end of the buried storm drain will control erosion and reduce sediment loads to the river.

The Garth Woods restoration project is restricted to the northernmost section of the site to complement future habitat enhancement to be performed by Westchester County. On the west bank of the river at the upstream end of the site, 0.35 acres of forested and scrub/shrub wetlands will be created. Native plantings will be placed in 0.14 acres of the lawn adjacent to the created wetlands, on both sides of the paved path. Invasive species will be removed from

0.03 acres near the northern border of the site and planted with native, upland or wetland, shrubs and herbaceous vegetation. Wetland creation will increase biodiversity, improve aquatic habitat and water quality, and increase flood control at both sites.

In total 7,260 CY of material will be excavated during clearing and grubbing for invasive species and native plantings activities and emergent wetland, wet meadow, forested scrub/shrub wetland creation. Duration of construction is estimated at 9.5 months and is expected to begin in 2026.

Bronx River – Determination

Initial ESA coordination with NMFS and subsequent querying of the NOAA Section 7 Mapper indicated no occurrence of threatened or endangered species within the Bronx River project areas. The District has determined that construction of the Bronx River projects is not likely to affect threatened and endangered species under the jurisdiction of NMFS.

Flushing Creek – Proposed Plans

Flushing Creek- The project site is located in a highly urbanized area in Queens, New York. In preparation for the World's Fair in 1939, there was significant stream straightening, filling of wetland areas, and headwater reconfiguration of Flushing Creek. Continued development in the area has led to loss and degradation of tidal wetlands. Remaining wetlands are dominated by invasive species and limited to fringe areas. Currently, the site has low ecological value suffering from bank erosion, profusion of invasive species, low benthic and fish abundance and diversity, and poor water quality.

The recommend design includes re-grading existing common reed-dominated marsh as well as conversion of existing mudflat areas to low marsh. High marsh and scrub shrub area will be established in the transitional zones between low marsh and upland maritime forest. The existing upland forest will be restored to a more diverse and functional maritime forest community. Finally, re-contouring along the mudflat will address issues of water quality and provide the appropriate hydrology necessary for persistence of the created habitat.

In total 39,015 CY of excavation will take place throughout the site with 12,200 CY to be taken off site and 26,815 CY to be beneficially re-used onsite to create upland habitat. Invasives (*Phragmites*) would be removed along with 1ft root mat and would be placed off-site. Other invasive species may be smothered or left on site in riparian area if not part of active restoration actions. Material excavated to create wetlands will be kept on-site and placed in upland and/or adjacent areas as needed. Cover requirements including 2-ft of cover in upland/riparian areas and 1-ft cover in wetland areas.

In total Restoration measures include 9.76 acres of low marsh, 2.47 acres of high marsh, 1.80 acres of scrub/ shrub, and 3.89 acres of maritime forest. Duration of construction is estimated to be 23 months and is expected to begin in 2024.

Flushing Creek – Determination

Atlantic and Shortnose Sturgeon

In a letter dated 27, April 2016, your office advised us of the possible occurrence of threatened and endangered adult and sub-adult Atlantic sturgeon from Gulf of Maine, New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS as well as adult shortnose sturgeon may occur in the proposed project area. The range of Atlantic and shortnose sturgeon within the vicinity of Flushing Creek includes the Hudson River to the dam at Troy (NYSDEC, NYNHP). Shortnose sturgeons have been sighted foraging or transiting through the East River and its tributaries (NOAA). Although both Long Island Sound and the East River are noted as being within the range of both Atlantic and shortnose sturgeon; salinity ranges, poor water quality, and size of the water body within the project area of Flushing Creek, likely preclude the occurrence of sturgeon in the project area.

The Flushing Creek site requires some in water work; however, these activities will follow best management practices. Construction of Flushing Creek is primarily land based or within the tidal zone, outside of the known habitat of Atlantic and shortnose sturgeons. The District has determined that the construction activities at Flushing Creek will have no effect on Atlantic and shortnose sturgeon.

C. Lower Passaic River/ Hackensack River/ Newark Bay

Lower Passaic River Sites – Proposed Plans

Oak Island Yards- Construction is deferred following EPA Remedial Action. Site specific coordination will occur at a later date.

Branch Brook Park- The Branch Brook Park site is located in Newark, New Jersey. The park is surrounded by commercial and residential developments and roadways. The stream and forest areas within the park experience considerable amounts of anthropogenic trash and are dominated by non-native, invasive vegetation. Ponds at the site suffer from algal blooms and eutrophication from excess nutrient runoff.

The recommended plan for this site will enhance both terrestrial and aquatic habitats. 3,170 CY will be excavated from the 0.98 acre stream for stream naturalization and two feet of material (55,020 CY) will be excavated for pond deepening. Restoration measures also include 8.91 acres of invasive removal and select native plantings, 8.80 acres of forested/scrub-shrub wetland creation, and 10.24 acres of enhanced emergent wetlands. Construction is estimated to be 24 months and is expected to begin in 2030.

Lower Passaic River Sites – Determination

Initial ESA coordination with NMFS indicated no occurrence of threatened or endangered species within the Branch Brook Park project area. The Section 7 Mapper did not indicate potential presence of threatened or endangered species of concern. The District has determined that construction of the Branch Brook Park site is not likely to affect threatened or endangered species under the jurisdiction of NMFS.

Hackensack River Sites – Proposed Plans

Metromedia- The Metromedia track is located in Carlstadt, Bergen County, New Jersey. The site is bordered by the Hackensack River to the east and south and by the Marsh Resources Meadowlands Mitigation Bank to the north. The site is underdeveloped and dominated by common reed. The property also likely contains fill from unknown sources during construction of nearby radio towers.

The recommended plan will increase diversity and improve fish and wildlife habitat as well as improving flood storage and water quality. 38,000 CY of material will be excavated and replaced with 41,000 CY of clean fill. Restoration measures include enhancement of 26.5 acres of low marsh, creation of 9.4 acres of high marsh, 14.8 acres of scrub-shrub wetland, and 4.1 acres of maritime upland habitat. Duration of construction is estimated at 33.5 months and is expected to begin in 2028.

Meadowlark- Meadowlark Marsh is bounded to the south by Bellmans Creek, to the north and west by the New Jersey Turnpike – Eastern Spur, and to the east by 83rd street and active railroad tracks in Ridgefield, Bergen County, NJ. The upland area of the site is currently used as a dirt track for off-road vehicles, limiting the habitat available in upland areas. Pesticide overspray into a portion of the site from the utility right-of-way has been observed.

Restoration efforts at the site will improve fish and wildlife habitat as well as flood storage and nutrient and toxicant filtration for runoff from the surrounding developed areas. The entire site (71.5 acres) will be graded, with 64,400 CY of excavated material taken off site. High marsh and upland areas will be brought up to grade with 29,200 CY of fill and capped with clean material. Additional restoration measures include creation of 56.2 acres of low marsh, 6.5 acres of high marsh, 4.2 acres of forested/scrub shrub habitat, and culvert installation. Duration of construction is estimated at 33.5 months and is expected to begin in 2032.

Hackensack River Sites – Determination

Initial ESA coordination with NMFS indicated no occurrence of threatened or endangered species within the Hackensack River project area. However, the Section 7 Mapper indicated that endangered adult shortnose sturgeon and threatened and endangered adult and subadult Atlantic sturgeon may occur in the proposed project areas. The range for Atlantic and shortnose sturgeon, in the vicinity of the proposed projects, includes the Hudson River to the dam at Troy (NYSDEC, NYNHP). Although Atlantic and shortnose sturgeon that spawn in the Hudson River outmigrate to surrounding coastal waters near the project area, there is a lack of information linking Atlantic and shortnose sturgeon to the Hackensack River.

The Meadowlark Marsh site requires in water construction for culvert installation; however, these activities will follow best management practices and will employ a turbidity curtain along Bellmans Creek. Construction of the Metromedia Track site is primarily land based or within the tidal zone, outside of the known habitat of Atlantic or shortnose sturgeon. The District has determined that the construction activities at Meadowlark Marsh and Metromedia Track will have no effect on Atlantic and shortnose sturgeon.

D. Oysters

Oyster Sites – Proposed Plans

Naval Station Earle- The Naval Station Earle (NSE) is located in Sandy Hook Bay, New Jersey. Water depths at this site from the pier out into the channel vary from 12 to 40 feet. Previous oyster restoration studies by NY/NJ Baykeeper have been conducted at NWS Earle. There are no risks of oyster poaching at this site due to the proximity of the naval base.

The recommended plan creates an approximately 10 acre oyster reef through installation of 1,010 oyster pyramids with 30 oyster castle blocks per pyramid and creation of 350 CY of spat-on-shell. Duration of construction is estimated at 12 months and is expected to start in 2024.

Bush Terminal- The Bush Terminal site consists of eroding piers south of the Gowanus Canal on the western shore of Brooklyn. The piers were used for shipping during the industrial era. Due to this, as well as known historical dumping and the proximity to the Gowanus Canal, some level of contaminants in the sediment may be present. Water depth at the site varies from shallow to deep allowing for good habitat diversity.

The recommended plan for Bush Terminal would provide public access, awareness, and opportunities for future studies. Restoration measures for this site include 1,100 oyster gabions and 76,680 CY of spat-on-shell to create an approximately 31.4 acre oyster reef. Duration of construction is estimated at 15.5 months and is expected to start in 2028.

Head of Jamaica Bay- The Head of Jamaica Bay site is located in the northeast section of Jamaica Bay, adjacent to JFK Airport. Salt marsh habitat fringes much of the shoreline area. The bottom is steeply sloped close to the shoreline, with depths of up to 33 feet. Substrate in the area is primarily mud. Based on the nearest tidal current station in Jamaica Bay (Grass Hassock Channel), the current speeds in the eastern portion of the bay rarely exceed one (1) knot, making Head of Jamaica Bay well suited for larval settlement and oyster restoration.

The recommended plan will create nearly 10 acres of oyster reef through the placement of 9.85 acres of spat on shell placed on a substrate composed of shell and crushed porcelain. Structural complexity is created through placement of 337 gabions, 150 oyster castles and 470 super trays throughout the project area. The layer of substrate and spat on shell will be 12 inches thick and have a volume of 16, 840 cubic yards.

Oyster Sites – Determination

In a letter dated April 27, 2017, your office advised us that four species of threatened or endangered sea turtles which are seasonally present off the shore of Long Island, including its bays and tributaries, may be present at the Naval Station Earle site. These include the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, the threatened North Atlantic DPS of green, and the endangered Kemp’s riley and leatherback sea turtles. According to USFWS (1997), the noted species of sea turtles regularly occur in the New York Bight, including the New York Harbor, during the summer and fall, and the loggerhead has been reported in the Sandy Hook area.

Construction activities at the three recommended oyster reef sites will require placement of material over a significant area of bottom habitat. These activities will temporarily increase turbidity and have the potential for smothering when material is placed. In water construction activities at both sites will employ best management practices and environmental windows for sea turtles from May-mid November for in water construction activities. Additionally, it is anticipated that mobile individuals will relocate during this period of disturbance. The District has determined that construction activities at Bush Terminal, Naval Station Earle, and Head of Jamaica Bay will have no effect on sea turtles.

Initial ESA coordination with NMFS also indicated that threatened and endangered adult and sub adult Atlantic sturgeon from New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS as well as shortnose sturgeon may occur in the oyster reef proposed project areas. The New York

Natural Heritage Program and the NYSDEC indicate on their websites that the range for the Atlantic and short nose sturgeon, in the vicinity of the proposed projects, includes the Hudson River to the dam at Troy. Although Atlantic and short nose sturgeon that spawn in the Hudson River out migrate to surrounding coastal waters near the project area, there are no data or surveys linking their occurrence near the project sites. Construction of the oyster reefs will require in water placement of material; however, these activities will employ BMPs such as turbidity barriers and do not require in water dredging or pile driving. The District had determined that the construction activities at Bush Terminal, Naval Station Earle, and Head of Jamaica Bay will have no effect on Atlantic and shortnose sturgeon.

USFWS Coordination

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO ATTENTION OF:

To: U.S. Fish and Wildlife Service, New York Field Office **FAX:** (631) 286-4003
Email: Steve_Papa@fws.gov

Request for review pursuant to:
☒ **Section 7(a) (2) of the Endangered Species Act of 1973 (ESA)**
☐ **Fish and Wildlife Coordination Act (FWCA)**

Date: 10/8/2019 **Permit Application Number:**________ Jamaica Bay Region
Project Name: Hudson Raritan Estuary Ecosystem Restoration ~~**Location:** Lat. __.__° Long. -__.__°~~
County: ________ **Corps Contact:** Diana Kohtio, **Phone:** 917-790-8619 Perimeter Sites
Date USFWS response due*: Public Review Period **Email:** diana.m.kohtio@usace.army.mil
☐ **LOP/IP** ☐ **NWP/RGP**

*(for LOPs or IPs – length of LOC/PN, for NWP/RGP – 10 days). Pursuant to 50 CFR 402.13, the Corps shall not issue a permit prior to USFWS concurrence, unless No Effect determination.

Listed/proposed/candidate species and/or designated critical habitat with potential to occur in proposed project area:

☐ Bog turtle (T)	☒ Piping plover (T)	☐ Northern long-eared bat (T)
☐ Dwarf wedgemussel (E)	☒ Roseate tern (E)	☒ Red Knot (T)
☐ Indiana bat (E)	☐ Sandplain gerardia (E)	
☐ Karner blue butterfly (E)	☒ Seabeach amaranth (T)	
☐ Northern wild monkshood (T)**	☐ Small whorled pogonia (T)**	

** No consultation required for plant species in counties where plants have only historically been present

The U.S. Army Corps of Engineers has determined that the proposed project:
☒ will result in no effect to piping plover, roseate tern, seabeach amaranth
☐ may affect________
☒ may affect, but is not likely to adversely affect red knot
☐ may affect and is likely to adversely affect________

See attached project description (including any conservation measures that are part of the proposal), permit conditions, permit application details, and rationale for the above-listed determination(s).

The U.S. Army Corps of Engineers' requests:
☒ USFWS concurrence with our determinations ☐ Additional assistance to make our determination

The U.S. Fish and Wildlife Service: ☐ Requests additional time for review
☒ Acknowledges no effect determination, no further ESA consultation/coordination is required***
☒ Concurs with your determination, no further ESA consultation/coordination is required***
☐ Has no objection pursuant to FWCA ☐ Is taking no action pursuant to FWCA
☐ Will provide FWCA comments separately ☐ Requests additional information ☐ See attached recommendations

USFWS Contact(s): [signature] Supervisor signature: ________
Date: 3/2/2020 Date: ________

***Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of federally-listed and proposed endangered and threatened species in New York is available for your information. Until the proposed project is complete, we recommend that you check our website every 90 days from the date of this letter to ensure that listed species presence/absence information for the proposed project is current.

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF:

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Request for review pursuant to:

☒ **Section 7(a) (2) of the Endangered Species Act of 1973 (ESA)**
☐ **Fish and Wildlife Coordination Act (FWCA)**

Date: 10/8/19 **Permit Application Number:** ________ Jamaic Bay Marsh Islands

Project Name: Hudson Raritan Estuary Ecosystem Restoration **Location:** Lat. __.__° Long. __.__°

County: ________ **Corps Contact:** Diana Kohtio **Phone:** 917-790-8619

Date USFWS response due*: Public Review Period **Email:** diana.m.kohtio@usace.army.mil

☐ **LOP/IP** ☐ **NWP/RGP**

*(for LOPs or IPs – length of LOC/PN, for NWP/RGP – 10 days). Pursuant to 50 CFR 402.13, the Corps shall not issue a permit prior to USFWS concurrence, unless No Effect determination.

Listed/proposed/candidate species and/or designated critical habitat with potential to occur in proposed project area:

☐ Bog turtle (T)	☒ Piping plover (T)	☐ Northern long-eared bat (T)
☐ Dwarf wedgemussel (E)	☒ Roseate tern (E)	☒ Red Knot (T)
☐ Indiana bat (E)	☐ Sandplain gerardia (E)	
☐ Karner blue butterfly (E)	☒ Seabeach amaranth (T)	
☐ Northern wild monkshood (T)**	☐ Small whorled pogonia (T)**	

** No consultation required for plant species in counties where plants have only historically been present

The U.S. Army Corps of Engineers has determined that the proposed project:

☒ will result in no effect to Piping plover, roseate tern, seabeach amaranth
☐ may affect ________
☒ may affect, but is not likely to adversely affect red knot
☐ may affect and is likely to adversely affect ________

See attached project description (including any conservation measures that are part of the proposal), permit conditions, permit application details, and rationale for the above-listed determination(s).

The U.S. Army Corps of Engineers' requests:

☒ USFWS concurrence with our determinations ☐ Additional assistance to make our determination

The U.S. Fish and Wildlife Service: ☐ Requests additional time for review
☒ Acknowledges no effect determination, no further ESA consultation/coordination is required***
☒ Concurs with your determination, no further ESA consultation/coordination is required***
☐ Has no objection pursuant to FWCA ☐ Is taking no action pursuant to FWCA
☐ Will provide FWCA comments separately ☐ Requests additional information ☐ See attached recommendations

USFWS Contact(s): [signature] Supervisor signature: ________
Date: 3/2/2020 Date: ________

***Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of federally-listed and proposed endangered and threatened species in New York is available for your information. Until the proposed project is complete, we recommend that you check our website every 90 days from the date of this letter to ensure that listed species presence/absence information for the proposed project is current.

October 2015 Version

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF:

To: U.S. Fish and Wildlife Service, New York Field Office **FAX:** (631) 286-4003
Email: Steve_Papa@fws.gov

Request for review pursuant to:

☒ **Section 7(a) (2) of the Endangered Species Act of 1973 (ESA)**
☐ **Fish and Wildlife Coordination Act (FWCA)**

Date: 10/8/19 **Permit Application Number:** Harlem River / East River / Western LI Sound

Project Name: Hudson Raritan Estuary Ecosystem Restoration **Location:** ~~Lat.~~ __.____° Long. -__.____°

County: ________ **Corps Contact:** Diana Kohtio **Phone:** 917-790-8619

Date USFWS response due*: Public Review Period **Email:** diana.m.kohtio@usace.army.mil

☐ **LOP/IP** ☐ **NWP/RGP**

*(for LOPs or IPs – length of LOC/PN, for NWP/RGP – 10 days). Pursuant to 50 CFR 402.13, the Corps shall not issue a permit prior to USFWS concurrence, unless No Effect determination.

Listed/proposed/candidate species and/or designated critical habitat with potential to occur in proposed project area:

☒ Bog turtle (T)	☒ Piping plover (T)	☐ Northern long-eared bat (T)
☐ Dwarf wedgemussel (E)	☒ Roseate tern (E)	☒ Red Knot (T)
☐ Indiana bat (E)	☐ Sandplain gerardia (E)	
☐ Karner blue butterfly (E)	☐ Seabeach amaranth (T)	
☐ Northern wild monkshood (T)**	☐ Small whorled pogonia (T)**	

** No consultation required for plant species in counties where plants have only historically been present

The U.S. Army Corps of Engineers has determined that the proposed project:

☐ will result in no effect to bog turtle, piping plover, roseate tern, seabeach amaranth

☐ may affect __________

☒ may affect, but is not likely to adversely affect red knot (Flushing Creek site)

☐ may affect and is likely to adversely affect __________

See attached project description (including any conservation measures that are part of the proposal), permit conditions, permit application details, and rationale for the above-listed determination(s).

The U.S. Army Corps of Engineers' requests:

☒ USFWS concurrence with our determinations ☐ Additional assistance to make our determination

The U.S. Fish and Wildlife Service: ☐ Requests additional time for review

☒ Acknowledges no effect determination, no further ESA consultation/coordination is required***
☒ Concurs with your determination, no further ESA consultation/coordination is required***
☐ Has no objection pursuant to FWCA ☐ Is taking no action pursuant to FWCA
☐ Will provide FWCA comments separately ☐ Requests additional information ☐ See attached recommendations

USFWS Contact(s): [signature] Supervisor signature: __________

Date: 3/2/2020 Date: __________

***Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of federally-listed and proposed endangered and threatened species in New York is available for your information. Until the proposed project is complete, we recommend that you check our website every 90 days from the date of this letter to ensure that listed species presence/absence information for the proposed project is current.

October 2015 Version

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

October 8, 2019

REPLY TO
ATTENTION OF
Environmental Analysis Branch

Mr. Eric Schrading
Field Supervisor NJ Field Office
U.S. Fish and Wildlife Service
4 E. Jimmie Leeds Road, Suite 4
Galloway, New Jersey 08205

Subject: Hudson Raritan Estuary Ecosystem Restoration Project

Dear Mr. Schrading:

The New York District Corps of Engineers (District), along with our partners, are currently finalizing the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report and Environmental Assessment. The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural conditions. At this time, the District is following up on our initial coordination regarding threatened and endangered species to fulfill Section 7 consultation under the ESA of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq) in the Hudson Raritan Estuary in the vicinity of the proposed restoration actions {Jamaica Bay Perimeter sites (3), Jamaica Bay Marsh Islands (5), Bronx River sites (5), Flushing Creek, Lower Passaic River (2), Hackensack River (2), and an Oyster Reefs (3)}.

For the above referenced projects, the District has determined a “No Effect” on the federally threatened piping plover, bog turtle, and seabeach amaranth as well as the endangered Northeast Region roseate tern and “May Affect but Is Not Likely to Adversely Affect” on the federally threatened red knot. A complete determination analysis is enclosed.

Should you have any questions regarding this action or the above requests please contact the project biologist, Diana Kohtio, by phone (917) 790-8619, or by email at Diana.M.Kohtio@usace.army.mil.

Sincerely,

WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.08 12:24:27 -04'00'

Peter Weppler, Chief
Environmental Analysis Branch

cc: Mars- NJFO
Sinkevich – LIFO

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

October 8, 2019

REPLY TO
ATTENTION OF
Environmental Analysis Branch

Mr. David A. Stilwell
Field Supervisor NY Field Office
U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Subject: Hudson Raritan Estuary Ecosystem Restoration Project

Dear Mr. Stilwell:

The New York District Corps of Engineers (District), along with our partners, are currently finalizing the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report and Environmental Assessment. The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural conditions. At this time, the District is following up on our initial coordination regarding threatened and endangered species to fulfill Section 7 consultation under the ESA of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq) in the Hudson Raritan Estuary in the vicinity of the proposed restoration actions {Jamaica Bay Perimeter sites (3), Jamaica Bay Marsh Islands (5), Bronx River sites (5), Flushing Creek, Lower Passaic River (2), Hackensack River (2), and an Oyster Reefs (3)}.

For the above referenced projects, the District has determined a “No Effect” on the federally threatened piping plover, bog turtle, and seabeach amaranth as well as the endangered Northeast Region roseate tern and “May Affect but Is Not Likely to Adversely Affect” on the federally threatened red knot. A complete determination analysis is enclosed.

Should you have any questions regarding this action or the above requests please contact the project biologist, Diana Kohtio, by phone (917) 790-8619, or by email at Diana.M.Kohtio@usace.army.mil.

Sincerely,

WEPPLER.PETER.M.1228647353
Digitally signed by WEPPLER.PETER.M.1228647353
Date: 2019.10.08 12:21:33 -04'00'

Peter Weppler, Chief
Environmental Analysis Branch

cc: Sinkevich – LIFO
Mars – NJFO

HUDSON RARITAN ESTUARY ECOSYSTEM RESTORATION REPORT

US FISH AND WILDLIFE SERVICE
ENDANGERED SPECIES ACT
EFFECTS DETERMINATION

US ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT

OCTOBER 2019

Table of Contents

Appendices

Appendix A- Feasibility Level Engineering Designs

I. IPAC Resources and Species Information

Piping plover (*Charadrius melodus*) - On January 10, 1986, the piping plover was listed as threatened and endangered under provisions of the ESA. Three distinct populations were identified by the Service during the listing process: Atlantic Coast (threatened), Great Lakes (endangered), and Northern Great Plains (threatened). The Atlantic Coast population breeds on coastal beaches from Newfoundland to North Carolina (NC) and winters along the Atlantic Coast from NC southward, along the Gulf Coast and in the Caribbean.

Red Knot (*Calidris canutus rufa*) - The red knot was listed as threatened under the ESA on January 12, 2015. Red knots are also federally-protected under the Migratory Bird Treaty Act and are listed as endangered in NJ. Within Jamaica Bay, red knots may occur in the intertidal habitats (e.g., mudflats and beaches) during their spring (May 1 thru June 7) and fall (July 7 to November 30) migration periods. The spring migration is timed to coincide with the spawning season for the horseshoe crab (*Limulus polyphemus*).

Roseate Tern (*Sterna dougallii dougallii*) - The endangered Northeast Region population of roseate terns is present along the Atlantic Coast south to North Carolina. At the time of this analysis, critical habitat had not been established for this species. Roseate tern are protected under the Migratory Bird Treaty Act. A marine coastal species, the roseate tern breeds along the coasts of the Atlantic, Pacific and Indian oceans on salt marsh islands and beaches with sparse vegetation. In eastern North America, it breeds from the Canadian Maritime Provinces south to Long Island, although formerly the breeding range extended to Virginia. In New York, this species breeds only at a few Long Island colonies. The largest colony, more than 1,000 pairs, is located at Great Gull Island off eastern Long Island.

Seabeach Amaranth (*Amaranthus pumilus*) - Seabeach amaranth was federally listed as a threatened species in 1993. At the time of this analysis, critical habitat had not been established for this species. The primary habitat for seabeach amaranth consists of the dynamic and ever changing seaward facing areas of barrier islands, including overwash flats at accreting ends of islands, lower foredunes, and upper strands of non-eroding beaches located landward of the wrack line (USFWS 1996). Seabeach amaranth occasionally establishes populations in other habitats, including sound- side beaches, foredune blowouts, and on replenished beaches. Seabeach amaranth occupies a narrow beach zone that lies above mean high tide at the lowest elevations at which vascular plants regularly occur.

Bog Turtle (*Clemmys muhlenbergii*)- On November 4, 1997, the bog turtle was listed as threatened and similarity of appearance (threatened) under provisions of the ESA. Two populations were identified by the Service: Northern population (threatened) and Southern population (similarity of appearance (threatened)).

The Northern population appears in Massachusetts, Connecticut, New York, New Jersey, Delaware, Maryland, and Pennsylvania.

Migratory Birds- The District has consulted USFWS IPaC database to identify the migratory bird species within the vicinity of the recommended projects.

II. Planning Regions

A. Jamaica Bay Planning Region

Jamaica Bay Perimeter Sites – Proposed Plans

Dead Horse Bay- The project area is under the jurisdiction of the National Park Service (within the boundaries of Gateway National Recreation Area) and is adjacent to Floyd Bennett Field in Kings County, NY. Extensive historic landfilling activities across the entire site have resulted in marsh loss and a high proportion of invasive species. Erosion is claiming the western peninsula and exposing the solid waste landfill.

The recommended plan maximizes marsh habitat by creating a tidal channel in the northern portion of the site and re-grading the existing upland *Phragmites* stand to salt marsh elevations to create a 31 acre tidal marsh system. On the southern point, the landfill at the shoreline will be removed and replaced with clean fill and sand from the northern portion of the site. By the removal action, the fringe marsh will be able to support native wetland plant species with high habitat value. This measure will serve as the least cost placement for the approximately 669,000 cubic yards that must be excavated to create the northern marsh. Additionally, the fill and sand will be planted with maritime plants and trees to achieve multiple benefits: 1) to stabilize the excavated fill, which is placed on site over 61 acres as the least cost placement option; 2) to act as a protective buffer for intertidal habitat (37 out of 61 acres, when counting to 300 ft. out from the intertidal habitat); and 3) adding additional habitat values associated with maritime forests, a major historical feature within the bay and integral to a fully functioning ecosystem to support species.

Landfill materials will be excavated from the water's edge and reused on site to the extent possible, creating dunes further inland that are capped by clean sand. Excavated materials that cannot be reused onsite will be removed and processed at a registered landfill facility. In total this plan restores 130.7 acres which includes 31 acres of low marsh, 7 acres of high marsh, 4 acres of creek, and 27.7 acres of dunes.

Fresh Creek- The project area, under the jurisdiction of NYC Parks, is located in and along the tidal wetlands and adjacent upland bordering Fresh Creek, a tributary to Jamaica Bay, in Kings County, NY. The site includes beach, mudflat, salt marsh, coastal scrub/shrub forest, mature woodlands, and invasive plant species; it is surrounded by dense urban development and subject to combined sewer overflow (CSO) and stormwater outfalls.

The recommended plan creates a tidal marsh system continuous around the basin and includes basin filling and re-contouring to improve water quality and low quality benthic habitat resulting from past dredging and fill activities, existing CSOs, and untreated stormwater runoff. Excavation of 193,220 cubic yards of material from the channel, intertidal, and upland will be redistributed on site and capped with clean fill to create valuable upland scrub shrub and maritime forest habitat. This plan includes restoration of 16.1 acres of low marsh, 4.4 acres of high marsh, 3.6 acres of coastal scrub shrub, 10.7 acres of maritime forest, and restoration to 45.8 acres of tidal channels and pools. Recommended actions will complement NYC Parks' small-scale restoration efforts and NYCDEP's salt marsh mitigation along the creek.

Brant Point- The project area is located in the southern portion of Jamaica Bay in Queens County, NY and is under the jurisdiction of New York City Parks and Recreation (NYC Parks). A grounded barge located offshore has acted as an erosion control device and created high quality benthic habitat behind the structure. However, the site still suffers from shoreline erosion and loss of wetlands and has a high proportion of invasive plant species. Excessive dumping of soil, trash, and other debris and the covering of the historic marsh with fill material has compromised the natural habitat.

The recommended plan at Brant Point would preserve coastal marsh, and restore low marsh, high marsh, upland meadow, and maritime forest. Excavation of 29,520 cubic yards to create the marsh habitat will be re-distribution on site and capped with clean fill for meadow and maritime forest creation. Three offshore stone breakwaters and a rock revetment would be constructed along a portion of the shoreline to protect the point from ongoing erosion. Restoration will complement the floating islands adjacent the site that were constructed by NYCDEP. This plan includes the restoration of 2.9 acres of low marsh, 0.74 acres of high marsh, 1.5 acres of maritime forest, 2.6 acres of meadow restoration, and construction of tidal channels.

Jamaica Bay Perimeter Sites – Determination

Piping Plover (*Charadrius melodus*) - Numerous sources have confirmed the presence of Piping Plover along the Atlantic Ocean Shoreline of Jamaica Bay. The existing habitats at Dead Horse Bay, Brant Point, and the Back Bay tributary of Fresh Creek do not contain the wide flat sandy coastal beach habitat preferred by piping plover. Although ebird reports limited sitings of piping plover at Dead Horse Bay South the District is unaware of any recent siting in either project area.

The proposed project area for the Jamaica Bay Perimeter sites are outside of the final critical habitat for this species (published in the Federal Register on May 19, 2009). The District has determined that construction of the Jamaica Bay Perimeter sites will have no effect on Piping Plover.

Red Knot (*Calidris canutus rufa*) - At the time of this analysis, critical habitat had not been established for this species. Although there are no know comprehensive databases for red knot presence in Jamaica Bay, USFWS (HRE FWCAR 2018) has indicated that red knot as well as horseshoe crabs have been documented at Brant Point and Dead Horse Bay South. The District is unaware of any recent sitings of red knot in the vicinity of the Fresh Creek project site. Despite the development and high recreational use of the area by humans, red knot are utilizing the suitable habitats in the project area.

Although some minor, short-term, impacts to the red knot food resources and habitat will result from proposed project modifications, overall improvements to habitat can be expected to result from the proposed activity. Details of this determination are provided below.

The primary direct impacts resulting from implementation of the restoration project activities will be disturbance and direct impact of benthic, immobile invertebrate and plant communities currently living in these areas due to excavation of existing habitat and burial from sand placement. As a result, red knots will experience some short-term loss of food resources within these areas. The direct placement of sand fill is not expected to cause long-term significant impacts on the red knot. In addition, although the red knot would avoid foraging within areas of direct excavation and sand placement in the intertidal zone, until benthic food sources recolonized the site, recolonization of benthic communities in the intertidal zones typically takes place within six months to two years following sand placement activities.

Other short-term impacts, such as a slight decrease in water quality and an increase in turbidity, also are likely to occur during sand fill activities. Changes in water quality and turbidity may cause some short-term avoidance of the intertidal zone by the red knot during periods of low water quality resulting from construction activities. These impacts to their foraging activities will be short term and will have a minimal effect on them because red knot are mobile and can utilize unaffected foraging areas nearby.

Therefore, a May Affect, but Not Likely to Adversely Affect (NLAA) determination was made by the District for red knot for the overall proposed restoration project activities in the Jamaica Bay Perimeter sites.

Table 1: Summary of JB Perimeter Site Project Effects on Populations of Red Knot

Activities	Potentially	Not Likely to Adverse	Likely to Adversely Affect	No Effect
No-Action				
Project				
Staging Area Construction and U				X
Placement of Sand		X		
Plantings				X
Cumulative Impacts				
Periodic Maintenance of Invasive Plants				X

Roseate Tern (*Sterna dougallii dougallii*)- There are no know populations or recent sitings of Roseate Terns in the back bay portion of the HRE Jamaica Bay Planning Region. The District has determined that construction of the Jamaica Bay perimeter will have no effect on roseate terns.

Seabeach Amaranth (*Amaranthus pumilus*)- According to the New York Natural Heritage Program (NYNHP), seabeach amaranth is only known from Long Island, ranging from Coney Island to near the east end of the South Fork along the southern shore. The District has determined that construction of the Jamaica Bay Perimeter siteswill have no effect on seabeach amaranth.

Migratory Birds- IPaC has identified that 60 species of migratory birds may occur within the vicinity of Jamaica Bay. The District will work with the appropriate regulatory agencies and avoid and minimize disturbance to migratory birds during construction, including a restriction on tree or shrub/scrub removal from March 15 to July 31. The District has determined that construction of the Jamaica Bay Perimeter sites will have no effect on migratory birds.

Jamaica Bay Marsh Islands – Proposed Plans

Duck Point- The elevations at Duck Point represent approximately 17 acres, more than half of which are at the lower end of the low marsh range. The recommended alternative includes delivering 213,776 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 62.6 acres, 38.6 acres of which would be marsh. Of the marsh habitat, 22.5 acres are low marsh, 13.9 acres are high marsh, and 2.2 acres are scrub.

Stony Creek- The existing condition remnant marsh at Stony Creek is 34 acres, it is well defined and characterized by relatively high elevations compared to the remaining Jamaica Bay marsh islands as whole, however, almost 60 percent of the marsh island has been lost in the past 42 years. The recommended alternative involves delivering 151,360 cubic yards of clean fill to the island and grading the sediment. This would make the total footprint of the island 69.6 acres, 52 acres of which would be marsh. Of the marsh habitat, 26 acres are low marsh, 25.3 acres are high marsh, and 0.7 acres are scrub.

Pumpkin Patch West- Currently approximately 4 acres. The recommended alternative includes delivering 327,686 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 32.9 acres, 23.2 acres of which would be marsh. Of the marsh habitat, 13.7 acres are low marsh, 8.6 acres are high marsh, and 0.9 acres are scrub.

Pumpkin Patch East- Pumpkin Patch East is currently approximately 8 acres. The recommended alternative includes delivering 351,952 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 40.5 acres, 28.8 acres of which would be marsh. Of the marsh habitat, 15.6 are low marsh, 10.1 acres are high marsh, and 3.1 acres are scrub.

Elders Center- Elders Point Marsh was historically one island but marsh loss in the center of the island created two distinct islands separated by a mud flat. When the restoration of Elders Point East and Elders Point West were planned and implemented, it was infeasible to restore Elders Point Center based on the depth of the substrate in that area. The restoration was limited to an increase in size of 40 acres of new marsh at Elders Point East (2007) and 43 acres of new marsh at Elders Point West (2010). Presently, no marsh island exists above water between the two islands The recommended alternative includes delivering 284,891 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 41.7 acres, 27.5 acres of which would be marsh. Of the marsh habitat, 15.2 acres are low marsh, 10.9 acres are high marsh, and 1.4 acres scrub.

Jamaica Bay Marsh Islands – Determination

Piping Plover (***Charadrius melodus***) **-** Numerous sources have confirmed presence of Piping Plover along the Atlantic Ocean Shoreline of Jamaica Bay. Within the Back Bay there have been recent confirmed sightings at Broad Channel (ebird); however, data from observational bird counts conducted at previously constructed marsh islands Elders East and JoCo Marsh from 2006-2010 revealed no Piping Plover sightings (USACE 2017).

The proposed project area for the Jamaica Bay Marsh Islands is outside of the final critical habitat for this species (published in the Federal Register on May 19, 2009). In addition the expected limit of disturbance for Pumpkin Patch East (proposed site nearest to Broad Channel) is approximately 1000 feet from the shoreline of Broad Channel. The District has determined that construction of the Marsh Islands will have no effect on Piping Plover.

Red Knot (*Calidris canutus rufa*) - Of the five proposed islands it has been documented that Elders Point East supports spawning horseshoe crabs (USACE 2017); horseshoe crabs are also tracked and documented to occur throughout Jamaica Bay. The Service has noted in the Fish and Wildlife Coordination Act Report (April 2019) that the red knot is highly sensitive to disturbance during the critical period in their life cycle when migrating to and from their breeding and wintering habitats.

At the time of this analysis, critical habitat had not been established for this species and while there are no know comprehensive databases for red knot presence in Jamaica Bay, sightings have been reported throughout the Wildlife Refuge and Broad Channel, at Big and Little Egg Marshes, and Yellow Bar (ebird). Data from observational bird counts conducted at previously constructed marsh islands Elders East and JoCo Marsh from 2006-2010 revealed no Red Knot sightings (USACE 2017). However, there have been recent sightings and documentation of a few red knots in the vicinity of the five marsh islands (intertidal flats on perimeter and Atlantic Shoreline). Despite the development and high recreational use of the area by humans, red knot are utilizing the suitable habitats in the Project Area.

Existing conditions elevations at Elders Center, Pumpkin Patch East, and Pumpkin Patch West are primarily below surface water and are unlikely to support breeding horseshoe crabs. Stony Point and Duck Point marshes have a higher existing condition elevation within the proposed restoration footprint. Regardless of horseshoe suitability, the proposed marsh islands at times exists as mudflats and therefore have the potential to support red knot.

Although some minor, short-term, impacts to the red knot food resources and habitat will result from proposed project modifications, overall improvements to habitat can be expected to result from the proposed activity. Details of this determination are provided below.

The primary direct impacts resulting from implementation of the restoration project activities will be disturbance and direct impact of benthic, immobile invertebrate and plant communities currently living in these areas due to burial from sand placement. As a result, red knots will experience some short-term loss of food resources within the sand placement. The direct placement of beach fill is not expected to cause long-term significant impacts on the red knot. In addition, although the red knot would avoid foraging within areas of direct sand placement in the intertidal zone until benthic food sources recolonized the site, recolonization of benthic communities in the intertidal zones typically takes place within six months to two years following sand placement activities.

Other short-term impacts, such as a slight decrease in water quality and an increase in turbidity, also are likely to occur during sand fill activities. Changes in water quality and turbidity may cause some short-term avoidance of the intertidal zone by the red knot during periods of low water quality resulting from construction activities. These impacts to their foraging activities will be short term and will have a minimal effect on them because red knot are mobile and can utilize unaffected foraging areas nearby.

Therefore, a May Affect, but Not Likely to Adversely Affect (NLAA) determination was made by the District for red knot for the overall proposed restoration project activities at the Jamaica Bay Marsh Islands.

Table 2: Summary of JB Marsh Island Project Effects on Populations of Red Knot

Activities	**Potentially**	**Not Likely to Adversely Affect**	**Likely to Adversely Affect**	**No Effect**
No-Action				
Project				
Staging Area Construction and				X
Placement of Sand		X		
Plantings				X
Cumulative Impacts				
Periodic Maintenance of Invasive Plants				X

Roseate Tern (*Sterna dougallii dougallii*)- There are no know populations or recent sightings of Roseate Terns in the back bay portion of the HRE Jamaica Bay Planning Region. The District has determined that construction of the Marsh Islands will have no effect on the roseate tern.

Seabeach Amaranth (*Amaranthus pumilus*)- Seabeach amaranth is dependent on a terrestrial, upper beach habitat that is not flooded during the growing season, this habitat type does not currently exist nor is it targeted for restoration at the proposed marsh island sites.

According to the NYNHP seabeach amaranth is only known from Long Island, ranging from Coney Island to near the east end of the South Fork along the southern shore. The District has determined that construction of the Marsh Islands will have no effect on seabeach amaranth.

Migratory Birds- IPaC has identified that 60 species of migratory birds may occur within the vicinity of Jamaica Bay. The District will work with the appropriate regulatory agencies and avoid and minimize disturbance to migratory birds during construction, including a restriction on tree or shrub/scrub removal from March 15 to July 31. The District has determined that construction of the Jamaica Bay Marsh Islands will have no effect on migratory birds.

B. Harlem River/ East River/ Western Long Island Sound

Harlem River/ East River/ Western Long Island Sound *Sites – Proposed Plans*

Bronx River – Proposed Plans

Bronx Zoo and Dam- The project area is located adjacent to the Bronx Zoo in Bronx County, NY. The site is an over-widened channel that experiences stagnation and constricted flow made worse by the two dams within the channel. Sewage sources and runoff from the Bronx Zoo contribute to the waste infiltration and distinct sewage odor of the water. The wetlands and upland woodlands within the site are relegated to thin strips of land dominated by invasive species.

The recommended plan for the Bronx Zoo and Dam site will improve aquatic habitat and water quality. Approximately 0.28 acres of invasive vegetation along both banks and on the upland island upstream of dams will be removed and 0.28 acres of native vegetation will be planted in these locations and an additional location downstream of the dams. Fish ladder installation will link area upstream of the dams to the river channel below the dams and open Bronx River access to anadromous fish. Creation of 1.14 acres of emergent wetlands along both banks upstream of the dams and along the west bank downstream of the dams will provide habitat for migratory birds and flood control. Creation of 0.48 acres of forested wetlands created along the east bank upstream of the dams may provide potential habitat for endangered bat species, if present. In total, 3,320 CY of material will be excavated during clearing and grubbing activities and to reach grade for the recommended habitats, excavated material will be beneficially reused on site to the extent possible. Additional restoration measures include removal of debris between dams, sediment trap installation to reduce sediment loads reaching the river, installation of 750 linear feet rock wall upstream of the river, and improved public access to the site. Duration of construction is estimated at 11 months and is expected to begin in 2024.

Stone Mill Dam- The project area is within a steep valley in the New York Botanical Garden in Bronx County, NY. Wetlands are practically non-existent in the site and consist of few, very small (less than 5 square feet) discontinuous pockets of emergent vegetation. River samples often contain high levels of coliform bacteria and poor water quality due to illegal CSOs. The extreme channel habitats, including sediment laden pond, fast moving rocky channel and dam, impede fish movement and provide low to moderate fish and wildlife habitat.

The recommended plan for Stone Mill Dam increases and improves tributary connections, shoreline and shallows, and habitats for fish, crab, and lobsters. Fish ladder installation at this site is a critical component of the fish passage projects along the Bronx River and links the slow-flowing pool upstream of dam and the faster-flowing channel downstream of the dam. This measure will open up additional upstream habitat for anadromous fish. Approximately 0.027 acres of native vegetation will be planted along the east bank of the river, abutting the fish ladder. Invasive vegetation will be removed from 0.005 acres along the west bank, downstream of the dam, and planted with native vegetation. Duration of construction is estimated at 8 months and is expected to begin in 2026.

Shoelace Park- Shoelace Park: The project area is adjacent to the Bronx River Parkway in Bronx County, NY. The site currently provides limited fish and wildlife habitat due to nearby urban development, significant habitat fragmentation, sedimentation issues, and dense growth of invasive species.

The recommended plan increases and improves wetlands, public access, shoreline and shallows, and mudflat habitat. Native upland trees and shrubs will be planted along almost the entire length of the Bronx River Parkway roadway embankment along the west side of the site and on the steep slope along the east bank of the river. Forested and scrub/shrub wetlands totaling 1.1 acres will be created along two segments of the river on both banks. In stream work includes 5.7 acres of channel realignment using instream cross vanes and J-hooks. Between the forested wetland areas near the southern end of the site, 2.09 acres of banks will be stabilized using stacked rock walls with brush layers or crib walls and the river bottom will be excavated, bed material replaced, and cross vanes constructed. Invasive species removal with native plantings along 7.89 acres will provide a wooded riparian corridor along the banks of the entire reach. Riparian woodlands and created forested wetlands would provide habitat resources that are currently very limited in the Bronx urban environment.

Additional restoration measures at Shoelace Park include installation of 2.07 acres of vegetation swales, bioretention basins, raingardens along the east bank to reduce sediment loads reaching the river, and shoreline softening along 0.012 acres of the west bank at the southern end of site using a stacked rock wall with brush layers.

In total 40, 430 CY of material will be excavated during construction. 3,440 CY of material will be excavated during invasive species removal and select native plantings; 1, 010 CY will be excavated from the streambed and banks for construction of j-hooks and rock vanes; 8,910 CY will be excavated from the from the channel for in channel modifications and installation of an stone bottom;

18,400 CY will be excavated for sediment load reduction; 8,670 CY will be excavated during installation of the stepped rock wall. To the extent possible, this material will be reused onsite for habitat creation. Duration of construction is estimated at 13.5 months and is expected to begin in 2030.

Bronxville Lake- The project area is within a park that is part of the Bronx River Parkway Reservation in Westchester County, NY. The site is subject to nutrient-enriched runoff from the park and several drainage pipes that empty into the lake from the parkway and upland areas.

The recommended plan for Bronxville Lake will improve aquatic habitat, water quality, and flow regime. Native upland trees and shrubs will be planted in 1.36 acres in the northwest portion of the site along the Bronx River Parkway and in a small area along the southeast portion of the lake. Removal of 0.03 acres of invasive species will be replanted with native plants. Narrow strips of emergent vegetation will be created along 0.59 acres of the lake banks. Sections of the lake bottom will be filled and 2.49 acres of forested and scrub/shrub wetlands will be created in these areas; the remainder of the lake bottom will be retained in open water habitat. Sediment within two sections of the channel and adjacent lake bottom will be dredged. The bed of the channel will be restored by excavating the bottom and installing 250 tons of bedding stone. Rip rap forebay will be constructed in the river channel upstream of the lake to cause sediment to settle out of flow. The existing rock weir at the southern end of the lake will be modified to facilitate fish passage, opening new habitat in the Bronx River to anadromous and catadromous fish. Due to the proximity of major arterial infrastructure, shorelines were engineered with excessive armor of concrete.

Additional restoration measures for Bronxville Lake site include installation of vegetated swales, bioretention basins, raingardens at three locations to reduce sediment load to river, and improved public access.

In total 56,200 CY of material will be excavated during construction. 28,100 CY of material will be excavated from the shoreline, 21, 900 CY of material will be excavated during channel realignment; this material will beneficially reused on site to the extent possible. 4,100 CY of material excavated in clearing and grubbing activities for the forested scrub/shrub wetland and emergent wetland; similarly, 2, 100 CY of material will be removed during clearing and grubbing of invasive species and native plantings activities throughout the site, these materials will be removed from the site. Duration of construction is estimated at 12.5 months and is expected to begin in 2030.

Garth Harney- The project area is located north of Harney Road in Westchester County, NY and is bordered to the east and west by the Bronx River Parkway. The site contains thin strips of sparsely vegetated wetlands at Garth Woods and at Harney Road wetlands, often less than two feet wide. The broad and shallow channel and narrow wetland areas provide limited habitat for aquatic species.

At the Harney Road site, 0.85 acres of the river channel will be modified upstream of Harney Road and a short off-site section of the river channel downstream of the weir by replacing bed material and constructing instream cross vanes. Modification of the existing weir at the southern end of site, removing 30 cubic yards of concrete, will promote fish passage and provide new habitat for catadromous and anadromous fish species between Harney Road and Kensico Dam. 0.03 acres of the west bank downstream of the weir will be softened by constructing a stacked rock wall with brush layer. Along both shores of the river, 0.79 acres of emergent wetlands will be created containing a wet meadow. Between the emergent wetlands on the east shore and the paved path, 1.43 acres of native upland trees and shrubs will be planted. Invasives species along 0.03 acres of the west bank of the river will be removed and planted with native, upland or wetland shrubs and herbaceous vegetation. Installation of a raingarden/bioretention area at the upstream end of the buried storm drain will control erosion and reduce sediment loads to the river.

The Garth Woods restoration project is restricted to the northernmost section of the site to complement future habitat enhancement to be performed by Westchester County. On the west bank of the river at the upstream end of the site, 0.35 acres of forested and scrub/shrub wetlands will be created. Native plantings will be placed in 0.14 acres of the lawn adjacent to the created wetlands, on both sides of the paved path. Invasive species will be removed from 0.03 acres near the northern border of the site and planted with native, upland or wetland, shrubs and herbaceous vegetation. Wetland creation will increase biodiversity, improve aquatic habitat and water quality, and increase flood control at both sites.

In total 7,260 CY of material will be excavated during clearing and grubbing for invasive species and native plantings activities and emergent wetland, wet meadow, forested scrub/shrub wetland creation. Duration of construction is estimated at 9.5 months and is expected to begin in 2026.

Bronx River – Determination

Piping Plover (*Charadrius melodus*) – There have been no reported sightings (eBird) of piping plover along the Bronx River. The existing habitats at the Bronx Zoo and Dam, Stone Mill Dam, and Shoelace Park do not contain the wide flat sandy coastal beach habitat preferred by piping plover.

The proposed project area for the Bronx River sites is outside of the final critical habitat for this species (published in the Federal Register on May 19, 2009). The District has determined that construction of the Bronx River sites will have no effect on Piping Plover.

Bog Turtle (*Clemmy muhlenbergii)* – At the time of this analysis, critical habitat has not been established for this species. Bog Turtles usually occur in small, discrete populations, generally occupying open-canopy, herbaceous sedge meadows, and fens bordered by wooded areas. These wetlands are a mosaic of microhabitats that include dry pockets, saturated areas, and areas that are periodically flooded. Bog Turtles depend upon this diversity of microhabitats for foraging, nesting, basking, hibernating, and sheltering. Unfragmented riparian systems that are sufficiently dynamic to allow the natural creation of open habitat are needed to compensate for ecological succession.

Bog Turtles inhabit open, unpolluted emergent and scrub/shrub wetlands such as shallow spring-fed fens, sphagnum bogs, swamps, marshy meadows, and wet pastures. These habitats are characterized by soft muddy bottoms, interspersed wet and dry pockets, vegetation dominated by low grasses and sedges, and a low volume of standing or slow-moving water, which often forms a network of shallow pools and rivulets. Bog Turtles prefer areas with ample sunlight, high evaporation rates, high humidity in the near-ground microclimate, and perennial saturation of portions of the ground. Eggs are often laid in elevated areas, such as the tops of tussocks. Bog Turtles generally retreat into more densely vegetated areas to hibernate from mid-September through mid-April.

The Final Fish and Wildlife Coordination Act Report for the HRE Ecosystem Restoration Project (2018) does note that NYSDEC lists the bog turtle as a species of greatest conservation need. However, a literature search yielded no reports of bog turtle in the project area. NYNHP has noted that in New York State, extant populations of bog turtles are known from small portions of six counties in the lower Hudson River Valley. There are a few records of bog turtle in Westchester County from the 1990s; however, it is unknown if any extant populations remain (https://guides.nynhp.org/bog-turtle/).

After a full evaluation of the bog turtle life history, habitats in the project area, and proposed project activities, the District has determined that construction of the Bronx River sites will have no effect on bog turtle.

Migratory Birds- IPaC has identified that 20 species of migratory birds may occur within the vicinity of Bronx Zoo and Dam, Stone Mill Dam, and Shoelace Park; and 14 species of migratory birds may occur within the vicinity of Bronxville Lake and Garth Woods/Harney Road. The District will work with the appropriate regulatory agencies and avoid and minimize disturbance to migratory birds during construction, including a restriction on tree or shrub/scrub removal from March 15 to July 31. The District has determined that construction of the Harlem River/ East River/ Western Long Island Sound restoration sites will have no effect on migratory birds.

Flushing Creek – Proposed Plans

Flushing Creek- The project site is located in a highly urbanized area in Queens, New York. In preparation for the World's Fair in 1939, there was significant stream straightening, filling of wetland areas, and headwater reconfiguration of Flushing Creek. Continued development in the area has led to loss and degradation of tidal wetlands. Remaining wetlands are dominated by invasive species and limited to fringe areas. Currently, the site has low ecological value suffering from bank erosion, profusion of invasive species, low benthic and fish abundance and diversity, and poor water quality.

The recommend design includes re-grading existing common reed-dominated marsh as well as conversion of existing mudflat areas to low marsh. High marsh and scrub shrub area will be established in the transitional zones between low marsh and upland maritime forest. The existing upland forest will be restored to a more diverse and functional maritime forest community. Finally, re-contouring along the mudflat will address issues of water quality and provide the appropriate hydrology necessary for persistence of the created habitat.

In total 39,015 CY of excavation will take place throughout the site with 12,200 CY to be taken off site and 26,815 CY to be beneficially re-used onsite to create upland habitat. Invasives (*Phragmites*) would be removed along with 1ft root mat and would be placed off-site. Other invasive species may be smothered or left on site in riparian area if not part of active restoration actions. Material excavated to create wetlands will be kept on-site and placed in upland and/or adjacent areas as needed. Cover requirements including 2-ft of cover in upland/riparian areas and 1-ft cover in wetland areas.

In total Restoration measures include 9.76 acres of low marsh, 2.47 acres of high marsh, 1.80 acres of scrub/ shrub, and 3.89 acres of maritime forest. Duration of construction is estimated to be 23 months and is expected to begin in 2024.

Flushing Creek – Determination

Piping Plover (*Charadrius melodus)*- There have been no piping plover sightings within the vicinity of Flushing Creek (eBird). The existing habitats do not contain the wide, flat, sandy coastal beach habitat preferred by piping plover. The proposed project area for Flushing Creek is outside of the final critical habitat for this species (published in the Federal Register on May 19, 2009). The District has determined that construction of the Flushing Creek site will have no effect on Piping Plover.

Red Knot (*Calidris canutus rufa)*- At the time of this analysis, critical habitat had not been established for this species and there were are no know comprehensive databases for red knot presence in and around Flushing Creek. The District is unaware of any recent sitings of red knot in the vicinity of the

Flushing Creek project site. Despite the development and high recreational use of the area by humans, potential exists for red knot to utilize habitats in the Project Area.

Although some minor, short-term, impacts to the red knot food resources and habitat could result from proposed Project modifications, overall improvements to habitat can be expected to result from the proposed activity. Details of this determination are provided below.

The primary direct impacts resulting from implementation of the restoration project activities will be disturbance and direct impact of the benthic, immobile invertebrate and plant communities currently living in these areas due to excavation of existing habitat and burial from sand placement. As a result, red knots will experience some short-term loss of food resources within these areas. The direct placement of sand fill is not expected to cause long-term significant impacts on the red knot. In addition, although the red knot would avoid foraging within areas of direct excavation and sand placement in the intertidal zone until benthic food sources recolonized the site, recolonization of benthic communities in the intertidal zones typically takes place within six months to two years following sand placement activities.

Other short-term impacts, such as a slight decrease in water quality and an increase in turbidity, also are likely to occur during sand fill activities. Changes in water quality and turbidity may cause some short-term avoidance of the intertidal zone by the red knot during periods of low water quality resulting from construction activities. These impacts to their foraging activities will be short term and will have a minimal effect on them because red knot are mobile and can utilize unaffected foraging areas nearby.

Therefore, a May Affect, but Not Likely to Adversely Affect (NLAA) determination was made by the District for red knot for the overall proposed restoration project activities at Flushing Creek.

Table 1: Summary of Flushing Creek Project Effects on Populations of Red Knot

Activities	Potentiall y	Not Likely to Adversel y Affect	Likely to Adversel y Affect	No Effect
No-Action				
Project				
Staging Area Construction and				X
Placement of Sand		X		
Plantings				X
Cumulative Impacts				
Periodic Maintenance of Invasive Plants				X

Roseate Tern (*Sterna dougallii dougallii*)- There have been no roseate tern sightings within the vicinity of Flushing Creek (eBird). The District has determined that construction of Flushing Creek will have no effect on the roseate tern.

Seabeach Amaranth (*Amaranthus pumilus*)- The District is not aware of reported sightings of seabeach amaranth in the Flushing Creek site. Seabeach amaranth is dependent on terrestrial, upper beach habitat that is not flooded during the growing season. This habitat type does not currently exist nor is it targeted for restoration at the Flushing Creek site. The District has determined that construction of Flushing Creek will have no effect on seabeach amaranth.

Migratory Birds- IPaC has identified that 18 species of migratory birds may occur within the vicinity of Flushing Creek. The District will work with the appropriate regulatory agencies and avoid and minimize disturbance to migratory birds during construction, including a restriction on tree or shrub/scrub removal from March 15 to July 31. The District has determined that construction of Flushing Creek will have no effect on migratory birds.

C. Lower Passaic River/ Hackensack River/ Newark Bay

Lower Passaic River Sites – Proposed Plans

Oak Island Yards- Construction is deferred following EPA Remedial Action. Site specific coordination will occur at a later date.

Branch Brook Park- The Branch Brook Park site is located in Newark, New Jersey. The park is surrounded by commercial and residential developments and roadways. The stream and forest areas within the park experience considerable amounts of anthropogenic trash and are dominated by non-native, invasive vegetation. Ponds at the site suffer from algal blooms and eutrophication from excess nutrient runoff.

The recommended plan for this site will enhance both terrestrial and aquatic habitats. 3,170 CY will be excavated from the 0.98 acre stream for stream naturalization and two feet of material (55,020 CY) will be excavated for pond deepening. Restoration measures also include 8.91 acres of invasive removal and select native plantings, 8.80 acres of forested/scrub-shrub wetland creation, and 10.24 acres of enhanced emergent wetlands. Construction is estimated to be 24 months and is expected to begin in 2030.

Lower Passaic River Sites – Determination

Migratory Birds- IPaC has identified 9 species of migratory birds may occur within the vicinity of Branch Brook Park. The District will work with the appropriate regulatory agencies and avoid and minimize disturbance to migratory birds during construction, including a restriction on tree or shrub/scrub removal from March 15 to July 31. The District has determined that construction of the Branch Brook Park will have no effect on migratory birds.

Hackensack River Sites – Proposed Plans

Metromedia- The Metromedia track is located in Carlstadt, Bergen County, New Jersey. The site is bordered by the Hackensack River to the east and south and by the Marsh Resources Meadowlands Mitigation Bank to the north. The site is underdeveloped and dominated by common reed. The property also likely contains fill from unknown sources during construction of nearby radio towers.

The recommended plan will increase diversity and improve fish and wildlife habitat as well as improving flood storage and water quality. 38,000 CY of material will be excavated and replaced with 41,000 CY of clean fill. Restoration measures include enhancement of 26.5 acres of low marsh, creation of 9.4 acres of high marsh, 14.8 acres of scrub-shrub wetland, and 4.1 acres of maritime upland habitat. Duration of construction is estimated at 33.5 months and is expected to begin in 2028.

Meadowlark- Meadowlark Marsh is bounded to the south by Bellmans Creek, to the north and west by the New Jersey Turnpike – Eastern Spur, and to the east by 83rd street and active railroad tracks in Ridgefield, Bergen County, NJ. The upland area of the site is currently used as a dirt track for off-road vehicles, limiting the habitat available in upland areas. Pesticide overspray into a portion of the site from the utility right-of-way has been observed.

Restoration efforts at the site will improve fish and wildlife habitat as well as flood storage and nutrient and toxicant filtration for runoff from the surrounding developed areas. The entire site (71.5 acres) will be graded, with 64,400 CY of excavated material taken off site. High marsh and upland areas will be brought up to grade with 29,200 CY of fill and capped with clean material. Additional restoration measures include creation of 56.2 acres of low marsh, 6.5 acres of high marsh, 4.2 acres of forested/scrub shrub habitat, and culvert installation. Duration of construction is estimated at 33.5 months and is expected to begin in 2032.

Hackensack River Sites – Determination

Migratory Birds- IPaC has identified 33 species of migratory birds that may occur within the vicinity of Metromedia and 34 species in the vicinity of Meadowlark. The District will work with the appropriate regulatory agencies and avoid and minimize disturbance to migratory birds during construction, including a restriction on tree or shrub/scrub removal from March 15 to July 31. The District has determined that construction of the Hackensack River sites will have no effect on migratory birds.

D. Oysters

Oyster Sites – Proposed Plans

Naval Station Earle- The Naval Station Earle is located in Sandy Hook Bay, New Jersey. Water depths at this site from the pier out into the channel vary from 12 to 40 feet. Previous oyster restoration studies by NY/NJ Baykeeper have been conducted at NWS Earle. There are no risks of oyster poaching at this site due to the proximity of the naval base.

The recommended plan creates an approximately 10 acre oyster reef through installation of 1,010 oyster pyramids with 30 oyster castle blocks per pyramid and creation of 350 CY of spat-on-shell. Duration of construction is estimated at 12 months and is expected to start in 2024.

Bush Terminal- The Bush Terminal site consists of eroding piers south of the Gowanus Canal on the western shore of Brooklyn. The piers were used for shipping during the industrial era. Due to this, as well as known historical dumping and the proximity to the Gowanus Canal, some level of contaminants in the sediment may be present. Water depth at the site varies from shallow to deep allowing for good habitat diversity.

The recommended plan for Bush Terminal would provide public access, awareness, and opportunities for future studies. Restoration measures for this site include 1,100 oyster gabions and 76,680 CY of spat-on-shell to create an approximately 31.4 acre oyster reef. Duration of construction is estimated at 15.5 months and is expected to start in 2028.

Head of Jamaica Bay- The Head of Jamaica Bay site is located in the northeast section of Jamaica Bay, adjacent to JFK Airport. Salt marsh habitat fringes much of the shoreline area. The bottom is steeply sloped close to the shoreline, with depths of up to 33 feet. Substrate in the area is primarily mud. Based on the nearest tidal current station in Jamaica Bay (Grass Hassock Channel), the current speeds in the eastern portion of the bay rarely exceed one (1) knot, making Head of Jamaica Bay well suited for larval settlement and oyster restoration.

The recommended plan will create nearly 10 acres of oyster reef through the placement of 9.85 acres of spat on shell placed on a substrate composed of shell and crushed porcelain. Structural complexity is created through placement of 337 gabions, 150 oyster castles and 470 super trays throughout the project area. The layer of substrate and spat on shell will be 12 inches thick and have a volume of 16, 840 cubic yards.

Oyster Sites – Determination

Piping plover (*Charadrius melodus*)- There are no reported sightings of piping plover at the oyster reef sites (eBird). The project areas of the recommended reefs at Naval Station Earle, Bush Terminal, and Head of Jamaica Bay are outside of the final critical habitat for this species (published in the Federal Register on May 19, 2009), are within the channel, and are completely submerged. The District has determined that construction of the oyster reef sites will have no effect on Piping Plover.

Red Knot (*Calidris canutus rufa*)- There have been no reported sightings of red knot at the oyster reef sites (eBird). The project areas of the recommended reefs at Naval Station Earle, Bush Terminal, and Head of Jamaica Bay are within the channel and completely submerged. The District has determined that construction of the oyster reef sites will have no effect on red knot.

Roseate Tern *(Sterna dougalli dougalli*)- There have been no reported sightings of roseate tern at the oyster reef sites (eBird). The project areas of the recommended reefs at Naval Station Earle, Bush Terminal, and Head of Jamaica Bay are within the channel and completely submerged. The District has determined that construction of the oyster reef sites will have no effect on roseate terns.

Seabeach Amaranth (*Amaranthus pumilus*)- The project areas of the recommended reefs at Naval Station Earle, Bush Terminal, and Head of Jamaica Bay are within the channel and completely submerged. The District has determined that construction of these sites will have no effect on seabeach amaranth.

Migratory Birds- IPaC has identified 23 species of migratory birds within the vicinity of Naval Station Earle, 51 species in the vicinity of Bush Terminal, and 60 species in the vicinity of Head of Jamaica Bay. The project areas of the recommended reefs are within the channel and completely submerged. The District has determined that construction of the oyster reef sites will have no effect on migratory birds.

Appendix F2:
Fish and Wildlife Coordination Act Report

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

20 October 2017

Mr. David Stilwell, Field Supervisor
United States Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045

Mr. Eric Schrading, Field Supervisor
United States Fish and Wildlife Service
New Jersey Field Office
4 Jimmie Leeds Road
Galloway, NJ 08205

Attn: Steve Para, Kerri Dikun, Steve Mars

Dear Mr. Stilwell and Mr. Schrading,

The United States Army Corps of Engineers (USACE), New York District (District) provides this letter as a response to the United States Fish and Wildlife Service's (USFWS) Draft Fish and Wildlife Coordination Act Report (FWCAR), dated March 2017, for the Hudson- Raritan Estuary Ecosystem Restoration Feasibility Report and Environmental Assessment, and serves as ongoing coordination with USFWS.

Responses:

1. In the Project Impacts section (XI), habitat modification (C), the Service makes note of plans to incorporate armoring of shorelines along the Bronx River and the potential negative impacts to habit.
   Response: The highly urban nature of the Bronx River watershed produces storm water runoff that is conveyed through the river resulting in flash floods, erosion, and excessive sedimentation. The District notes that the recommendation of armored shorelines along certain sections the Bronx River will stabilize the shorelines in highly disturbed areas where a re-naturalization is no longer a reality. In these cases the District has recommended techniques such as stacked rock walls with brush layers, tiered rock slopes, and drilling with native plant material in an effort to maintain some infiltration of surface runoff and provide habitat.

2. The District acknowledges and concurs with the Services listed resources of concerns (V) and Planning Recommendations (XII), with the following comments:

a. In planning recommendations for Invasive Species (2) the Service recommends that the Corps and its project stakeholders should commit to a long-term effort at managing each restoration site.
Response: The District notes that while monitoring and adaptive management plans are crafted with a long term view and along with the non-federal sponsor, after a period not to exceed 10 years, the responsibility is passed to the non-federal sponsor and the Corps can no longer assure upkeep of the site.

b. The Service provides a summary of contaminant risks (V,4) in all the waterways of the HRE for which restoration is recommended including potential risks from genetic resistance/tolerance as well as potential impacts from cap material and planting vegetation.
Response: The District acknowledges that contaminants are a complex challenge in the HRE and that they affect many of the decisions related to natural resources. The District shares your concerns regarding the potential for increased ecological risk resulting from future restoration actions. However, it should be noted that if no action were taken, ecological risk would remain the same or may even increase. By utilizing restoration measures such as capping, treatment, or other forms of isolation, increased risk can be avoided or the present risk can be reduced. There is no long-term, sustainable design solution for eliminating this risk, aside from undertaking the cleanup of the entire HRE.

c. In planning recommendations for Environmental Contaminants (4) the Service recommends that the District develop a matrix that evaluates contaminant/re-contaminant risk of each of the 33 project sites.
Response: This type of information is typically gathered and reviewed in our first phase of site specific HTRW investigations which take place during the Pre-Construction, Engineering and Design (PED). It is generally accepted that some sources of contamination of the waters and wetlands of the HRE are external to the system and cleanup of these sources is important. To schedule the restoration of sites in the HRE according to cleanup of these external sources will present a very long time frame. It is conceivable restoration would never be conducted if "the water quality of adjacent waterbodies" such as Newark Bay or the Passaic River must reach conditions that are at least no worse than that in the Meadowlands. With multiple variables to consider within a prioritization tool or matrix potential risk associated with recontamination is just one. The Harbor Estuary Restoration Workgroup is working towards advancing these issues in the upcoming year.

d. In planning recommendations for Environmental Contaminants (4) the Service recommends that if the Corps selects a restoration project in close proximity to a known pollution source, it selects a high marsh alternative.
Response: In the current state of planning the District has recommended restoration alternatives that fulfill our requirements for environmental benefits and cost effectiveness. The District will have the opportunity to optimize these designs as the planning process is advanced into PED and will coordinate any optimization, to the extent possible, with the Service. Also, in the aftermath of Hurricane Sandy, it is important to plan for sea level rise (SLR) impacts in designing tidal wetland restoration projects. One of the main considerations and goals of implementing projects within HRE is to create not only resilient communities and infrastructure,

but also resilient tidal wetlands in the face of sea level rise. To support the project design, the District will incorporate future impacts of local sea level rise using the most recent version of the USACE sea level change projection methodology summarized in United States Army Corps of Engineers Engineering Regulation (ER) 1100-2- 8162.

e. In planning recommendations for Coastal Resiliency Projects (7) the Service inquires how Coastal Resiliency studies such as East Rockaway to Rockaway- Jamaica Bay Reformulation Studies will be handled within the HRE Study area.
Response: Following Hurricane Sandy, which severely impacted portions of New York and New Jersey in October 2012, the Jamaica Bay perimeter wetland sites were evaluated further in the East Rockaway to Rockaway Inlet and Jamaica Bay Reformulation Study as potential natural/nature based features (NNBFs). The New York/New Jersey Harbor and Tributaries feasibility study will investigate Coastal Storm Risk Management problems and solutions within the HRE. The study will consider past, current, and future CSRM and resilience planning initiatives and projects underway by USACE and other Federal, State, and local agencies. Three overarching efforts will be performed:

1) Assess the study area's problems, opportunities and future-without project conditions;
2) Assess the feasibility, as defined in applicable laws, regulations and guidelines, of implementing multi-faceted, system-wide CSRM solutions in a watershed context, such as policy/programmatic strategies, and basin-wide hydrologic and hydraulic measures; and
3) If basin-wide solutions are not feasible, assess the feasibility of implementing site-specific solutions, such as a combination of structural, nonstructural, and/or NNBFs.

f. In reference to Planning recommendations for Supply of Genetic Stock of Native Plantings (6):
Response: The District acknowledges the need for locally sourced and genetically diverse plant material stock for HRE restoration projects. While there is currently no program in place for the District to bank seed material and because we are limited in how we can direct the consultants to purchase material, the Plans and Specifications appears to be the most appropriate place to capture these important details. Therefore, the Corp requests that the Services provide a list of priority species along with species specific guidelines/benchmarks that the District can include in the design Specifications on a site by site basis. Additionally and where appropriate, the District will recommend that projects partnered with New York City should have plant material sourced by City resources (Native Plant Center) and funded as in kind services or the like. The District recognizes the consequences that a shortage of appropriate plant material could have on persistence of the constructed habitat; however, appropriate planning sequencing and constraints in funding will limit the amount of projects that go into construction simultaneously likely limiting some of these concerns.

g. In planning recommendations for Planning Objectives (8) the Service has recommended reducing input of floatables and sediments into waterbodies within the HRE.

Response: The District notes that reduction of sediment inputs has been considered and incorporated into several of the designs, however floatables collection is beyond the scope of the HRE Study Authority. The District has an ongoing New York and New Jersey Harbor Drift Collection Maintenance Program. Drift collection vessels are used on a daily basis (one vessel works on each weekend day) to collect large floating drift that is a threat to the many deep-draft cargo carriers and petroleum tankers, as well as the growing number of high-speed passenger commuter ferries, cruise ships and recreational vessels. Consistent with the authorization of the Water Resources Development Act of 1990, floatables, especially increased floatables from heavy rain events, are simultaneously effectively and efficiently collected to protect the shoreline and beaches of New York and New Jersey. In some instances our non-federal sponsors have systems in place for floatables collection (eg. Bronx River).

3. The District is in concurrence with the Mitigation Recommendations (XII, B) 1-11 and will implement, where practicable, on a site by site basis.

4. As discussed in the Mitigation Recommendation Section on Environmental Contaminants (XII, B, 12) and detailed in the Appendices E, F, and G the Service has provided detailed recommendations for sampling- Pre-construction Site Characterization, Post-construction Baseline Assessment, and Post Construction Monitoring.
Response: The District understands the need for robust sampling protocol and as part of the planning process performs the environmental sampling protocol that is appropriate for the specific site.

   a. There are several Corps documents to guide environmental sampling and risk assessment:
      i. EM 200-1-4 Risk Assessment Handbook, Volume II Environmental Evaluation 31 December, 2010. The handbook provides guidelines to risk assessors with basic/minimal requirements for evaluating Architect/Engineer prepared ecological risk assessments. And documenting risk management options associated with HTRW investigations, studies and designs consistent with principals of good science. This goes to the defining the quality of risk assessments.
      ii. EM 200-1-6 Chemical Quality Assurance for HTRW Projects 10 October, 1997. This document provides specific guidance, procedures, criteria and tools for implementation of the HTRW Quality Assurance (QA) Program. Chemical QA is required to ensure analytical data generated meets the criteria prescribed in the technical project planning. This document is intended for use as a companion document to ER 1110-1-263.
      iii. EM 200-1-7 Performance Evaluation Program, 1 February, 2001. This provides specific guidance, procedures, criteria and tools for implementation of the performance Evaluation Program. This covers performance evaluation of analytical laboratories to ensure technically competence, reliability and data of acceptable quality. This is a companion document for use along with ER-1110-1-263.

b. The Service recommends that predicted sediment mercury be mapped along with 2,3,7,8-TCDD, and total PCB's be overlaid to reveal areas with acceptable concentrations of these contaminants for the purpose of choosing restoration sites.
Response: Contaminant concentrations sampling will be conducted as part of the Corps HTRW analysis. However, predictive mapping will not be.

c. The Service has recommended additional sediment testing at the proposed oyster restoration sites.
Response: Additional HTRW sampling will occur prior to any restoration activities. As a practice, the District does not construct restoration projects directly on areas that exceed contaminants limits set by EPA or the state.

d. The Service has recommended that the Corps place a two-foot cap of clean material over all underlying areas with contamination exceeding acceptable thresholds. The purpose of this thick cap is to prevent the spread of contaminants through burrowing aquatic organisms disturbance via perturbation, and transport via interstitial water.
Response: As stated in the Draft FR/EA, some sites (Jamaica Bay) have hazardous, toxic, and radioactive waste reports for the restoration areas that show minimal contamination, typical of ambient levels found in urban contexts. With sites that do have this minimal level of contamination, recontouring the land would not place contaminated soils onto clean soils, rather it is expected that similar soils and contaminant levels exist throughout the sites. Moreover, restoration plans include placement of a clean planting growing media following soil/sediment regrading on each site. Further testing will be conducted during the PED phase. The removal of any soil or sediment would be accomplished with the use of appropriate BMPs to limit and/or eliminate the transport of materials during construction by alluvial and/or aeolian forces.

Thank you for providing the draft FWCAR. Responses, along with the FWCAR, will be included in the NEPA for the HRE project. If you have any questions regarding the responses provided, please contact Ms. Diana Kohtio at diana.m.kohtio@usace.army.mil, or at 917-790-8619. We look forward to continued coordination as we finalize the NEPA document and move to the design and construction phase.

Sincerely,

Mr. Peter Weppler
Chief, Environmental Analysis Branch

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Field Office
3817 Luker Road
Cortland, New York 13045

and

New Jersey Field Office
4 East Jimmie Leeds Road, Unit 4
Galloway, New Jersey 08205

2017-CPA-0109

Peter Weppler, Chief
Environmental Analysis Branch, New York District
U.S. Army Corps of Engineers
Jacob K. Javits Federal Building
New York, New York 10278-0090
Attention: Diana Kohtio

Subject: Final Fish and Wildlife Coordination Act Report for the Hudson-Raritan Estuary Comprehensive Restoration Plan and HRE Ecosystem Restoration Feasibility Study

Dear Mr. Weppler:

The U.S. Fish and Wildlife Service (Service) has prepared this final Fish and Wildlife Coordination Act (FWCA) report pursuant to the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) in support of the U.S. Army Corps of Engineers, New York District's (Corps) *Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan* and HRE Ecosystem Restoration Feasibility Study. This report was prepared by the Service's New Jersey, New York, and Long Island Field Offices in accordance with the fiscal year 2017 Scope of Work (SOW) transfer funding agreement dated October 17, 2016.

As per the SOW, the final FWCA report will be sent to the New Jersey Department of Environmental Protection (NJDEP), the New York State Department of Environmental Conservation (NYSDEC), and the National Oceanic and Atmospheric Administration (NOAA). A courtesy copy is also being mailed to New York City Department of Parks and Recreation (NYCDPR) as many of the proposed restoration projects identified in the HRE Feasibility Study are on New York City (NYC)-owned lands.

Thank you for your continued cooperation and leadership in addressing landscape-level restoration efforts throughout the HRE. The Service continues to look forward to working cooperatively with the Corps to maximize benefits to our Nation's fish and wildlife resources from the proposed project. Please contact Steve Mars, of the New Jersey Field Office, at (609) 382-5267 should you have any question regarding this draft FWCA report for activities that occur in New Jersey. Please contact Steve Papa or Kerri Dikun, of the Long Island Field Office, at (631) 286-0485 (extensions 2120 and 2116, respectively), should you have any question regarding activities that may occur in New York.

Sincerely,

David A. Stilwell
Field Supervisor
New York Field Office

Eric Schrading
Field Supervisor
New Jersey Field Office

cc: USACE, New York, NY (D. Kohtio)
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Final Fish and Wildlife Coordination Act

SECTION 2(b) REPORT

U.S. Army Corps of Engineers
Hudson Raritan Estuary Comprehensive Restoration Plan
HRE Ecosystem Restoration Feasibility Study

Prepared by:

Department of the Interior
U.S. Fish and Wildlife Service
Long Island Field Office, New York Field Office,
and New Jersey Field Office

Prepared for:

U.S. Army Corps of Engineers
New York District
New York, New York

April 2018

EXECUTIVE SUMMARY

The final Fish and Wildlife Coordination Act (final FWCA) report was prepared by the U.S. Fish and Wildlife Service (Service) to support the U.S. Army Corps of Engineers, New York District's (Corps) *"Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan* (CRP)" and HRE Ecosystem Restoration Feasibility Study (HRE Feasibility Study or Study). A copy of the draft FWCA report was provided to the Corps, the National Park Service (NPS), the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), the New York State Department of Environmental Conservation (NYSDEC), the New Jersey Department of Environmental Protection (NJDEP), and the City of New York (NYC). The final FWCA report reflects comments received by the Corps, NOAA Fisheries, NJDEP, and NYC. No comments were received from the NPS or the NYSDEC on the draft FWCA report.

The final FWCA report discusses the current environmental conditions of the HRE Feasibility Study Area, details federal trust resource issues (endangered species, migratory birds, migratory fish, and species of greatest conservation need), and offers a series of recommendations that will maximize the habitat benefits of each of the proposed restoration projects identified in the CRP and HRE Feasibility Study on fish and wildlife resources.

The HRE Feasibility Study Area consists of one of the largest estuaries on the east coast of the United States and includes parts of western Long Island Sound, the Bronx, Passaic, Hackensack and Hudson Rivers, and Raritan and Jamaica Bay. It provides valuable habitat for nearly 400 species of plants and animals, including trust resources of the Service, numerous federal and state listed species, and migratory birds and fish.

The HRE Feasibility Study Area is also home to more than 20 million people and the Ports of New York and New Jersey, collectively one of the largest ports in the United States, supporting over 330,000 maritime related jobs. It is also where the American Industrial Revolution began in the 18th Century, involving the manufacturing and shipping of commercial goods that continue to this day. Along with over two hundred years of supporting business, employment, housing, and commerce, the HRE changed dramatically from its pre-colonial days. Nearly all of the freshwater and tidal wetlands and hundreds of acres of open waters were filled, dredged, or dumped into to accommodate human expansion in the area. Many businesses and municipalities disposed of solid and liquid waste, and numerous chemicals, all at the detriment of a once healthy and thriving ecosystem. Today, many toxic compounds can be found in uplands and estuary sediments, posing a threat to the human environment, including fish and wildlife resources and their habitats.

The Service identifies a number of fish and wildlife resource concerns and planning objectives in the final FWCA document and a series of planning and mitigation recommendations that if implemented, will meet the goals of the HRE CRP.

The final FWCA report identifies the development history of the HRE (*i.e.*, habitat loss and degradation, extirpation of native species, significant stream and coastal fortification, urbanization, and industrialization) and the single greatest challenge to planning and implementing a habitat restoration initiative in the HRE – the presence of legacy contaminants.

The Service identifies numerous academic and government research that highlight biotic contaminant exposure in the HRE. The Service also makes recommendations with many of the individual projects identified by the Corps, including added project features to avoid or minimize exposure of fish and wildlife resources to toxic chemicals.

In addition, the Service recommends that to achieve a level of "permanence" for many of the proposed restoration projects, the Corps and their project sponsors should commit to monitoring and managing each of the restoration sites for a minimum of five years in order to evaluate project success and implement adaptive measures, if necessary.

The Service is confident that should the Corps and its project sponsors implement the recommendations contained in the final FWCA report, the overall goals of the HRE Feasibility Study of restoring habitats; improving coastal resilience; remediating environmental contaminants; controlling invasive species; and protecting fish and wildlife and their habitats will have a greater probability of success. The Service is committed to moving us closer to a more natural and nature-based solution that protects the coastline of the HRE.

Questions, comments and suggestions related to this document are encouraged and should be directed to:

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

I. INTRODUCTION

This final Fish and Wildlife Coordination Act (FWCA) report was prepared pursuant to the FWCA, as amended (48 Stat. 401, as amended 661 *et seq*.) and provides updated conservation and planning assistance to the U.S. Army Corps of Engineers, New York District's (Corps) *Hudson-Raritan Estuary (HRE) Comprehensive Restoration Plan (CRP)* (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The CRP is an outgrowth of the HRE Ecosystem Restoration Feasibility Study (HRE Feasibility Study) which was authorized by House of Representatives' Committee on Transportation and Infrastructure Resolution, dated April 15, 1999, Docket Number 2596. Through these efforts, the Corps is currently proposing habitat restoration at 33 sites across five planning regions identified in the CRP.

Specifically, the final FWCA report contains updated information on wildlife resources (including threatened and endangered species), an assessment of project impacts, recommendations to avoid and minimize project-related impacts, and recommendations for additional monitoring and investigations over the life of the proposed restoration projects. It is based on information the Corps provided to the U.S. Fish and Wildlife Service (Service) on July 8, 2016; several site visits conducted by the Service; updated studies, academic research, field notes, site photographs, and maps; analysis of Geographic Information Systems (GIS) data sets; and responses received on the Service's draft FWCA report by the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), the City of New York (NYC), and the New Jersey Department of Environmental Protection (NJDEP).

Upon agreement by the Corps and the project sponsors of the final restoration plans, additional review by the Service may be necessary under a separate transfer of funding agreement pursuant to the FWCA, with further involvement of the NOAA Fisheries, the NJDEP, the New York State Department of Environmental Conservation (NYSDEC), NYC, and the National Park Service (NPS), as necessary.

As per the scope of work (SOW) between the Corps and Service dated October 17, 2016, the draft FWCA report was transmitted to the NOAA, the NJDEP, and the NYSDEC for their review and comments. A courtesy copy was also mailed to New York City Department of Parks and Recreation (NYCDPR) for comments as many of the proposed restoration projects identified in the HRE Feasibility Study are on NYC-owned lands. In addition, we also sought additional comments from the NYCDPR on the Service's native landscape recommendations; specifically, the need to develop a long-term management plan that ensures a sufficient supply of genetically diverse plants on NYC public lands.

II. PURPOSE, SCOPE, AND AUTHORITY

The purpose of the Corps' current update to the HRE Feasibility Study is to identify water resource issues, discuss existing environmental conditions, and highlight factors contributing to environmental degradation in the HRE. The HRE Feasibility Study also strives to contribute to ecosystem restoration, by building upon existing restoration and section 404 of the Clean Water Act (CWA; 33 U.S.C. 1344 *et seq*.) mitigation efforts.

The CRP serves as the Corps' strategic plan for ecological restoration program by using Target Ecosystem Characteristics (TEC) developed by the region's stakeholders, including Federal, State, and local agencies and interested public. The CRP's goal is to develop a mosaic of habitats that provide an important ecosystem property or feature that is of ecological and/or societal value including coastal wetlands, shellfish/oyster reefs; eelgrass beds; water bird islands; public access; maritime forest; tributary connections; shorelines and shallow habitat; fish, crab, and lobster habitat; reduction of contaminated sediments; and improvement of enclosed and confined waters.

The CRP includes a total of eight 'Planning Regions' that are geographically located within an approximately 25-mile (mi) radius around the Statue of Liberty, in the States of New Jersey (NJ) and New York (NY) (U.S. Army Corps of Engineers 2016a). These include:

1) Newark Bay/Lower Passaic/Hackensack River, NJ;
2) Kill Van Kull and Arthur Kill, NY and NJ;
3) Lower Bay, NY and NJ;
4) Lower Raritan River, NJ;
5) Upper Bay, NY and NJ;
6) East River/Harlem River/Western Long Island Sound (includes Bronx River), NY;
7) Lower Hudson River, NY and NJ; and
8) Jamaica Bay, NY.

A total of 33 proposed restoration sites were identified by the Corps (U.S. Army Corps of Engineers 2016a), and fall within 5 of the 8 Planning Regions, including numbers 1, 3, 5, 6, and 8, listed above. These are discussed in more detail in the following sections and in Appendix A.

The HRE Feasibility Study was authorized by House of Representatives' Committee on Transportation and Infrastructure Resolution dated April 15, 1999, Docket Number 2596. For projects authorized under the Water Resource Development Act (33 U.S.C. 2201 *et seq*.), the Endangered Species Act (ESA; 87 Stat. 884, as amended; 16 U.S.C. 15.31 *et seq*.) and the FWCA represent the primary authorities for the Service's coordination with the Corps. Under the FWCA, the Corps and the Service coordinate during project planning to conserve, protect, and enhance fish, wildlife, and plants and their habitats. The final FWCA report constitutes the report of the Secretary of the Interior as required by section 2(b) of the FWCA, which establishes fish and wildlife conservation as a co-equal purpose or objective of federally-funded or permitted water resource development projects. The FWCA allows for reports and recommendations from the Service and the State to be integrated into the Corps' reports seeking authorization for the federal action, and it grants the Corps the authority to include fish and wildlife conservation measures within these projects.

This report does not preclude separate review and comments by the Service pursuant to the December 22, 1993, Memorandum of Agreement (MOA) among the U.S. Environmental Protection Agency (USEPA), the NJDEP, and the Service, if project implementation requires a permit from the NJDEP pursuant to the New Jersey Freshwater Wetlands Protection Act (NJSA; N.J.S.A. 13:9B *et seq*.) or the NYSDEC (Articles 24 and 25 of NY State's Environmental Conservation Law - 6NYCRR Parts 663-665 and 661, respectively) nor do they preclude comments or recommendations on any documents prepared pursuant to the National Environmental Policy Act, as amended (NEPA; 83 Stat. 852, as amended; 42 U.S.C. 4321 *et seq*.).

Additional laws relevant to natural resource protection and the HRE Feasibility Study under the which the Service has provided comments include the ESA, the NEPA, the CWA (33 U.S.C. 1251 *et seq.*), the Migratory Bird Treaty Act (MBTA; 40 Stat. 755; 16 U.S.C. 703 *et seq.*), and the Bald and Golden Eagle Protection Act (BGEPA; 54 Stat. 250, as amended; 16 U.S.C. 668-668d).

The ESA establishes specific consultation, evaluation, and reporting requirements for both the action agency and the Service. The ESA requires that each federal agency shall, in consultation with the Secretary of the Interior, ensure that any action authorized by such agency is not likely to jeopardize the continued existence of listed species or their critical habitats. Subject to such guidelines as the Secretary may establish, federal agencies are to consult on any prospective agency actions that may affect such species or habitats. Action agencies should determine the listed species that may occur in a project area; whether or not such species are present and, if so, whether or not they are "likely to be affected" by the proposed action; and enter into formal consultation where a "likely to be adversely affected" determination is made.

Finally, this report also provides comments in support of the 2003 MOA between the Corps, the Service, the Federal Aviation Administration (FAA), and others regarding Aircraft-Wildlife Strikes and the circular entitled, *"Advisory Circular Subject: Hazardous Wildlife Attractants on or Near Airports (150/5200-33B)*."

The Service understands that the final FWCA report and/or findings and recommendations will be incorporated into a Corps' draft environmental assessment (EA) for the HRE Feasibility Study.

III. RELEVANT STUDIES AND REPORTS

Over the years, the Corps has conducted numerous feasibility studies for civil works and restoration projects within the HRE and coordinated with the Service under the FWCA to produce Planning Aid or FWCA reports.

The following provides a summary of previous Corps and Service reports relevant to ecosystem restoration in the HRE Feasibility Study Area. A full list of studies and reports is on file at the Service's New York, New Jersey (NJFO), and Long Island (LIFO) Field Offices. These reports should be used in conjunction with the information and recommendations in this report to determine the effects of the HRE Feasibility Study projects; identify fish and wildlife resource concerns and ecologically beneficial opportunities, and identify potential mitigation measures to address construction and maintenance of the proposed restoration activities.

A. NEWARK BAY/HACKENSACK RIVER/PASSAIC RIVER PLANNING REGION

Several reports and letters were prepared by the NJFO that are relevant to the CRP's and HRE Feasibility Study's Lower Bay and Newark Bay/Hackensack River/Passaic River Planning Regions, including:

- Planning Aid Report (PAR) for the Corps' Hackensack Meadowlands Ecosystem Restoration Project. Bergen and Hudson Counties, NJ. March 2004 (U.S. Fish and Wildlife Service 2004).

- PAR for the Corps' Lower Passaic River Remediation and Ecosystem Restoration. Project Bergen, Essex, Hudson, and Passaic Counties, NJ. Biological Resources Overview and Restoration Opportunities. October 2005 (U.S. Fish and Wildlife Service 2005a).

- PAR for the Corps' Hackensack Meadowlands Ecosystem Restoration Project. Bergen and Hudson Counties, NJ – Environmental Contaminants Issues for Restoration. November 2005 (U.S. Fish and Wildlife Service 2005b).

- Service's letter on Corps' October 2006 draft Meadowlands Comprehensive Restoration Implementation Plan (MCRIP). January 24, 2007 (U.S. Fish and Wildlife Service 2007a).

- The Hackensack Meadowlands Initiative, Preliminary Conservation Planning. March 2007 (U. S. Fish and Wildlife Service 2007b).

- Planning Aid Letter (PAL) for the CRP on Corps' Draft Target Ecosystem Characteristics. September 14, 2007 (U.S. Fish and Wildlife Service 2007c).

- PAL on Corps' draft Meadowlands Comprehensive Restoration Implementation Plan (MCRIP). March 17, 2008 (U.S. Fish and Wildlife Service 2008a).

- Draft PAL for the Joseph G. Minish Passaic River Waterfront Park and Historic Area, City of Newark, Essex County, NJ. February 19, 2016 (U.S. Fish and Wildlife Service 2016a).

- Final PAL for the Joseph G. Minish Passaic River Waterfront Park and Historic Area, City of Newark, Essex County, NJ. April 22, 2016 (U.S. Fish and Wildlife Service 2016b).

B. HARLEM RIVER/EAST RIVER/WESTERN LONG ISLAND SOUND PLANNING REGION

- Bronx River Ecosystem Restoration Project, Water Quality and Biological Baseline Data Collection, Westchester and Bronx Counties, New York. Final Data and Documentation Report. May 2006. U.S. Army Corps of Engineers, New York District, New York, NY.

- Bronx River Section 14 Existing Conditions Report for the Westchester County Center – Feasibility Report. 2009. U.S. Army Corps of Engineers, New York District, New York, NY.

- Soundview Park, Bronx, New York, Ecosystem Restoration Study. U.S. Army Corps of Engineers, New York District, New York, NY. (see http://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487636/fact-sheet-soundview-park-bronx-new-york/)

C. JAMAICA BAY PLANNING REGION

- Draft Jamaica Bay, Marine Beach, and Plumb Beach Ecosystem Restoration Feasibility Study. August 2013. U.S. Army Corps of Engineers, New York District, New York, NY.

- Jamaica Bay Marsh Islands, Jamaica Bay, NY, Integrated Ecosystem Restoration Report, Environmental Assessment and Finding of No Significant Impact. 2006. Army Corps of Engineers. New York District, New York, NY. (see: http://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487604/fact-sheet-jamaica-bay-marsh-islands/)

- Jamaica Bay Self-Sustaining Oyster Population project. NYCDEP project, funded on June 16, 2014, by a Department of the Interior (DOI) Sandy Coastal Resiliency grant administered by National Fish and Wildlife Foundation (NFWF).

- Gerritsen Creek – Marine Park Ecosystem Restoration Report (ERR) with integrated Environmental Assessment (EA). October 2003. U.S. Army Corps of Engineers, New York District, New York, NY. (see: http://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487245/fact-sheet-gerritsen-creekmarine-park-ny/)

IV. DESCRIPTION OF THE STUDY AREA

An overview of the HRE Feasibility Study Area, planning regions, and the 33 potential restoration projects, which are the focus of this final FWCA report, is shown on Figure 1. The sites are grouped according to their Planning Regions as set forth in the Corps and PANYNJ (2016), and described below. More detailed descriptions of each of the proposed restoration projects are given in Appendix A.

A. NEWARK BAY/HACKENSACK RIVER/PASSAIC RIVER PLANNING REGION

The Hackensack and Passaic River basins create the upper boundary of this Planning Region, with the lower boundary defined by Newark Bay and its ports (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The Corps identified seven sites for consideration in this planning region, including Meadowlark Tract, Metromedia Marsh, Essex County Branch Brook Park, Dundee Island Park, Clifton Dundee Canal Green Acres, Lower Passaic River "Deferred" Site - Oak Island Yards, and Lower Passaic River "Deferred Site" - Kearny Point. Predominant land uses in this Planning Region include commercial, industrial, and residential development (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The Hackensack Meadowlands is a dominant feature within this region, measuring approximately 19,730 acres (ac). The lower 1.7 miles (mi) of the Lower Passaic

River is dominated by petroleum commercial facilities currently utilizing the river (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

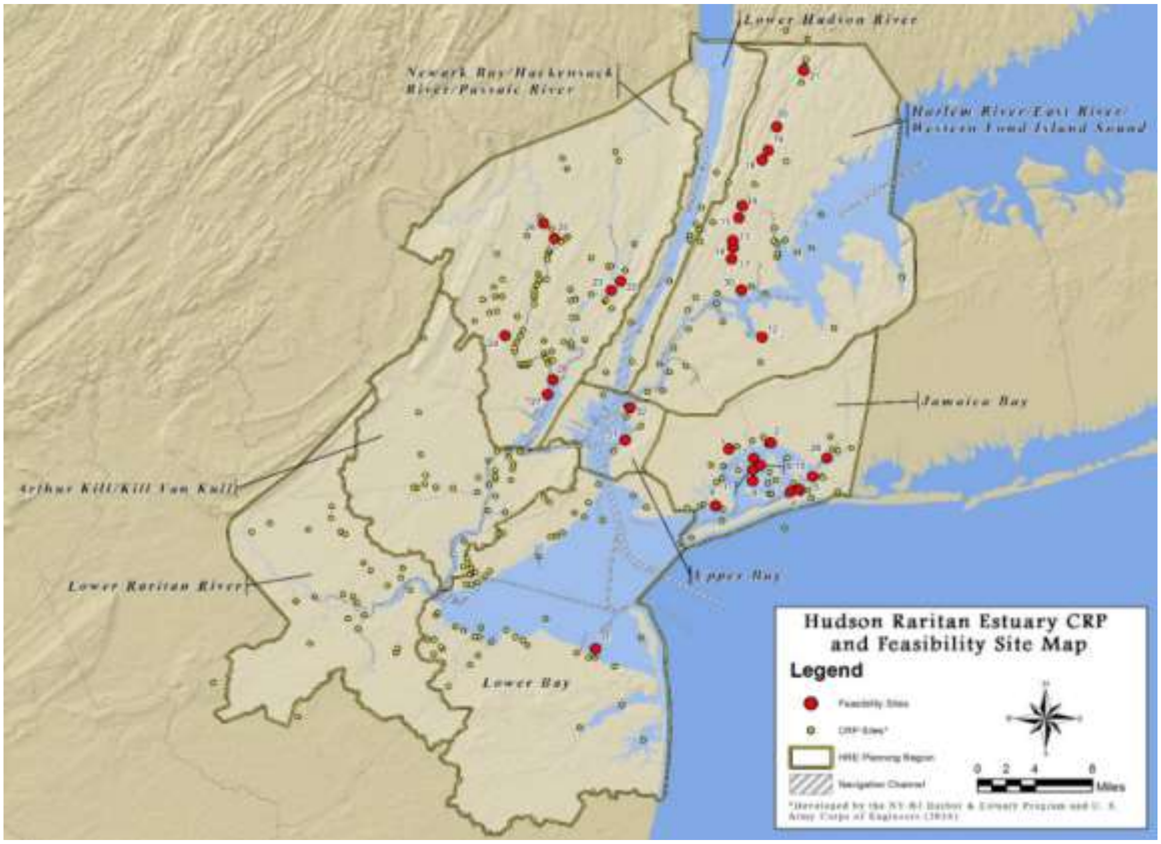

Figure 1. HRE Comprehensive Restoration Plan and Feasibility Site Map (U.S Army Corps of Engineers 2009a).

B. ARTHUR KILL /KILL VAN KULL REGIONAL PLANNING AREA

This planning region encompasses portions of Essex, Union, and Middlesex Counties in NJ, and the western portion of Staten Island in NY. It also includes the Arthur Kill and the Kill Van Kull waterways, as well as fresh water sources including the Rahway and Elizabeth Rivers and Fresh Kills Creek. The Kill Van Kull connects the planning region with Upper New York Bay and the Arthur Kill connects the planning region with Raritan Bay (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). The area surrounding these waterways is heavily industrialized and developed. Various landfills, power plants, sewage treatment plants, refineries, and brownfields are found along the Arthur Kill and Kill Van Kull. Oil spills, effluent, and leachate from these industries have influenced water and sediment quality in this region (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). Despite the development and industrialization in this planning region, the area has been designated by the Service as a Significant Habitat Complex of the New York Bight Watershed. The region supports tidal and freshwater wetlands, marshlands, mudflats, and intact riparian habitat. Additionally, there are backwater and deepwater habitats that support important estuarine fish species, and islands in the Arthur Kill/Kill Van Kull support nesting populations of wading birds (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

The HRE Feasibility Study does not identify any projects in the Arthur Kill/Kill Van Kull Regional Planning Area.

C. LOWER BAY PLANNING REGION

The proposed restoration site in this planning region is the Naval Weapons Station Earle. Overall, the Lower Bay Planning Region contains an expanse of both deep and shallow open water habitats, including Lower New York Bay, Raritan Bay, and Sandy Hook Bay. This planning region is bounded on the north by Staten Island and Brooklyn; on the south by Monmouth County, NJ; and on the ocean side by a transect between Sandy Hook, NJ, and Rockaway Point, NY. The Lower Bay Planning Region is predominantly developed with industrial, commercial, and residential land uses. Sandy Hook's shoreline is interspersed with public and private marinas, sandy beaches, and rip-rapped shorelines (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

D. LOWER RARITAN RIVER REGIONAL PLANNING AREA

This is the most western planning region and is located mostly in Middlesex County, NJ. The planning region encompasses the lower six miles of the Raritan River before its confluence with Raritan Bay (U.S. Army Corps of Engineers, Port Authority of New York and New Jersey 2016). The shorelines of the river in this region are surrounded by residential and industrial development. Industrial development is more prevalent at the river's mouth, residential development becomes more common further upstream, and agricultural lands can be found at the upstream boundaries of the region. Industrial properties adjacent to the river include the Sayreville Power Plant, the Werner Generating station, the former Raritan arsenal, and an un-remediated landfill (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). Despite an estimated 93 percent loss of wetlands in this region during the past few centuries and the influences of shoreline development, this planning region still supports some regionally important floral and faunal assemblages. Notably, the region contains a 1,000-ac wetland complex that supports waterfowl, wading birds, mammals, and fish (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

The HRE Feasibility Study does not identify any projects in the Lower Raritan River Planning Area.

E. UPPER BAY PLANNING REGION

Governors Island and Bush Terminal restoration sites are located in New York Harbor's Upper Bay Planning Region. Governors Island, a 176-ac island located west of Brooklyn (separated by the Buttermilk Channel), is less than 1,000 yards south of Battery Park on the southern tip of Manhattan. Bush Terminal sits on the waterfront of Upper Bay in the Sunset Park neighborhood of Brooklyn. Upper Bay is considered a Class I waterbody by the NYSDEC due to the presence of Polychlorinated biphenyls (PCBs) and other contaminants of concern, including heavy metals, and is best suited for secondary contact including fishing and boating (New York State Department of Environmental Conservation 2016a, 6 NYCRR Part 701.13). Despite the influences of heavy urbanization surrounding Upper New York Bay, the waterbody supports a diverse aquatic ecosystem (National Park Service 2008).

F. HARLEM RIVER/EAST RIVER/WESTERN LONG ISLAND SOUND PLANNING REGION

1. Bronx River

A total of 10 restoration sites are located along or at the mouth of the Bronx River in the Harlem River/East River/Western Long Island Sound Planning Region. Four projects are located in Westchester County, including Westchester County Center, Garth Woods/Harney Road, Crestwood Lake, and Bronxville Lake. The remaining six sites are in Bronx County, including Muskrat Cove, Shoelace Park, Stone Mill Dam, Bronx Zoo and Dam, River Park/West Farm Rapids Park, and Soundview Park.

The Bronx River serves as a tributary of the Long Island Sound and the HRE. Originating near the Kensico Reservoir in Valhalla, NY, its watershed covers 56 square miles (sq. mi.), as it flows for 23 mi. before it enters into the East River, between the Soundview and Hunts Point neighborhoods. Fifteen miles of the river occur in Westchester County and the remaining eight miles flow through Bronx County. The Bronx River is a highly modified and urbanized water course, and, as a result, water quality has been degraded from runoff due to the conversion of forested lands to development and impervious surfaces. Pollution enters the Bronx River from nonpoint and point sources, which include discharges from sewage outfalls (Center for Watershed Protection, Inc. 2010). Additionally, there are dams and rock weirs on the river that create barriers to fish passage. The lowest dam on the river at 182nd Street was modified by the NYCDPR by constructing a fish ladder in 2014.

A fish passage feasibility study by NYCDPR (Larson *et al*. 2004) determined that the Bronx River has suitable levels of dissolved oxygen, salinity, temperature, suspended sediment, flow, and channel habitat to support river herring (blueback herring [*Alosa aestivalis*] and alewives [*Alosa pseudoharengus*]). However, in certain areas of the river or at certain times (*e.g.*, after storms or in particular seasons), some of these parameters may exceed threshold values suitable for river herring and/or other native fish species (Larson *et al.* 2004; Crimmens and Larson 2006). Spawning and refuge habitats are present for river herring and other native species, but they are not abundant (Larson *et al.* 2004; Crimmens and Larson 2006).

Due to low dissolved oxygen and/or pathogens, all sections of the Bronx River are listed on NYSDEC's Proposed Final 2016 section 303(d) list of priority waterbodies (New York State Department of Environmental Conservation 2016a). The uppermost reach within Westchester County (NY-1702-0107) is classified by the NYSDEC as Class C. New York State (NYS) lists Class C waters as best suited for fishing (6 NYCRR Part 701.8). The middle portion of the Bronx River (NY-1702-0106) is classified as Class B. NYS lists that the best uses of Class B waters are primary and secondary contact recreation and fishing (6 NYCRR Part 701.7). The lower tidal portion of the river (Section 1702-0006) is designated as Class I. The best usages of Class I waters are secondary contact recreation and fishing (6 NYCRR Part 701.13).

2. Flushing Creek

Flushing Creek is located in northern Queens and empties into Flushing Bay, which is adjacent to LaGuardia Airport. The Flushing Creek watershed is approximately 10,000 acres. The watershed is primarily residential, but also includes commercial, industrial, institutional, and open/recreational spaces. The land directly surrounding Flushing Creek is industrial, commercial, vacant, or used in support of transportation-related features. Flushing Meadows-Corona Park is a notable open space/recreation area that comprises about 20 percent of the watershed. The water quality of Flushing Creek and Bay is negatively influenced by sewer systems, filled wetlands, and shoreline hardening (AECOM USA, Inc. 2014).

G. LOWER HUDSON RIVER REGIONAL PLANNING AREA

The Lower Hudson River planning region extends from Upper New York Bay to the Tappan Zee Bridge and includes ports and riparian lands in Bergen and Hudson Counties in NJ and NYC, Rockland, and Westchester Counties in NY. The areas surrounding the river are highly populated. Land use in the region includes residences, marinas, marine parks, vacant disturbed lands, and commercial and industrial facilities. Commercial and industrial facilities include power plants and wastewater treatment plants (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). Consumptive uses of the river and freshwater discharges have impacted the natural salinity range of the river, which, in turn, has impacted habitats and fish and wildlife. The river has also been impacted by a history of navigational use which has resulted in a narrowing and a deepening of the river and shoreline hardening (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). Contamination of the river is a major concern, and 200 mi of the river has been designated as a Superfund Site due to General Electric releasing nearly 500,000 pounds of PCBs into the river between 1946 and 1977. General Electric is working with the USEPA to develop a dredging plan to safely clean the river (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). Despite significant human impacts, the region still supports habitats that are important to a variety of fish and wildlife species. This planning area falls within the Service designated Significant Habitat Complex of the New York Bight watershed (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

The HRE Feasibility Study does not identify any projects in the Lower Hudson River Planning Area.

H. JAMAICA BAY PLANNING REGION

There are twelve proposed restoration sites in the Jamaica Bay Planning Region including Dead Horse Bay, Fresh Creek, Hawtree Point, Brant Point, Dubos Point, Bayswater State Park, Head of Bay, Elders Center Marsh Island, Duck Point Marsh Island, Pumpkin Patch East Marsh Island, Pumpkin Patch West Marsh Island, and Stony Point Marsh Island. The Dead Horse Bay restoration site is furthest west and is located on the north shore of Rockaway Inlet adjacent to the NPS's Floyd Bennett Field. The Fresh Creek and Hawtree Point restoration sites are located on the northern shore of Jamaica Bay. Immediately adjacent to John F. Kennedy International Airport (JFK Airport), Head of Bay is a basin in the easternmost section of Jamaica Bay. Three sites are located on the eastern portion of the bayside of the Rockaway Peninsula, including Brant Point, Dubos Point, and Bayswater State Park. Lastly, the Jamaica Bay Marsh Islands, including Elders Center Marsh Island, Duck Point Marsh Island, Pumpkin Patch East Marsh Island, Pumpkin Patch West Marsh Island, and Stony Point Marsh Island, are centrally-located within the bay, just west of Cross Bay Boulevard.

Jamaica Bay is an approximately 20,000-ac saline to brackish bay that lays between the Rockaway Peninsula and the mainland shorelines of southern Brooklyn and Queens. The bay is comprised of marshes, open water, maritime shrub and scrub, and shorelines, with a mean depth of approximately 13 feet (ft). It connects to Lower New York Bay and the Atlantic Ocean through Rockaway Inlet.

Heavily urbanized areas of NY, Queens, Kings, and Nassau Counties surround the bay. As a result, the bay's bottom and shorelines have been modified over time and its ecological functions and values have been significantly altered by human activity. About 12,000 of the original 16,000 ac of wetlands in the bay, mostly around the perimeter of the bay, have been filled. Extensive areas of the bay have been dredged for navigation channels and to provide fill for the airports and other construction projects, and there have been extensive modifications to the freshwater and brackish creeks. Specifically, an estimated 125 million cubic yards (cu. yd.) of material was removed from the bay and substantial modifications to the tidal inlet connections with Atlantic Ocean occurred (New York City Department of Environmental Protection 2007). The majority of the bay's freshwater input is now from sewage treatment facilities which contribute between 259 and 287 million gallons of treated effluent per day (New York City Department of Environmental Protection 2007; Waldman 2008).

The bay experiences annual algal blooms, decreased dissolved oxygen levels in select areas, and increased nutrient levels. Water quality sampling and modeling show that Jamaica Bay is a eutrophic system but, in spite of this, water quality indicators (*i.e.*, dissolved oxygen and fecal coliform) suggest water quality of the bay is improving, although high levels of nitrogen and chlorophyll-*a* continue to persist and prove problematic in the estuary (New York City Department of Environmental Protection 2007).

The primary sediments found within the eastern and northern portions of the bay are characterized as muddy fine sand while the southern and western portions of the bay are characterized as fine to medium sands (U.S. Fish and Wildlife Service 1997). As discussed in more detail in the following sections, Jamaica Bay contains large quantities of chemicals, including heavy metals, pesticides, PCB, dichlorodiphenyltrichloroethane (DDT), and 2,3,7,8,-tetrachlordibenzo-*p*-dioxin (2,3,7,8-TCDD) (U.S. Army Corps of Engineers 2016b). Concentrations of many of these contaminants exceed State regulatory thresholds throughout the bay (Steinberg *et al.* 2004; New York State Department of Environmental Conservation 2014a).

Despite the negative influences of the surrounding urbanization, Jamaica Bay provides habitat to various fish and wildlife species and has received special designations from multiple agencies and organizations. For example, Jamaica Bay is recognized as a New York State Department of State (NYSDOS) Significant Coastal Fish and Wildlife Habitat, an Audubon Important Bird Area, and is a component of the Jamaica Bay and Breezy Point Significant Habitat Complex designated by the Service (New York City Department of Environmental Protection 2007; U.S. Fish and Wildlife Service 1997; Burger and Liner 2005; and New York State Department of State 1992). In addition, a portion of the bay is within the NPS Gateway National Recreation Area's 9,100-ac Jamaica Bay National Wildlife Refuge.

V. FISH AND WILDLIFE RESOURCE CONCERNS AND PLANNING OBJECTIVES

The purpose of coordination between the Corps and the Service under the FWCA is to ensure equal consideration of fish and wildlife resources in the planning of water resource development projects. The Service's emphasis for the HRE Feasibility Study restoration projects is to ensure beneficial outcomes by identifying means and measures to mitigate the potential adverse impacts during construction activities, to recommend additional monitoring and investigations over the life of the restoration projects, and to make positive contributions to the restoration, conservation, and enhancement of fish and wildlife resources and their respective habitats.

The term "wildlife resources" as used herein includes birds, fish, mammals, and all other classes of native animals and all types of aquatic and land vegetation upon which fish and wildlife are dependent, pursuant to the FWCA. Aquatic habitats, marsh grasslands, bay bottoms, and stream riparian corridors are of primary importance to the Service because these habitats are limited in availability, rich in species, and support some of the rarest species in the NY and NJ urban areas. However, all fish and wildlife resources were considered in this report.

A. FISH AND WILDLIFE RESOURCE CONCERNS

The Service has several fish and wildlife resource concerns, as identified in this section. Recommendations to address these concerns are found in Section XII, *"Service Planning and Mitigation Recommendations."*

1. Habitat Loss and Degradation

The HRE is located in one of the most developed areas of the country and as a result, many natural habitats have been lost and degraded over time. The terrestrial and aquatic habitats in the HRE have been significantly altered to accommodate extensive residential and industrial development (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016; O'Neil *et al.* 2016). Terrestrial habitats have been lost and replaced with buildings, roads, and other impervious surfaces. The diminishment of natural vegetative communities has created fragmented habitats and resulted in limited food, cover, and nesting habitat for fish and wildlife in the HRE. Aquatic habitats have also been extensively altered. For example, it is estimated that eastern oyster reefs once covered approximately 200,000 ac within the HRE, but due to sedimentation, over-harvesting, harbor development, and poor water quality, naturally existing oyster reefs no longer exist in the HRE (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016; O'Neil *et al.* 2016). Shallow water habitats, wetlands, and streams and creeks were also more extensive within the HRE, however these habitats have been severely diminished due to filling, hardening of shorelines, and dredging practices that were used to allow for development and navigation (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). Additionally, the history of shoreline disturbance and development has significantly contributed to a reduction in the amount of suitable shoreline habitat available for use by wildlife. It is estimated that 36 percent of the shoreline within the HRE is hardened, with some areas of the HRE such as Upper Bay reaching 87 percent hardened shoreline (O'Neil *et al.* 2016). The armoring of river banks and shorelines is an ongoing threat as communities attempt to increase protection from erosion, storms, and sea-level rise. In addition to the physical changes to habitat, degraded water quality has also been a problem in the HRE. Water quality in the HRE has been compromised by chemical contaminants, heavy metals, bacteria, nutrients, sediments, and floatables that enter the estuary from various sources including, but not limited to industrial discharges, landfills, sewage, wastewater, and road runoff (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016; O'Neil *et al.* 2016).

2. Invasive Species

Invasive plants can be problematic as they can have negative impacts on native species and ecosystems. Invasive plant species may lower plant diversity by outcompeting native species (Hejda *et al.* 2009; Charles and Dukes 2007). The presence of invasive species may also lower wildlife diversity, and species composition can be different in areas of high densities of invasive plants than in areas with native plants (Benoit and Askins 1999; Herrera and Dudley 2003; Burghardt *et al.* 2009). Invasive plants may have other ecosystem effects such as: alterations of energy, nutrient, and hydrological cycles; changes to disturbance regimes; alterations to physical habitat; and impacts on climate and atmospheric composition (Charles and Dukes 2007). Numerous species of invasive plants can be found within the HRE Feasibility Study Area and are problematic at many of the proposed restoration sites.

3. Wildlife and Habitat Management Related to the FAA MOA

Wildlife management is a significant issue, particularly near JFK and LaGuardia Airports. Aircraft colliding with wildlife, particularly birds, can pose a risk to air travel on and around airports. Restoring and managing habitat within the vicinity of airports can have impacts on overall bird populations in the area which may contribute to the likelihood of bird strikes. As a result, the FAA has developed an MOA with the Service to guide restoration and management efforts such that they do not create conditions that would result in dangers to air travel. Additionally, the U.S. Department of Agriculture's (USDA) Wildlife Services undertakes gull and geese population control measures within the Jamaica Bay Wildlife Refuge near JFK Airport and gull and coyote control near LaGuardia Airport.

4. Environmental Contaminants

Many of the waterways within the HRE (*i.e*., the Arthur Kill, Kill Van Kull, Passaic River, Hackensack River, Newark Bay, Jamaica Bay, and parts of the Hudson River) were historically, and continue to be, heavily-industrialized. Contaminants that have been identified in these water bodies include, but are not limited to, metals, polycyclic aromatic hydrocarbons (PAH), pesticides, chlorinated dioxins and furans, PCBs, solvents, and wastewater-related pharmaceuticals and healthcare products, derived from point and non-point sources. The presence of legacy contaminants in these sediments poses a significant challenge in performing habitat restoration (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016).

Further, a considerable number of studies have specifically evaluated the biological effects of contamination within the HRE; a brief summary of this research is presented in Appendix D. (Note that this review does not include the vast amount of information from the USEPA's remedial investigative studies and independent researchers that document tissue concentrations in HRE's biota exceeding literature-based effects thresholds). Most of these studies have not teased out the specific compound responsible for observed effects. Indeed, contaminant impacts are often additive, or even synergistic (*i.e.*, the combined effects are greater than the separate effects added together), making it difficult to discern the relative contribution of various compounds on an overall biological response. Thus, although some of the studies focused on impairment caused by a specific contaminant, it is important to recognize that the overall potential for contaminant impacts within the HRE is a function of the mixture of various compounds that are present and which together may have very different, and often more detrimental, effects than they each would individually.

The CWA mandates that States submit biennial reports to the USEPA, describing the quality of their waters. The biennial Statewide Water Quality Inventory Report or "305(b) Report" must include the status of principal waters in terms of overall water quality and support of designated uses, as well as strategies to maintain and improve water quality. The 305(b) reports are used by Congress and the USEPA to establish program priorities and funding for federal and state water resource management programs. The biennial List of Water Quality Limited Waters or "303(d) List" identifies waters that are not attaining designated uses because they do not meet surface water quality standards despite the implementation of technology-based effluent limits. Nearly all of the projects proposed in the CRP lie in waters reported by the NJDEP and the NYSDEC as "impaired" (New Jersey Department of Environmental Protection 2012). Impairments in these waterways are due to low dissolved oxygen, the presence of pathogens, and the exceedances of PCB, DDT, dieldrin, benzo(a)pyrene, chlordane, mercury and other heavy metals, dioxins/ furans, PAHs, pesticides, volatile organic compounds (VOCs), and increased floatables (U.S. Environmental Protection Agency 2014a; New Jersey Department of Environmental Protection 2014).

The NJDEP uses the USEPA's Rapid Bioassessment Protocols (RBPs) to help monitor the health of streams and watersheds. One protocol, termed Ambient Biological Monitoring Network (AMNET), examines dynamics of benthic macroinvertebrate populations to determine taxa present. Ratings of the stream condition are based on the biodiversity of the system and the level of pollution tolerance of the families collected, the ratio of pollution tolerant to pollution intolerant families such as members the insect orders Ephemoptera (mayflies), Plectoptera (stoneflies), and Trichoptera (caddisflies), often referred to as EPTs. The AMNET scoring system rates stream conditions in the Northeast as either “excellent,” “good,” “fair,” or “poor.” Invertebrate sampling by the NJDEP in 1993 rated the waters they sampled in the HRE (Lower Raritan River, Arthur Kill/Kill Van Kull, and Newark Bay/Hackensack River, Passaic River Planning Regions) as “severely” (13.3 percent), moderately (57.9 percent) or non-impaired (31.9 percent) (New Jersey Department of Environmental Protection 1994). In a similar AMNET effort in 2008, the NJDEP found similar results of degraded macroinvertebrate communities for the Northeast Water Region (Passaic and Hackensack River Watershed); with 6.9 percent rated as “excellent,” 18.6 percent exhibiting “good,” 51 percent “fair,” and 23.5 percent “poor” (New Jersey Department of Environmental Protection 2012).

The NYSDEC identified contaminants in the middle and lower portions of the Bronx River; however the levels encountered were “not likely to cause chronic toxicity to sediment-dwelling organisms, but cadmium, lead, and PAHs (*e.g*., pyrene) were found at elevated levels” (New York State Department of Environmental Conservation 2011). In addition, “…Macroinvertebrate (crayfish) tissue collected at this site and chemically analyzed showed chromium, lead and titanium to be elevated and should continue to be monitored.” Finally, the NYSDEC considered the water quality of this portion of the Bronx River to be poor and aquatic life not fully supported in the stream” (New York State Department of Environmental Conservation 2011).

In Flushing Creek, contaminant risk appears minimal in this area of the Harlem River/East River/Western Long Island Sound Planning Region. In addition, parts of the Lower Bay Planning Region (Sandy Hook, and Shrewsbury and Navesink Rivers) also exhibit minimum contaminant risk as these sites are not in close proximity to sources of chemical pollution.

In Jamaica Bay, chemicals from modern sources (*i.e*., wastewater treatment plants discharges, combined sewer overflows, non-point source discharges, and chemical and oil spills) are also known to adversely affect bottom sediments (U.S. Army Corps of Engineers and Port Authority of New York and New Jersey 2016). A study by Benotti and Brownawell (2007) also identified fifteen pharmaceutical compounds in Jamaica Bay at least once, including 12 that were identified in most, or all, of the 24 sites which were surveyed. These compounds included: caffeine, cotinine, nicotine, paraxanthine, acetaminophen, carbamazepine, cimetidine, codeine, diltiazem, ketoprofen, metformin, ranitidine, and salbutamol. Laboratory and field studies have shown that various classes of pharmaceuticals can have negative effects, such as reduced health and reproduction, on fish and other aquatic organisms (Corcoran *et al*. 2010; Gaw *et al.* 2014; Overturf *et al*. 2015; Fabbri and Franzellitti 2016). There is growing concern about pharmaceuticals in aquatic environments and their impacts on aquatic organisms, marine ecosystems, and human health (Corcoran *et al*. 2010; *Gaw et al*. 2014; Overturf *et al*. 2015; Fabbri and Franzellitti 2016).

The Upper Bay Planning Region is considered a Class I waterbody by the NYSDEC due to the presence of PCBs and other contaminants of concern including heavy metals (New York State Department of Environmental Conservation 2016a, 6 NYCRR Part 701.13).

The HRE's geographic boundary includes numerous Superfund and state-designated hazardous waste sites. The CRP indicated that habitat restoration in contaminated habitats may result in the creation of "attractive nuisance issues" whereby "…the restoration site has the potential to release contamination into the food chain (wildlife or human)," highlighting the challenges of planning habitat restoration in contaminated areas. In the report entitled, *"The Hackensack Meadowlands Initiative*" (U.S. Fish and Wildlife 2007b), the Service also highlighted concerns that contaminants may have created sink habitats for certain invertebrates and fishes in the Hackensack Meadowlands. A sink habitat is a habitat in which species cannot persist due to elevated mortality rates, without immigration into the habitat. Many of the contaminants encountered in the Hackensack Meadowlands are found throughout the HRE Feasibility Study Area. Academic research suggests that similar processes of contamination and risk to aquatic biota are occurring elsewhere in the HRE.

Remedial investigations and/or Ecological Risk Assessments of environmental contaminants associated with the Diamond Alkali, United Oil Products, Ventron/Velsicol, and Scientific Chemical Processing Superfund Sites (Louis Berger Group *et al.* 2014; Berry's Creek Study Area Cooperating PRP Group 2016; CH2M Hill Engineers, Inc. 2016) have identified the following compounds that may present ecological risk to fish and wildlife:

- 2,3,7,8-TCDD;
- total PCBs;
- PAHs;
- TCDD Toxic Equivalents (TEQs, including all dioxin-like compounds);
- total DDx (*i.e*., DDT and its isomers); and
- Mercury.

Additionally, there is a large body of peer-reviewed science, documenting that measured concentrations of several of these contaminants in HRE sediments are at levels harmful to a variety of species that form the food base of trust species under the Service's jurisdiction (*e.g*., see Long *et al.* 1995 and Beckert and Ginn 2008, which provide literature reviews for the Effects Range-Low [ER-L] and Effects Range-Median [ER-M] thresholds). Moreover, some of these contaminants biomagnify up the food chain to higher trophic-level organisms, including humans, where they may exert a variety of toxicological effects (see reviews by Eisler 1987a and 1987b; Boening 1998; Herbert *et al.* 1999; New Jersey Mercury Task Force 2002; Scheuhammer *et al.* 2007; Ottinger *et al.* 2009).

The Corps mapped predicted concentrations of PCBs and 2,3,7,8-TCDD in the top 10 cm of sediment throughout the HRE (U.S. Army Corps of Engineers, Port Authority of New York and New Jersey 2016). Approximately 62 percent of the HRE had sediment concentrations exceeding a remediation goal for 2,3,7,8-TCDD of 3.17 parts per trillion (ppt), a value calculated by the Service (Kubiak *et al.* 2007), using an effects concentration for successful oyster reproduction and oyster lipid content reported by Wintermyer and Cooper (2003), in conjunction with measured organic carbon contents of sediment in the HRE (Contamination Assessment and Reduction Project [CARP] 1999-2000). The Corps (2009a) also mapped predicted concentrations of total PCBs in sediment and compared those concentrations to the ER-L and ER-M values reported by Long *et al.* (1995). Approximately 90 percent of the HRE had expected sediment PCB concentrations exceeding the ER-M, while 99 percent had sediment PCB concentrations exceeding the ER-L. These evaluations reveal the difficulties in finding potential restoration sites without environmental contaminant issues within in the HRE. However, the difficulty may actually be even greater, given that a similar exercise has not been conducted for mercury.

The Service has previously objected to the Corps issuing section 404 Permits under the CWA for tidal restoration/mitigation projects proposed in areas of the HRE that pose a significant threat to fish and wildlife resources due to contaminant risk (*e.g.*, U.S. Fish and Wildlife Service 2015). These mitigation projects included the Evergreen Hackensack River Mitigation Bank, the Kane Mitigation Bank, the Evergreen MRI-3 Mitigation Bank, Global Terminal, the Evergreen Mill Creek Mitigation Bank, the Tremley Point Connector Road, the Piles Creek Mitigation Bank, the Borough of Carteret, Constable Hook, Losen Slote, and the Saw Mill Creek Mitigation Bank.

Post-construction monitoring for contaminant risk was required for four mitigation projects authorized by the Corps, including the Kane Mitigation Bank, the Evergreen MRI-3 Mitigation Bank, the Saw Mill Creek Mitigation Bank, and the Global Terminal Mitigation Bank. However, remediated and restored tidal wetlands that are in close proximity to significantly degraded sediments (*i.e.*, pollution sources) are still at risk of being re-contaminated. For example, despite the Kane, MRI-3, and Global project sites being properly cleaned, post-construction monitoring has revealed a general trend of recontamination, with contaminant concentrations rising and, in some cases, exceeding levels known to cause harm to aquatic organisms, as documented in their respective project monitoring reports and referenced by the Service (2015). Therefore, if measures are not in place to address re-contamination, should it occur, the cycle of exposing fish and wildlife resources to toxic substances will likely continue, as well as continued state advisories for the consumption of fish and shellfish from the region.

5. Genetic Resistance/Tolerance

In addition to the large body of literature documenting the effects of contaminants on biota in multiple planning regions of the HRE, a variety of studies have demonstrated that organisms in the estuary have evolved genetic resistance, or tolerance, to contamination. Mummichog (*Fundulus heteroclitus*), Atlantic tomcod (*Microgadus tomcod*), fiddler crabs (*Uca* spp.) , and grass shrimp (*Palaemonetes pugio*) in the HRE have all been shown to have evolved resistance to toxicity of various compounds including PCBs (Yuan *et al.* 2006), 2,3,7,8-TCDD (Prince and Cooper 1995a and 1995b), and methylmercury (Kraus and Weis 1988; Kraus *et al.* 1988; Weis and Weis 1989; Weis 2002). Organisms collected in the HRE and exposed to contaminants in the laboratory showed resistance to (*i.e.*, a lower frequency of) contaminant impacts including lesions, cardiac and skeletal defects, teratogenic effects, and reduced survival, depending on the contaminant and organism, in comparison to those collected in reference locations. While this may seem to be protective of organisms living in a highly contaminated environment, there appears to be corresponding biological costs to this chemical resistance, such as reduced life span, fecundity, and growth rate, or adaptability to changing conditions; increased susceptibility to other stressors; and reduced fitness in the presence of contaminants (Bush and Weis 1983; Toppin *et al.* 1987; Meyer *et al.* 2000; Meyer and Di Giulio 2003; Wirgin *et al.* 1989; Wirgin and Waldman 2004). Biological resistance also raises concerns about the possibility of an increased potential for the bioaccumulation of contaminants to higher trophic levels through the evolution of toxicity-resistant prey species (Wirgin and Waldman 2004).

6. Fish/Shellfish Consumption Advisories and Guidance

Due to measured levels of TCDD TEQ, total PCBs, and methylmercury in the fish and crabs in the Passaic, Hackensack and Hudson Rivers, the NJDEP's "Fish Smart, Eat Smart - A Guide to Health Advisories for Eating Fish and Crabs Caught in New Jersey Waters" (New Jersey Department of Environmental Protection 2016a) maintains a complete "do not eat or harvest" fish and crab advisory for all tidal portions of the Passaic River. The advisories are the result of calculated cancer risks to the general public from eating fish and crab from these affected waterways. In addition, advisories are in place for the Newark Bay complex (including the Newark Bay, tidal Hackensack River, Arthur Kill, Kill Van Kull, and tidal tributaries), the Hudson River (from the upper New York/New Jersey border to Bayonne in Upper New York Harbor), and the Raritan Bay complex in the lower New York Harbor (including Raritan Bay, the tidal Raritan River, and the tidal portions of all tributaries). These advisories recommend that the general public limit consumption of fish and shellfish including: blue crab (*Callinectes sapidus*), American eel (*Anguilla rostrata*), white perch (*Morone americana*), white catfish (*Ameiurus catus*), striped bass (*Morone saxatilis*), winter flounder (*Pseudopleuronectes americanus*), summer flounder (*Paralichthys dentatus*), American lobster (*Homarus americanus*), weakfish (*Cynoscion regalis*), porgy (*Sparidae* spp.), and channel catfish (*Ictalurus punctatus*). Recommendations are more restrictive for high-risk categories of human populations including pregnant women and children. All waters upstream (north) of the Arthur Kill are condemned and closed to the harvest of clams, mussels, and oysters (New Jersey Department of Environmental Protection 2016a).

The New York State Department of Health (2016) maintains similar fish consumption advisories for the area encompassing the five boroughs of NYC, where a majority of the HRE restoration projects are proposed. These advisories include a complete ban on consumption of all fish and shellfish from Jamaica Bay; a ban on consumption of American eel, gizzard shad (*Dorosoma cepedianum*), white perch, and striped bass from the Arthur Kill, Kill Van Kull, Raritan Bay, and Upper New York Bay; a ban on consumption of channel catfish, gizzard shad, and white catfish from the East River and Harlem River; and various restrictions on the consumption of other fish species, including rainbow smelt (*Osmerus mordax*), Atlantic needlefish (*Strongylura marina*), and carp (*Cyprinidae* spp.). The principal identified toxic compounds include PCBs, dioxin, and cadmium. In addition, NYC waters are closed to shellfishing (*i.e.*, harvesting of clams, mussels, oysters and scallops). It is noted however, that despite advisories, fishing and consumption of fish still occurs, particularly by economically disadvantaged residents (Greene 2017).

The State advisories for consumption of fish and shellfish in the New York and New Jersey Harbor may not be sufficiently protective for human consumption if the additive toxicity of the principle contaminants of concern is considered. Researchers from Canada studied the additive effects of chemicals (*i.e.*, PCBs, mercury, dioxins and furans, and pesticides, among others) in Great Lakes fish and determined that approximately half of the advisories currently issued are potentially not adequately protective when considering the additive effects of chemical mixtures (Gandhi *et al.* 2017).

The U.S. Food and Drug Administration (USFDA) also has measures in place to protect human health by requiring that food containing certain hazardous substances in excess of identified levels be removed from commerce. Current USFDA tolerances, action levels, or guidance values for PCBs, DDTs, and methylmercury are 2.0, 5.0, and 1.0 parts per million (ppm), respectively, in edible fish and shellfish tissue (U.S. Food and Drug Administration 2001). The USFDA does not have a uniform guidance value for dioxin or dioxin TEQs; however, in response to an incident involving contamination of animal feed by dioxin, USFDA scientists established a "level of concern" of 1 ppt in edible tissues of fish, eggs, meat, poultry, and other food products (Food Safety Inspection Service 1997). Tissues containing higher concentrations were deemed adulterated and unfit as food (U.S. General Accounting Office 1998).

The USEPA has developed guidance regarding fish consumption limits (U.S. Environmental Protection Agency 2000). The recommended maximum fish tissue concentrations of methylmercury, DDT, PAHs, PCBs, and dioxin/furan TEQs to allow for unrestricted consumption (*i.e*., more than sixteen meals per month) are 0.029 ppm, 0.0086 ppm, 0.0004 ppm, 0.00015 ppm, and 0.019 ppm, respectively.

Tissue concentrations in a variety of fish and shellfish species have been found to exceed the USEPA's and/or the USFDA's action, tolerance, or guidance levels (U.S. Department of Commerce *et al.* 2007). More recently, Candelmo *et al.* (2010) reported that laboratory bluefish (*Pomatomus saltatrix*) fed prey fish from the Hackensack River for a period of four months accumulated mercury and PCBs to levels exceeding the USEPA's and/or the USFDA's action levels. It should be noted that these regulatory advisories are human-health based, and may not be fully protective of fish and wildlife resources due to differences in their life histories, exposure pathways, and specific sensitivities.

7. Coastal Resiliency Projects

The geographic boundary of the Atlantic Coast of New York, East Rockaway Inlet to Rockaway Inlet, and Jamaica Bay (ERRIJB) Reformulation Study is located in the HRE Feasibility Study Area and includes various coastal storm risk reduction features in or around Jamaica Bay. Based on the information provided to the Service, it appears the ERRIJB Reformulation Study would likely affect the function and permanence of the proposed HRE Feasibility Study restoration projects. However, the degree to which this may occur is unknown. In addition, some sites are listed both as restoration sites in the HRE Feasibility Study and as mitigation sites in the ERRIJB Reformulation Study, including Dead Horse Bay, Duck Point, and Elders Point. The Corps states in their October 23, 2017, response that following Hurricane Sandy, several of the Jamaica Bay restoration sites were further evaluated in the ERRIJB Reformulation Studies as potential natural/nature based features. The New York/New Jersey Harbor and Tributaries (NYNJHAT) feasibility study is also investigating coastal storm risk management problems and solutions within the HRE. These additional authorities give the Corps needed flexibility in identifying and implementing nature based resilience alternatives in the HRE.

8. Supply of Genetic Stock of Native Plantings

There is a shortfall of local genetic and diverse plant material available to meet the landscaping needs of the proposed projects. Contracting for native plant material under the current paradigm (*e.g.*, at the time of construction award) delays the initiation of procurement and production of plants and can result in compromised material selection, variety, and source (E. Toth, personal communication, June 5, 2017). In restoring natural systems, plant materials must be carefully sourced to avoid the negative genetic consequences of introducing maladapted genotypes into local plant populations. Founder effects, genetic swamping, and outbreeding depression are all well-established, negative consequences of translocating maladapted non-local genetic plant materials into restoration sites (Hufford and Mazer 2003).

Numerous coastal resiliency projects are proposed in the Tri-state area over the next decade for construction by the Corps, the Federal Emergency Management Agency, the Housing and Urban Development, the New York State Governor's Office of Storm Recovery, and other federal, state, and municipal agencies. The cumulative effect of these projects will likely further exacerbate the current shortage of locally sourced and genetically diverse plants for the HRE Feasibility Study Area.

The needs for acquiring appropriate plant material over the next ten years cannot be met without a multi-agency effort of assembling a regional team to collect, store, and produce sufficient quantities of genetically diverse plant material – similar to what the Bureau of Land Management (BLM) is undertaking with numerous stakeholders, seed collectors, farmers, and commercial growers (see *Plant Genetic Tolerance and Supply* section later in this report). The problem of native plant procurement for these post-hurricane Sandy projects has recently been further identified by the Rockefeller Foundation in the just-released study entitled, *"Challenges in Supplying Native Plants for Resilience (for the NYC Region),"* by Taedoki B.V. and The Rockefeller Foundation (2016).

B. PLANNING OBJECTIVES

From the Service's perspective, a desired output for each of the 33 projects identified is consistent with the Corps: to achieve long-term ecological integrity and fully functioning restored habitats.

The following objectives have been identified by the Service:

1) The historic impacts of shoreline degradation, habitat fragmentation, and the spread of invasive species on fish and wildlife populations and their habitats should be reduced.
2) A scientifically robust adaptive management (AM) program with clearly-identified decision points, alternative actions, and costs should be implemented. The AM program should ensure achievement of each objective.

3) A strategy for restoration that is sensitive to issues of existing environmental contamination and potential re-contamination of restored habitats should be developed.
4) Restoration site planning that does not conflict with other habitat management efforts in the HRE should eb ensured.
5) Restoration projects should support the recovery of fish and wildlife resources and their respective habitats, including listed species (ESA), birds of conservation concern, and other declining flora and fauna.

VI. EVALUATION METHODOLOGY

The Corps' planning schedule and funding limitations precluded the Service from conducting field surveys and investigations for the Service's trust resources in the proposed project areas. Therefore, descriptions of natural resources are based on previous studies for this and similar projects, relevant grey and peer-reviewed literature, local, state, and federal fish and wildlife reports and plans, and personal communications with knowledgeable biologists, planners, coastal geologists, and engineers. Further investigations by the Service will be necessary upon the Corps selection of any of the proposed 33 restoration projects.

As discussed in more detail in the following section, this report discusses fish and wildlife resources focused on four ecological systems (riverine, estuarine, palustrine, and terrestrial) found in the HRE Feasibility Study Area.

VII. FISH AND WILDLIFE RESOURCES

A. ENDANGERED SPECIES AND SPECIES UNDER REVIEW FOR ESA LISTING

1. Endangered Species

Since the Corps began studying the HRE in 1996, several species of fauna that could occur in the project area have been de-listed and listed by the Service under the ESA. Species which were delisted include the peregrine falcon (*Falco peregrinus*) in 1999 and the bald eagle (*Haliaeetus leucocephalus*) in 2007. The peregrine falcon remains listed as endangered by NY and NJ. The bald eagle remains listed as threatened (non-breeding) and endangered (breeding) in NJ. In NY, the bald eagle is listed as threatened by the NYSDEC. The Indiana bat (*Myotis sodalis*; endangered), the northern long-eared bat (*Myotis septentrionalis*; threatened), the red knot (*Calidris canutus rufa*; threatened), and the rusty-patched bumble bee (*Bombus affinis*; endangered, effective date March 21, 2017) have been added to the list pursuant to the ESA.

Pursuant to section 7 of the ESA, the Corps is required to make a determination as to whether the proposed restoration projects "may affect" listed species and seek the concurrence from the Service. The Service's Information, Planning, and Conservation System (IPaC) at https://ecos.fws.gov/ipac/ contains information on listed species and should be used in the Corps' determination process along with consultation with the Service.

The Indiana bat was listed as endangered in 1967. It is also listed as endangered in NY and NJ, and potential summer habitat for Indiana bat is present within the geographic area of the HRE.

In the summer, bats live in wooded or semi-wooded areas. Groups of female Indiana bats form maternity colonies to bear their offspring in crevices of trees or under loose tree bark. Dead trees are preferred roost sites, and trees standing in sunny openings are attractive because the air spaces and crevices under the bark are warm. Typical roosts are beneath the bark and in crevices of dead trees and beneath loose bark of living trees. Roost trees are likely to be exposed to direct sunlight throughout the day, and are as likely to be in upland habitats as in floodplain forests. Indiana bats are also known to roost in human-made structures such as bridges, sheds, houses, and abandoned churches.

The northern long-eared bat was listed as threatened by the Service on April 2, 2015. Potential summer habitat for the northern long-eared bat is present within the geographic area of the HRE. The northern long-eared bat has a similar life history as the closely related Indiana bat, roosting in trees and foraging on flying insects. In areas of potential habitat for northern long-eared bat, seasonal restrictions for tree removal are recommended from April 1 through September 30. For more information on the biology and threats to the northern long-eared bat, please follow the links provided in Appendix H.

The red knot was listed as threatened under the ESA on January 12, 2015. Red knots are also federally-protected under the MBTA, and are listed as endangered in NJ. Within Jamaica Bay, red knots may occur in the intertidal habitats (*e.g.*, mudflats and beaches) during their spring (May 1 thru June 7) and fall (July 7 to November 30) migration periods. This species is highly sensitive to disturbance during this critical period in their life cycle to and from their breeding and wintering habitats.

The final rule listing the rusty-patched bumble bee as endangered appeared in the January 11, 2017, *Federal Register* and took effect on March 21, 2017. The rusty-patched bumble bee, once widespread, is now found in scattered, small populations in 12 states and one Canadian province. Historically, this bumble bee was abundant and widespread, with hundreds of populations located throughout the east and upper Midwest of the United States (U.S.) and throughout most of southern Canada (Xerces Society 2017). The geographic area of the HRE Feasibility Study Area likely served as habitat. Since the late 1990s, however, the rusty-patched bumble bee's abundance and distribution declined by about 91 percent. The percent decline may actually be higher because many of the populations that we considered current for our listing assessment have not been reconfirmed since the early 2000s and may no longer persist.

Threats to the rusty-patched bumble bee causing the recent dramatic decline include: disease, pesticides, climate change, habitat loss, and small population dynamics. It appears that no one single factor is causing the decline, but the cumulative threats have likely caused the decline. Bumble bees are important pollinators of wildflowers and are the chief pollinator of many economically important crops. Even in crops that can be self-pollinated (*e.g.*, some tomatoes), the plant produces more and bigger fruits with the aid of bumblebees for pollination. In natural areas, bumble bees pollinate plants that provide food for other wildlife. By conserving this species, other species of pollinators simultaneously benefit.

The Service and the NOAA Fisheries share jurisdiction for sea turtles. The NOAA Fisheries has responsibility for federally-listed sea turtles in the marine environment and the Service has responsibility while they are on land. There are four threatened or endangered sea turtle species that may occur within the HRE: loggerhead sea turtle (*Caretta caretta*; threatened), Kemp's ridley sea turtle (*Lepidochelys kempii*; endangered), green sea turtle (*Chelonia mydas*; threatened), and leatherback sea turtle (*Dermochelys coriacea*; endangered). In the HRE, these species are limited to the marine environment and are therefore the sole responsibility of the NOAA Fisheries. The following have been identified as threats to sea turtles in the marine environment: bycatch in commercial and recreational fisheries, capture during channel dredging, vessel collisions, marine pollution, and impingement on power plant intakes, among others (National Oceanic and Atmospheric Administration 2017b).

There are two other federally-listed species that may occur in the HRE that are under the jurisdiction of the NOAA Fisheries: shortnose sturgeon (*Acipenser brevirostrum*; endangered) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*; endangered, threatened). Sturgeons are an anadromous species found in rivers, estuaries, and coastal waters along the Atlantic Coast. The shortnose sturgeon was originally listed as endangered on March 11, 1967, under the Endangered Species Preservation Act (80 Stat. 926; 16 U.S.C. 668 [a][c]) and remained when the ESA was enacted in 1973. Atlantic sturgeon is also listed as endangered. Specifically, Atlantic sturgeons that are spawned in rivers of the U.S. or are captive progeny of Atlantic sturgeon that spawned in the U.S. are listed under the ESA as five Distinct Population Segments (DPS). As of February 6, 2012, the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs were listed as endangered. The Gulf of Maine DPS is listed as threatened.

2. Species under Review for Federal Listing

The Service is evaluating the little brown bat (*Myotis lucifugus*), the tri-colored bat (*Perimyotis subflavus*) (NYSDEC species of concern), the monarch butterfly (*Danaus plexippus*), and the yellow-banded bumble bee (*Bombus terricola*) to determine if listing under the ESA is warranted. These four species may be present in the HRE Feasibility Study Area. Species being evaluated for listing do not receive any substantive or procedural protection under the ESA, and the Service has not yet determined if listing of any of these three species is warranted. However, the Corps should be aware that these species are being evaluated for possible listing and may wish to include them in field surveys and/or impact assessments, particularly for projects with long-term planning horizons and/or long operational lives. Despite the current status of these species (*i.e.*, non-listed) each of these species is in decline range-wide for the East Coast.

The Service recently reevaluated the American eel (*Anguilla rostrata*), which is also present in the HRE Feasibility Study Area; however, on October 2015, the Service determined that listing the American eel was not warranted.

The Service noted in our final FWCA report for the Joseph G. Minish Passaic River Waterfront Park and Historic Area (Minish) dated April 22, 2016, that there were three bridges that spanned the Passaic River that were in the Corps' Minish project boundary. Bridges have been documented as important roosting habitat for 24 species of bats (Keeley and Tuttle 1999). In the final FWCA report, the Corps agreed to investigate bat use of the Minish project site to ensure that it would not affect a federally-listed species.

We note that some of the proposed restoration projects would be constructed in the marine environment. Principal responsibility for threatened and endangered marine species is vested with NOAA Fisheries. The proposed projects include several waterways that provide habitat for the federally-listed shortnose sturgeon and the Atlantic sturgeon, necessitating consultation with the NOAA Fisheries in accordance with the ESA. The appropriate contact is provided below.

Mr. Mark Murray Brown
Section 7 Coordinator
NOAA Fisheries
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, Massachusetts 19030
(978) 281-9328

In addition, the Corps should continue coordinating with the NOAA Fisheries regarding potential effects of the potential restoration sites designated as Essential Fish Habitat (EFH), pursuant to section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265).

B. NY AND NJ SPECIES OF GREATEST CONSERVATION NEED

Since 2001, the Service has awarded State Wildlife Grants (SWG) for "the development and implementation of programs for the benefit of wildlife and their habitat, including species that are not hunted or fished…" To participate in the SWG program, as directed by Congress, the fish and wildlife agencies of each state, commonwealth, territory, and the District of Columbia developed a Comprehensive Wildlife Conservation Plan (later referred to as a State Wildlife Action Plan or SWAP) for review and approval by the Service. All the SWAPs were submitted to the Service and approved by early 2006. These plans identify and describe species of greatest conservation need and include many species which have experienced significant population declines.

The Service recognizes that the states of NY and NJ have identified species of greatest conservation need as part of their respective SWAPs. Many of those identified species overlap with species that are discussed in the following sections of this report. The NJDEP's Division of Fish and Wildlife identified numerous species of greatest conservation need and are listed in Table 1.

Table 1. NJDEP Division of Fish and Wildlife species of greatest conservation need in the HRE Feasibility Study Area.

Common Name	**Scientific Name**
Alewife	*Alosa pseudoharengus*
Allegheny Woodrat	*Neotoma magister*
American Bumble Bee	*Bombus pensylvanicus*

Common Name	**Scientific Name**
American Oystercatcher	*Haematopus palliatus*
American Woodcock	*Scolopax minor*
Ashton Cuckoo Bumble Bee	*Bombus bohemicus*
Atlantic Green Turtle	*Chelonia mydas*
Atlantic Leatherback	*Dermochelys coriacea*
Atlantic Loggerhead	*Caretta caretta*
Atlantic Ridley	*Lepidochelys kempii*
Atlantic Sturgeon	*Acipenser oxyrinchus*
Black Rail	*Laterallus jamaicensis*
Black Skimmer	*Rynchops niger*
Blueback Herring	*Alosa aestivalis*
Blue-winged Warbler	*Vermivora pinus*
Bobolink	*Dolichonyx oryzivorus*
Bog Turtle	*Glyptemys muhlenbergii*
Brook Trout	*Salvelinus fontinalis*
Carpenter Frog	*Lithobates virgatipes*
Cerulean Warbler	*Dendroica cerulea*
Comely Shiner	*Notropis amoenus*
Common Tern	*Sterna hirundo*
Eastern Box Turtle	*Terrapene carolina carolina*
Eastern Hognose Snake	*Heterodon platirhinos*
Eastern Lampmussel	*Lampsilis radiata*
Eastern Meadowlark	*Sturnella magna*
Eastern Redbelly Turtle	*Pseudemys rubriventris*

Common Name	**Scientific Name**
Eastern Spadefoot	*Scaphiopus holbrookii*
Forster's Tern	*Sterna forsteri*
Grasshopper Sparrow	*Ammodramus savannarum*
Indiana Bat	*Myotis sodalis*
Kentucky Warbler	*Oporornis formosus*
Least Tern	*Sternula antillarum*
Leonard's Skipper	*Hesperia leonardus*
Little Blue Heron	*Egretta caerulea*
Little Brown Bat	*Myotis lucifugus*
Longtail Salamander	*Eurycea longicauda longicauda*
Mud Sunfish	*Acantharchus pomotis*
New Jersey Chorus Frog	*Pseudacris kalmi*
North Atlantic Right Whale	*Eubalaena glacialis*
Northeastern Beach Tiger Beetle	*Cicindela dorsalis dorsalis*
Northern Black Racer	*Coluber constrictor constrictor*
Northern Bobwhite	*Colinus virginianus*
Northern Diamondback Terrapin	*Malaclemys terrapin terrapin*
Northern Harrier	*Circus cyaneus*
Northern Myotis	*Myotis septentrionalis*
Northern Pine Snake	*Pituophis melanoleucus melanoleucus*
Northern Red Salamander	*Pseudotriton ruber ruber*
Northern Scarlet Snake	*Cemophora coccinea copei*
Peregrine Falcon	*Falco peregrinus*
Pied-billed Grebe	*Podilymbus podiceps*

Common Name	**Scientific Name**
Pine Barrens Treefrog	*Hyla andersonii*
Piping Plover	*Charadrius melodus*
Prothonotary Warbler	*Protonotaria citrea*
Red Knot	*Calidris canutus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Robust Baskettail	*Epitheca spinosa*
Rusty-patched Bumble Bee	*Bombus affinis*
Scarlet Tanager	*Piranga olivacea*
Shortnose Sturgeon	*Acipenser brevirostrum*
Snowy Egret	*Egretta thula*
Swamp Darter	*Etheostoma fusiforme*
Triangle Floater	*Alasmidonta undulata*
Tricolored Heron	*Egretta tricolor*
Variable Cuckoo Bumble Bee	*Bombus variabilis*
Vesper Sparrow	*Pooecetes gramineus*
Wood Thrush	*Hylocichla mustelina*
Wood Turtle	*Glyptemys insculpta*
Yellow Bumble Bee	*Bombus fervidus*
Yellow-banded Bumble Bee	*Bombus terricola*

The NYSDEC did not provide comments to the draft FWCA report nor did they identify species of greatest conservation need for New York State that are likely to be found in the HRE Feasibility Study Area. The NYSDEC's full list of species of greatest conservation need can be accessed at the following site: https://www.dec.ny.gov/animals/9406.html (New York State Department of Environmental Conservation 2015). This list can be cross-referenced to determine if any of the species identified in this report are considered species of greatest conservation need in New York.

C. BALD AND GOLDEN EAGLE PROTECTION ACT

The bald eagle is protected under the BGEPA, the MBTA, the NJSA (N.J.S.A. 23:2A-1), and five sections of NYS's Environmental Conservation Law (ECL). As noted above, bald eagles are listed as a NYS-listed threatened species (ECL Article 11-0535); both the species and their occupied habitat are protected. Eagles are also protected by ECL Article 11-0537. In addition, bald eagles are defined as wild birds and, therefore, are considered protected wildlife under ECL Article 11-0103. ECL Article 11-0107 provides protection by making it illegal to take protected wildlife except as permitted by the Fish and Wildlife Law. Finally, ECL 03-0301(1)(c), provides for the propagation, protection, and management of fish and other aquatic life and wildlife and the preservation of endangered species.

While the bald eagle population is increasing in NY and NJ and its population status will likely continue to expand in the HRE Feasibility Study Area, there are known occurrences of the bald eagle in proximity to some of the proposed restoration sites. There has been an active eagle nest on Overpeck Creek, a tributary of the Hackensack River (located in the Newark Bay/Lower Passaic River/Hackensack River Planning Region) since 2014.

D. AVIAN SPECIES

Migratory birds are a Federal trust resource responsibility of the Service. Many species of migratory birds have experienced population declines in recent decades, largely due to direct and indirect destruction and fragmentation of their habitats (Dunne 1989). The FWCA requires the Secretary of the Interior, through the Service, to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. *Birds of Conservation Concern 2008* (U.S. Fish and Wildlife Service 2008b) is the most recent effort to carry out this mandate. The overall goal of that report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally-listed threatened or endangered) that represent our highest conservation priorities. A resource assessment by the Service's IPaC identified a total of 32 Birds of Conservation Concern to occur seasonally or year-round within the HRE Feasibility Study Area (U.S. Fish and Wildlife Service 2016c). These are listed in Table 2, below.

Table 2. Birds of Conservation Concern in the HRE (U.S. Fish and Wildlife Service 2016c).

Common Name	**Scientific Name**	**Season Found at Location**
American Bittern	*Botarus lentiginosus*	Breeding
American Oystercatcher	*Haematopus palliatus*	Year-round
Bald Eagle	*Haliaeetus leucocephalus*	Breeding
Black-billed Cuckoo	*Coccyzus erythopththalmus*	Breeding
Black Skimmer	*Rynchops niger*	Breeding
Blue-winged Warbler	*Vermivora pinus*	Breeding

Common Name	**Scientific Name**	**Season Found at Location**
Canada Warbler	*Wilsonia canadensis*	Breeding
Cerulean Warbler	*Dendroica cerulea*	Breeding
Common Tern	*Sterna hirundo*	Breeding
Fox Sparrow	*Passerella iliaca*	Wintering
Golden-winged Warbler	*Vermivora chrysoptera*	Breeding
Gull-billed Tern	*Gelochelidon nilotica*	Breeding
Horned Grebe	*Podiceps auritus*	Migrating
Hudsonian Godwit	*Limosa haemastica*	Migrating
Kentucky Warbler	*Oporomis formosus*	Breeding
Least Tern	*Sterna antillarum*	Breeding
Loggerhead Shrike	*Lanius ludovicianus*	Year-round
Marbled Godwit	*Limosa fedoa*	Wintering
Peregrine Falcon	*Falco peregrinus*	Wintering
Pied-billed Grebe	*Podilymbus podiceps*	Year-round
Prairie Warbler	*Dendroica discolor*	Breeding
Purple Sandpiper	*Calidris maritima*	Wintering
Red-throated Loon	*Gavia stellata*	Migrating
Rusty Blackbird	*Euphagus carolinus*	Wintering
Saltmarsh Sparrow	*Ammodramus caudacutus*	Breeding
Seaside Sparrow	*Ammodramus maritimus*	Year-round
Short-eared Owl	*Asio flammeus*	Wintering
Snowy Egret	*Egretta thula*	Breeding
Upland Sandpiper	*Bartramia longicauda*	Breeding
Willow Flycatcher	*Empidonax traillii*	Breeding
Wood Thrush	*Hylocichla mustelina*	Breeding
Worm Eating Warbler	*Helmitheros vermivorum*	Breeding

Niles *et al*. (2001) and an ongoing census study conducted at the Rutgers University Newark Campus (http://ebird.org/ebird/nj/hotspot/L657485), which is within 0.6 mi. of the Passaic River, identified over 140 species of breeding/nesting or transient migratory bird species for the Passaic River area. New Jersey Sports and Exposition Authority (NJSEA), (formally the New Jersey Meadowlands Commission) has conducted numerous bird census efforts in the Hackensack Meadowlands, including the Hackensack River area (New Jersey Meadowlands Commission 2007). From 2005 to 2006, and along with the New Jersey Audubon Society, they recorded 200 species of birds, including 29 State-listed threatened and endangered species or species of concern (New Jersey Meadowlands Commission 2007). Another survey effort was conducted to determine avian use of Harrier Meadow after restoration. In that study 91 species of birds were identified utilizing the restored marsh (Seigel *et al.* 2005). The Niles *et al*. (2001), Rutgers University, and NJSEA surveys were conducted in the Newark Bay and Passaic and Hackensack River Planning Regions.

The NYCDPR has conducted numerous breeding bird surveys for many of their parks located throughout the City's five boroughs. NYCDPR also coordinated with the Bronx River Alliance to lead a Bronx River Bioblitz in 2005 during which bird species were surveyed. A Bronx River bird species list (Appendix B, Table 2) has been compiled from data from these survey efforts (New York City Department of Parks and Recreation and Bronx River Alliance 2005; New York City Department of Parks and Recreation 2017). The Bronx River corridor primarily supports a suite of bird species that is typical of urban/suburban areas and/or disturbed wetlands (Anzelone *et al.* 2007). A study of breeding birds within the Bronx River Forest included, but is not limited to, the following species: American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), Baltimore oriole (*Icterus galbula*), red-winged blackbird (*Agelaius phoeniceus*), yellow warbler (*Setophaga petechia*), warbling vireo (*Vireo gilvus*), and common grackle (*Quiscalus quiscula*) (Anzelone *et al.* 2007). Migratory birds, particularly neotropical songbirds, are also known to stop over at sites along the Bronx River during migration. A study by the Wildlife Conservation Society at the Bronx Zoo determined that neotropical migrants caught within the site had ample fat reserves - providing evidence that sites on the Bronx River provide necessary food resources for migrants (Crimmens and Larson 2006). The estuarine area of the lower Bronx River supports wintering waterfowl including: canvasback (*Aythya valisineria*), ruddy duck (*Oxyura jamaicensis*), and scaup species (Crimmens and Larson 2006). A more complete list of birds found in the Bronx River can be found in Appendix B.

The NPS conducted numerous bird surveys in Jamaica Bay (National Park Service 2014). Over the course of the NPS surveys from 1994 to 2014, 320 species of birds were identified using the Jamaica Bay Wildlife Refuge. Many of these accounts include rare observances (only identified once or twice during the 20-year survey period); however, 27 species, including, but not limited to obligate saltmarsh bird species and wading bird colonies, have been found breeding or utilizing the marsh habitat of Jamaica Bay on a yearly basis. Many of these species are recognized by the Service (U.S. Fish and Wildlife Service 2008b), the NYSDEC (New York State Department of Environmental Conservation 2015), and/or the draft Eastern Saltmarsh Bird Business Plan (Partners in Flight 2014) as species of conservation concern.

Numerous migratory shorebirds also pass through Jamaica Bay. Most notably, NY's largest concentrations of migratory red knots are found in Jamaica Bay. Significant flocks of semipalmated sandpiper (*Calidris pusilla*) and sanderling (*C. alba*) have also been documented (New York City Audubon unpublished data). Significant concentrations of wintering waterfowl can also be found in Jamaica Bay. Large numbers of greater scaup (*Aythya marila*), canvasback, American black duck (*Anas rubripes*), brant (*Branta bernicla*), Canada goose (*B. canadensis*), bufflehead (*Bucephala albeola*), mallard (*Anas platyrhynchos*), ruddy duck, red-breasted merganser (*Mergus serrator*), snow goose (*Chen caerulescens*), and American wigeon (*Anas americana*) have been documented since the late 1970s (New York State Department of State 1992; U.S. Fish and Wildlife Service 1997; Waldman 2008). Other species documented within the bay include horned grebe (*Podiceps auritus*), green-winged teal (*Anas crecca*), gadwall (*Anas strepera*), northern shoveler (*Anas clypeata*), and common goldeneye (*Bucephala clangula*) (U.S. Fish and Wildlife Service 1997).

1. Neotropical Migrants

Neotropical migrants are those bird species that breed in the U.S. and Canada, and migrate south to overwinter in the neotropics. Declines in neotropical migrants have been recognized for decades. For example, Robbins *et al.* (1989) analyzed breeding bird survey data from 1966 through 1987 and detected declines in neotropical migrants throughout Eastern North America. Analyses of breeding bird survey data from 1966-2013 also indicate declines in nearly fifty-percent of neotropical migrant species (Sauer *et al.* 2014). Neotropical migrants suffer mortality during all phases of their annual life cycle, however the greatest mortality for some species may occur during migratory periods (Holmes 2007). Numerous species of migratory neotropical bird species fulfill many of their life stages (*i.e.*, breeding and migration) within the HRE Feasibility Study Area.

The following neotropical bird species are recognized by the Service as species of concern (U.S. Fish and Wildlife Service 2008b) and may be found within the HRE Feasibility Study Area: cerulean warbler (*Dendroica cerulea*), golden-winged warbler (*Vermivora chrysoptera*), Canada warbler (*Wilsonia canadensis*), wood thrush (*Hylocichla mustelina*), prairie warbler (*Dendroica discolor*), black-billed cuckoo (*Coccyzus erythopththalmus*), willow flycatcher (*Empidonax traillii*), Kentucky warbler (*Oporomis formosus*), blue-winged warbler (*Vermivora pinus*), and worm-eating warbler (*Helmitheros vermivorum*) (U.S. Fish and Wildlife Service 2016a).

2. Saltmarsh Birds

Many bird species rely on saltmarsh habitat for foraging and/or nesting. Certain species, such as saltmarsh sparrows (*Ammodramus caudacutus caudacutus*) and clapper rails (*Rallus crepitans*), are obligate saltmarsh nesting species, meaning that they nest exclusively in saltmarsh habitat and are particularly vulnerable to marsh loss or degradation. These and other species are found breeding or utilizing saltmarsh habitats that are found in the HRE Feasibility Study Area.

Saltmarshes have historically suffered losses due to human alterations such as draining and filling to make room for development, and continue to suffer from degradation and losses today resulting from sea-level rise and contamination. Because of saltmarsh loss and the impacts of sea-level rise, species such as the saltmarsh sparrow are recognized as species of conservation concern (New York State Department of Environmental Conservation 2015; U.S. Fish and

Wildlife Service 2008b; International Union for Conservation of Nature 2016). Sea-level rise poses a threat to saltmarsh birds as it reduces available saltmarsh habitat and may lead to an increased frequency of nest flooding - a major cause of nest loss for marsh-nesting species (Gjerdrum *et al.* 2008; Shriver *et al.* 2007; and Bayard and Elphick 2011).

New York and New Jersey, through their own environmental laws, have a high level of responsibility for the recovery of a number of saltmarsh nesting birds including saltmarsh sparrows, seaside sparrows (*Ammodramus maritimus*), and willets (*Tringa semipalmata*), as well as other species. These states, either alone or combined, support a high proportion of the northeast regional population of a number of saltmarsh birds (Saltmarsh Habitat and Avian Research Program 2015a and 2015b).

3. Shorebirds

Many species of shorebirds in the U.S. are suffering from declines in populations. The *Atlantic Flyway Shorebird Business Strategy* (Winn *et al.* 2013) identifies the following as some of the main threats to shorebirds: hunting, predation, human disturbance, and habitat loss and change. The following species are recognized by the *Atlantic Flyway Shorebird Business Strategy* as species of greatest conservation concern: American oystercatcher (*Haematopus palliatus*), semipalmated sandpiper, red knot, whimbrel (*Numenius phaeopus*), Wilson's plover (*Charadrius wilsonia*), marbled godwit (*Limosa fedoa*), piping plover, purple sandpiper (*Calidris maritima*), red-necked phalarope (*Phalaropus lobatus*), ruddy turnstone (*Arenaria interpres*), sanderling, snowy plover (*Charadrius nivosus*), American golden-plover (*Pluvialis dominica*), greater yellowlegs (*Tringa melanoleuca*), and lesser yellowlegs (*Tringa flavipes*). Except for the snowy plover, all of these species have been recorded in the HRE Feasibility Study Area (note: Wilson's plover is a very rare occurrence in the HRE) (eBird 2018).

4. Waterfowl

The HRE Feasibility Study Area falls within the region of the Atlantic Coast Joint Venture (ACJV). Much of the HRE Feasibility Study Area including Jamaica Bay, Western Long Island Sound, New York Harbor, and the barrier coastal lagoons and saltmarshes of NJ is recognized as a focal area by the ACJV *Waterfowl Implementation Plan* (Atlantic Coast Joint Venture 2005). The sheltered open water, fringing marshes, and mudflats in these areas provide habitat for wintering sea, bay, and dabbling ducks (Atlantic Coast Joint Venture 2005). Mid-winter survey data from 1970-2003 indicated that various waterfowl species including the American black duck and long-tailed duck (*Clangula hyemalis*) (which are found in the HRE), have suffered population declines (Atlantic Coast Joint Venture 2005). Furthermore, the status of many sea duck populations is largely unknown, and there is concern for these species. Five sea duck species, some of which occur in the HRE, are designated as high priority species by the Sea Duck Joint Venture Management Board Management Board (SDJV). Recent and ongoing efforts are being made to better understand these populations and the threats they may face (Sea Duck Joint Venture Management Board 2014). The main threats to waterfowl are: habitat loss, fragmentation and degradation; contaminants; disease; invasive species; predation and harvest; human population and disturbance; and global climate change (Atlantic Coast Joint Venture 2005).

E. AQUATIC RESOURCES

1. Tidal Wetlands

Coastal marshes are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within federal trusteeship (*i.e*., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries). They perform a variety of important functions that benefit both fish and wildlife resources such as spawning and nesting habitat for fish and wildlife and human needs such as storm protection for human infrastructure. The loss of wetlands in the HRE is significant (Figure 2). Only 20 percent of the historic wetlands that predated American colonial settlement remain in the HRE (New York City 2009).

More than 70 percent of the total wetlands in the Hackensack Meadowlands were destroyed by human activities (U.S. Fish and Wildlife Service 2007b). New York City has only one percent of its historic freshwater wetlands and 10 percent of its historic tidal wetlands. These remaining wetlands are concentrated in Brooklyn (principally tidal wetlands around Jamaica Bay), Queens (principally tidal), and Staten Island (both tidal and freshwater) (New York City 2009). The majority of saltmarsh habitat within the HRE Feasibility Study Area occurs in Jamaica Bay. Like many saltmarshes along the east coast, Jamaica Bay wetlands have experienced declines in acreage. There are various factors that may have contributed to this decline, including: sediment deprivation, channel deepening, eutrophication, stabilization of the Rockaway Inlet, growth of the Rockaway peninsula, and sea-level rise.

The HRE Feasibility Study Area provides an opportunity to restore marsh acres to Jamaica Bay, however threats to both natural and restored marshes still exist. Water quality, particularly increased nitrogen levels and eutrophication, may complicate saltmarsh restoration efforts and make saltmarshes more vulnerable to sea-level rise by weakening root systems and through loss of organic biomass (due to increased microbial decomposition) resulting in marsh elevation loss (Turner *et al.* 2009; New York State Department of Environmental Conservation 2014b). Recontamination from area sediments is another threat to saltmarsh restoration which is discussed at greater length in the Section V(A)(4), *Environmental Contaminants*, above.

Figure 2. Historic Wetland Losses in the HRE (New York City 2009).

2. Freshwater Wetlands

Like tidal marshes, freshwater wetlands provide habitat for a variety of fish and wildlife resources while also providing ecological services for people. Historically, the HRE Feasibility Study Area contained more freshwater wetland habitat. However, due to conversion of wetlands to agricultural, industrial, or residential uses, many wetlands were lost. Only one percent of those freshwater wetlands that existed in NYC pre-colonial era remain (New York City 2009). The HRE Feasibility Study proposes freshwater wetland restoration efforts in NY (Westchester County Center, Harney Road and Garth Woods, Bronxville Lake, Crestwood Lake, Shoelace

Park, Bronx Zoo and Dam, and River Park/West Farm Rapids Parks on the Bronx River) and NJ (Essex County Bound Brook).

3. Riparian Areas

Although definitions vary, riparian areas can generally be described as rivers, streams, creeks, and other waterbodies and the adjacent areas that are influenced by those water courses. Riparian areas are an ecotone where aquatic and terrestrial habitats meet. These areas tend to support diverse plant species and provide valuable habitat for a number of aquatic and terrestrial animal species including migratory birds (Gregory *et al.* 1991; Pennington *et al.* 2008; Naiman *et al.* 1993; Pennington and Gorchov 2010). In addition to providing habitat for wildlife, riparian areas also serve other important functions including: buffering sediment and nutrient runoff, dispersing aquatic organisms and plant propagules, acting as wildlife corridors, and connecting adjacent natural areas (Naiman and Décamps 1997; Naiman *et al.* 1993). Many of the riparian areas within the HRE Feasibility Study Area have been degraded due to alterations such as human development, channel modifications, bank stabilization and hardening, increased thermal and sediment inputs, and invasive species.

F. MAGNUSON STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with NOAA Fisheries on any activities proposed to be authorized, funded, or undertaken that may adversely affect essential fish habitat (EFH). The process is guided by the requirements of EFH regulation at 50 CFR 600.920, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in the relevant consultation procedure. EFH has been defined in 50 CFR section 600.10 as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

50 CFR section 600.10 further states: For the purpose of interpreting the definition of essential fish habitat, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life-cycle.

The EFH final rule at 50 CFR section 600.810 defines an adverse effect as "any impact which reduces the quality and/or quantity of EFH." The rule further states that: An adverse effect may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from action occurring within EFH or outside EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Areas within the HRE have been designated as EFH for a number of federally-managed species, including Atlantic butterfish (*Peprilus triacanthus*), Atlantic sea herring (*Clupea harengus*), bluefish (*Pomatomus saltatrix*), black sea bass (*Centropristis striata*), red hake (*Urophycis chuss*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), winter flounder, windowpane (*Scophthalmus aquosus*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculates*), cobia (*Rachycentron canadum*), clearnose skate (*Raja eglanteria*), little skate (*Leucoraja erinacea*), and winter skate (*Leucoraja ocellata*). More information about EFH and EFH within the HRE can be found at: http://www.habitat.noaa.gov/protection/efh/efhmapper/ (National Oceanic and Atmospheric Administration 2018).

G. FINFISH

Louis Berger Group, Inc., *et al.* (2014) identified 38 finfish species within an 8-mi length of the Passaic River. Predominant fish caught during four sampling events in 2010 and 2011 included winter flounder, Atlantic silverside (*Menidia menidia*), striped bass, three-spine stickleback (*Gasterosteus aculeatus*), scup (*Stenotomus chrysops*), bay anchovy (*Engraulidae* spp.), weakfish, summer flounder, northern pipefish (*Syngnathus fuscus*), northern puffer (*Sphoeroides maculates*), and bluefish. Sampling effort by the Jacques Whitford Company in 2001 (TAMS 2004) performed at the confluence of the Passaic River and Newark Bay also revealed a species list similar to that found in the Louis Berger Group, Inc. *et al.* (2014). New Jersey Meadowlands Commission (2005) conducted a two-year finfish study of the Hackensack Meadowlands watershed, identifying 33 species of fish. To date, the NJSEA has identified over 50 species of finfish utilizing habitat in the Hackensack Meadowlands (New Jersey Sports and Exposition Authority 2017). A complete list of species from each of these studies can be found in Appendix C, Table 1.

The U.S. Army Corps of Engineers (2013b) identified 58 species of fish in the Arthur Kill/Kill Van Kull, Newark Bay, Upper New York Bay, and Lower New York Bay Planning Regions (see Appendix C, Table 2, for a list of species identified).

The fish community of the Bronx River (Appendix C, Table 3) is dominated by pollution tolerant species. While not all historic fish populations exist in the river, the fish community is reportedly largely intact (Crimmens and Larson 2006). The Bronx River Ecological and Watershed Management Plan included the findings of fish surveys conducted in the NYC portion of the Bronx River by Dr. Joseph Rachlin of Lehman College's Laboratory for Marine and Estuarine Research (Rachlin 2003). The most widely-distributed freshwater species found in the river in 2002-2003 were mummichog, fourspine stickleback (*Apeltes quadracus*), and tessellated darter (*Ethoestoma olmstedi*). Surveys conducted in the northern portion of Bronx County within the Bronx River identified, from most to least abundant: white sucker, fourspine stickleback, mummichog, tesselated darter, and blacknose dace (*Rhinichthys atratulus*). White sucker, fourspine stickleback, and mummichog accounted for 72 percent of all individuals caught (Crimmens and Larson 2006). Typical fish species encountered by the NYSDEC in surveys between East Gun Hill Road in the Bronx and Tuckahoe Station in Westchester, include: redbreast sunfish, white sucker (*Catastomus commersoni*), yellow bullhead (*Ameiurus natalis*), blacknose dace, and tesselated darter (Cohen 2016). Additional information on freshwater fish utilizing the Bronx River can be found in U.S. Army Corps of Engineers (2009b), which is incorporated by reference into this report.

The Bronx River also supports diadromous fish including blueback herring and American eel. Blueback herring have been documented in the mouth of the river and unidentified herring eggs and larvae have been found in the mouth of the river and up to 1.5 mi. upstream, indicating that river herring may be spawning in the Bronx River (Larson *et al.* 2004). Landing statistics and the number of fish observed on annual spawning runs indicate a drastic decline in alewife and blueback herring populations throughout much of their range since the mid-1960s. Many factors have contributed to the declining abundance of river herring, including direct fishing, incidental bycatch, habitat loss, predation, and climate change. As a result of declines, they are designated as a Species of Concern by the NOAA Fisheries. Species of Concern are those species about which the Service has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA.

Jamaica Bay provides important spawning, foraging, and nursery habitat for many finfish and shellfish species. Species documented in the bay include: winter flounder, summer flounder, windowpane flounder, weakfish, bluefish, scup, blueback herring, Atlantic cod (*Gadus morhua*), black sea bass, northern kingfish (*Menticirrhus saxatilis*), tautog (*Tautoga onitis*), Atlantic silversides, mummichog, striped killifish (*Fundulus majalis*), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy, northern pipefish, American shad (*Alosa sapidissima*), Atlantic sturgeon, sea robin (*Prionotus carolinus*), striped bass, banded killifish (*Fundulus diaphanus*), cunner (*Tautogolabrus adspersus*), inland silverside (*Menidia berylinna*), striped sea robin (*Prionotus evolans*), white mullet (*Mugil curema*), and white perch (National Park Service 2007; U.S. Fish and Wildlife Service 1997; New York State Department of State 1992).

H. MARINE AND ESTUARINE INVERTEBRATES

As demonstrated in numerous studies undertaken in the Lower Passaic River, high concentrations of toxic, persistent, and bio-accumulative contaminants are widespread in the sediments of the Passaic River. This has affected the crustacean, bivalve, and benthic communities of the HRE Feasibility Study Area. In Louis Berger, Inc. *et al.* (2014), surveys resulted in consistent results of biotic communities known for pollution tolerance. The dominant benthic macroinvertebrate taxon was either a polychaete (*Leitoscoloplos* or *Marenzellaria viridis*), oligochaete (*Tubificoides heterochaetus* or *Limnodrilus hoffmeisteri*), or a crustacean (*Cyathura polita*). Blue crab was the dominant invertebrate, followed by grass shrimp and mud crab (unspecified), while in the Mollusc family the blue mussel (*Mytilus edulis*) and an unidentified snail was found in the project vicinity. Blue crab was also the dominant invertebrate identified in the Corps (2013b) finfish surveys of the Lower New York Harbor. These species are heavily influenced by the urban setting of the HRE Feasibility Study Area.

The horseshoe crab (*Limulus polyphemus*) can be found in many of the tidal waters of the HRE. Their eggs provide an important food source for migrating shorebirds. Horseshoe crabs are also important to medical research and pharmaceutical companies and are harvested by commercial fishermen to be used as bait in eel and conch fisheries. Coast-wide management of horseshoe crabs is essential to maintain healthy populations. The status of horseshoe crab populations along the Atlantic coast is poorly understood, but horseshoe crabs continue to be harvested while their populations decline. Although horseshoe crab eggs are suspected to be superabundant, a decline in the horseshoe crab population could severely impact migrating shorebird populations that depend on the eggs for survival. The survival of this species is linked to the survival of the threatened red knot, as horseshoe crab eggs are an important food source for migratory red knots. Horseshoe crabs are known to spawn within the HRE Feasibility Study Area, primarily within Jamaica Bay and the Raritan Bay.

Beach nourishment is a regular practice in Delaware Bay and can affect spawning habitat for horseshoe crabs. Although beach nourishment generally preserves horseshoe habitat better than hard stabilization structures, nourishment can enhance, maintain, or decrease habitat value depending on beach geometry and sediment matrix (Smith *et al.* 2002a). In a field study in 2001 and 2002, Smith *et al.* (2002a) found a stable or increasing amount of spawning activity at beaches that were recently nourished while spawning activity at control beaches declined. These authors also found that beach characteristics affect horseshoe crab egg development and viability. Beach nourishment can alter both the beach foreshore (sediment size distribution, slope, and width) and low tide terrace (sediment size distribution, elevation, and width) (Smith *et al.* 2002b). Avissar (2006) modeled nourished versus control beaches and found that nourishment may compromise egg development and viability. Although nourishment is generally considered to be environmentally compatible, the effect of nourishment on horseshoe crab spawning, egg development, and survival of juveniles is understudied (Smith *et al.* 2002b). Evaluating the impacts of beach nourishment projects on horseshoe crab populations and beach fidelity has been identified as a high research priority by Atlantic States Marine Fisheries Commission (ASMFC) (2013 and 2015). Despite possible drawbacks, beach nourishment is often successfully used to restore and maintain horseshoe crab spawning habitat on both sides of Delaware Bay.

I. DIAMONDBACK TERRAPINS

Diamondback terrapins (*Malaclemys terrapin*) inhabit coastal marshes, tidal creeks, estuaries, bays, and coves where they forage and breed. Breeding and nesting typically occurs in May, June, and July. Nest locations are commonly found on uplands adjacent to estuarine habitats and include dunes, grasslands, shrublands, beaches, and sand/gravel trails (Feinberg and Burke 2004). Terrapin populations are declining across their range - Atlantic and Gulf Coasts of the United States. Major threats to terrapins include: road mortality, predators, mortality due to fishing gear, harvesting, and habitat destruction. Terrapins are known to nest within the HRE Feasibility Study Area.

VIII. OTHER ENVIRONMENTAL CONDITIONS

A. CLIMATE CHANGE AND SEA-LEVEL RISE

The term "climate change" refers to a change in the mean or variability of one or more measures of climate (*e.g.*, temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (Intergovernmental Panel on Climate Change 2007). Extensive analyses of global average surface air temperature, the most widely used measure of change, clearly indicate that warming of the global climate system has occurred over the past several decades (Intergovernmental Panel on Climate Change 2013). One very likely outcome of climate change is an accelerated rise in sea level. Measurements of global mean sea level indicate sea level has risen at an average rate of 1.7 millimeters (mm) per year from 1901 to 2010; at a faster rate of 3.2 mm per year from 1993 to 2010; and will exceed that rate during the 21st Century (International Panel on Climate Change 2013). Sea-level rise will likely have implications for restoration activities planned or underway in the HRE Feasibility Study Area. Sea-level rise will affect the types of natural communities found in the HRE Feasibility Study Area. Additional tidal flow from modest sea-level rise may have both beneficial and adverse impacts on restoration that are difficult to predict without additional information (*e.g.*, precise elevations of restoration sites, site-specific sedimentation/erosion rates, predicted future current velocities) (U.S. Fish and Wildlife Service 2007c). Recently, sea-level rise in a 1,000 kilometers (km) reach of the Atlantic Coast from Cape Hatteras, North Carolina, to Cape Cod, Massachusetts (which includes the HRE Feasibility Study Area), experienced three to four times higher sea-level rates than the global average (Sallenger *et al.* 2012). Many models of climate change project a shift to more intense individual storms and fewer weak storms in the North Atlantic Basin. Long-term effects of climate change may impact coastal communities such as the New Jersey Highlands and result in adverse effects to marine wetlands in the HRE Feasibility Study Area.

Climate change is expected to have impacts on oceans and estuaries beyond sea-level rise. The Intergovernmental Panel on Climate Change identified changes in water temperature and acidification of ocean water as other wide-reaching concerns resulting from climate change (Wong *et al*. 2014). Changes in water temperature may impact the distribution, abundance, and production of aquatic life (Wong *et al.* 2014; Scavia *et al*. 2002). As a result of warmer temperatures, some species may be pushed pole-ward, some may suffer from living in sub-optimal temperatures, while others may be lost entirely (Wong *et al.* 2014; Scavia *et al.* 2002). Acidification due to the absorption of increased atmospheric carbon dioxide could have impacts on the ocean's "calcifiers" such as shellfish, which may not be able to survive at higher acidity levels (Wong *et al.* 2014). The effects of climate change will likely result in more localized impacts, as well. A concern for estuaries is the exacerbation of existing human pressures, such as eutrophication. For example, changes in climate may result in alterations of freshwater inputs, water temperature, sea level, and ocean exchange which can make estuaries more vulnerable to eutrophication (Scavia *et al.* 2002). Other climate-related impacts to estuaries may include: changes in water residence time, nutrient delivery, dilution, vertical stratification, phytoplankton growth rates, and sediment deposition/erosion balances as a result of changes in freshwater inflow, air temperatures, and precipitation patterns (Wong *et al*. 2014; Scavia *et al*. 2002).

B. PLANT POLLINATORS

It is anticipated that each project would include the development of a native landscaping plan for all post construction activities. Pollinators contribute substantially to the economy of the United States and are vital in maintaining healthy ecosystems, yet severe losses to pollinator species from the environment, including honey bees, native bees, bats, and butterflies, have been observed over the past few decades. Honey bee (*Apis mellifera L.*) pollination alone adds more than $15 billion in value to agricultural crops each year in the U.S. (U.S. Department of

Agriculture 2015) (USDA). The number of honey bee colonies declined about 50 percent from 1940s levels; and since the 2008 emergence of Colony Collapse Disorder (CCD - a phenomenon that occurs when the majority of worker bees in a colony disappear), annual losses of honey bee colonies averaged about 30.5 percent (U.S. Environmental Protection Agency 2014b). CCD was first observed in the winter of 2006/2007 when large-scale losses of managed honey bee colonies in the U.S. were observed (vanEngelsdorp *et. al* 2009). Another pollinator species experiencing steep population decline is the monarch butterfly. The number of migrating monarch butterflies reached an all-time low in 2013-2014, reduced by 97 percent from the 1996-1997 high and by 90 percent from the 20-year average (Rendón-Salinas and Tavera-Alonso 2014).

With the potential listing of the monarch butterfly for protection under the ESA, the Service has a mandate to work in collaboration with the Monarch Joint Venture (a partnership of federal and state agencies, non-governmental organizations, and academic programs) to increase monarch butterfly habitat (milkweed and foraging food sources). In an effort to ensure the sustainability of food production systems, avoid additional economic impact on the agricultural sector, and protect the health of the environment, President Obama established the Pollinator Health Task Force to expand federal efforts to reverse pollinator losses and help restore populations to healthy levels. In a June 20, 2014, memorandum, the President called on federal agencies, including the Service, the Corps, and the USDA to "develop... plans to enhance pollinator habitat, and subsequently implement, as appropriate, such plans on their managed lands and facilities, consistent with their missions and public safety;... ." (The White House Office of Press Secretary 2014).

IX. FISH AND WILDLIFE RESOURCES - FUTURE WITHOUT THE PROJECT

The No Action Alternative represents the foreseeable future if no action is taken. Specifically, under the No Action Alternative, no habitat restoration would occur in the planning region, and, as a result, invasive species, degraded water quality, and degraded terrestrial habitats would persist in the project sites. Based on current trends, it is estimated that declining conditions will continue to exert negative impacts to fish and wildlife populations that use these habitats into the foreseeable future.

X. DESCRIPTION OF THE SELECTED ALTERNATIVE

The proposed restoration activities include 33 sites within five Planning Regions of the HRE Feasibility Study Area. Information obtained from the Corps concerning details of the proposed activities at each site were provided in an electronic correspondence to the Service on July 8, 2016, and are summarized below. More detailed information on each of the project sites can be found in Appendix A.

A. NEW YORK HRE PROJECT SITES

1. East River/Harlem River/ Western Long Island Sound (includes the Bronx River) Planning Region

Of the eleven projects that occur in the East River/Harlem River/Western Long Island Sound (includes the Bronx River) Planning Region, ten of them occur on the Bronx River. The main components of all but one of the ten Bronx River restoration projects focus on stream restoration, including bank stabilization, bank softening, channel modification, bed material replacement, improved public access, invasive species and debris removal, native plantings, and wetland creation. The Bronx Zoo, Stone Mill Dam, Bronxville Lake, Crestwood Lake, and Harney Road/Garth Woods projects have a fish passage component, which involves creating upstream passage via the construction of a fish ladder or by modifying migration barriers. Some projects also include the installation of stormwater basins and/or rain gardens to reduce sediment runoff into the river. The HRE project at Soundview Park's main component is oyster restoration. The main focus of the Flushing Creek project is to restore an intertidal marsh and a coastal maritime forest and the inclusion of several stormwater infiltration features to collect runoff from non-permeable surfaces.

2. Jamaica Bay Planning Region

The proposed restoration projects in the Jamaica Bay Planning Region include wetland restoration, invasive species removal, beach fill and dune creation, and native plantings of coastal grassland, coastal shrub, and coastal maritime forest communities. Some projects also have proposed a hardened shoreline component, including rip-rap, soldier piles, boulder placement, or the installation of geo-tubes (Dubos Point, Brant Point, and Bayswater State Park) One project, Head of Bay, is an oyster restoration project.

3. Upper Bay Planning Region

The main element of Governors Island proposal includes oyster reef restoration via the use of gabion blocks, triangular structures, and hanging trays. The main components of the Bush Terminal restoration project include oyster spat on shell; gabion blocks and oyster condos; and hanging trays/super trays to grow out oysters.

B. NEW JERSEY HRE PROJECT SITES

1. Newark Bay/Hackensack River and Passaic River Planning Region

The principal focus of the two Hackensack River proposals (Meadowlark Marsh and Metromedia Tract) within the Newark Bay/Hackensack River and Passaic River Planning Region is to improve site hydrology, wetland restoration, removal of contaminated sediment, invasive species control, and the planting of coastal maritime and scrub shrub habitat.

For the non-tidal restoration project in Essex County Branch Brook Park, the Corps proposes to remove invasive species and debris, perform channel dredging and modifications, stabilize the creek's shorelines, and plant native emergent and forested scrub shrub communities along the creek banks.

The Corps is proposing several restoration projects along the banks of the tidally influenced Passaic River at Dundee Island Park/Pulaski Park and Clifton Dundee Canal. The focus on restoration for these two park sites is debris removal, excavation of upland material, invasive species control, improving public access, and the planting of native trees and shrubs.

For Newark Bay, the Corps is proposing two tidal wetland restoration projects that are in a deferred status as the projects are in the boundary of the Lower Passaic River Superfund Study Area (Oak Island Yard and Kearny Point). Both projects include the removal of contaminated sediments, improving site hydrology, invasive species control, and the planting of native wetland and upland coastal maritime plant communities.

2. Lower Bay Planning Region

The Corps is proposing to expand on previous work performed by the New York/New Jersey Baykeeper (see http://nynjbaykeeper.org/). The proposal includes the installation of spat on shell, gabion blocks, and reef balls to improve habitat for the oyster. The project is located within and adjacent to the piers that serve the Naval Weapons Station at Earle, NJ.

XI. PROJECT IMPACTS

The following impacts to fish and wildlife and their habitats may occur if any of the proposed restoration projects are constructed. As these are proposed restoration projects, the objective is to restore natural functions that were formerly provided by wetlands and other coastal habitats, such as maritime forest and coastal scrub/shrub habitat. The long-term success of the restoration activities will likely depend on concerted efforts to address continuing impacts to the coastal and riverine systems which necessitated the restoration activities, such as nutrient overloading, invasive species, dumping, and the effects of climate change.

A. TURBIDITY

Turbidity in the water column, excavation, and burial can be detrimental to both mobile and sessile organisms and is likely to occur during construction of the restoration projects. Suspended solids in water can affect fish populations by delaying hatching time of fish eggs (Schubel and Wang 1973), killing fish by coating their gills, and by creating anoxic conditions (O'Connor *et al.* 1976). Sherk *et al.* (1974) found that demersal fish are more tolerant of suspended solids than filter-feeding fish, resulting in an advantage to demersal fish and a disadvantage to filter feeders. Furthermore, increases in turbidity due to the resuspension of sediments into the water column during dredging can degrade water quality, lower dissolved oxygen levels, and release chemical contaminants bound to the fine-grained estuarine/marine sediments. Suspended sediment can also mask pheromones used by migratory fishes to reach their spawning grounds and impede their migration and can smother immobile benthic organisms and demersal newly-settle juvenile fish (Auld and Schubel 1978; Breitburg 1988; Newcombe and MacDonald 1991; Burton 1993; Nelson and Wheeler 1997). Fish tolerance to suspended solids varies from species to species and by age. However, the increase in turbidity should be short-term, and the project will likely increase habitat quality for fish and reduce sediment in the aquatic system.

Sessile animals, or those species/life stages with limited mobility, are likely to suffer direct mortality during excavation and indirect mortality from turbidity/sedimentation. For invertebrate species, mortality may be reduced and recolonization rates increased through the implementation of best management practices, such as erosion control measures. Impacts to sessile invertebrates are expected to be temporary and mobile organisms will likely be deterred from utilizing the site. Time-of-year restrictions (TOY) and/or other best management practice (BMP) recommendations are offered at the end of this report to avoid or minimize impacts to fish and wildlife resources.

B. DISTURBANCE

During the construction of the proposed restoration projects, disturbance to fish and wildlife resources will likely occur. Forest, grassland, marine, and coastal birds are common in the area and could use the sites within the five Planning Regions for foraging, nesting, roosting, or stopovers during migration. Nesting birds typically occupy the area between April and August. Migrants are typically present from March through late May and early September through mid-October. Resident species are present year-round. As a result, construction of the restoration projects will likely temporarily disrupt resident birds and breeding migrants. Significant short-term impacts to nesting, foraging, and roosting behavior could occur. However, it is anticipated that potential long-term beneficial impacts to birds would occur from the improved habitat conditions of the restored marshes and streambanks.

Birds could be displaced during sediment dredging and placement. The noise and activity of dredging and placement operations would likely deter birds from using areas in the immediate vicinity of equipment during active periods. In addition, the benthic macroinvertebrate community, a source of forage for many shorebirds, would be adversely affected in the areas of sand placement and disposal for an undetermined amount of time.

Should bald eagles be detected in the proximity to the restoration sites, they may respond in a variety of ways when they are disturbed by human activities. For example, during the nest building period, eagles may inadequately construct or repair their nest, or may abandon the nest, both of which can lead to failed nesting attempts. During the incubation and hatching period, human activities may startle adults or cause them to flush from the nest. Startling can damage eggs or injure young when the adults abruptly leave the nest.

Prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool and fail to hatch. Young nestlings rely on their parents to provide warmth or shade, and may die from hypothermia or heat stress if adults are forced away from the nest for an extended period of time. Eggs and juveniles are subject to greater predation risk while they are unattended.

The implementation of the Service's mitigation recommendations found later in this report, regarding construction TOY restrictions or other best management practices would avoid or minimize impacts to these resources.

C. HABITAT MODIFICATION

The proposed restoration projects will result in habitat modifications that may impact fish and wildlife species and their habitats. Most of the proposed modifications should have beneficial impacts once the projects are completed; however, converting one habitat type to another (*e.g.*, replacing *Phragmites* with *Spartina* spp. or converting open water to marsh habitat) may alter species compositions, as all habitats do not perform the same function for fish and wildlife species. For example, *Phragmites* supports a different suite of bird species than native saltmarsh plants (Benoit and Askins 1999). Lewis and Casagrande (1997) describe the following suite of species using *Phragmites*: red-winged blackbird, American goldfinch (*Spinus tristis*), yellow warbler, black-crowned night-heron (*Nycticorax nycticorax*), common yellowthroat (*Geothypis trichas*), and swamp sparrow (*Melospiza georgiana*). It is possible that removing stands of *Phragmites* may impact these species; however, their abundance may not be impacted if there are other suitable habitats available to them nearby (Yasukawa and Searcy 1995). Furthermore, other bird species, such as saltmarsh and seaside sparrows, are more likely to use native saltmarsh plants (Benoit and Askins 1999), and might benefit from the conversion. Marsh size and distance from other marshes have been found to influence species richness, with richness decreasing with greater distance from other marshes and when marsh size is less than 12 ac (Brown and Dinsmore 1986). Different species also have different thresholds for minimum marsh size in which they will be found. Modifying or converting habitat may influence how it is used by fish and wildlife species.

Conversion of *Phragmites* dominated marshes to that of *Spartina* spp. may also increase the bioavailability of sediment bound contaminants. Windham *et al.* 2001 found the release of mercury from leaf tissue from *Spartina alterniflora* was 2-3 times higher than for *Phragmites*. Modifying or converting habitat may therefore influence the bio-uptake of pollutants in fish and wildlife species and lead to increased risk of biomagnifying pollutants into the food chain in the HRE Feasibility Study Area.

For the proposed Bronx River and the Essex County Branch Brook restoration projects, the Service anticipates that temporary habitat loss will occur during construction as a result of dewatering of riverine areas, excavation of bed material, channel modification, and removal of vegetation. However, with the replacement of bed material, improved channel conditions, addition of instream habitat features, and introduction of native vegetation, we expect that habitat losses will be of short duration and offset by long-term habitat enhancement. The planting and seeding of native species will improve habitat conditions, thereby increasing ecosystem diversity and storm damage protection. The planting of native woody vegetation on the river banks may also increase the amount of shade, and potentially reduce the temperature of the stream/river channel, increase dissolved oxygen solubility, and improve aquatic (fish/amphibians/reptiles) species habitat suitability (Federal Interagency Stream Restoration Working Group 1998). A vegetated river bank would also provide forage, cover, and breeding habitat for songbirds, wading birds, and waterfowl. Removing or modifying barriers on the Bronx River can increase fish passage and reproduction of diadromous fishes. Herring eggs and larvae have been found in the lower reaches of the Bronx River and the installation of fish ladders or the removal of fish blockages could improve herring production in the river.

Within the proposed Bronx River and Branch Brook restoration sites, the use of bioengineering techniques in stabilizing river bank or softening pre-existing hard armored banks can reduce turbidity/suspended solids in the river while also providing edge habitat, decreasing flow velocities, and increasing the capacity of the river to accumulate/store/filter materials, sediment, and energy (Federal Interagency Stream Restoration Working Group 1998). However, a few restoration sites on the Bronx River incorporate hard armoring of the shoreline. Armoring of the river shoreline has numerous potential impacts to this habitat, including, but not limited to, decreased infiltration of surface runoff, increased flow velocities, decreased opportunity for habitat development, and loss of edge habitat (Federal Interagency Stream Restoration Working Group 1998). The Corps has recommended additional project features to minimize the effects of armoring, including stacked rock walls with brush layers, tiered rock slopes, and drilling with native plant material in an effort to maintain some infiltration or surface runoff and provide habitat. Additional project features such as those incorporated by the City College of New York regarding increased filtration in impervious materials should also be considered (Brzozowski 2017; City College of New York 2011).

For the proposed Jamaica Bay and Passaic and Hackensack River restoration sites, the Service anticipates temporary habitat loss will occur during construction as a result of the currently vegetated areas being converted to bare soil until herbaceous plantings become established. With establishment of vegetation, we expect that habitat losses will be of short duration and offset by habitat enhancement. Following restoration and the attainment of pre-determined physical and biological performance measures, fish and wildlife habitat quality is likely to increase in the restoration areas. The reductions or elimination of areas currently dominated by invasive/exotic plant species to native vegetated wetlands or forests will benefit fish and wildlife species. The conversion or creation of native habitats will also offset habitats that have been lost due to human alteration or the effects of sea-level rise. Upland habitats will be enhanced to improve habitat for terrestrial species. Invasive/exotic plant species displace native vegetation communities with monotypic/depauperate stands. The diversity of forage and cover available for wildlife is also reduced. Some species, such as tree-of-heaven (*Ailanthus altissima*), produce allelopathic compounds that inhibit the establishment of other species (Mergen 1959). In saltmarshes where common reed stands have displaced high marsh, numerous studies have found lower species diversity and/or density of birds and mammals in common reed stands relative to low marsh communities (Howe *et al*. 1978; Roman *et al*. 1984; Lapin and Randall 1993; Warren and Fell 1995; Benoit and Askins 1999; Chamber *et al*. 1999). The relative value of these common reed stands to invertebrates is unclear and is being investigated (Niedowski 2000).

Numerous species may benefit from the proposed project, including marsh invertebrates, fish species adapted to shallow tidal and intertidal habitats; wading birds, and shorebirds. The reduction in elevation and resulting increase in tidal flushing will provide feeding and nursery areas within the intertidal zone for species, such as fiddler crab, banded killifish, and silversides. Avifauna such as saltmarsh sharp-tailed sparrow and seaside sparrow will likely benefit from the construction of high marsh habitat (*e.g.*, increased nesting habitat). Diamondback terrapins, a unique saltmarsh species that is present in portions of Jamaica Bay, may benefit from the creation of low marsh and tidal creeks.

The principal impact of oyster restoration projects in Jamaica Bay, Governors Island, and the Naval Weapons Station at Earle will be the conversion of soft-bottom habitat to hard bottom habitat. This will likely change the species composition in the area of the restoration; however, pilot studies from sites within the HRE Feasibility Study Area have indicated that the addition of oysters increases species richness (Grizzle *et al.* 2012; Lodge *et al.* 2015). Oysters will likely have other beneficial impacts including localized benefits to water quality and storm attenuation.

D. PLANT GENETIC TOLERANCE AND SUPPLY

Many commercially-produced native plant products do not safeguard against the consequences of founder effects, genetic sampling and outbreeding depression and much government-developed material used by commercial growers is sourced too narrowly. Reliance on these monocultures leaves restored populations vulnerable to disease and pests. For example, virtually all restored foredune habitat from Massachusetts to North Carolina use American beachgrass (*Ammophila breviligulata*) sourced from the USDA-Natural Resources Conservation Service stock originating in Cape Cod prior to 1970. Recent studies reveal that *Ammophila* spp. populations exhibit significant genetic variation over very short distances and are more diverse than expected given the plant's' reproductive strategy, and that the USDA-sourced stock, which is easily distinguished from the native populations, is monotypic (Fant *et al.* 2008).

Seed collection in advance of projects allows for the necessary lead time to locate appropriate source populations and bank seed in preparation for plant production. Depending on the type and quantity of species, as well as environmental conditions, up to five years of seed collection may be necessary to secure sufficient quantity. In addition, restoration species may be slow growing and some may take three to five years to reach sufficient size before being available for planting. Lastly, for those projects requiring bulk seed for seeding operations, as opposed to planting with live plants, development of bulk seed is a multi-staged process that requires three to five years of development, and in some instances up to seven years before becoming readily available in sufficient quantity (*e.g.*, from initial wild seed collection to large-scale commercial production).

The Bureau of Land Management (BLM), in conjunction with many stakeholder partners, has developed a national seed strategy for the rehabilitation and restoration of land holdings across the nation. They have partnered with numerous stakeholders to implement a national plan which identified four primary goals centered on building a “seed industry” for rehabilitation and restoration. One of the four principal BLM goals is to identify seed needs and ensure the reliable availability of genetically appropriate seed across several eco-regional programs of the Nation (Bureau of Land Management 2015, see: https://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/plants/seedstrategy.html).

E. ENVIRONMENTAL CONTAMINANTS

Dredging sediments can re-suspend contaminants, making them more bioavailable (Knott *et al*. 2009). Adverse effects can begin at the base of the food chain, accounting for toxicity to phytoplankton and autotrophic bacteria (Nayer *et al.* 2004). Dredging can also result in sediment resuspension which can enhance the growth of water column bacteria and protozoa through release of nutrients. This establishes a pathway for organic contaminants to be accumulated by microorganisms and higher trophic animals (*i.e.*, filter feeding organisms) (Latimer *et al.* 1999; Zarull *et al.* 1999). The degree of contaminant bioavailability is determined by *'the reactivity of each contaminant with the biological interface, the presence of other chemicals that may antagonize or stimulate uptake, and external factors such as temperature that affect the rate of biological or chemical reactions'* (Luoma 1983, as quoted in Eggleton and Thomas 2004).

The use of cap material may also pose issues related to recontamination. For example, caps that do not include geotextile or armored barriers, can allow burrowing organisms to bring the contaminants to the surface where other organisms can be exposed (Rohr *et al.* 2016). Klerks *et al*. (2007) demonstrated that ghost shrimp (*Sergio trilobata* and *Lepidophthalmus louisianensis*) burrowing has been shown to move buried metals to the sediment surface in Tampa Bay, Florida. The planting of vegetation can also mobilize buried metals into the leaf litter (Mertens *et al.* 2007, in Rohr *et al.* 2016).

These academic studies and others referenced in the final FWCA report highlight the challenges of performing environmental restoration in a polluted environment, especially, given the risk these pollutants may have on fish and wildlife resources, through bio-magnification and bioaccumulation.

XII. SERVICE PLANNING AND MITIGATION RECOMMENDATIONS

The Service provides the following planning and mitigation recommendations to facilitate the HRE Feasibility Study. They include avoidance and minimization measures and recommendations to address resource concerns, planning objectives, and project impacts identified in earlier sections of this report.

The planning recommendations given below are provided as measures related to the formulation and design of the proposed restoration projects. As ecosystem restoration projects advance in the Corps planning and construction process, the Service considers this draft FWCA report as an opportunity to integrate fish and wildlife conservation into the planning process.

The mitigation recommendations contained herein also addresses:

- The Service's National Mitigation Policy (see https://www.gpo.gov/fdsys/pkg/FR-2016-11-21/pdf/2016-27751.pdf);

- The Service's Endangered and Threatened Wildlife and Plants; ESA Compensatory Mitigation Policy (see https://www.gpo.gov/fdsys/pkg/FR-2016-12-27/pdf/2016-30929.pdf);

- The Service's Interim Guidance on Implementing the Final ESA Compensatory Mitigation Policy (see https://www.fws.gov/endangered/improving_ESA/pdf/Interim_Guidance_for_Implementing_the_Endangered%20Species%20Act%20Jan%202017.pdf);

- The *Presidential Memorandum – Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment. November 3, 2015* (The White House Office of the Press Secretary 2015).

The Service has jurisdiction over a broad range of fish and wildlife resources. Service authorities are codified under multiple statutes that address management and conservation of natural resources from many perspectives, including, but not limited to, the effects of land, water, and energy development on fish, wildlife, plants, and their habitats. The types of resources for which the Service is authorized to recommend mitigation also include those that contribute broadly to ecological functions that sustain species. Section 404 of the CWA (33 CFR 320.4) codifies the significance of wetlands and other waters of the United States as important public resources for their habitat value, among other functions.

Mitigation planning often presents practicable opportunities to implement mitigation measures in a manner that outweighs impacts to affected resources. When resource enhancement is also consistent with the mission, authorities, and/or responsibilities of action proponents, the Service will encourage proponents to develop measures that result in a net gain toward achieving conservation objectives for the resources affected by their actions.

Objectives identified by the Service in providing recommendations on the HRE Feasibility Study are to protect and conserve fish and wildlife resources in each of the proposed restoration project areas, while assuring that a net gain in ecological benefits are delivered. This includes developing recommendations to make the project more environmentally compatible and to further conserve and enhance the diversity and abundance of fish and wildlife resources and their habitats in each proposed project area and on a landscape level throughout the HRE.

The outcome of consultation under section 7 of the ESA or future consultations under the FWCA, could affect the recommendations herein. In addition, the Service provides conservation measures intended to facilitate the recovery of listed species, sensitive habitats, and other fish and wildlife resources.

A. PLANNING RECOMMENDATIONS

1. Habitat Loss and Degradation

We recommend that the Corps carefully evaluate the use of hard structures in project design. If feasible, traditional hard structures that provide little ecological value should be avoided, and "soft," nature-based, and/or ecologically-enhanced alternatives should be selected whenever practicable. The NOAA Fisheries provides the following ecological modification recommendations to reduce impacts to aquatic resources. The Service recommends that the

Corps consider these methods in the design of any HRE restoration project that is in a high energy environment warranting hard armoring:

- Incorporate oyster or clam shell bags or marine-safe concrete that encourages shellfish to attach or settle;
- Establish living structures, like corals and oysters, and design systems to function as closely to natural systems as possible;
- Incorporate native and genetically diverse low and high marsh vegetation augmented by regionally specific coastal plants;
- Incorporate native seagrass;
- Incorporate sandy or cobble beach, mudflats, or other natural shoreline features;
- Maintain wetlands and/or upland riparian buffers adjacent to a structure;
- Add fish habitat enhancement structures to bulkheads; and
- Incorporate breaks or openings in any hard structural elements (excluding bulkheads and seawalls) to facilitate natural water flushing and allow aquatic organisms to access nearshore and shoreline habitat (*e.g.*, fish and turtles and horseshoe crabs for nesting) (National Oceanic and Atmospheric Administration Living Shorelines Workgroup 2015).

2. Invasive Species

As discussed above, the Corps and its project stakeholders should commit to a long-term effort at managing each restored site to prevent the recolonization of invasive species. Efforts to manage each restored site beyond ten years will be the responsibility of the local sponsor. This will be especially true in the non-tidal HRE proposed projects as most adjoining properties will likely be a source of invasive species colonization. This commitment will ensure a high level of "permanence" in the restoration work performed.

3. Wildlife Management

In accordance with the 2003 MOA, *"Aircraft-Wildlife Strikes,"* and the subsequent 2007 circular entitled, *"Hazardous Wildlife Attractants on or Near Airports,"* the Corps should commence coordination with the Service and the FAA for activities in close proximity to Newark, LaGuardia, and JFK Airports

4. Environmental Contaminants

The Corps recognizes that contaminants are a complex challenge in the HRE Feasibility Study Area and that contaminant risk affects many decisions related to natural resources and selection of project alternatives. Some project alternatives can involve the removal and proper disposal of contaminated materials and result in a net reduction of risk to biota utilizing the restored sites. In addition, the Corps reiterated that during the Pre-construction, Engineering, and Design (PED) phase for each selected alternative, a general site investigation for contamination would occur, including predictive mapping, where applicable. The Corps states that there are several documents that would guide them in the development of a sampling protocol and in conducting individual site risk assessments. This includes Engineering Manual 200-1-4 Risk Assessment Handbook, Volume II Environmental Evaluation; Engineering Manual 200-1-6 Chemical Quality Assurance for Hazardous Toxic Radioactive Waste Projects; and Engineering Manual 200-1-7 Performance Evaluation (including ER-1110-1-263). Generally, the Corps confirmed that they would not construct restoration projects directly on areas that exceed contaminant levels set by the USEPA or the states of NY or NJ. This would include contaminant levels that exceed the ecological risk thresholds established by the NYSDEC and the NJDEP. Based on the Corps' ER 1165-2-132 guidance "Removal of hazardous, toxic, and radioactive waste impacted soils would be performed by the non-federal sponsor to the depth and grade required for restoration standards at the restoration site." For sites that do have minimal contamination, re-contouring of the land would not place contaminated soils onto clean soils and restoration plans would include placement of a clean growing media following soil/sediment regrading on each site.

The Corps should investigate each potential restoration site based on the following:

- Baseline conditions, defined by historical characteristics or best available data, should be determined before initiating restoration activities (see Rohr *et al.* 2016) so as to measure restoration success. Knowledge of existing concentrations and distribution patterns of contaminants will help guide the selection of the most cost-effective and environmentally beneficial restoration strategies (*e.g.*, Neponset River, Massachusetts, Breault and Cooke 2004).

- The following list of essential biodiversity variables was evaluated by Pereira *et al*. (2013) to address biodiversity loss: *"1) genetic composition of selected populations, 2) individual fitness, 3) population abundance of species, 4) species traits, 5) evolutionary diversity, 6) community structure and composition, 7) ecosystem function, 8) resistance and resilience, and 9) ecosystem services*." The Corps should work with the HRE stakeholders to develop the appropriate monitoring matrices to ensure success of each project selected. Long-term monitoring beyond ten years after project construction would be the responsibility of the local cost sharing sponsor.

- Due to the presence of sediment contamination, and the potential for these sediments to contribute to contaminant risk to biota in the HRE Feasibility Study Area, the Service recommended that the Corps develop a matrix that would evaluate contaminant/re-contaminant risk of each of the 33 project sites, relative to established ERM concentrations for PCBs, mercury, and dioxin and furans. The Harbor Estuary Program Restoration Working Group is currently working towards advancing a prioritization or matrix strategy for the selection of project alternatives. This will aid in identifying which projects can move ahead quickly to construction (little to no contaminant risk) versus which ones would require additional review/modification/remediation, and/or postponement (due to heightened contaminant risk).

- The Service recommends giving priority to projects that do not adjoin contaminated waterways to avoid the risk of recontamination. Should the Corps select a restoration project in close proximity to a known pollution source, it should optimize the design of the project based on benefits to the environment, contaminant risk, and cost effectiveness. The selection of a high marsh construction alternative, where possible, is an alternative that could meet the rigors of cost-benefit analysis and minimize contaminant risk to biota. The advantage of a high marsh project is that it is not inundated with each daily tide, and, therefore, is less likely to re-contaminate by nearby polluted sediments. Over time and if local project conditions permit for landward expansion, there may be a conversion of high marsh to low marsh due to sea-level rise (depending on accretion rates); thus, resulting in resilient communities and infrastructure and resilient tidal wetland systems. The Corps will calculate local sea-level rise projections using the most recent methodologies summarized in the U.S. Army Corps of Engineers Engineering Regulation 1100-2-8162. During the lengthy conversion process (from high to intertidal marshes), there is considerable optimism that major pollution sources in the HRE will be remediated either through natural processes or active clean-up.

5. Coastal Resiliency Projects

We noted above that the Corps' coastal resiliency project for Jamaica Bay (proceeding under separate Congressional authority) included alternatives that resembled some of the proposed HRE Feasibility Study restoration projects. The Service sought clarification in the draft FWCA report from the Corps on the relationship, if any, between the HRE Feasibility Study and that of other similar related projects in the Jamaica Bay area (*i.e.*, ERRIJB Reformulation Study). The Corps acknowledges that additional reformulation/feasibility studies are underway in the HRE Feasibility Study Area pursuant to separate Congressional authorities. They include the ERRIJB Reformulation Study and the NYNJHAT Feasibility Study. The ERRJIB Reformulation Study has evaluated potential natural/nature based features within Jamaica Bay and the NYNJHAT Feasibility Study will investigate coastal storm risk management issues and solutions within the HRE. Although these geographic areas may overlap the HRE Feasibility Study Area, the administering authorities for the ERRJIB Reformulation and NYNJHAT Feasibility Studies listed above are different and, as such, so may be their solutions. The degree to which these additional but unrelated projects may interact with the HRE Feasibility Study is unknown at this time.

6. Supply of Genetic Stock of Native Plantings

- The Corps is in agreement that locally sourced and genetically diverse plant material will be used during project development, when available, and will include in their project plans specifications for the use of native plant material. The plant material selected must be of sufficient <u>local</u> genetic diversity to meet this recommendation. This will aid in the recovery of our dwindling (and sometimes listed) pollinator species that may be found in the HRE Feasibility Study Area geographic boundary. This effort can include the incorporation of site specific native seed banks, if available.

- The Corps has agreed to utilize the NYC Native Plant Center, where appropriate, for projects that partner with NYC. The Corps also recognizes that there may be times when shortages of appropriate plant material may occur. The Service continues to recommend that the Corps develop a strategy to meet the anticipated need for locally sourced and genetically diverse plant material for upwards of thirty projects under current consideration. This could include the undertaking of a stand-alone seed collection effort (as the BLM has begun) to fulfill the anticipated needs in the HRE Feasibility Study Area. The Service can assist the Corps in this seed collection effort. This collection effort will also comply with Title 18 Chapter 1 of the Administrative Code of the City of New York (section 18-141, Native Biodiversity Planting Practices), which requires "…greater native biodiversity … in public landscapes" (many of the HRE restoration projects are located on NYC-owned public lands).

- The Corps has requested the Service provide a priority species list along with species specific guidelines/benchmarks that the Corps can include in the design specifications on a site by site basis. This request would be most appropriately addressed in a new SOW with the Corps, or on a project by project basis where new SOWs will be anticipated once the Corps selects which of the 33 HRE Study sites are further advanced to the Planning and Engineering Design phase. The design specifications should anticipate the approximate numbers of plants as identified in the enclosed Excel Spreadsheet (Appendix H) of estimated habitat types and subsequent plant material needs (by species) for the proposed restoration sites. Based on the total acreage of the 33 projects identified by the Corps, the Service estimates the amount of plant material could include upwards of 550,000 trees, 1.1 million shrubs, 21 million plugs, and potentially several tons of pollinator-friendly forbs and graminoids seeds. The amount of plant material and species selected for each of the 33 proposals will likely change as project plans become more fully developed.

- In addition to the recommendations discussed above, additional recommendations for native landscaping will be necessary once details are known on soil types, soil and erosion control measures, BMPs to control compaction of soils, invasive species and herbivory control measures, and establishing performance measures to ensure success of each restoration project's stated goal (*i.e.*, percent plant cover, hydrologic flow, and invasive species monitoring and management).

The Service stands ready to assist the Corps in developing a strategy that will meet the needs for providing sufficient quantities of genetically diverse native plant material for the HRE Feasibility Study Area and for other Corps-related resilience and coastal protection projects in NY and NJ.

7. Endangered Species

- The Corps should continue to informally consult with the Service and the NOAA Fisheries pursuant to section 7 of the ESA, to address federally-listed species and their habitats.

- The Service recommends that the Corps consult with the NYSDEC and the NJDEP regarding potential impacts to state-listed threatened and endangered species.

8. Planning Objectives

- The Service recommends that the Corps develop a target species and habitat list for monitoring and evaluation of restoration success, with continued coordination with the Service as the project planning advances.

- The Service recommends that the Corps develop an adaptive management and monitoring program, including funding for implementation by the local cost-sharing partner, to evaluate the effectiveness of the restoration efforts and pre-established project goals. The management and monitoring plan should be implemented for a minimum of five years after project construction. Objectives should be developed which are unambiguous, and include specific metrics and specific target conditions. Objectives should contain elements that can be readily measured (*e.g.*, percent aerial coverage of all plantings, hydrologic performance and biota use of the restored sites, including documenting fish passage) so as to promote the evaluation of management actions and recognize their contributions to successful management. Objectives should also be based on the capacities of the natural resource system being managed and the political or social system within which management occurs (long-term maintenance by the local sponsor), as well as results oriented and time-fixed (Williams and Brown 2012).

- Further detailed planning of project features (*e.g.*, Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service. .

- An annual report documenting the status of implementation, maintenance and adaptive management measures should be prepared for a minimum of five years after project construction by the managing agency and provided to the Service, the NOAA Fisheries, the USEPA, and the state wildlife agencies. That report should also describe future management activities, and identify any proposed changes to the existing management plan or corrective measures taken to ensure project success.

Floatables and sediments are also identified as a problem for the water bodies within the HRE Feasibility Study Area (Crimmens and Larson 2006; Larson *et al.* 2004; New York State Department of Environmental Conservation 2016a; AECOM USA, Inc. 2014). Reducing the input of floatables and sediments into these systems where possible is also recommended.

B. MITIGATION RECOMMENDATIONS (THE CORPS IS IN CONCURRENCE WITH THE MITIGATION RECOMMENDATIONS 1-11 AND WILL IMPLEMENT, WHERE PRACTICABLE, ON A SITE BY SITE BASIS).

1. Marine and Estuarine Invertebrates

- Horseshoe crabs are identified as a priority species and suitable habitats at project sites should be identified prior to project implementation and pre-and post-construction monitoring for this species should be undertaken. Implement TOY restrictions in coastal waters for any in-water construction activities from May 1 through July 1 of any given year to protect breeding horseshoe crabs.

2. Avian Species

- According to the New Jersey Division of Fish and Wildlife Guidance Manual for the Protection of Fish and Wildlife Resources dated July 2008 (NJDFW Guidance), the general timing restriction to protect nesting migratory birds from tree or shrub/scrub removal is March 15 to July 31. Failure to do so may result in the illegal destruction of nests with eggs or unfledged chicks. According to the NJDFW Guidance, this recommended TOY restriction should be expanded to March 1 for nesting raptors and to August 15 for all nesting migratory birds and August 31 for the common tern. The Service recommends that this TOY restriction should also apply for all HRE projects proposed in NY.

- To minimize disturbance to nesting colonial waterbirds and wading birds (*i.e.*, herons, egrets, night-herons, glossy ibis, and/or cormorants), all HRE project activities occurring within 200 m (Rodgers and Schwikert 2002) of a rookery should be restricted from March 15 through August 15. The buffer distance was derived from that recommended by Rodgers and Schwikert (2002) for double-crested cormorants from personal watercraft (156 m). Double-crested cormorants have the greatest buffer need of any of the wading bird species in the HRE Feasibility Study Area. We extended the buffer to 200 m, as project-related disturbances may be greater than that of personal watercraft. The birds would likely be exposed to project related activities for greater lengths of time and may be exposed to a greater variety of disturbances (*e.g.*, boats, construction equipment, workers, etc.).

- To avoid impacts to any roosting bats or nesting birds, it is recommended that the Corps implement a monitoring plan of bridges located in close proximity to any of the HRE project sites. HRE activities resulting in disturbance should be restricted if impacts are observed until roosting or nesting is completed.

- To protect bald eagles, coordinate with the Service, the NJDFW Endangered and Nongame Species Program and the NYSDEC-Region II to determine if any TOY restrictions or buffer zones are warranted.

3. Finfish Species

- The Service recommends that the Corps consult with the NOAA Fisheries, the NJDFW, and the NYSDEC to determine if TOY construction windows are warranted for any aspect of the proposed restoration projects, including in-water work, to protect migrating, overwintering, and/or spawning fish species.

- Fish habitat enhancement, such as the addition of pools or boulders or the installation of anchored large wood, should also be considered and incorporated where possible to provide fish spawning and refuge habitat. A need for these habitat components was identified for the Bronx River (Crimmens and Larson 2006; Larson *et al.* 2004).

4. Plant Pollinators

- All revegetation efforts should include native and genetically diverse plants into project landscaping designs, when practicable, that support pollinators.

- The Service recommends that the Corps examine whether any native seed banks are present at any of the identified project sites, if appropriate. If native seed banks are available, the Corps should work towards preserving them for future use at each respective restoration site.

- The Service recommends that the Corps use the technical guidance found in Appendix H in the development of a pollinator friendly native landscape plan (*i.e.*, Conservation Cover (327) for pollinators; Mowing: Best Practices for Monarchs; Pollinator-Friendly Best Management Practices for Federal Lands; Pollinators in Natural Areas; and Supporting the Health of Monarchs and other Pollinators).

- The Service recommends that the Corps include native pollinator plants in all of their final landscaping plans, when practicable, to comply with the President's pollinator initiative.

5. Turbidity and Soil Erosion

- To minimize short-term increases in turbidity, work should begin from the landward side before "breaking out" into open water areas. Silt fence should be properly installed between disturbed areas and adjacent wetlands. All soil and erosion measures proposed should be coordinated with the Service to ensure they are sufficiently protective of Service Trust Resources prior to approval by the local Soil Erosion Conservation District. At least 6 inches (in.; 15 centimeters [cm]) of the toe of the silt fence should be buried parallel to the ground surface on the upslope side of the fence. The silt fence should be inspected following installation and after significant storm events to ensure that it is functioning properly. Silt fence is preferable to hay or straw bales as the bales represent a potential undesirable seed source in maritime shrubland or grassland habitats.

- The use of soil erosion control measures, as approved by the local Soil Erosion Control District, should be installed prior to the grading of any proposed HRE Feasibility Study projects. The use of jute matting or other biodegradable natural material is recommended for stabilizing all project construction areas. The matting should be maintained until the site has recovered sufficiently to avoid any soil movement within or off the proposed project site(s). The matting will also aid in improved stabilization of any planted materials.

- The Service recommends that the temporary access routes and staging areas for all construction activities be restricted from sensitive habitat areas, including wetlands and riparian zones. The use of low ground pressure vehicles for all work proposed in marshes and open waters, when necessary, should be implemented.

6. Tidal Marshes

Broome (1990) and Niedowski (2000) provide detailed information on establishing various saltmarsh communities. We have summarized their recommendations below and recommend these be considered in project planning.

For low marsh areas, saltmarsh cordgrass (*Spartina alterniflora*) can be propagated by bare root seedlings, plugs, or seedlings in peat pots (Broome 1990). Direct seeding is generally less reliable and there have been incidences when low seed viability reduced successful establishment of this species. Bare root seedlings or plugs are generally less expensive than potted seedlings. Most low saltmarsh planting plans involve planting plugs on 24-in. or 36-in. centers (60 to 90 cm). The Service recommends that saltmarsh cordgrass plugs be planted on a minimum 18-in. (45 cm) center along the newly created creek banks and areas subject to wave action. The closer spacing will reduce the time to establish dense cover and will reduce opportunities for erosion. Wider spacing would be appropriate for other sites and is likely to be less expensive. If Canada geese or brant are abundant in the project area following planting, they may pose a risk to the successful establishment of dense stands of vegetation. Fencing or other measures (*i.e.*, hazing) may be necessary to prevent browsing of the freshly-planted marsh areas.

For high marsh areas, saltmeadow hay (*Spartina patens*) and spikegrass (*Distichlis spicata*) can be propagated by bare root seedlings and plugs. The Corps should seek local sources of genetically viable and native stock for all of their planting needs. Seeding is not as effective for this species and would require the collection of mature seed and cold stratification of the seed over the winter and spring months. Fertilization may also be necessary, but the greater interval between tidal flushes allows the use of standard (as opposed to slow-release) fertilizers (Broome 1990). We recommend planting at 18-in. (45 cm) centers to quickly establish a dense cover of vegetation to reduce the opportunity for common reed to become established. Geese and brant may need to be discouraged (*i.e.*, fencing or hazing) from using the site until the vegetation becomes established. Any woody planting should be properly centered according to individual species requirements and staked (large containerized specimens) until root systems become well established.

7. Maritime Grassland

Establishment of native warm season grasses is a more complicated process than the use of standard conservation mixes of introduced cool season grasses. Warm season grasses allocate resources to root systems before significant shoot growth is observed, so most of the aboveground growth does not occur until the second growing season. Because of this root system development, they are well adapted to well-drained soils and dry conditions. The Service supports the Corps' proposal to ensure that at least 18 in. (45 cm) of suitable topsoil (free of weed seed and predominantly mineral in composition) is spread on the grassland restoration sites prior to seeding if needed at a project site.

Various seed mixes are available for grassland establishment. The Corps should seek local sources of genetically viable and native stock for all of their planting needs. The NYCDPR identifies native grass and forb species that are recommended for maritime grasslands in the New York City area in its "Native Species Planting Guide for New York City" (New York City Department of Parks and Recreation 2014). We recommend that the Corps use this document to develop a species list for maritime grassland plantings in the HRE. Detailed information on warm season grass establishment and management can be found in Dickerson *et al*. (1998). As stated above, measures may have to be implemented to reduce grazing by geese or brant until the vegetation is established and is of sufficient height and vigor.

8. Transition Zones

Marsh elder (*Iva frutescens*) and groundsel tree (*Baccharis halimifolia*) are two species well adapted to transition zones between low marsh and adjacent uplands. These species are tolerant of saline conditions and infrequent tidal inundation. Peat pots or bareroot seedlings should be planted on 3-ft (90 cm) centers. To stabilize slopes, the Service recommends a conservation mix containing annual rye (*Lolium* spp.) for quick cover and slope stabilization, and a native grass such as switchgrass (*Panicum virgatum*) that will increase habitat diversity and help prevent common reed colonization.

9. Upland Enhancement

Upland enhancement consisting of the establishment of woody plant species to improve habitat diversity and aesthetics is proposed for a portion of the proposed project area. The Long Island Shore Species seedling mix produced by the NYSDEC's Saratoga Tree Nursery may be a suitable mix of species for well-drained portions of the proposed disposal area. Portions of the disposal area with finer-grained sediments and those that are somewhat poorly drained could be planted with other species, such as pin oak (*Quercus palustris*), sweetgum (*Liquidambar styraciflua*), red mulberry (*Marus rubra*), and sassafras (*Sassafras albidium*). Interspersed with the woody plantings should be a conservation seed mix containing annual rye for quick cover establishment. The soil conditions in the enhancement areas should be examined and soil fertility should be tested to determine the appropriate species and needs for fertilizer application.

10. Native Landscaping

If necessary, imported soil should be free of chemical or foreign seed contamination. Chemically contaminated soils or the presence of foreign/invasive seeds will likely jeopardize project stated goals and potentially prove very costly should post construction contaminant remediation or if invasive species management be necessary. The Corps should take the necessary steps (*e.g.*, washing of vehicles) to avoid the importation of foreign seed material for any construction equipment entering the project sites.

11. Climate Change and Sea-level rise

Given the long lifespan of all of the proposed projects identified in the HRE Feasibility Study, the Corps should consider the possible long-term effects of climate change and sea-level rise on project design, with an emphasis on ensuring permanence of project features and components.

12. Environmental Contaminants

- The Service recommends that predicted sediment mercury concentrations be mapped, and that the maps for 2,3,7,8-TCDD, total PCBs, and mercury be overlaid to reveal areas with acceptable concentrations of all three contaminants. Restoration actions should be implemented first in these areas.

- The Service recommends that the Corps perform additional testing (see sediment testing recommendations below) of sediments at the four proposed oyster project sites to determine if the presence of contaminants will impede attainment of the stated project goals, or if project modifications (*i.e.*, sediment remediation or project relocation) are necessary to ensure successful restoration of oyster populations.

- The Service recommends that the Corps place a 2-ft cap of clean material over all underlying areas with contamination exceeding acceptable thresholds. The purpose of a thick cap of clean material is to prevent burrowing aquatic organisms from accessing any underlying un-remediated sediments, protect against disturbance via perturbation, and limit transport of contamination through the cap’s interstitial water. The Corps and the USEPA developed a formula to isolate underlying contaminated sediments from burrowing marine aquatic organisms (U.S. Army Corps of Engineers 1997). This formula was implemented by the federal government for the construction of the Newark Bay Confined Disposal Facility (CDF), which is located in the HRE Feasibility Study Area. That formula recommended a 3-ft cap of clean material for the CDF. In another project faced with similar bioturbation concerns, the Corps, in concert with the Service, the NOAA Fisheries, and the NJDEP, required 2 ft of material be placed over all areas with underlying contamination within the 42-ac Lincoln Park tidal wetland restoration project, which is also located in the HRE Feasibility Study Area. A clean cap design of one foot is acceptable for all non-tidal wetland applications when underlying sediments are contaminated.

- In conjunction with the HRE Feasibility Study Area, and as part of the Corps HTRW investigations, the Service recommends that the Corps implement pre-construction sampling, remediation (if necessary), and post-construction sampling, as described below, to further evaluate and enhance the potential for successful restoration of tidal wetlands where contaminated sediments are prevalent.

    - Pre-Construction Sampling. Restoration should not proceed at any site within the HRE without prior screening for contaminants. If concentrations of contaminants in sediment exceed acceptable thresholds, biological testing and/or remediation may be necessary. The Service has prepared pre-construction sampling recommendations for sediment and biota (Appendix E) to evaluate contamination at project sites. This sampling protocol is currently being used for proposed mitigation projects within the HRE Feasibility Study Area that are pending Corps' approval. However, it should be noted that NY and NJ have different recommendations for site characterization and remediation. Consequently, the appropriate state agency and other stakeholders (see Interagency Coordination, below) should be consulted to develop a pre-construction sampling plan, and to evaluate the results of that sampling, at each site prior to construction.

    - Remediation. The Service recommends that areas with contamination exceeding acceptable thresholds at project depth be excavated or capped (or excavated and capped, depending on desired final elevation) with 2 ft of clean material.

    - Post-Construction Baseline Characterization Assessment and Monitoring. For each site requiring remediation, the Service recommends that post-construction sampling and monitoring plans be developed for stakeholder (Service, Corps, NOAA, NJDEP, and NYSDEC) approval prior to project implementation. Biota should be included in the post-construction sampling. The Service's recommendations for post-construction sampling are presented in Appendices F (Post-Construction Baseline Assessment) and G (Post-Construction Monitoring). As was the case for pre-construction sampling, recommendations may be different for different project sites, depending upon the location, potential for recontamination, results of the pre-construction contaminant assessment, and remedial approach.

    - Monitoring Reports. To ensure a level of permanence of restoration work completed, the applicant should submit a post construction monitoring report by November of each year, for five years post-project. The monitoring report should incorporate the results of testing for contaminants in tissue and sediment per the recommendations above. This monitoring should be conducted in conjunction with any other performance criteria required by any state permit to ensure vegetative or hydrologic success. The post-construction monitoring report should also address on-site conditions and any corrections taken to ensure project success (see below long-term maintenance performance measures).

    - Long-term maintenance. Upon project completion, the Corps, the local cost-sharing sponsor, and the holder of title to the land that was restored should develop a long-term management plan for the life of the project. The Corps and the USEPA promulgated a mitigation rule in 2008 entitled, *"Compensatory Mitigation for Losses of Aquatic Resources,"* (2008 Rule) (see http://www.epa.gov/wetlandsmitigation/). The 2008 Rule addressed the need for project sponsors to conduct long-term maintenance and stewardship of selected sites in order to ensure project success for the life of the project. To that end, the Service recommends that the Corps and its cost-sharing sponsors and the holders of the public lands where the projects are proposed enter into an agreement to maintain the restored HRE sites for the life of the project.

The monitoring efforts discussed throughout the final FWCA should incorporate the goals established in the Water Resources Development Act of 2016 (33 U.S.C. section 2283, Fish and Wildlife Mitigation) for developing a matrix that measures the ecological success of each project site and the entity responsible for conducting the requisite monitoring (until the project sufficiently demonstrates that it has met its ecological success criteria). The Service recommends further coordination in the development and implementation of these efforts.

The agreement should include provisions for eradication of any invasive species that exceeds five percent of any restored area, (uplands or wetlands); the use of herbivory control (*i.e.*, fencing) to minimize deer and other animal browsing; develop a public access plan, if any; collect or remove trash; repair vandalized or damaged structures; rectify trespass use (*i.e.*, all-terrain vehicles); and prepare an annual report (see above) of project conditions and management activities conducted in order to ensure project success.

- Interagency Coordination. The following offices should be coordinated with when seeking joint concurrence of any sampling plan:

Service:	Amy Roe New York Field Office 3817 Luker Road Cortland, NY 13045 amy_roe@fws.gov (607) 753-9334 x610	Melissa Foster New Jersey Field Office 4 E. Jimmie Leeds Road, Suite 4 Galloway, NJ 08205 melissa_foster@fws.gov (609) 382-5262 (office) (609) 703-9199 (cell)
NOAA Fisheries:	Reyhan Mehran NOAA Ocean Service Office of Response and Restoration 290 Broadway, 18th Floor New York, NY 10007 (212) 637-3257 reyhan.mehran@noaa.gov	Lisa Rosman NOAA Ocean Service Office of Response and Restoration 290 Broadway, 18th Floor New York, NY 10007 (212) 637-3259 lisa.rosman@noaa.gov

Karen Greene
NOAA/National Marine Fisheries Service
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NYSDEC: Susan Maresca
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NJDEP: Susan D. Lockwood
NJDEP-Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420
Trenton, NJ 08625-0420
(609) 984-0580
Susan.Lockwood@dep.nj.gov

C. SPECIFIC RECOMMENDATIONS FOR INDIVIDUAL SITES

In addition to the recommendations cited above, the following site-specific recommendations are provided. Recommendations from previous PALs or FWCA reports are incorporated by reference. Each of the restoration projects and sites are also identified by their CRP identification number (if applicable).

1. Newark Bay/Lower Passaic/Hackensack River Regional Planning Area, NJ

a. Meadowlark Tract (CRP ID 719)

The project site is located on Bellman's Creek, which is tidally influenced by the Hackensack River. Bellman's Creek is known to contain numerous contaminants in sediments at levels demonstrated to be harmful to fish and wildlife resources. Although contaminant data for this portion of Bellman's Creek is somewhat limited, surface sediment samples collected as part of the USEPA Berry's Creek Study Area Remedial Investigation show exceedances of ER-Ms for mercury (26 of 29 samples); sum of PCBs (29 of 29 samples), and 2,3,7,8-TCDD (6 of 8 samples) (data accessed via Query Manager; National Oceanic and Atmospheric Administration 2017a).

As discussed in the Environmental Contaminant section of this report, the Corps should further characterize the project site to determine the extent, if any, of environmental contamination.

Should the site contain contaminants at levels that pose an ecological risk, the Corps should either postpone the project until the source of contamination is remediated and the risk of recontamination is ameliorated, or design the project with a focus on maximizing the number of high marsh acres and reducing the number of acres of intertidal marsh.

b. Metromedia Marsh (CRP ID 721)

This project site adjoins the Hackensack River, which, as indicated above, is known to contain numerous contaminants in sediments at levels demonstrated to be harmful to fish and wildlife resources. Hackensack River sediments are known to be contaminated with 2,3,7,8 TCDD, mercury, PCBs, VOC's, PAHs, and other compounds. The USEPA has been petitioned by the Hackensack Riverkeeper to designate 22 mi of the Hackensack River, which includes the geographic boundary of Metromedia Marsh, as a Superfund site (http://www.hackensackriverkeeper.org/category/news/press-releases/). The Metromedia Marsh project site also adjoins several mitigation sites (Kane Mitigation Bank, MRI-3, and Global Terminal Projects) whose monitoring efforts thus far show a trend towards recontamination, despite each of these sites having been fully remediated at the time of construction. As a result, the Service recommends that the Corps defer a decision on this site until after the USEPA has determined whether or not the Hackensack River will be designated a Superfund site. Further, additional sediment characterization of the project site will be necessary, should the Corps proceed with construction of the project. Depending upon the levels of contamination in sediment, the Corps could design the project, to the maximum extent practicable, as a high marsh system to minimize recontamination risk.

c. Essex County Branch Brook Park (CRP ID 887)

The project site has the potential for restoration of 26.3 ac of freshwater wetland habitat, including 4,200 ft of Branch Brook. It is recommended that the Corps conduct sediment characterization at project grade to evaluate the presence of legacy contaminants, with a goal of fully remediating the site if contaminants occur above acceptable thresholds. The Service also recommends the incorporation of an interpretive trail in the project's final design. In addition, the general recommendations for landscaping presented above should be incorporated into the project design. (*i.e.*, ensuring local genetic diversity for all plant materials). This project should receive priority status as the site has less potential of recontamination than those located in the tidal portions of the HRE Feasibility Study Area.

d. Dundee Island Park (CRP ID 900)

This project site was evaluated during the Service's review of potential mitigation sites for the Joseph G. Minish Passaic River Waterfront Park and Historic Area (final PAL dated April 22, 2016) (U.S. Fish and Wildlife Service 2016b). In the Service's PAL, the site was rejected due to its close proximity to the Passaic River, which has been heavily polluted with 2,3,7,8 TCDD and is part of a USEPA Superfund Site. However, if the proposed restoration project will not be influenced by the Passaic River (*e.g.*, a riparian or upland park) the site may present little risk to fish and wildlife resources and should further be considered and evaluated. Since the project site contains an abandoned rail line, further characterization of the property should occur, especially at project grade, to determine if there are any contaminant concerns that need to be addressed.

e. Clifton Dundee Canal Green Acres (CRP ID 902)

At this site, the Corps proposes to reconnect floodplains and riparian buffers to the river and improve habitat quality for aquatic organisms. The site adjoins the Passaic River, a known Superfund Study Area, and is currently under fish consumption advisories due to the effects of 2,3,7,8-TCDD, found in the Passaic River. It is currently vegetated with mature trees and would offer little revegetation opportunities at the project site.

This project site was evaluated during the Service's review of potential mitigation sites for the Joseph G. Minish Passaic River Waterfront Park and Historic Area (final PAL dated April 22, 2016) (U.S. Fish and Wildlife Service 2016b). The Service is concerned that any new hydrologic connection to the river may pose an unacceptable risk to aquatic organisms (*i.e.*, contaminants sink) and recommends further investigation of the scope of this hydrologic connection and the potential for contaminant risk on fish and wildlife resources.

f. Lower Passaic River "Deferred" Site - Oak Islands Yards (CRP ID 866)

The project site is located on Newark Bay, a waterbody known to contain numerous contaminants in sediments at levels demonstrated to be harmful to fish and wildlife resources. The project site has, in the past, been considered as a potential mitigation site pursuant to the Corps' section 404 of the CWA program. However, due to the presence of contaminants and the expected recontamination risk from adjacent sources, it was not used as a mitigation site. Newark Bay is also influenced by the Passaic River, the Arthur Kill, and the Hackensack River - waterways known to be contaminated by numerous other Superfund and state hazardous waste sites (*e.g.*, Linden Chemical Processing, Occidental Chemical Corporation, Standard Chlorine Chemical Company, Ventron/Velsicol, United Oil Products, Diamond Head Oil Refinery, Riverside Industrial Park, Syncon Resins, and Scientific Chemical Processing).

In consideration of the above, the Service recommends that no further restoration work be considered for this project site until after the remediation of Newark Bay, the Hackensack River watershed, and the Passaic River are complete, ensuring that the risk of recontamination from these contaminated water bodies is sufficiently ameliorated.

The Service notes that the Oak Island Yard project was also subject to a grant from the NFWF as part of their post-hurricane Sandy coastal resilience grant program. The grant was awarded to the City of Newark for the construction of tidal marshes, coastal maritime and scrub shrub wetlands, shoreline stabilization, and invasive species control (nearly identical to that being proposed by the Corps). The City of Newark is proceeding to undertake only the upland portions of the resilience project due to the amount of contaminants contained in the existing marsh plain and also due to the ongoing investigation by the USEPA, which is developing a potential remedial action of Newark Bay.

g. Lower Passaic River "Deferred" Site - Kearny Point (CRP ID 865)

This project site is in close proximity to the Oak Island Yard project site, described above. Due to the risk of contamination and recontamination from the surrounding water bodies, as discussed previously for the Oak Island Yard project, we recommend that restoration at this site be postponed until after remediation of contamination in Newark Bay, the Berry's Creek watershed, and the Hackensack and Passaic River watersheds is complete and the risk of recontamination is sufficiently addressed. In addition, the Service is aware that the project site is presently zoned "heavy industrial" and that the current landowner is considering developing the site under the State of New Jersey's brownfield program. As such, unless the Corps acquires the project site in the immediate future, the ability to undertake restoration efforts at this site appears unlikely.

2. Arthur Kill /Kill Van Kull Regional Planning Area, NJ

There are no projects identified in the Arthur Kill/Kill Van Kull Regional Planning Area.

3. Lower Bay Regional Planning Area, NY and NJ

Naval Weapons Station Earle (Oyster Restoration, no CRP number)

The Service supports oyster restoration projects in the HRE where conditions are suitable for oyster survival and successful recruitment. In Appendix D, the Service described research demonstrating that 2,3,7,8-TCDD impaired gonadal development in, and egg viability and larval production of, oysters in the Arthur Kill (*e.g.*, Wintermyer and Cooper 2003). Based on the prevailing science, the Service calculated a recommended sediment threshold of 0.0032 nanograms per gram (ng/g) 2,3,7,8-TCDD (Kubiak *et al.* 2007) for siting potential oyster restoration projects in the HRE. The CRP adopted the Service's recommendation.

The New York/New Jersey Baykeeper oyster restoration project being carried out at the Naval Weapons Station Earle appears to be located in an area with sediment concentrations of 2,3,7,8-TCDD that are likely to exceed the Service's calculated safe threshold (U.S. Army Corps of Engineers, Port Authority of New York/New Jersey, and New York/New Jersey Hudson-Raritan Estuary Program 2016). While the oysters at Naval Weapons Station Earle thus far appear to be surviving and growing, to our knowledge the potential occurrence of reproductive impairments in these oysters, such as those observed by Wintermyer and Cooper (2003), has not been evaluated. Thus, the placement of oysters at this location may be counter-productive to the stated goals of the project (*i.e.*, to promote and enhance recovery of the eastern oyster). In fact, it appears that approximately 62 percent of the sediment within the geographic boundary of the HRE is predicted to have 2,3,7,8-TCDD concentrations in sediment that exceed the threshold of 0.0032 ng/g, including the other four sites where oyster recovery projects have been proposed (Governors Island, Soundview Park, Jamaica Bay, and Bush Terminal Projects).

To address the concerns about potential impacts of 2,3,7,8-TCDD on oyster restoration projects in the HRE, the Service recommends that the Corps initiate a study similar to that performed by Wintermyer and Cooper (2003) be undertaken at existing or proposed oyster recovery projects, if not done so already. This includes projects being undertaken by the New York/New Jersey

Baykeeper (including Naval Weapons Station Earle and Soundview Park), the Oyster Restoration Research Partnership Program, and the NYCDEP NFWF-funded oyster restoration project for Jamaica Bay. If such studies indicate that the oysters are not negatively impacted by the presence of 2,3,7,8-TCDD in project sediments, and the risk of bioaccumulation is low, then the projects should be prioritized for future construction.

In addition, the Service recommends the Corps consider the placement of an oyster restoration project at the U.S. Coast Guard's Search and Rescue Station at Sandy Hook. This area has the same shellfish classification as Naval Weapons Station Earle (NWSE) (New Jersey Department of Environmental Protection 2016b) and is patrolled by both Coast Guard and NPS personnel. Therefore, public access is restricted (similar to that at NWSE) and compliance with current restrictions imposed by the USFDA and the NJDEP can be assured. The Service also requests the Corps consider additional oyster restoration projects in the Navesink and Shrewsbury Rivers, both waterways of the HRE Feasibility Study Area, which are open to shellfishing and appear to have fewer contaminant issues than other areas of the HRE.

4. Lower Raritan River Regional Planning Area, NJ

There are no projects identified in the Lower Raritan River Planning Area.

5. Upper Bay Regional Planning Area, NY and NJ

<u>Bush Terminal (Oyster Restoration) and Governors Island (Oyster Restoration, no CRP numbers assigned by the Corps).</u>

As discussed above with the proposed oyster restoration project at Navy Weapons Station Earle, the sediments at the restoration sites should be characterized to ensure that contaminant levels are below the recommended 2,3,7,8 TCDD level for oyster body burden level.

If sediment contaminant loads of 2,3,7,8 TCDD exceed the 0.0032 ng/g threshold, then the Service recommends that restoration at this site should be postponed until the site is adequately remediated, or a different site is chosen for oyster restoration. If the contaminant loads for 2,3,7,8 TCDD and other analytes are compatible for oyster restoration, the Service recommends that the Corps coordinate with the sponsors of already existing oyster restoration projects in these locations to further the HRE oyster restoration projects.

Common terns nest on abandoned Yankee, Lima, and Tango piers on Governors Island. To prevent disturbance to nesting terns, oyster restoration work should not occur within 300m (Erwin 1989) of these piers between April 1 and September 1.

6. Lower Hudson River Regional Planning Area

There are no projects identified in the Lower Hudson River Planning Area.

7. East River/Harlem River/Western Long Island Sound Regional Planning Area (includes Bronx River), NY

The Service recommends that the Corps characterize the sediments at the proposed restoration sites within this planning region to ensure that restoration efforts at the site are compatible with contaminant loads and/or to prevent the resuspension of contaminants into the water column.

If sites are too contaminated for the proposed projects, then the Service recommends that restoration activities should not go forward. If contaminants are not problematic and projects proceed, then the Service recommends incorporating bio-engineering practices to create “softer” streambanks and to provide habitat for fish and wildlife species.

Long-term monitoring and management should occur at these sites for a minimum of 5 years after project construction, particularly for invasive species. Many of the proposed restoration sites within this planning region were included in NYCDPR’s Bronx River Riparian Invasive Plant Management Plan (Yau *et al.* 2012), the Corps should coordinate with the NYCDPR and use this document in the development of project plans to remove and monitor invasive species at these sites.

a. <u>Flushing Creek (CRP ID 188)</u>

The Corps should ensure that plans for this site are compatible with and/or enhance the goals of the NYDEP’s Combined Sewer Overflow Long-term Control Plan for Flushing Creek (AECOM USA, Inc. 2014).

b. <u>Bronx Zoo and Dam (CRP ID 944)</u>

NYCDPR has created designs for fish ladders at this site (Tobing 2014). The Corps should coordinate with the NYCDPR to implement these designs.

c. <u>Stone Mill Dam (CRP ID 945)</u>

NYCDPR has created designs for fish ladders at this site (Tobing 2014). The Corps should coordinate with the NYCDPR to implement these designs.

d. <u>Shoelace Park (CRP ID 113)</u>

The Center for Watershed Protection, Inc. (2010) recommended the installation of in-stream cover (*i.e.*, anchored large wood or placed boulders) at this site. The Service supports this recommendation and its inclusion in this proposed restoration project.

e. <u>Muskrat Cove (CRP ID 862)</u>

Crimmens and Larson (2006) recommended that the outer bank armor at this site be replaced with large wood, boulders and vegetation to provide fish and wildlife cover, habitat value, and stability. The Service recommends these measures be incorporated into this proposed restoration project.

f. River Park/West Farm Rapids Park (CRP ID 860)

The Center for Watershed Protection, Inc. (2010) recommended the installation of in-stream cover (*i.e.*, anchored large wood or placed boulders) at this site. The Service supports this recommendation and inclusion into this proposed restoration project.

g. Bronxville Lake (CRP ID 857)

The Corps should design fish passage that allows for river herring and American eel at this site.

h. Crestwood Lake (CRP ID 852)

The Corps should design fish passage that allows for river herring and American eel at this site.

i. Garth Woods/Harney Road (CRP ID 942)

The Corps should design fish passage that allows for river herring and American eel at this site.

j. Westchester County Center (CRP ID 854)

No additional recommendations.

k. Soundview Park (Oyster Restoration, no CRP number)

As discussed above the sediments at the oyster restoration sites should be characterized to ensure that contaminant levels are below the recommended 2,3,7,8 TCDD level for oyster body burden level. If sediment contaminant loads of 2,3,7,8 TCDD exceed the 0.0032 ng/g threshold, then restoration at this site should be postponed until the site is adequately remediated, or a different site is chosen for oyster restoration. If the contaminant loads for 2,3,7,8 TCDD and other analytes are compatible for oyster restoration, then the Service recommends that the Corps coordinate with the sponsors of already existing oyster restoration projects in these locations to further the HRE oyster restoration projects.

8. Lower Hudson River Regional Planning Area, NY and NJ

There are no projects identified in the Lower Hudson River Planning Area.

9. Jamaica Bay Regional Planning Area, NY

The Service recommends that the Corps characterize the sediments at the proposed restoration sites within this sub-planning area to ensure that restoration efforts at the sites are compatible with contaminant loads and/or to prevent the resuspension of contaminants into the water column. If sediment at the proposed restoration sites have concentrations of contaminants that exceed the New York State Screening Values (New York State Department of Environmental Conservation 2014a), then restoration activities should not go forward or should be relocated to areas without contaminant risk.

If sediments are within the New York State Screening Values and the project proceeds, then the Service also recommends that the Corps ensure that all project features are in compliance with the 2003 MOA between the Corps, the Service, and the FAA regarding Aircraft-Wildlife Strikes and the *"Advisory Circular Subject: Hazardous Wildlife Attractants on or Near Airports (150/5200-33B)."*

Furthermore, marsh restoration should be focused on high marsh ecotypes as contaminant risk is likely lower over the short-term on fish and wildlife resources and because high marshes are less attractive to large-bodied bird species that are hazardous to aircraft. Also, the highly imperiled saltmarsh sparrow prefers high marsh habitat. The use of bio-engineering and/or living shoreline techniques should be incorporated into project plans wherever possible in order to enhance fish and wildlife habitat and to reduce the use of traditional hardened shorelines (bulkheads, revetments, breakwaters) that provide limited ecological value. More information about living shorelines can be found in ARCADIS U.S., Inc. (2014), National Oceanic and Atmospheric Administration Living Shorelines Workgroup (2015), and New York State Department of Environmental Conservation (2016b). Finally, long-term monitoring and management should occur at these sites for a minimum of five years after protection to ensure project success and the management of invasive species.

a. <u>Fresh Creek (CRP ID 730)</u>

The Service recommends that the Corps coordinate with the NYCDPR in the saltmarsh restoration efforts at this site as they have assessed and/or restored saltmarshes at parks within the Jamaica Bay area. Consideration should also be given to the proximity of the site to the landfill to ensure that leachate does not negatively impact the goals of the restoration and/or negatively impact fish and wildlife resources at the site. The NYCDEP has conducted ribbed mussel research at this site, the Corps should coordinate with NYCDEP to enhance this project and/or to ensure that it is not negatively impacted by HRE restoration efforts.

b. <u>Hawtree Point (CRP ID 161)</u>

No additional recommendations.

c. <u>Dubos Point (CRP ID 149)</u>

Red knots, saltmarsh-nesting birds, horseshoe crabs, and diamondback terrapins have been documented at this site. We recommend that project plans reduce impacts to, and, where appropriate, maximize habitat for these species. The Corps should coordinate with the NYCDEP to ensure that project plans do not interfere with oyster restoration efforts at this site, and to design the project to be complementary to these efforts, if possible.

d. Brant Point (CRP ID 172)

Red knots, saltmarsh-nesting birds, and horseshoe crabs have been documented at this site. Project plans should reduce impacts to, and where appropriate, maximize habitat for these species. The Corps should coordinate with the NYCDEP to ensure that project plans do not interfere with oyster restoration efforts at this site, and to design the project to be complementary to these efforts if possible.

e. Bayswater State Park (CRP ID 148)

Saltmarsh-nesting birds and horseshoe crabs have been documented at this site. We recommend that project plans reduce impacts to, and where appropriate, maximize habitat for, these species.

f. Dead Horse Bay (CRP ID 732)

Red knots, saltmarsh-nesting birds, and horseshoe crabs have been documented at this site. We recommend that project plans reduce impacts to, and, where appropriate, maximize habitat for these species. The importation of any beachfill should be comparable (texture and size) to that of the existing beach areas that provide for spawning horseshoe crabs. Consideration should also be given to the proximity of the site to the landfill to ensure that leachate does not negatively impact the goals of the restoration and/or negatively impact fish and wildlife resources at the site.

g. Elders Center Marsh Island (CRP ID 939)

Elders Point East supports spawning horseshoe crabs as well as a colony of nesting egrets and herons. Saltmarsh nesting bird species and diamondback terrapins have also been documented at this site. To minimize disturbance to wading bird colonies, project activities should not occur within 300m (Erwin 1989) of a rookery between March 1 and September 1. In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season. The spawning season for horseshoe crabs would be protected by this TOY restriction. Additionally, the importation of any beach fill should be comparable (texture and size) to that of the existing beach areas that provide for spawning horseshoe crabs.

h. Duck Point Marsh Island (CRP ID 935)

No additional Service recommendations.

i. Pumpkin Patch – East Marsh Island (CRP ID 936)

No additional Service recommendations.

j. Pumpkin Patch – West Marsh Island (CRP ID 936)

No additional Service recommendations.

k. Stony Point Marsh Island (CRP ID 937)

No additional Service recommendations.

l. Jamaica Bay – Head of Bay (Oyster Restoration, no CRP number assigned)

As discussed above, the sediments at oyster restoration sites should be characterized to ensure that contaminant levels are below the recommended 2,3,7,8 TCDD level for oyster body burden level. If sediment contaminant loads of 2,3,7,8 TCDD exceed the 0.0032 ng/g threshold, then restoration at this site should be postponed until the site is adequately remediated, or a different site is chosen where the compound 2,3,7,8 TCDD is not an issue. If the contaminant loads for 2,3,7,8 TCDD and other analytes are compatible for oyster restoration, the Service recommends that the Corps coordinate with the sponsors of already existing oyster restoration projects in these locations to further the HRE oyster projects.

XIII. SERVICE CONCLUSIONS AND RECOMMENDATIONS

The controlling ecological factor for ensuring success of any of the restoration projects is the risk of exposing aquatic biota to the numerous contaminated sediments found in the HRE Feasibility Study Area. The Corps has identified this risk as an "attractive nuisance" whereby the restoration of habitat "... has the potential to release contamination into the food chain (wildlife or human)." (U.S. Army Corps of Engineers 2010). The Corps continues to acknowledge risk from contaminant exposure to "human health or ecological health" in their 2016 HRE CRP. Early sediment characterization efforts by the Corps has shown that every Planning Region in the HRE is degraded due to contamination and that until remedial actions in the Hudson River, Hackensack River and the Lower Passaic River (including Newark Bay) are completed, these waterways will continue to influence area sediments and biological functions in a negative way.

It is the Service's position that it is not advisable to undertake intertidal marsh restoration projects in areas that may pose a contaminant risk to biota that may use newly restored habitats. While the removal of contaminated material from any individual HRE Feasibility Study restoration project site is a positive action, it is unlikely that an intertidal marsh restoration project in close proximity to known pollution sources will maintain acceptable contaminant levels long-term, or "in permanence." The Service recognizes that it may take decades for appropriate remedies to be developed and implemented in many areas of the HRE; however, there are numerous federal and state authorities that are working today to reduce contamination and revitalize areas of the HRE, including many USEPA Superfund and state hazardous waste sites. Until such time as the contamination threat is properly ameliorated, the Service recommends that the Corps examine areas across the HRE landscape that are demonstrated to be below effects thresholds to fulfill its immediate project purpose/need, or modify such projects to reduce the threat of contaminant risk (*i.e.*, high marsh design). The Service is available to further assist in the development of pre- and post-construction monitoring plans to evaluate contamination in abiotic and biotic media, as well as trophic transfer into fish and wildlife resources.

The Service requests that the Corps convene a meeting with all of the regulatory stakeholders (*i.e*., Service, USEPA, NPS, NOAA, NJDEP, NYSDEC, NYC, and PANY/NJ) to develop a strategy to discuss the contaminant risk that any of these projects pose and to develop a project selection strategy that advances the goals of the HRE Feasibility Study while being sufficiently protective of fish and wildlife resources.

XIV. REFERENCES

6 NYCRR Part 701.7. New York Codes, Rules, and Regulations: 6 NYCRR, Chapter X – Division of Water, Article 2 – Classes and Standards of Quality and Purity, Part 701 – Classifications of Surface Waters and Groundwaters. s 701.7 – Class B Fresh Surface Waters.

6 NYCRR Part 701.8. New York Codes, Rules, and Regulations: 6 NYCRR, Chapter X – Division of Water, Article 2 – Classes and Standards of Quality and Purity, Part 701 – Classifications of Surface Waters and Groundwaters. s 701.8 – Class C Fresh Surface Waters.

6 NYCRR Part 701.13. New York Codes, Rules, and Regulations: 6 NYCRR, Chapter X – Division of Water, Article 2 – Classes and Standards of Quality and Purity, Part 701 – Classifications of Surface Waters and Groundwaters. s 701.13 Class I Saline Surface Waters.

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XV. LIST OF ABBREVIATIONS, ACRONYMS, FOREIGN EXPRESSIONS, AND UNITS OF MEASURE (INCLUDES MAIN BODY AND APPENDICES)

A. ABBREVIATIONS AND ACRONYMS	
2,3,7,8 TCDD	2,3,7,8-tetrachloro-dibenzo-*p*-dioxin
ACJV	Atlantic Coast Joint Venture
ASMFC	Atlantic States Marine Fisheries Commission
AM	Adaptive Management
AMNET	Ambient Biological Monitoring Network
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BSAF	Biota-sediment Accumulation Factor
CARP	Contaminant Assessment and Reduction Project
CCD	Colony Collapse Disorder
CDF	Confined Disposal Facility
CFR	Code of Federal Regulations
Corps	United States Army Corps of Engineers
CRP	Hudson Raritan Estuary Comprehensive Restoration Plan
CWA	Clean Water Act
DDT	dichloro-diphenyl-trichloroethane
DF	Dredging Factors
DOI	Department of the Interior
ECL	Environmental Conservation Law
EE	Ecological Evaluation
EETG	Ecological Evaluation Technical Guidance
EFH	Essential Fish Habitat
ERA	Ecological Risk Assessment
ER-L	Effects Range-low

ER-M	Effects Range-medium
ERRIJB	East Rockaway Inlet to Rockaway Inlet, and Jamaica Bay
ESA	Endangered Species Act
ESC	Ecological Screening Criteria
ESNR	Environmentally Sensitive Area
FAA	Federal Aviation Administration
FSPM	Field Sampling Procedures Manual
FWCA	Fish and Wildlife Coordination Act
GIS	Geographic Information Systems
HRE	Hudson Raritan Estuary
ID	Identification
Inc.	Incorporated
IPaC	Information, Planning, and Conservation System
ISM	Incremental Sampling Methodology
JFK	John F. Kennedy
MBTA	Migratory Bird Treaty Act
MCRIP	Meadowlands Comprehensive Restoration Implementation Plan
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NJ	New Jersey
NJDFW	New Jersey Division of Fish and Wildlife
NJSEA	New Jersey Sports and Exposition Authority
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRC	National Research Council
NY	New York

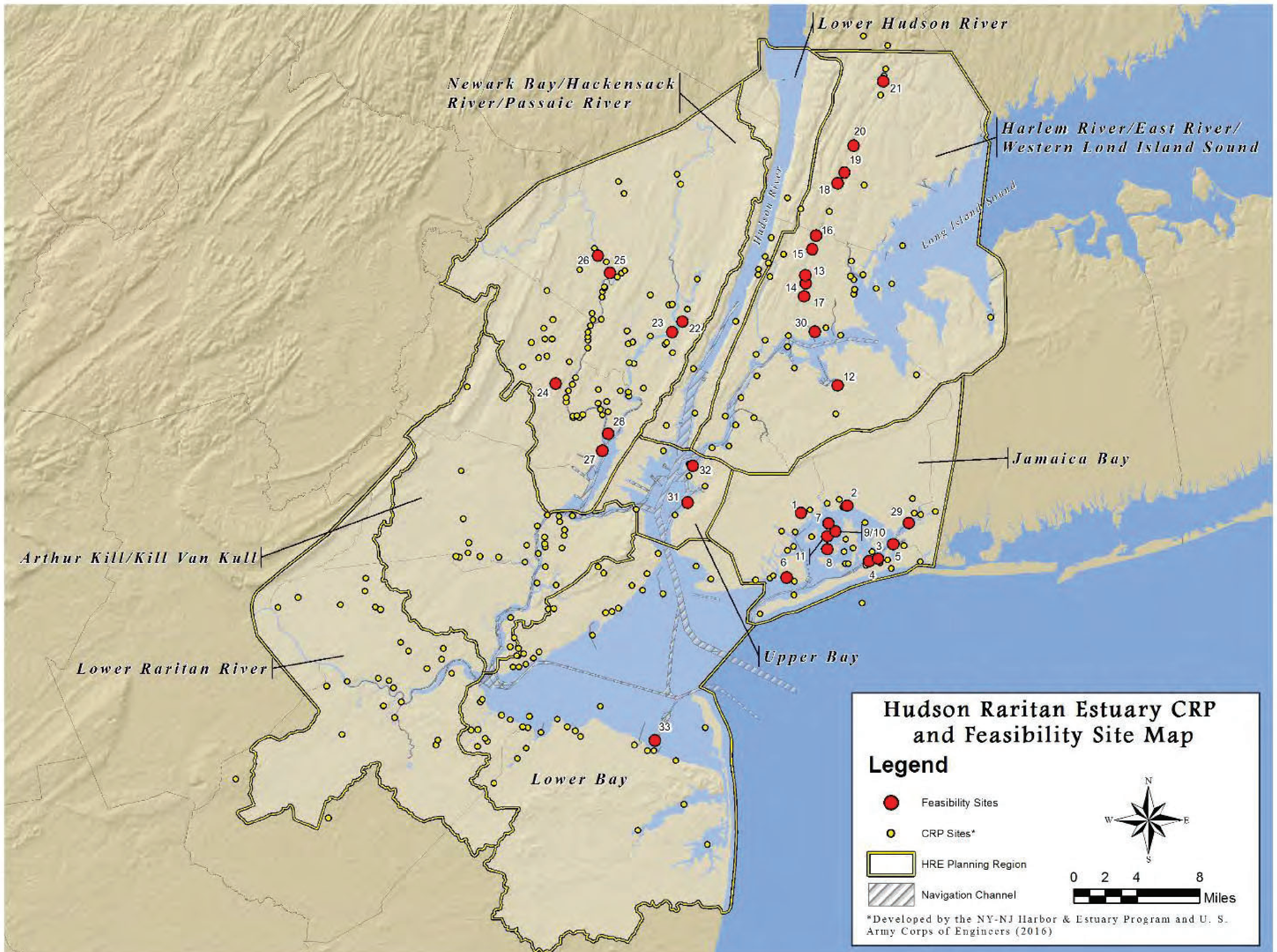
NYC	New York City
NYCDPR	New York City Department of Parks and Recreation
NYNJHAT	New York/New Jersey Harbor and Tributaries
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
PAH	Polycyclic Aromatic Hydrocarbons
PANYNJ	Port Authority of New York and New Jersey
PCB	Polychlorinated biphenyl
PHA	Phytohemagglutinin
QA/QC	Quality Assurance/Quality Control
RBP	Rapid Bioassessment Protocol
Service	U.S. Fish and Wildlife Service
Soil-SI,RI,RA TG	Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil
SOW	Scope of Work
SRP	Site Remediation Program
SWAP	State Wildlife Action Plan
SWG	State Wildlife Grant
TAL	Target Analyte List
TCL	Target Compound List
TEC	Target Ecosystem Characteristic
TEQ	Toxic Equivalents
UCL	Upper Confidence Interval
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFDA	United States Food and Drug Administration

VOC	Volatile Organic Compound
WDA	Wetland Disturbance Area

C. SYMBOLS AND UNITS OF MEASURE	
cm	centimeter
cu.yd.	cubic yards
ft	feet (=0.30 m)
g	gram (=0.0001kg, =0.0353 ounces)
mi	miles
mm	millimeter
ng	nanogram
ppt	parts per trillion

B. ABBREVIATIONS AND MEANINGS OF FOREIGN EXPRESSIONS		
e.g.	*exempli gratia*	for example
et al.	*et alia*	and others
et seq.	*et sequentia*	and the following things
i.e.	*id est*	that is

APPENDIX A. Site-Specific Project Descriptions for the Hudson Raritan Estuary Restoration Feasibility Study.



Restoration Sites

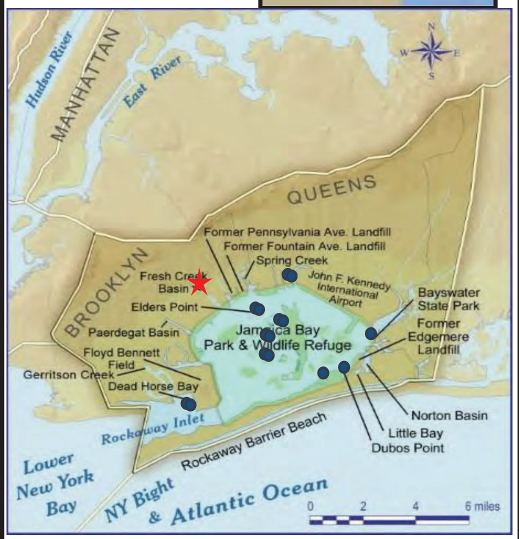
1. Fresh Creek (CRP ID 730)
2. Hawtree Point (CRP ID 161)
3. Dubos Point (CRP ID 149)
4. Brant Point (CRP ID 172)
5. Bayswater State Park (CRP ID 148)
6. Dead Horse Bay (CRP ID 732)
7. Elders Center Marsh Island (CRP ID 939)
8. Duck Point Marsh Island (CRP ID 935)
9. Pumpkin Patch- East Marsh Island (CRP ID 936)
10. Pumpkin Patch-West Marsh Island (CRP ID 936)
11. Stony Point Marsh Island (CRP ID 937)
12. Flushing Creek (CRP ID 188)
13. Stone Mill Dam (CRP ID 945)
14. Bronx Zoo and Dam (CRP ID 944)
15. Shoelace Park (CRP ID 113)
16. Muskrat Cove (CRP ID 862)
17. River Park/West Farm Rapids Park (CRP ID 860)
18. Bronxville Lake (CRP ID 857)
19. Crestwood Lake (CRP ID 852)
20. Garth Woods/Harney Road (CRP ID 942)
21. Westchester County Center (CRP ID 854)
22. Meadowlark Tract (CRP ID 719)
23. Metromedia Marsh (CRP ID 721)
24. Essex County Branch Brook Park (CRP ID 887)
25. Dundee Island Park (CRP ID 900)
26. Clifton Dundee Canal Green Acres (CRP ID 902)
27. Lower Passaic River "Deferred" Site-
    Oak Island Yards (CRP ID 866)
28. Lower Passaic River "Deferred Site"-
    Kearny Point (CRP ID 865)

Oyster Restoration:

29. Jamaica Bay - Head of Bay
30. Soundview Park
31. Bush Terminal
32. Governors Island
33. Naval Weapons Station Earle

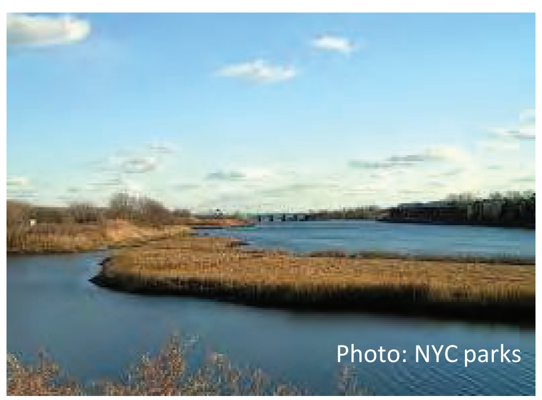
HRE- Jamaica Bay- Fresh Creek

Jamaica Bay Planning Region



★ Fresh Creek

● Other Jamaica Bay Restoration



Baseline Conditions and Water Resource Problems

- **Loss of marsh habitat** – Jamaica Bay has lost over 2000 acres in the last century, 75% reduction from historic levels.
- Site **dominated by non-native, invasive plant species**, which is a threat to existing desirable wetland habitats
- **Poor benthic habitat**
- **Poor tidal flushing and circulation**
- Continuing **shoreline erosion**
- **Fill and hardened shorelines**
- **Landfill leachate, CSO and waste water discharges**
- Presence of a combined sewer overflow at the head of the basin
- **Poor water quality** at the head of Fresh Creek
- **Straightened and deepened creek** with no finger tributaries

Restoration Opportunities/Measures

- Habitat improvements
- Wetland restoration/creation
- Invasive species removal/native species plantings
- Channel modification/realignment
- Bank stabilization
- Stream geomorphology restoration
- Secondary benefits of water quality improvements
- Sediment load reduction
- Basin bathymetry reconfiguration to promote optimal circulation
- Beneficial re-use of material onsite
- Public education/access

Jamaica Bay, Marine Park and Plumb Beach Feasibility Study History

- ✓ Study Resolution in 1990, Recon Report in 1994, FCSA with NYCDEP in 1996
- ✓ 39 restoration opportunities identified in the "Jamaica Bay: Navigational Channels and Shoreline Environmental Surveys" Report in 1997
- ✓ 8 restoration sites recommended and approved at Alternative Formulation Briefing (AFB) December 2010 and included in the Nov 2010 Preliminary Draft Feasibility Report/Environmental Assessment.
- ✓ Sandy 113-2: Interim Report 2 identified study to be evaluated for CSRM
- ✓ Restoration opportunities considered in the East Rockaway to Rockaway - Jamaica Bay Reformulation Study; using Evaluation of Planned Wetlands to characterize functionality at each site (2015)
- ✓ Designs were optimized and were integrated in the "perimeter plan" alternative considered in the Reformulation Study
- ✓ Storm Surge Barrier selected as the coastal flooding measure for interior communities within Jamaica Bay as part of the Reformulation TSP
- ✓ Optimized restoration (Reformulation Study) recommended in HRE Feasibility Study (per strategy approved by Director of Civil Works, Aug 2014)
- ✓ Updated MII Micro-Computer Aided Cost Estimating System (MCASES) costs

Alternative	1	2	3	4	5
Description	✓ Invasive dominated areas restored to saltmarsh or native coastal shrub, grass or forest habitat by grubbing, regrading, and planting. ✓ ~ 6.3 acres of low marsh, 1.7 acres of high marsh, and 9.7 acres of transitional coastal shrub zone restored. ✓ ~4.5 acres of buffer maritime forest restored for sustainability of marsh restoration.	✓ Similar to Alt. 1, with addition of recontouring at head of the basin through half of the underwater community. ✓ This is expected to improve flushing at the head of the basin and improve dissolved oxygen. ✓ ✓ Vegetation plantings and acreages are same as in Alt. 1.	✓ Basin filling only at the head of creek, raising the level of the bottom to intertidal levels, creating marsh and tidal creek habitat resulting in decreased residence time of water at the head of the creek with increase wetland habitat. ✓ 2.1-acre channel created, along with 13.0 acres of low marsh and 2.4 acres of high marsh. ✓ Similar to Alt. 1, an incidental 4.5 acres of forest will be restored, and 11 acres of coastal shrub created. The amount of coastal shrub is increased slightly from previous alt. to create a transition zone in the northwest corner of the site.	✓ Alt. 4 maximizes water quality improvements by improving tidal prism throughout the basin. ✓ Recontouring would occur with bottom filled from head to Jamaica Bay including filling of an existing 19'deep dredged channel in the southern portion of the basin. ✓ Vegetation plantings and acreages are same as in Alt. 1.	**Recommended at AFB 2010 and Approved:** ✓ Combines Alts. 3 and 4. Habitat improvements are exactly the same as Alt. 3. ✓ The head of the basin will be filled to create tidal marshes and creeks; however, the basin will be recontoured to the mouth of Fresh Creek substantially improving flushing throughout the basin, improve DO, increase wetland, and cap contaminated sediment. ✓ Restoration of 33 acre tidal marsh system with protective buffers will be created, which includes 13 acres of low marsh, 2.4 acres of high marsh, 2.1 acres of creek/pool, 4.5 acres of maritime forest and 11 acres of coastal shrub. In addition, 60.1 acres of shallow water will be restored. ✓ Create small detention pond at the head of Fresh Creek as a means of filtering CSO output.
Average Annual Functional Capacity Units (AAFCUs)	88	119	126	208	246
Project Cost	NA	NA	NA	NA	**$37,252,938**

NA: Not Applicable- First Level Costs were only prepared for June 2010 TSP Alternative

Tentatively Selected Plan Design

East Rockaway to Rockaway- Jamaica Bay Reformulation Study Optimization:

- ✓ Restoration of ~29 acres tidal marsh system with protective buffers will be created, which includes 13.6 acres of low marsh, 2.5 acres of high marsh, 1.5 acres of creek/pool, 11.3 acres of maritime forest.
- ✓ 42.4 acres of shallow water through channel regrading will be restored.
- ✓ The head of the basin will be filled to create tidal marshes and creeks; however, the basin will be recontoured to the mouth of Fresh Creek substantially improving flushing throughout the basin, improve DO, increase wetland, and cap contaminated sediment.
- ✓ Create small detention pond at the head of Fresh Creek as a means of filtering CSO output.
- ✓ Reformulation Study would recommend a tide gate at Fresh Creek if the perimeter plan was the TSP.

UPDATED PROJECT COST (2016): $44,051,000

Significance of Restoration in the Region and at the Site

- ✓ One of two last major parcels of contiguous wildlife habitat in NY Bight
- ✓ Major stopover point in the Atlantic Flyway for over 300 species of migratory shorebirds
- ✓ Valuable nursery and feeding area for many finfish species
- ✓ Designated by NYC as a Special Natural Waterfront Area (1999)
- ✓ Recognized as Critical Environmental Area by NYSDEC
- ✓ Highly productive habitat (1999) per USFWS
- ✓ USEPA's CCMP identified Jamaica Bay as only one of two sites in the HRE area targeted for special efforts to protect and restore ecological integrity and values.

Selected Alternative Map
Fresh Creek, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

NYC Environmental Protection

NYC Parks

New York State of Opportunity Department of Environmental Conservation

HRE- Jamaica Bay- Hawtree Park

Jamaica Bay Planning Region

★ Hawtree Point

● Other Jamaica Bay Restoration Recommendations

Baseline Conditions and Water Resource Problems

- **Loss of marsh habitat** – Jamaica Bay has lost over 2000 acres in the last century, a 75% reduction from historic levels.
- Sites is dominated **by non-native, invasive plant species**, which is a threat to existing desirable wetland habitats
- Continuing **shoreline erosion**
- **Filled wetlands**
- Historic structures and canal systems of Hamilton beach **under the fill**
- **All Terrain Vehicle use along shoreline** of project area

Restoration Opportunities/Measures

- Habitat improvements
- Wetland protection and expansion through improvement of surrounding habitats
- Invasive species removal/native species plantings
- Erecting barrier to off-road vehicles

Jamaica Bay, Marine Park and Plumb Beach Feasibility Study History

- ✓ Study Resolution in 1990, Recon Report in 1994, FCSA with NYCDEP in 1996
- ✓ 39 restoration opportunities identified in the "Jamaica Bay: Navigational Channels and Shoreline Environmental Surveys" Report in 1997
- ✓ 8 restoration sites recommended and approved at the Alternative Formulation Briefing (AFB) December 2010 and included in the Nov 2010 Preliminary Draft Feasibility Report/Environmental Assessment.
- ✓ Sandy 113-2: Interim Report 2 identified study to be evaluated for CSRM
- ✓ Restoration opportunities considered in the East Rockaway to Rockaway - Jamaica Bay Reformulation Study; using Evaluation of Planned Wetlands to characterize functionality at each site (2015)
- ✓ Designs were not optimized and were integrated in the "perimeter plan" alternative considered in the Reformulation Study
- ✓ Storm Surge Barrier selected as the coastal flooding measure for interior communities within Jamaica Bay as part of the Reformulation TSP
- ✓ Restoration recommended in HRE Feasibility Study (per strategy approved by Director of Civil Works, Aug 2014)
- ✓ Updated MII Micro-Computer Aided Cost Estimating System (MCASES) costs

Alternative	**1**
Description	**Recommended at AFB 2010 and Approved:** ✓ Within the limited confines of Hawtree Point, one solution was developed. ✓ Alternative 1 recovers 1.7 acres of coastal scrub shrub and grassland habitat from the existing invasive dominated areas. Some regrading and grubbing would remove the invasive species and native grasses and shrubs will be planted at the site. ✓ This alternative also includes the creation of a natural barrier to motorized vehicles. By placing boulders along the boundary of the restoration area, the newly created habitats as well as the preserved existing marshes will be protected. ✓ Through implementation of this project, an existing patch of salt marsh hay (0.07 acres) will be excavated and replaced. ✓ This area is currently being invaded by the surrounding invasives. Salt marsh hay will be planted in the location after the excavation and regrading of the surrounding land. The net amount of wetland habitat will be the same before and after project implementation.
Average Annual Functional Capacity Units (AAFCUs)	**6.5**
Project Cost	**$1,588,678**

Tentatively Selected Plan Design

<u>East Rockaway to Rockaway- Jamaica Bay Reformulation Study Optimization:</u>

✓ Based on recent field observations, no optimization is recommended.

UPDATED PROJECT COST (2016): $1,417,000

<u>Significance of Restoration in the Region and at the Site</u>

✓One of two last major parcels of contiguous wildlife habitat in NY Bight

✓Major stopover point in the Atlantic Flyway for over 300 species of migratory shorebirds

✓Valuable nursery and feeding area for many finfish species

✓Designated by NYC as a Special Natural Waterfront Area (1999)

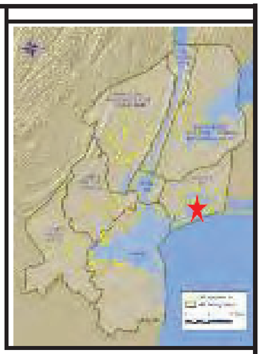
✓Recognized as Critical Environmental Area by NYS Dept of Environmental Conservation

✓Singled out by USFWS as highly productive habitat (1999)

✓USEPA's CCMP identified Jamaica Bay as only one of two sites in the HRE area targeted for special efforts to protect and restore ecological integrity and values.

HRE- Jamaica Bay- Dubos Point

Jamaica Bay Planning Region



★ Dubos Point

• Other Jamaica Bay Restoration Recommendations

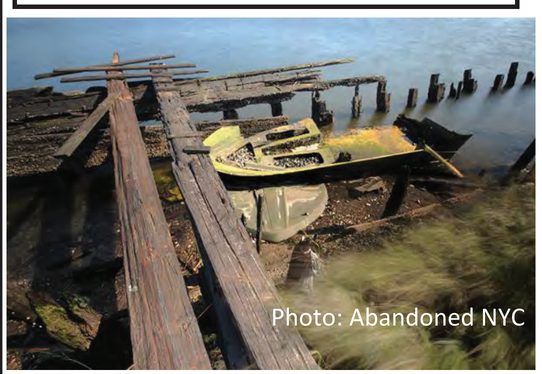


Photo: Abandoned NYC

Photo: Abandoned NYC

Baseline Conditions and Water Resource Problems (EPW Report)

- **Loss of marsh habitat** – Jamaica Bay has lost over 2000 acres in the last century, a 75% reduction from historic levels.
- Site is **dominated by non-native, invasive plant species**, which is a threat to existing desirable wetland habitats.
- High energy littoral zone along western and northern shorelines.
- Continuing **shoreline erosion**.
- Dumped **trash and debris** throughout site.
- **Fill material** over historic marsh.

Restoration Opportunities/Measures

- Habitat improvements
- Wetland creation
- Invasive species removal/native species plantings
- Channel modification/realignment
- Shoreline stabilization
- Incorporate protective strategies against dumping.
- Beneficial use of material on site

Jamaica Bay, Marine Park and Plumb Beach Feasibility Study History

- ✓ Study Resolution in 1990, Recon Report in 1994, FCSA with NYCDEP in 1996
- ✓ 39 restoration opportunities identified in the "Jamaica Bay: Navigational Channels and Shoreline Environmental Surveys" Report in 1997
- ✓ 8 restoration sites recommended and approved at Alternative Formulation Briefing (AFB) December 2010 and included in the Nov 2010 Preliminary Draft Feasibility Report/Environmental Assessment.
- ✓ Sandy 113-2: Interim Report 2 identified study to be evaluated for CSRM
- ✓ Restoration opportunities considered in the East Rockaway to Rockaway - Jamaica Bay Reformulation Study; using Evaluation of Planned Wetlands to characterize functionality at each site (2015)
- ✓ Designs were optimized and integrated in the "perimeter plan" alternative considered in the Reformulation Study
- ✓ Storm Surge Barrier selected as the coastal flooding measure for interior communities within Jamaica Bay as part of the Reformulation TSP
- ✓ Optimized restoration (Reformulation Study) recommended in HRE Feasibility Study (per strategy approved by Director of Civil Works, Aug 2014)
- ✓ Updated MII Micro-Computer Aided Cost Estimating System (MCACES) costs

Alternative	1	2	3
Description	✓ Restoration of marsh by creating tidal channels of ~0.7 acres in an existing filled common reed stand and regrading the area to salt marsh elevations to create ~3.5 acres of low marsh and 0.6 acres of high marsh ✓ Tidal channels in the northern tip will also be reopened to allow salt water flushing and fish migration to alleviate the local overabundance of mosquitoes. ✓ By removing mugwort-dominated areas the project will incidentally restore 2.0 acres of maritime forest. Native canopy trees, understory trees, shrubs, forbs, and ferns will be planted here to prevent the spread of invasive species into the aquatic habitat. ✓ The existing pilings will remain and will continue to offer some protection to the salt marsh on the point.	✓ Similar to Alt.1, with the only difference being the amount of toe protection installed. This Alt. utilizes the existing piles, replacing only the ones that have failed. Restoration plans, vehicle barriers, and vegetation plantings are the same as in Alt. 1.	**Recommended at AFB 2010 and Approved:** ✓ Same as Alt. 1 and maximizes marsh habitat protection by implementing toe protection surrounding the entire western and northern shore. ✓ The north and west shorelines are exposed to high wave velocities from Jamaica Bay. Soldier piles were installed in the past, and still exist on the site but are beginning to fail. In the areas of failure, the erosion is quite obvious. Toe protection in this alternative includes the use of soldier piles or its equivalent, placed to the level of MLW, along the entire shoreline replacing all of the existing piles. ✓ A total of 6.8 acres will be restored at this site including, 3.5 of low marsh, 0.6 of high marsh, 0.7 of creek or pool, and 2 acres of maritime forest.
Average Annual Functional Capacity Units (AAFCUs)	24	27	**58**
Project Cost	NA	NA	**$7,913,855**

NA: Not Applicable- First Level Costs were only prepared for June 2010 TSP Alternative

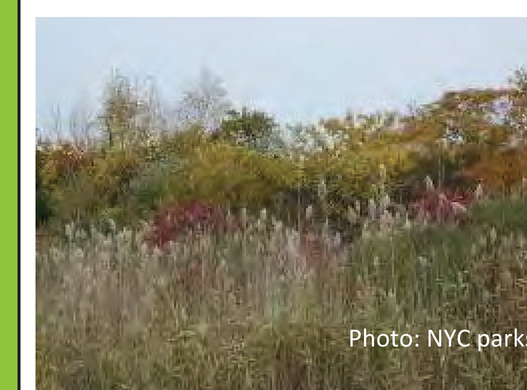


Photo: NYC parks

Photo: Abandoned NYC

Tentatively Selected Plan Design

East Rockaway to Rockaway- Jamaica Bay Reformulation Study Optimization:

- ✓A total of 7.1 acres will be restored at this site including, 3.3 of low marsh, 0.9 of high marsh, 0.7 of creek or pool, and 2 acres of maritime forest.
- ✓The north and west shorelines are exposed to high wave velocities from Jamaica Bay. Soldier piles were installed in the past, and still exist on the site but are beginning to fail. In the areas of failure, the erosion is quite obvious. Toe protection in this alternative includes the use of soldier piles or its equivalent, placed to the level of MLW, along the entire shoreline replacing all of the existing piles.
- ✓Reformulation Study would recommend a composite sea wall if the perimeter plan was the TSP. If this measure is implemented the cost would be borne by the local sponsor.

UPDATED PROJECT COST (2016): $9,261,000

Significance of Restoration in the Region and at the Site

- ✓One of two last major parcels of contiguous wildlife habitat in NY Bight
- ✓Major stopover point in the Atlantic Flyway for over 300 species of migratory shorebirds
- ✓Valuable nursery and feeding area for many finfish species
- ✓Designated by NYC as a Special Natural Waterfront Area (1999)
- ✓Recognized as Critical Environmental Area by NYS Dept of Environmental Conservation
- ✓Singled out by USFWS as highly productive habitat (1999)
- ✓USEPA's CCMP identified Jamaica Bay as only one of two sites in the HRE area targeted for special efforts to protect and restore ecological integrity and values.

NYC Parks

NYC Environmental Protection

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

HRE- Jamaica Bay- Brant Point

Jamaica Bay Planning Region

★ Brant Point

● Other Jamaica Bay Restoration Recommendations

Baseline Conditions and Water Resource Problems

- **Loss of marsh habitat** – Jamaica Bay has lost over 2000 acres in the last century, a 75% reduction from historic levels.
- Sites are **dominated by non-native, invasive plant species**, which is a threat to existing desirable wetland habitats
- A grounded barge offshore has acted as an erosion control device and created high quality benthic habitat behind the structure.
- **Fill material** over historic marsh.
- Continuing **shoreline erosion and wetland loss**.
- **Fill and hardening of shorelines**.
- Extensive **dumping of soil, trash, and debris** in wetland and upland.

Restoration Opportunities/Measures

- Habitat improvements
- Wetland creation/preservation
- Invasive species removal/native species plantings
- Address chronic erosion with off shore breakwaters
- Incorporate protective strategies against dumping.
- Beneficial use of material on site

Jamaica Bay, Marine Park and Plumb Beach Feasibility Study History

- ✓ Study Resolution in 1990, Recon Report in 1994, FCSA with NYCDEP in 1996
- ✓ 39 restoration opportunities identified in the "Jamaica Bay: Navigational Channels and Shoreline Environmental Surveys" Report in 1997
- ✓ 8 restoration sites recommended and approved at Alternative Formulation Briefing (AFB) December 2010 and included in the Nov 2010 Preliminary Draft Feasibility Report/Environmental Assessment.
- ✓ Sandy 113-2: Interim Report 2 identified study to be evaluated for CSRM
- ✓ Restoration opportunities considered in the East Rockaway to Rockaway - Jamaica Bay Reformulation Study; using Evaluation of Planned Wetlands to characterize functionality at each site (2015)
- ✓ Designs were optimized and integrated in the "perimeter plan" alternative considered in the Reformulation Study
- ✓ Storm Surge Barrier selected as the coastal flooding measure for interior communities within Jamaica Bay as part of the Reformulation TSP
- ✓ Optimized restoration (Reformulation Study) recommended in HRE Feasibility Study (per strategy approved by Director of Civil Works, Aug 2014)
- ✓ Updated MII Micro-Computer Aided Cost Estimating System (MCASES) costs

Alternative	1	2
Description	✓ Protection of existing 1.2 acres of marsh and restores an additional 1.9 acres of low marsh, 0.7 acres of high marsh, 2.5 acres of meadow, and 2.4 acres of maritime forest to prevent the spread of invasive species into the aquatic habitat. ✓ Soil excavated to regrade for the marsh creation will be used for onsite landscaping.	**Recommended at AFB 2010 and Approved:** ✓ In addition to the tidal fringe marsh of Alternative 1, Alt. 2 maximizes marsh habitat protection and creates macroinvertebrate habitat by creating offshore rubble mounds. ✓ The grounded barge at this site shows that offshore structures are capable of protecting the marshes and creating beneficial habitat for macroinvertebrates. Three rock mounds are needed to protect the point from the ongoing erosion. The rocks will be placed randomly within a trapezoidal shape to create interstitial spaces of various sizes that can be used as refugia by various species.
Average Annual Functional Capacity Units (AAFCUs)	12	**27**
Project Cost	NA	**$7,681,167**

NA: Not Applicable- First Level Costs were only prepared for June 2010 TSP Alternative

Tentatively Selected Plan Design

East Rockaway to Rockaway- Jamaica Bay Reformulation Study Optimization:

- ✓ No change to acreage, cost updated below. In addition to the tidal fringe marsh of Alt. 1, Alt. 2 maximizes marsh habitat protection and creates macroinvertebrate habitat by creating offshore rubble mounds.
- ✓ The grounded barge at this site shows that offshore structures are capable of protecting the marshes and creating beneficial habitat for macroinvertebrates. Three rock mounds are needed to protect the point from the ongoing erosion. The rocks will be placed randomly within a trapezoidal shape to create interstitial spaces of various sizes that can be used as refugia by various species.
- ✓ This Alt. protects the existing 1.2 acres of marsh, but also restores an additional 1.9 acres of low marsh, 0.7 acres of high marsh, 2.5 acres of meadow, and 2.4 acres of maritime forest to prevent the spread of invasive species into the aquatic habitat.
- ✓ Soil excavated to regrade for the marsh creation will be used for onsite landscaping.
- ✓ Reformulation Study would recommend a composite sea wall if the perimeter plan was the TSP. If this measure was implemented, the cost would be borne by the local sponsor.

UPDATED PROJECT COST (2016): $7,247,000

Significance of Restoration in the Region and at the Site

- ✓ One of two last major parcels of contiguous wildlife habitat in NY Bigh
- ✓ Major stopover point in the Atlantic Flyway for over 300 species of migratory shorebirds
- ✓ Valuable nursery and feeding area for many finfish species
- ✓ Designated by NYC as a Special Natural Waterfront Area (1999)
- ✓ Recognized as Critical Environmental Area by NYS Dept of Environmental Conservation
- ✓ Singled out by USFWS as highly productive habitat (1999)
- ✓ USEPA's CCMP identified Jamaica Bay as only one of two sites in the HRE area targeted for special efforts to protect and restore ecological integrity and values.

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

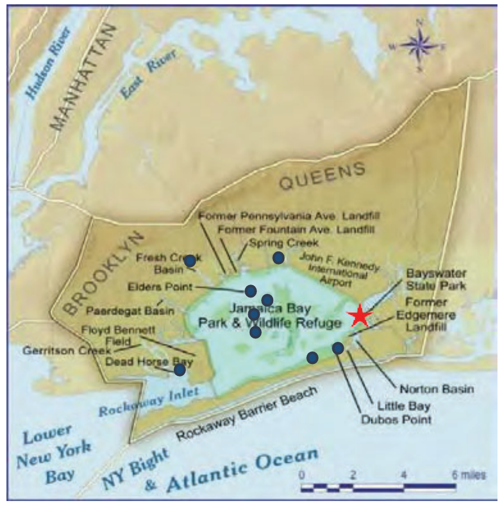
NYC Environmental Protection

NYC Parks

HRE- Jamaica Bay- Bayswater State Park

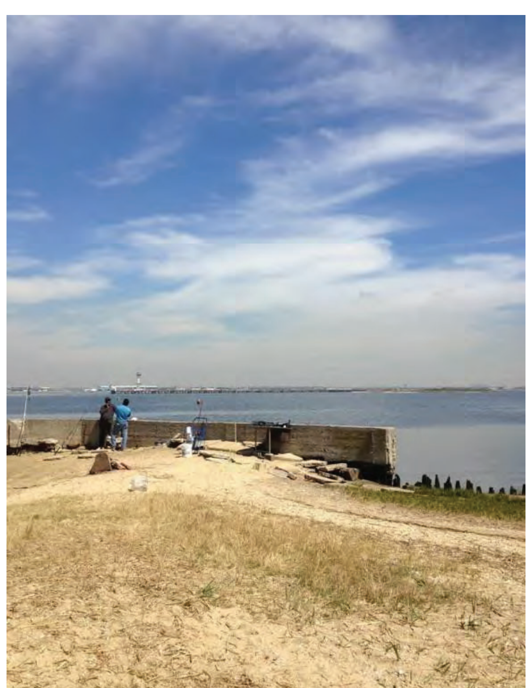
NEW YORK STATE OF OPPORTUNITY. Parks, Recreation and Historic Preservation

Jamaica Bay Planning Region



★ Bayswater State Park

● Other Jamaica Bay Restoration Recommendations



Baseline Conditions and Water Resource Problems

- **Loss of marsh habitat** – Jamaica Bay has lost over 2000 acres in the last century, a 75% reduction from historic levels.
- Site contains a mature native oak forest, rare for this area.
- Site is **dominated by non-native, invasive plant species**, which is a threat to existing desirable wetland habitats
- Potential loss of habitat due to **deteriorating seawall**
- Severe **shoreline erosion**
- **Fill and hardening of shorelines**

Restoration Opportunities/Measures

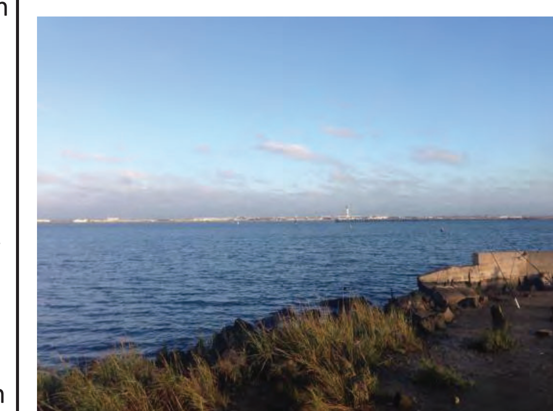
- Habitat Improvements
- Wetland creation/preservation
- Invasive species removal/native species plantings
- Bank/shoreline stabilization

Jamaica Bay, Marine Park and Plumb Beach Feasibility Study History

- ✓ Study Resolution in 1990, Recon Report in 1994, FCSA with NYCDEP in 1996
- ✓ 39 restoration opportunities identified in the "Jamaica Bay: Navigational Channels and Shoreline Environmental Surveys" Report in 1997
- ✓ 8 restoration sites recommended and approved at the Alternative Formulation Briefing (AFB) December 2010 and included in the Nov 2010 Preliminary Draft Feasibility Report/Environmental Assessment.
- ✓ Sandy 113-2: Interim Report 2 identified study to be evaluated for CSRM
- ✓ Restoration opportunities considered in the East Rockaway to Rockaway - Jamaica Bay Reformulation Study; using Evaluation of Planned Wetlands to characterize functionality at each site (2015)
- ✓ Designs were not optimized and were integrated in the "perimeter plan" alternative considered in the Reformulation Study
- ✓ Storm Surge Barrier selected as the coastal flooding measure for interior communities within Jamaica Bay as part of the Reformulation TSP
- ✓ Restoration recommended in HRE Feasibility Study (per strategy approved by Director of Civil Works, Aug 2014)

Alternative	1	2	3
Description	✓ Removes invasive dominated areas by regrading and creating a tidal channel of approximately 0.21 acres and associated salt marsh of 2.0 acres low marsh and 0.4 acres high marsh. All existing areas of marsh or native species will be preserved to the extent possible. ✓ Creation of ~ 0.7 acres of beach/dune ✓ Through selective removal of invasive/non-native vegetation, the mature woodland stands will be restored and replanted with native vegetation to prevent the spread of invasive species into the aquatic habitat and to provide a protective buffer for the marsh system. ✓ Training structures will be created on the banks at the mouth of the creek to stabilize the tidal creek and protect the existing beach and salt marsh habitat.	**Recommended at AFB 2010 and Approved:** ✓ Similar to Alt. 1, but with the addition of creating a tidal pool to the west of the creek/marsh complex. The tidal pool will cover approximately 0.6 acres to allow the creation of an additional 0.5 acres of low marsh. ✓ This area currently includes small patches of salt marsh and switchgrass, as well as some mowed areas that are mugwort-dominated. ✓ Hard structures will cover approximately 0.6 acres including armoring of the point and training structures at the mouth of the channel to protect the area from erosion.	✓ Integrates the tidal creek and marsh system of Alt. 1, but adds in the creation of a T-groin system and coastal dune restoration. ✓ The tidal creek area of restoration is exactly the same as in Alt. 1 and 2. The T-groin system would allow further inundation of tides creating 0.4 acres of shallow water and creating 0.5 acres of low marsh. ✓ Approximately 1.0 acre of dunes/ beach would also be constructed behind the groins. Low/high marsh will be planted in between rocks where tidal inundation and wave climate permit habitat survival.
Average Annual Functional Capacity Units (AAFCUs)	41	76	69
Project Cost	NA	**$4,767,283**	NA

NA: Not Applicable- First Level Costs were only prepared for June 2010 TSP Alternative



Tentatively Selected Plan Design

East Rockaway to Rockaway- Jamaica Bay Reformulation Study Optimization:

✓ Based on recent field observations, no optimization is recommended.

UPDATED PROJECT COST (2016): $5,633,000

Significance of Restoration in the Region and at the Site

✓ One of two last major parcels of contiguous wildlife habitat in NY Bight

✓ Major stopover point in the Atlantic Flyway for over 300 species of migratory shorebirds

✓ Valuable nursery and feeding area for many finfish species

✓ Designated by NYC as a Special Natural Waterfront Area (1999)

✓ Recognized as Critical Environmental Area by NYS Dept of Environmental Conservation

✓ Singled out by USFWS as highly productive habitat (1999)

✓ USEPA's CCMP identified Jamaica Bay as only one of two sites in the HRE area targeted for special efforts to protect and restore ecological integrity and values.

NEW YORK STATE OF OPPORTUNITY. Parks, Recreation and Historic Preservation

HRE- Jamaica Bay- Dead Horse Bay

Jamaica Bay Planning Region

★ Dead Horse Bay

• Other Jamaica Bay Restoration Recommendations

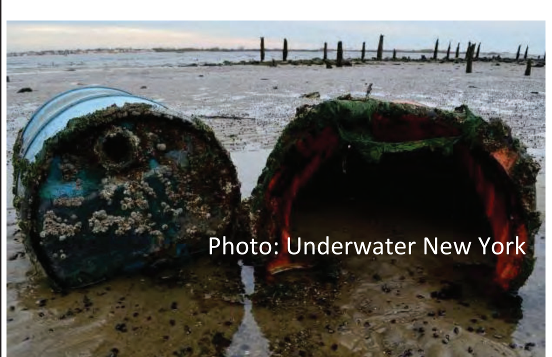


Photo: Underwater New York

Baseline Conditions and Water Resource Problems

- **Loss of marsh habitat** – Jamaica Bay has lost over 2000 acres in the last century, a 75% reduction from historic levels.
- Site is **dominated by non-native, invasive plant species**, which is a threat to existing desirable wetland habitats
- **Poor benthic habitat**
- **Poor tidal flushing and circulation**
- **Fill and hardening of shorelines**
- **Landfill leachate, CSO and waste water discharges**
- **Erosion and exposure of the solid waste landfill**
- **Steep bathymetry** of the southwest and southern shorelines

Restoration Opportunities/Measures

- Habitat improvements
- Wetland creation
- Dune creation in high energy southern parcel
- Invasive species removal/native species plantings
- Channel modification/realignment
- Bank and landfill stabilization
- Shoreline protection stragegies
- Stream geomorphology restoration
- Secondary benefits of water quality improvements
- Sediment load reduction
- Public education/access
- Beneficially reuse the excavated fill onsite

Jamaica Bay, Marine Park and Plumb Beach Feasibility Study History

- ✓ Study Resolution in 1990, Recon Report in 1994, FCSA with NYCDEP in 1996
- ✓ 39 restoration opportunities identified in the "Jamaica Bay: Navigational Channels and Shoreline Environmental Surveys" Report in 1997
- ✓ 8 restoration sites recommended and approved at the Alternative Formulation Briefing (AFB) December 2010 and included in the Nov 2010 Preliminary Draft Feasibility Report/Environmental Assessment.
- ✓ Sandy 113-2: Interim Report 2 identified study to be evaluated for CSRM
- ✓ Restoration opportunities considered in the East Rockaway to Rockaway - Jamaica Bay Reformulation Study; using Evaluation of Planned Wetlands to characterize functionality at each site (2015)
- ✓ Designs were not optimized and were integrated in the "perimeter plan" alternative considered in the Reformulation Study
- ✓ Storm Surge Barrier selected as the coastal flooding measure for interior communities within Jamaica Bay as part of the Reformulation TSP
- ✓ Restoration recommended in HRE Feasibility Study (per strategy approved by Director of Civil Works, Aug 2014)
- ✓ Updated MII Micro-Computer Aided Cost Estimating System (MCASES) costs

Alternative	1	2	3	4
Description	✓ Replace existing *Phragmites* stands in the northern portion of the site with fringe marsh system and native maritime forest species. ✓ The eroding shoreline and landfill in the southern portion of the site will be covered with clean fill and sand from the northern portion of the site. The sand will be used to create dunes along the edge of the water. ✓ Creation of dunes on ~ 31 acres, restore 10 acres of low marsh, and 3 acres of high marsh. Additionally, 87 acres of maritime forest will be restored to act as a protective buffer and provide habitat for the species that utilize the area.	✓ Alt. 2 includes all the elements of Alternative 1. ✓ Removal of 31 acres of the landfill closest to the water which covers the old existing marsh. ✓ Geotubes will be used to stabilize the remaining landfill and to prevent future erosion along the southern bank.	✓ Alt. 3 maximizes marsh habitat by creating a tidal channel in the northern portion of the site and regrading this existing upland *Phragmites* stand to salt marsh elevations. ✓ A tidal channel of ~ 4 acres will be built in the northern parcel and ~31 acres of low marsh and 7 acres of high marsh will be restored. ✓ Clean fill and sand will be beneficially reused to create dunes, and to restore the maritime forest. ✓ Creation of ~ 28 acres of dunes on the site and consequently restores over 60 acres of maritime forest. ~9 acres of existing beach will be preserved in the north. ✓ Stabilize the tidal creek and protect the existing beach habitat, training structures will be created on the banks at the mouth of the creek.	**Recommended at AFB 2010 and Approved:** ✓ Alt. 4 includes all the elements of Alt. 3, and also includes removal of 31 acres of landfill in the southern portion. ✓ The area will also be stabilized with geotubes beneath the dunes to avoid erosion of the site back into the remaining landfill. ✓ Materials will be beneficially reused on site to create dunes along the edge of the water and to restore a buffer to the maritime forest. ✓ This alt. will remove landfill and create dunes on ~27.7 acres of the site and will restore 61 acres of maritime forest on the southern parcel of the project area. Roughly 9 acres of existing beach will be preserved in the north. ✓ To stabilize the tidal creek and protect the existing beach habitat, training structures will be created on the banks at the mouth of the creek.
Average Annual Functional Capacity Units (AAFCUs)	116	166	334	**413**
Project Cost	NA	NA	NA	**$59,873,406**

NA: Not Applicable- First Level Costs were only prepared for June 2010 TSP Alternative

Tentatively Selected Plan Design

East Rockaway to Rockaway- Jamaica Bay Reformulation Study

- ✓ Based on recent field observations, no optimization is recommended.

UPDATED PROJECT COST (2016): $80,181,000

Significance of Restoration in the Region and at the Site

- ✓ One of two last major parcels of contiguous wildlife habitat in NY Bight
- ✓ Major stopover point in the Atlantic Flyway for over 300 species of migratory shorebirds
- ✓ Valuable nursery and feeding area for many finfish species
- ✓ Designated by NYC as a Special Natural Waterfront Area (1999)
- ✓ Recognized as Critical Environmental Area by NYS Dept of Environmental Conservation (NYSDEC)
- ✓ Singled out by USFWS as highly productive habitat (1999)
- ✓ USEPA's Comprehensive Conservation and Management Plan identified Jamaica Bay as only one of two sites in the HRE area targeted for special efforts to protect and restore ecological integrity and values.

Partner Collaboration:
Project now an important part of collaboration with USEPA Trash Free Waters Program, NPS Gateway National Recreation Area General Management Plan and other partner initiates (including NYSDEC, NYCDEP, NYCDP&R, NYSDOS, NYC Department of Sanitation) which have formed an Advisory Committee for the "Dead Horse Bay Restoration Project" formed on 19 July 2016.

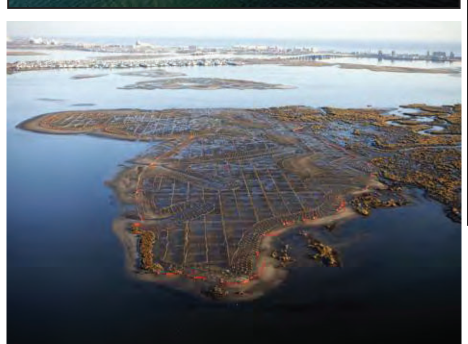
NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NYC Environmental Protection

NYC Parks

HRE – JAMAICA BAY MARSH ISLANDS

Jamaica Bay Planning Region



Baseline Conditions and Water Resource Problems

- Marsh Islands located in the USDOI National Park Service Gateway National Recreation Area
- More than 1,400 acres of tidal salt marsh have been lost from the marsh islands since 1924. Marsh island loss has been estimated at 47 acres/year.

Leveraging Lessons Learned and Plan Formulation

- Builds upon the success of construction of Elders East (2007- 43 acres, CYD), Elders West (2010- 40 acres, CYD), Yellow Bar (2012- 47 acres, 375,000 CYD), Black Wall (2012- 20 acres, 155,000 CYD) and Rulers Bar (2012- 10 acres, 95,000 CYD)
- Jamaica Bay Integrated Ecosystem Restoration Report and EA (2006), Engineering Documentation Report for Yellow Bar (2011), Structures of Coastal Resilience (2015)
- Ecological output for a given acre of marsh island is constant while the cost is dependent upon existing condition depth and the cost of the sand material and material transport.
- Size of the marsh island is influenced by the amount of contiguous and sustainable acreage within the 1974 regulatory footprint within a given range of elevations. The range of acreage at each marsh island has a minimum area driven by cost constraints of mobilization and demobilization, and maximum area described by the existing depth (contour) at which sand placement becomes more expensive and less cost-effective.
- ~50% Subsidence of sand following placement
- Islands selected based on constructability, bathymetry, hydrodynamics
- Past construction/monitoring indicated success of hummock replanting, tri-plugs, optimal spacing (18-in on center), seeding
- Islands selected based on minimum sand volumes for maximum wetland acreage and sustainability
- Marsh islands provide secondary coastal storm risk management benefits

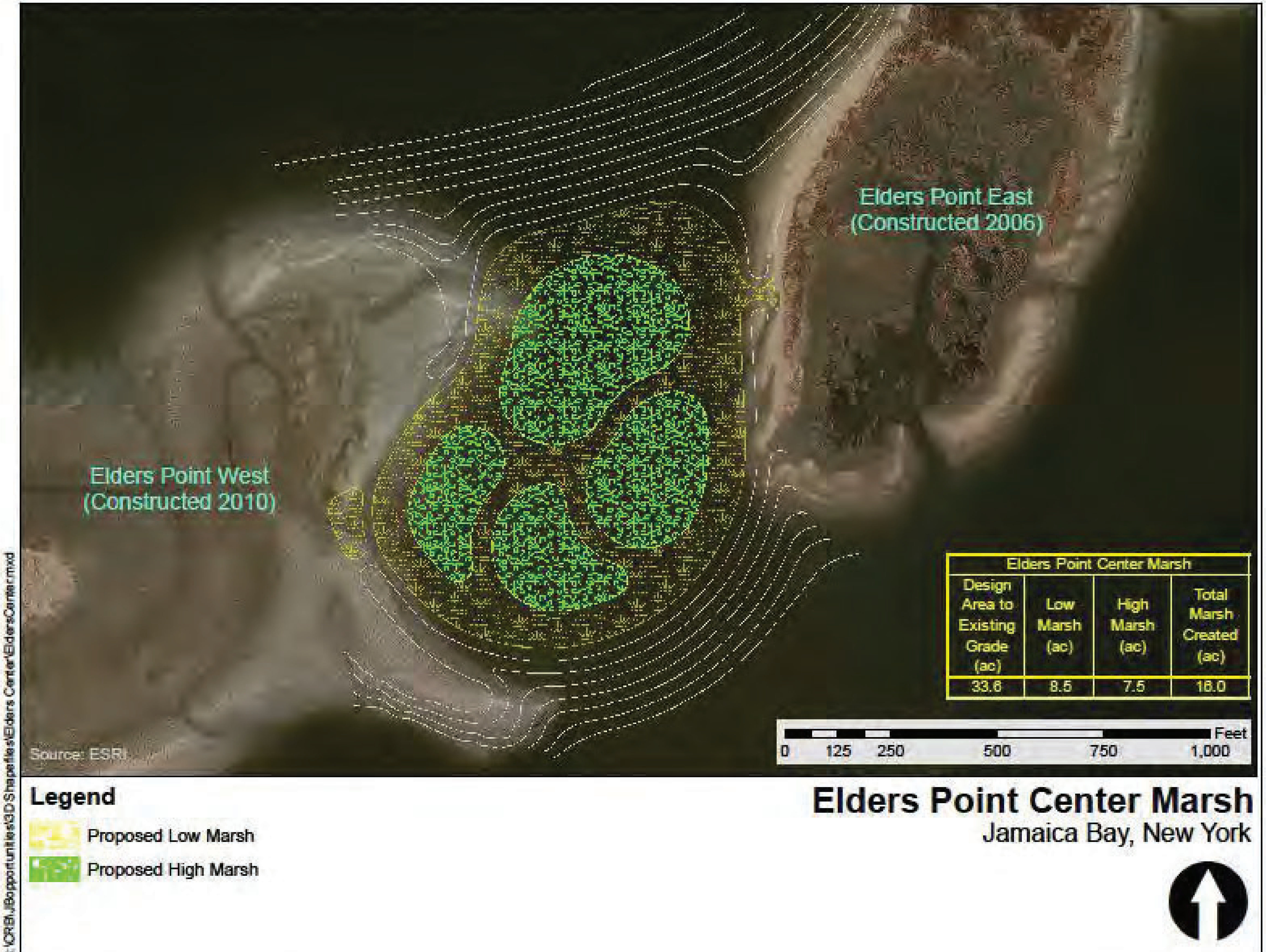
Site	Elders Center	Pumpkin Patch East	Pumpkin Patch West	Duck Point with Atoll Terrace	Stony Creek
CYD Sand	236,410	432,790	206,810	259,800	151,360
Total Marsh Created (ac)	16	35.3	16.3	27.9	51
Description	✓ Restoration of 8.5 aces low marsh and 7.5 acres of high marsh. ✓ Restores an area largely within the 1974 footprint of Elders West and connects two prior restorations ✓ Improves the sustainability of the Elders Marsh complex ✓ Serves as a potential area for natural sediment deposition and accretion.	✓ Restoration of 18.5 acres of low marsh and 16.8 acres of high marsh, returning this portion of Pumpkin Patch Marsh to the approximate dimensions of the 1974 footprint. ✓ Increases land above MTL (-0.27 ft NAVD88) from existing condition area of less than 5 acres to 35.3 acres.	✓ Restoration of 10.8 acres of low marsh and 5.5 acres of high marsh, returning this portion of Pumpkin Patch Marsh to the approximate dimensions of the 1974 footprint. ✓ As with the other recommended restorations, continued restoration within this northeast portion of Jamaica Bay will reestablish a system of marsh islands, resulting in reinforced sustainability for all individual islands. ✓ Increases land above MTL (-0.27 ft NAVD88) from existing condition area of less 4.5 acres to 20.2 acres	✓ Restoration of 15.4 acres of low marsh and 12.5 acres of high marsh ✓ Restores the "core" of this marsh to approximate 1974 dimensions ✓ Highly efficient restoration (cubic yards: marsh acres ratio) owing to the high existing condition elevations found within the 1974 footprint ✓ Atoll terrace design, based on Structures of Costal Resilience research, seeks to harness natural processes of sediment transport to promote sediment accretion and sustainability.	✓ Restoration of 26 acres of low marsh and 25.3 acres of high marsh ✓ Highly efficient restoration (cubic yards: marsh acres ratio) owing to the high existing condition elevations found within the 1974 footprint. ✓ The 1974 footprint of Stony Creek Marsh reveals a land area of approx. 85.0 acres. This restoration effort may be appreciably enlarged without a significant decrease in cubic yards: marsh acres efficiency. ✓ Pending further investigation of existing conditions, certain areas may not be restored or disturbed, thereby resulting in greater efficiency
Project Cost (Beneficial Use) *	**$19,038,318**	**$33,099,742**	**$18,211,235**	**$23,881,709**	**$25,589,074**

* Costs include Preconstruction Engineering & Design (PED) (20.9%) and Construction Management (9%) of first level construction costs similar to other HRE sites. These costs are assumed highly conservative since the costs will likely decrease with the design and implementation of each island.

Significance of Restoration in the Region and at the Site

- ✓ Surrounded by heavily urbanized and densely populated areas of Brooklyn and Queens, including JFK International Airport, there is little remaining habitat suitable for avian and marine wildlife in the region.
- ✓ The rapidly eroding marsh islands of Jamaica Bay are visited by more than 300 bird species annually, providing important nesting habitat to many of them. Wetlands within these islands are home to shellfish, invertebrates and more than 4 dozen fish species.
- ✓ Continued erosion of the marsh islands further reduces the quality of the existing available habitat.
- ✓ Jamaica Bay has been designated by the US Fish & Wildlife Service as a Significant Habitat Complex of the New York Bight Watershed.
- ✓ The enhancement of the marsh islands could help to reduce the fetch distance across Jamaica Bay, thereby potentially reducing such damage to the surrounding neighborhoods as occurred during catastrophic hurricane Sandy.

Tentatively Selected Plan Design

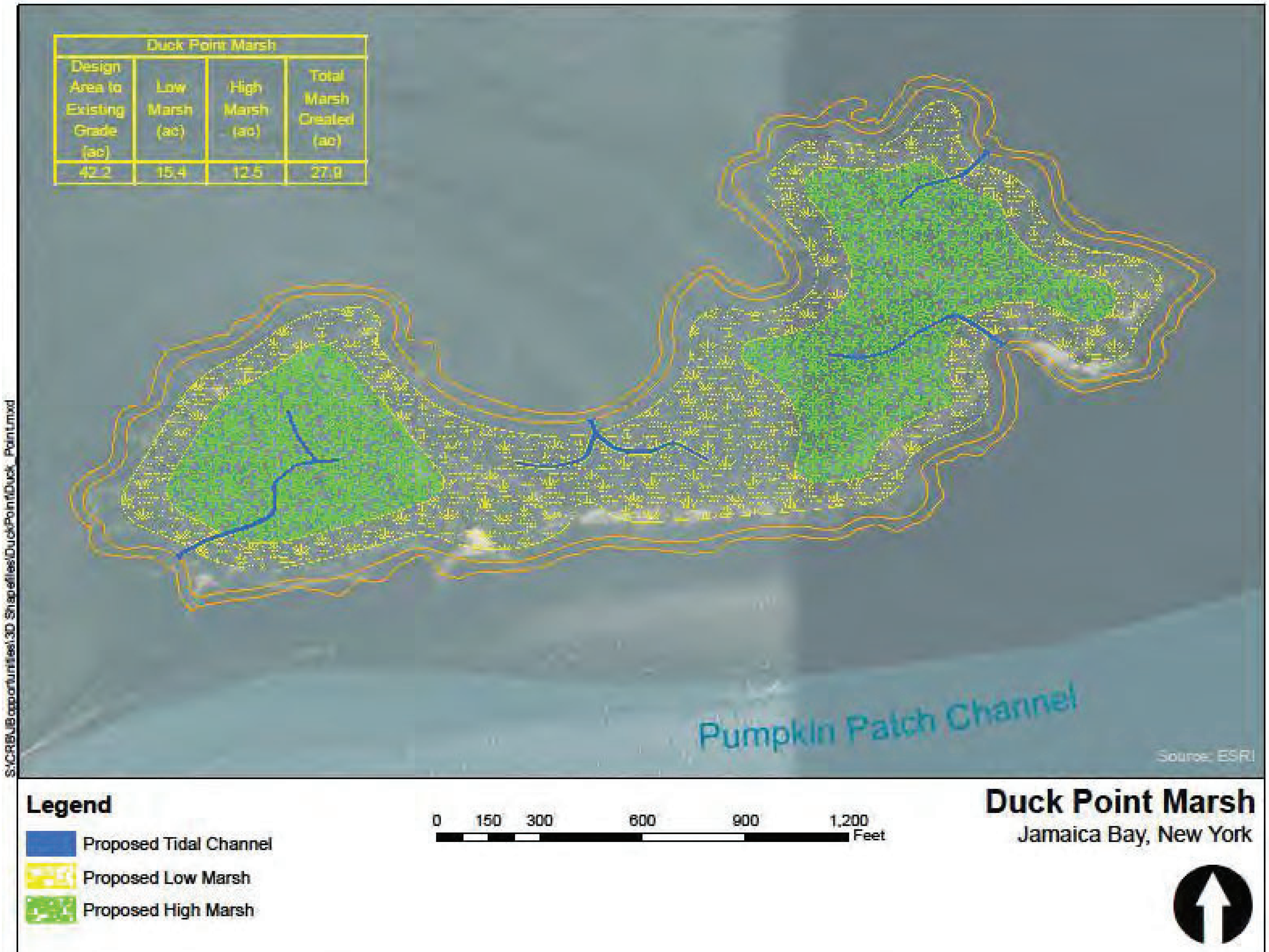


Elders Point Center Marsh			
Design Area to Existing Grade (ac)	Low Marsh (ac)	High Marsh (ac)	Total Marsh Created (ac)
33.6	8.5	7.5	16.0

NYC Environmental Protection

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tentatively Selected Plan Design

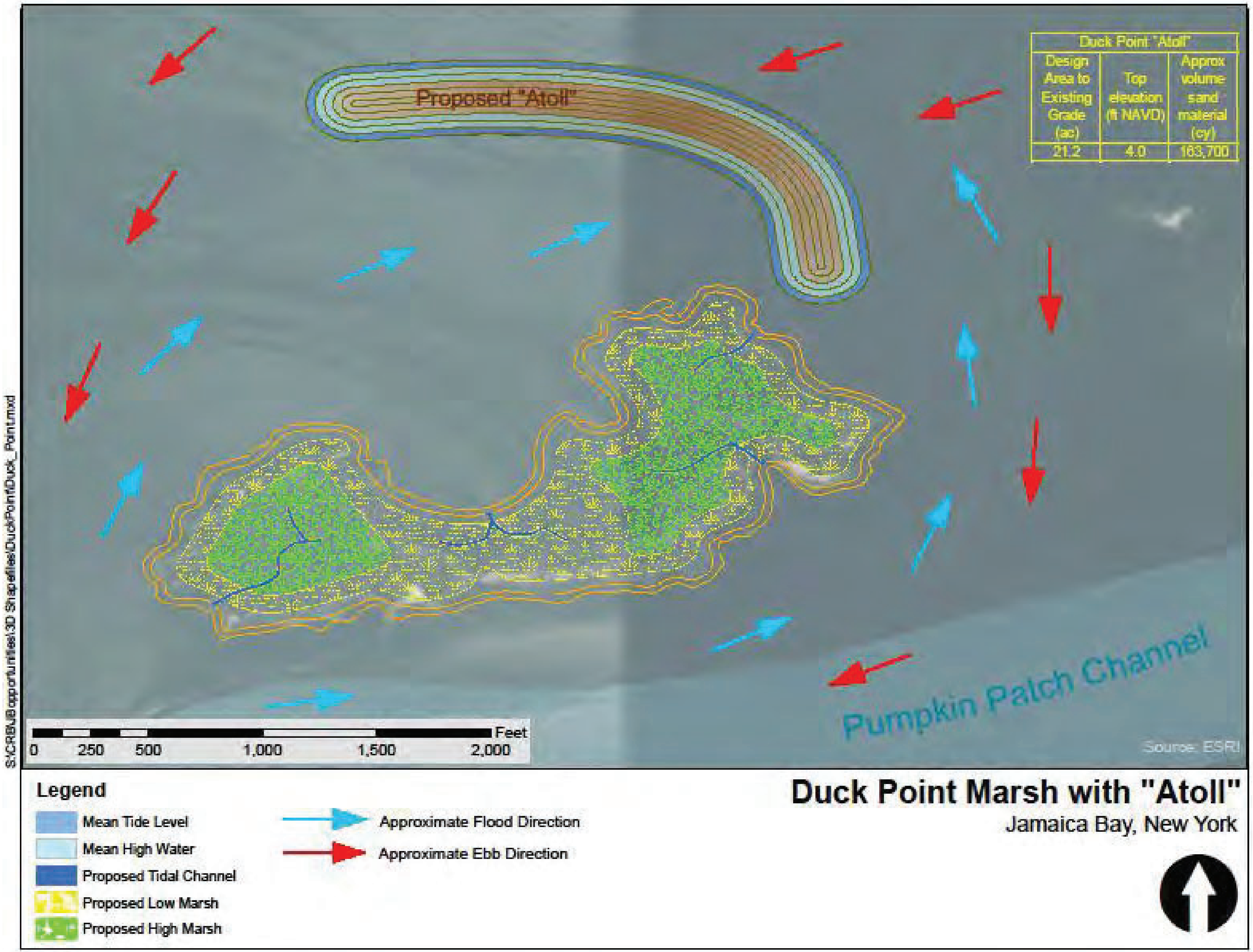


Duck Point Marsh			
Design Area to Existing Grade (ac)	Low Marsh (ac)	High Marsh (ac)	Total Marsh Created (ac)
42.2	15.4	12.5	27.9

NYC Environmental Protection

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tentatively Selected Plan Design



Tentatively Selected Plan Designs

Pumpkin Patch Marsh -West			
Design Area to Existing Grade (ac)	Low Marsh (ac)	High Marsh (ac)	Total Marsh Created (ac)
30.1	10.8	5.5	16.3

Pumpkin Patch Marsh -East			
Design Area to Existing Grade (ac)	Low Marsh (ac)	High Marsh (ac)	Total Marsh Created (ac)
52.0	18.5	16.8	35.3

NYC Environmental Protection

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tentatively Selected Plan Design

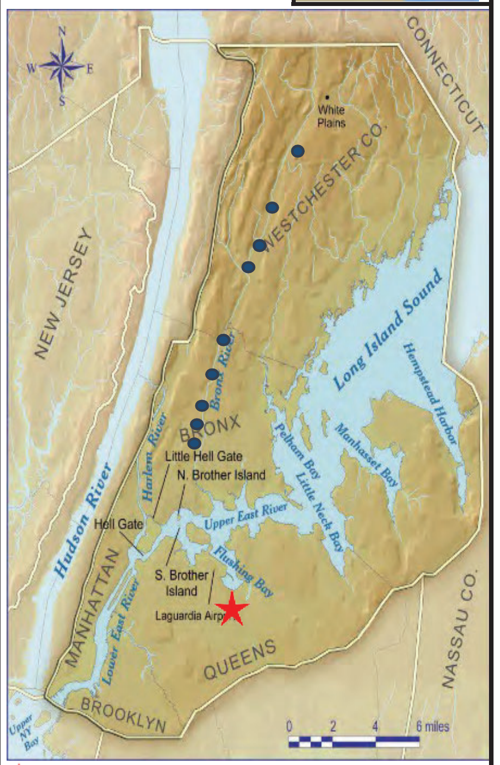
Stony Creek Marsh			
Design Area to Existing Grade (ac)	Low Marsh (ac)	High Marsh (ac)	Total Marsh Created (ac)
69.6	26.0	25.3	51.3

NYC Environmental Protection

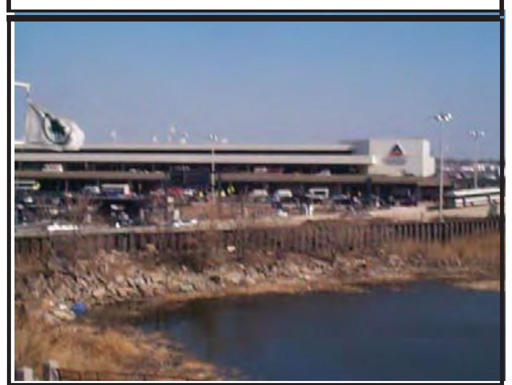
NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

HRE – Flushing Creek

Harlem River, East River, Long Island Sound Planning Region



★ Flushing Creek
● Restoration Sites Recommended in Planning Region



Baseline Conditions and Water Resource Problems

- Study area included Flushing Bay and Creek and the 20,577 ac watershed including ~16,700 ac of highly-urbanized densely-developed land.
- Prior to 1939 World's Fair, Flushing Creek was a sinuous tidal creek that supported an extensive tidal wetland system.
- Development of World's Fair site included **significant straightening of the stream, filling in wetlands**, and reconfiguring headwaters of Flushing Creek.
- Remaining **wetlands are significantly degraded** and are limited to fringe areas.
- Banks of Flushing Creek are organically rich muck **severely eroding** into the creek at low tide.
- **Shorelines and upland habitat are dominated by disturbed invasive species.**
- **Benthic communities are dominated by common pollution-tolerant marine annelids.**
- **Fisheries resources are limited in species diversity and abundance.**
- **Poor hydrologic connection, water circulation and tidal flushing** between Flushing Bay, Flushing Creek and Meadow Lake. **Poor water quality, hypoxic/anoxic conditions and odor problems** from exposed mudflats will be addressed by complementary NYCDEP Long Term Control Plan (CSO abatement) measures and environmental dredging activities.

Restoration Opportunities/Measures

- Habitat improvement
- Wetland creation
- Invasive species removal and native plantings
- Channel modification/realignment to improve flushing and erosion
- Bank stabilization
- Stream geomorphology restoration
- Improve suitability of bottom substrate for benthic community
- Secondary benefits of water quality improvements
- Sediment load reduction

Alternative	A	B	C
Description	✓ Open Water (4.84 ac): Further narrow creek bank to improve tidal flow, mixing from CSO outfalls, and flushing of sediments from upper Flushing Creek. ✓ Mudflat (1.25 ac): Eliminate or minimize mudflats by raising the elevation of low salt marsh surface and use a coir log or other tidal bank revetment to protect the edge from erosion. ✓ Low Marsh (4.01 ac): Re-grade existing common reed-dominated areas to create low salt marsh through planting saltmarsh cordgrass. ✓ High Marsh (0.41 ac): Establish transitional salt shrub/high marsh area between low marsh and upland maritime forest. ✓ Maritime Forest (6.85 ac): Restore existing upland forest area to a Maritime forest Community. ✓ Stormwater infiltration features would be placed to collect runoff from adjacent roads and areas to improve stormwater quality and sustainability of the wetland.	✓ Open Water (5.32 ac): Restoration of tidal creek by narrowing Flushing Creek to promote the flushing of sediments and optimize water quality by improved circulation. ✓ Mudflat (1.16 ac): Re-grade tidal creek edges to establish mudflats with a target elevation between Mean Low Water and Mean Tide Line ✓ Low Marsh (3.67 ac): Re-grade existing common reed-dominated areas to create low salt marsh consisting of saltmarsh cordgrass. ✓ High Marsh (0.44 ac): Establish transitional high marsh/shrub swamp area between low marsh and upland maritime forest. ✓ Maritime Forest (6.77 ac): Restore existing upland forest area to a Maritime forest Community.	✓ Open Water (8.38 ac): No habitat restoration within the tidal creek. ✓ Lower Marsh (2.42 ac): Re-grade existing common reed-dominated areas to create low salt marsh consisting of saltmarsh cordgrass. ✓ Existing Upland (6.56 ac): Preserve existing upland forest with no re-grading or replanting proposed.
Average Annual Functional Capacity Units (AAFCUs)	32.261	31.691	31.886
Project Cost	$ 18,998,000	$ 16,575,000	$ 5,538,000
Annual Cost	$ 788,910	$ 688,290	$ 229,970
Average Cost/AAFCU	$ 24,434	$ 21,720	$ 7,212

Alternatives C is the "Best Buy Plan"

Flushing Bay and Creek Ecosystem Restoration Feasibility Study History

- ✓ Reconnaissance Report (1996) demonstrated Federal interest in ecosystem restoration and related water quality improvements.
- ✓ The Preliminary Draft Feasibility Report prepared November 2007 evaluated 1) tidal and freshwater wetland restoration; 2) dredging in Flushing Bay and Creek; 3) partial or total removal of breakwater at La Guardia Airport; 4) reorientation of Federal Navigation Channel; and 5) Bank Stabilization, Site Cleanup and Debris Removal.
- ✓ A total of 17 Alternatives were evaluated. Cost Effectiveness/ Incremental Cost Analysis "Best Buy Plan" included the recommendation of 4.4 ac of riparian habitat, 5 ac of wetland habitat (both banks).
- ✓ NYCDEP requested coordination between restoration and NYCDEP's Long Term Control Plan (CSO Abatement) and dredging efforts in creek. Draft recommendation was optimized as a result of additional sampling and 3 additional alternatives were prepared.

Tentatively Selected Plan Design

Significance of Restoration in the Region and at the Site

✓Proposed restoration improves habitat for fish, birds and wildlife communities.

✓Restoration provides sediment stabilization, will reduce sediment scouring and improve water quality for fish propagation.

✓T&E species, critical habitat, ecological significance: [search standard databases IPAC, FWS NMFS..)

✓Advancement of TECs and Regional Goals? (calculate contribution to goals)

✓Habitats will provide secondary benefits of flood control to a flood prone area.

Leveraging with Partner Programs

✓Restoration coordinated and sequenced following the completion of NYCDEP water quality improvements resulting from their Long Term Control Plan and dredging and capping of Flushing Creek and Bay.

✓Habitat Sustainability expected from ongoing and continued operation of the Flushing Creek CSO tank.

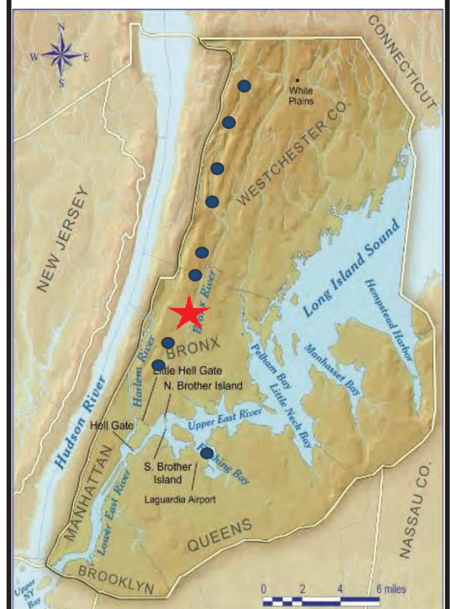
✓Restoration will complement the NYC Mayor's Flushing West Neighborhood Plan as part of the *Housing New York* program and the Flushing West Brownfield Opportunity Area.

NYC Environmental Protection

HRE- Stone Mill Dam

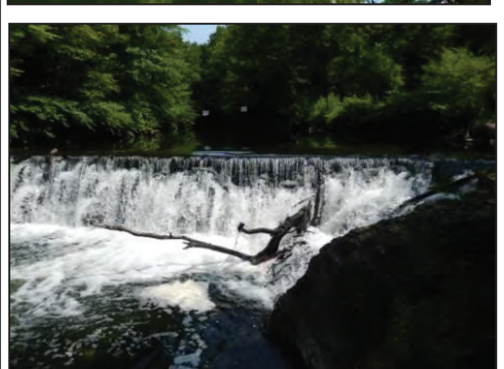
NYC Parks

Harlem River, East River, Long Island Sound Planning Region



★ Stone Mill Dam

● Other Restoration Sites in Region



Baseline Conditions and Water Resource Problems

- The Stone Mill Dam Site (also called Snuff Mill Dam) is situated in a steep valley within the New York Botanical Garden (NYBG). The valley side slopes are over 40-percent grade with numerous rock outcrops. The presence of a dam divides the site into two hydrologic regimes: a slow-flowing waterbody upstream of the dam and a swift-flowing waterbody downstream of the dam.
- A distinct **sewage odor** was encountered downwind of the dam. NYBG staff noted that samples from the River often contained **high levels of coliform bacteria**.
- Wetlands at the site consist only of a few, very small (less than five (<5) square feet), discontinuous pockets of emergent vegetation adjacent to the shoreline.
- Uplands consist of wooded slopes with large rock outcrops.
- Above the dam, the river is ponded and forms a large pool that is over four (4)-feet deep; NYBG personnel indicated that the pool contains a **thick sediment deposit**.
- Below the dam, swifter flows occur and the river bottom consists of cobbles and boulders. Pools in excess of four (4) feet occur below the dam. Most of the shoreline and banks consist of bedrock and boulders.
- At the southeast limits of the project, a stone and masonry retaining wall that separates a paved walkway from the shoreline has partially collapsed.

Restoration Opportunities/Measures

- Invasive species removal and replacement with native plantings
- Installation of fish ladder and concomitant attractors/habitat improvements
- Installation of native plantings area
- Bed Restoration

Alternative	**A**	**B**	**C**
Description	✓ Installation of a fish ladder to link the slow-flowing pool upstream of the dam and the faster-flowing channel downstream of the dam. ✓ Placement of clay-pipe fish attractors at both the upstream and downstream ends of the fish ladder to function as refuge habitats for fish. ✓ Planting of native vegetation along the east bank of the river, abutting the fish ladder (0.03 ac). ✓ Removal of invasive vegetation from a small area along the west bank, immediately downstream of the dam, and replacement with native vegetation.	✓ Installation of a fish ladder to link the slow-flowing pool upstream of the dam and the faster-flowing channel downstream of the dam. ✓ Planting of native vegetation along the east bank of the river, abutting the fish ladder (0.03 ac).	✓ River bed excavation and material replacement upstream of the dam (0.09 ac).
Project Cost	**$700,000**	$630,000	$470,000

Significance of Restoration in the Region and at the Site

- ✓ Fulfills HRE mission by promoting Target Ecosystem Characteristics by increasing /improving, tributary connections, shoreline and shallows, and habitats for fish, crab and lobsters.
- ✓ Improved fish connectivity- providing access for anadromous species
- ✓ Stone Mill Dam fish ladder is a critical component of fish passage projects along the Bronx River which will complement downstream fish ladder projects in order to expand fish passage and provide additional upstream habitat for anadromous fish
- ✓ Reduction of invasive plant species

Tentatively Selected Plan Design

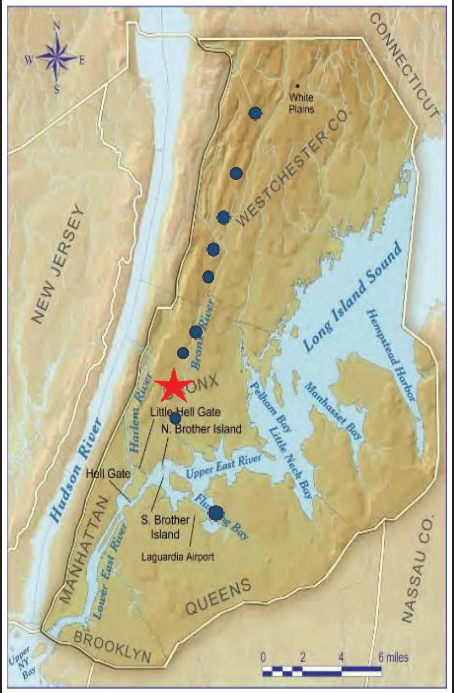
NYC Parks

HRE- Bronx Zoo and Dam

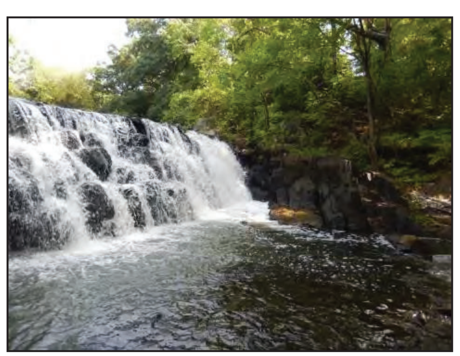
NYC Parks

NYC Environmental Protection

Harlem River, East River, Long Island Sound Planning Region



★ Bronx Zoo and Dam
● Other Restoration Sites in Region



Baseline Conditions and Water Resource Problems

- The Bronx Zoo and Dam site is generally flat and occupied with roadways, parking lots, and the installations of the Bronx Zoo.
- River flow is affected by a dam system consisting of two dams abreast of each other separated by a mid-stream island.
- A distinct **sewage odor** was encountered upon entering the water (downstream of East Fordham Road.)
- Upstream of the dams, the majority of the observed wetlands are narrow strips of emergent vegetation along the banks of the river. However, in the northwest corner, an emergent wetland-mudflat complex has formed. In the southeastern portion of the site, a small stream drains into a flat, low area, resulting in a small forested/scrub/shrub wetland.
- Downstream of the dam, **wetlands are very limited** and consist of only small, **discontinuous pockets of emergent vegetation** adjacent to the shoreline.
- Upstream of the dams, the uplands consist of lawns and a thin wooded strip along the shoreline. Downstream of the dam, the upland areas are comprised of deciduous woodlands. On the west bank, the zoo's amenities limit the width of these woods to fewer than 20 feet. In contrast, the woodlands extend for approximately 150 feet on the east side.
- In the northernmost portion of the site, the river is broader (~100-feet wide) and water flows more slowly than other typical channel sections, with depth over five (5) feet at some locations. Just upstream of the dam, an upland island vegetated mostly by **invasive species** splits the river into two channels that rejoin between the two dams. The west bank of the upstream portion of the river is mostly armored and directly adjacent to a zoo enclosure; **the east bank is fairly steep with lightly vegetated and bare areas**. Downstream of the dams, the narrower channel has a moderate flow with a rocky bottom and bank.
- Stream Visual Assessment Protocol (SVAP) revealed score of 3.9 for overall **POOR water quality** (< 6 considered Poor)

Restoration Opportunities/Measures

- Invasive species removal with native species plantings
- Channel modification with in stream structures
- Debris removal
- Forested scrub/shrub wetland creation
- Emergent wetland creation
- Select native plantings
- Shoreline softening
- Sediment load reduction
- Fish ladder installation
- Public access

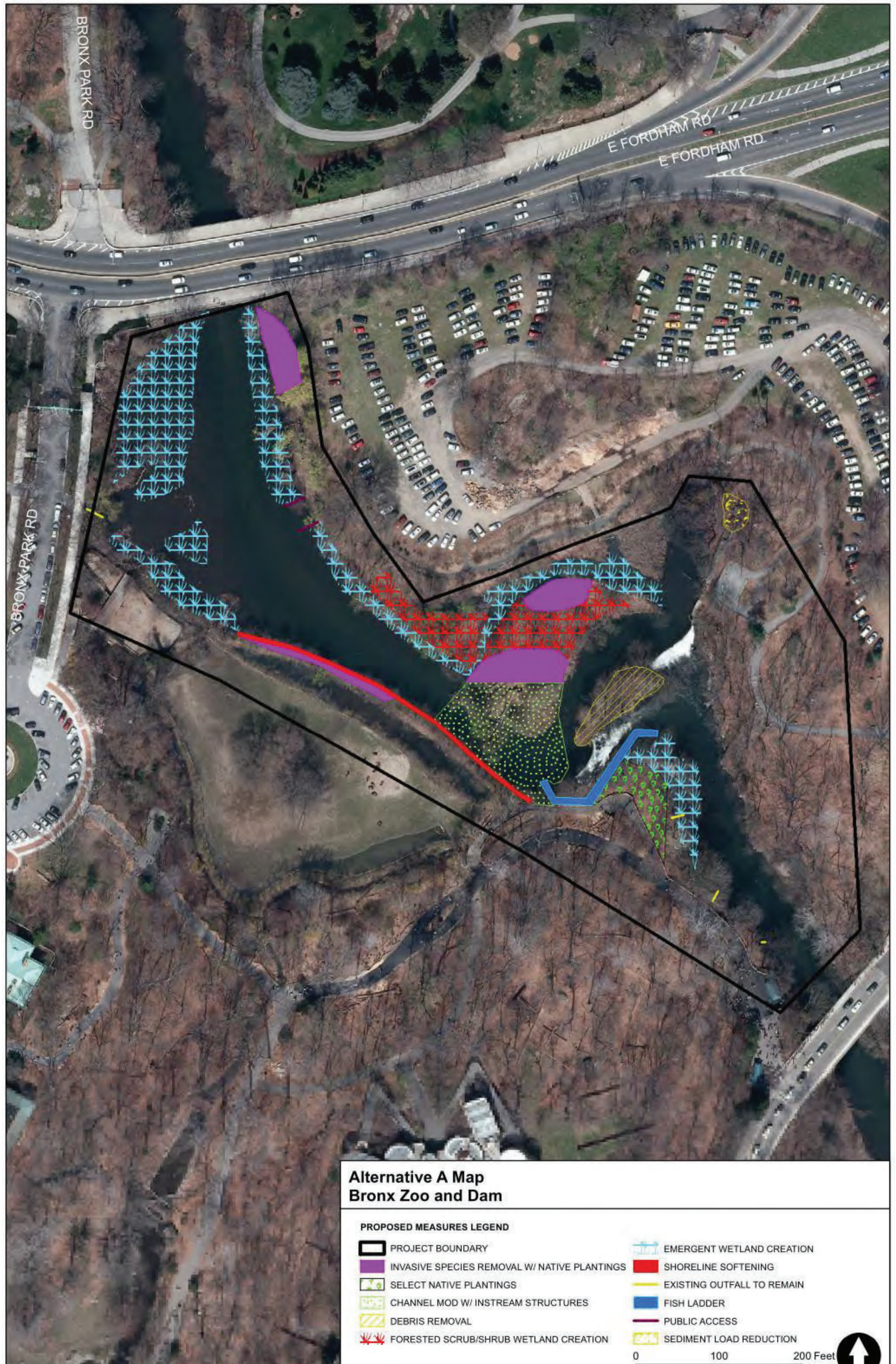
Alternative	A	B	C
Description	✓ Removal of invasive vegetation and native planting (0.27 ac) along both banks, on the upland island upstream of the dams, and additional location downstream of the dams. ✓ Channel modification (~0.35 ac): river bottom excavation and bed material replacement between the island and the west bank . ✓ Bank softening of the west side (415 lf) by select removal of the existing armor and native planting. ✓ Installation of a fish ladder (0.04 ac) to link the excavated channel area upstream of the dams to the river channel below the dams . ✓ Creation of emergent wetlands (0.99 ac) along both banks upstream of the dams, and along the west bank downstream of the dams. ✓ Creation of forested wetlands (0.29 ac) in two locations upstream of the dams, along the east bank and on the island . ✓ Debris removal between the dams (0.09 ac). ✓ Installation of a sediment trap to reduce sediment loads reaching the river. ✓ Improved public access.	✓ Removal of invasive vegetation and native planting (0.56 ac) along both banks, on the upland island upstream of the dams, and additional location downstream of the dams. ✓ Channel modification (~0.35 ac): river bottom excavation and bed material replacement between the island and the west bank . ✓ Bank softening of the west side (415 lf) by select removal of the existing armor and native planting. ✓ Installation of a fish ladder (0.04 ac) to link the excavated channel area upstream of the dams to the river channel below the dams . ✓ Creation of emergent wetlands (0.70 ac) along both banks upstream of the dams, and along the west bank downstream of the dams. ✓ Debris removal between the dams (0.09 ac). ✓ Installation of a sediment trap to reduce sediment loads reaching the river. ✓ Improved public access.	✓ Removal of invasive vegetation and native planting (0.56 ac) along both banks, on the upland island upstream of the dams, and additional location downstream of the dams. ✓ Installation of a fish ladder (0.04 ac) to link the excavated channel area upstream of the dams to the river channel below the dams . ✓ Creation of emergent wetlands (0.54 ac) along both banks upstream of the dams, and along the west bank downstream of the dams. ✓ Debris removal between the dams (0.09 ac). ✓ Installation of a sediment trap to reduce sediment loads reaching the river. ✓ Improved public access.
Average Annual Functional Capacity Units (AAFCUs)	**2.038**	**1.692**	**1.369**
Project Cost	**$6,150,000**	**$4,800,000**	**$3,940,000**
Average Cost	**$226,940**	**$192,730**	**$149,980**
Average Cost/AAFCU	**$121,166**	**$113,908**	**$109,550**

Alternatives A, B and C were all "Best Buy Plans", Alternative most cost-effective; however, Alternative A could be justified

Significance of Restoration in the Region and at the Site

- ✓ Improved aquatic habitat and water quality
- ✓ Improved flow regime
- ✓ Created wetlands provide habitats for migratory birds
- ✓ Created forested wetlands may provide potential habitat and roosting resources for endangered bat species, if present
- ✓ Improved fish connectivity- providing access for anadromous species
- ✓ Increased native biodiversity through wetland creation and targeted removals of invasive plant species
- ✓ Secondary benefit of increased flood control value through wetland creation
- ✓ Alternatives Improve water quality from score of 3.9 to 5.3 (Alternative A), 5.3 (Alternative B) and 4.9 (Alternative C)
- ✓ Improved public access

Tentatively Selected Plan Design

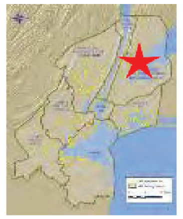


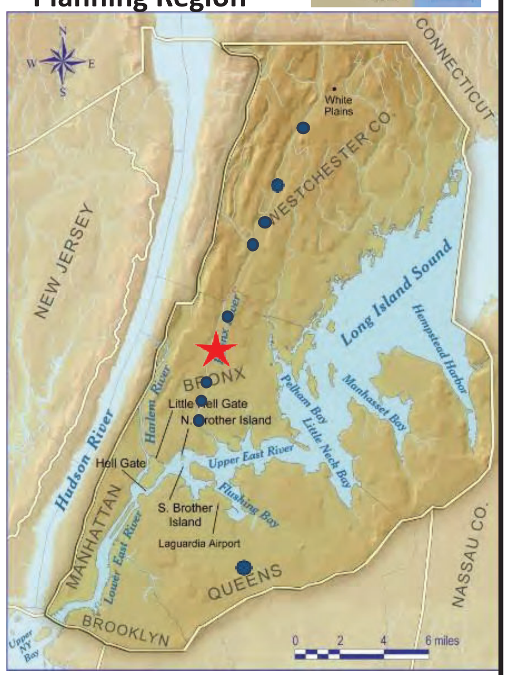
NYC Environmental Protection

NYC Parks

HRE- Shoelace Park North and South

Harlem River, East River, Long Island Sound Planning Region





Shoelace Park

Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems

- Shoelace Park is surrounded by dense, urban development. The west side of the site consists largely of the Bronx River Parkway's roadway embankment.
- Site characterized by **over-widened channel** with **steep vertical banks and eroded shoreline**.
- The eastern side of the site is parkland, predominantly consisting of maintained lawns that rise on a slope of notable steepness (~25- to 30-% grade) to 60 feet in elevation from the River channel.
- Banks are sparsely vegetated and wetlands are limited to very narrow, dispersed strips of emergent vegetation. The wetlands and large portions of the upland riverine corridor provide **low quality upland buffer** and are **dominated by invasive species**.
- Much of the uplands consist of Park lawns with pockets of deciduous woodlots in the extreme north and south sections.
- The channel bottom is sandy and generally one to three feet deep with limited riffles and pools, **poor water quality** and i**ncreased sediment load.**

Restoration Opportunities/Measures

- Habitat Improvement
- Wetland Creation
- Invasive species removal/native species plantings
- Channel modification/realignment
- Bank Stabilization
- Stream geomorphology restoration
- Secondary benefits of water quality improvements
- Sediment load reduction
- Public education/access

Alternative	A	B	C
Description	✓ Restoration of Bronx River reach to pre-industrialization conditions: realigns channel with natural meanders and restores large tracts of forested wetlands along the banks. ✓ Entire channel modification with instream structures (1.3 mi): restoration of natural pools, thalweg, riffle complexes, etc. - resulting in a substantial increase of aquatic habitat value. ✓ Bank stabilization with environmental engineering techniques that provide vegetation coverage along the banks (>1.1 mi on both sides). ✓ Select native plantings (>2.95 ac) would provide a wooded riparian corridor along the banks of the entire reach. The riparian woodlands and restored forested wetlands would provide habitat resources that are currently very limited in the Bronx urban environment and reduce nutrient inputs to the water. ✓ Sediment load reduction with bank stabilization and installation of rain gardens, bioretention basins, etc. ✓ Invasive removal and select native plantings (~3.5 ac). ✓ Public access to the river would be maintained.	✓ Entire channel modified with instream structures (1.3 mi): restoration of natural pools, thalweg, riffle complexes, etc. - resulting in a substantial increase of aquatic habitat value. ✓ Bank stabilization with environmental engineering techniques that provide vegetation coverage along the banks (>1 mi on both sides). ✓ Select native plantings would provide a wooded riparian corridor along the banks of the entire reach. ✓ Sediment load reduction with bank stabilization and installation of rain gardens, bioretention basins, etc. ✓ Invasive removal and select native plantings (~3.5 ac). ✓ Public access to the river would be maintained.	✓ Entire channel modified with instream structures (~1.2 mi): restoration of natural pools, thalweg, riffle complexes, etc. - resulting in a substantial increase of aquatic habitat value. ✓ Bank stabilization with environmental engineering techniques that provide vegetation coverage along the banks (>1.1 mi). ✓ Sediment load reduction with bank stabilization and installation of rain gardens, bioretention basins, etc. ✓ Invasive removal and select native plantings (3.5 ac). ✓ Public access to the river would be maintained.
Average Annual Functional Capacity Units (AAFCUs)	3.304	0.462	0.364
Project Cost	$24,260,000	$18,050,000	$8,590,000
Average Annual Cost	976,610	726,620	344,470
Average Cost (1000)/AAFCU	295,584	1,572,770	946,340

Alternative A is the "Best Buy Plan"

Significance of Restoration in the Region and at the Site

- ✓ Leverages proposed NYCDEP and NYCDP&R improvements including sediment load reduction within lawn areas of the park, invasive species removal and select native plantings.
- ✓ Restoration would reduce nutrient inputs to the water.
- ✓ Habitats will provide secondary benefits of flood control to a flood prone area.
- ✓ Creation of wetland forest would restore a limited habitat resource in the Bronx. Large trees could be a potential roosting/habitat resource for protected bat species, if present.
- ✓ Fulfills HRE mission by promoting Target Ecosystem Characteristics by increasing /improving wetlands, public access, shoreline and shallows, and habitats for fish, crab and lobsters.
- ✓ Environmental Justice: Restoration provides benefits for significant underserved population
- ✓ NYCDEP Coordination with CSO Abatement Program

Tentatively Selected Plan Design

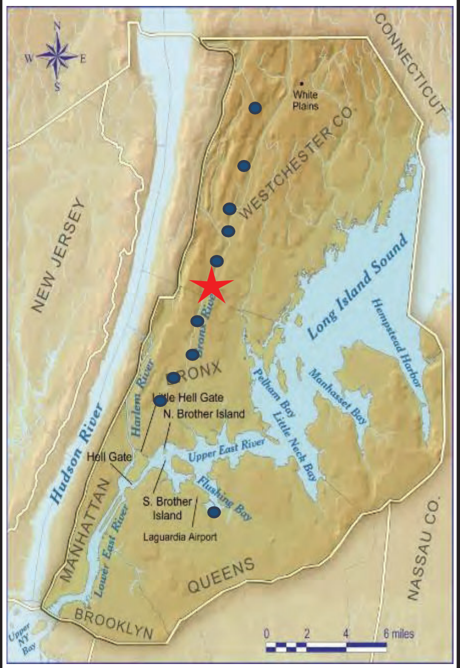
North

South (downstream)

NYC Parks

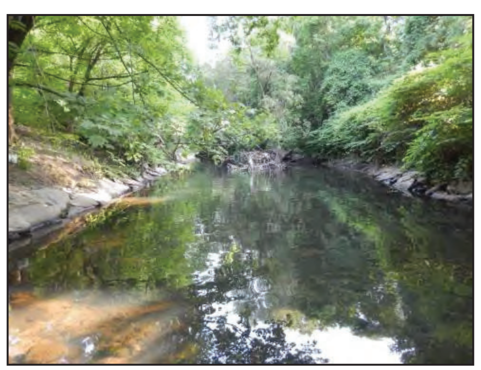
HRE- Muskrat Cove

Harlem River, East River, Long Island Sound Planning Region



★ Muskrat Cove

● Other Restoration Sites in Region



Baseline Conditions and Water Resource Problems

- The Muskrat Cove site is located just north of the Shoelace Park Site, flowing through a small valley located between a Metro North commuter rail line and the Bronx River Parkway, and intersected by Webster Avenue.
- The majority of the terrestrial area of the site consists of wooded slopes dominated by deciduous species.
- The **wetlands are limited** to very small isolated pockets with **sparse vegetation**.
- The uplands consist of maintained lawns associated with the park and Parkway right-of-way. Portions of the upland slopes were occupied by **dense stands of Japanese knotweed**. Paved walkways, retaining walls and other infrastructure fragment the woodlands.
- The river is shallow and widened with limited pools and riffles. The river bottom is sandy with large boulders.
- **Banks are armored** throughout much of the site, including almost the entire western shoreline; in some areas vegetation has grown up through cracks in the armor. In the northeastern half of the site, unarmored **banks are generally steep and some are undercut.**

Restoration Opportunities/Measures

- Invasive species removal and replacement with native plantings
- Channel modification with instream structures
- Debris and snag removal
- Shoreline softening and bank stabilization
- Sediment basin installation

Alternative	A	B	C
Description	✓ Invasive species removal with native plantings on the upland slopes and along both banks throughout the length of the site (~0.49 ac). ✓ River bank stabilization between Nereid Avenue and the rail line bridge over the river, construction of vegetated cribwalls, softening using drilling with native plant materials (1,350 lf). ✓ Removal of debris and log jams from the river (1.24 ac). ✓ Channel modification along two segments (1.24 ac), excavation and replacement of bed material, and construction of instream cross vanes and J-hooks. ✓ Installation of a sediment basin at an existing outfall to reduce sediment loads reaching the river.	✓ Invasive species removal with native plantings on the upland slopes and along both banks throughout the length of the site (~0.49 ac). ✓ River bank stabilization between Nereid Avenue and the rail line bridge over the river, construction of vegetated cribwalls, softening using drilling with native plant materials (1,350 lf). ✓ Removal of debris and log jams from the river (1.24 ac). ✓ Channel modification along one segment, excavation and replacement of bed material, and instream structures (0.11 ac). ✓ Bed restoration along another segment (0.26 ac) with creation of a riffle-pool complex. Excavation and replacement of bed material (0.10 ac), and placement of cut and round boulders. ✓ Installation of a sediment basin at an existing outfall to reduce sediment loads reaching the river.	✓ Invasive species removal with native plantings on the upland slopes and along both banks throughout the length of the site (~0.49 ac). ✓ River bank stabilization between Nereid Avenue and the rail line bridge over the river (640 lf). ✓ Removal of debris and log jams from the river (1.24 ac). ✓ Bed restoration along another segment (0.26 ac) with creation of a riffle-pool complex. Excavation and replacement of bed material (0.10 ac), and placement of cut and round boulders. ✓ Installation of a sediment basin at an existing outfall to reduce sediment loads reaching the river.
Average Annual Functional Capacity Units (AAFCUs)	0.757	0.766	0.095
Project Cost	$7,610,000	$7,810,000	$3,970,000
Avg Annual Cost	$306,350	$314,400	$159,410
Average Cost/AAFCU	$404,686	$410,443	$1,677,950

Alternatives A and B are "Best Buy Plans" and Alternative A is the most cost effective.

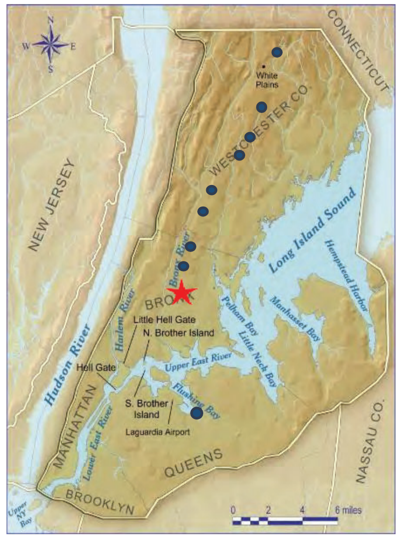
Significance of Restoration in the Region and at the Site

- ✓ Fulfills HRE mission by promoting Target Ecosystem Characteristics by increasing /improving wetlands, public access, shoreline and shallows, and habitats for fish, crab and lobsters.
- ✓ Improvements designed to act in concert with future Parks Department activities.
- ✓ Improved aquatic habitat and water quality
- ✓ Improved flow regime
- ✓ Reduction of invasive plant species
- ✓ Due to the proximity of major arterial infrastructure (road and rail embankments), shorelines were engineered with excessive amounts of concrete. Restoration efforts were designed to retain structural integrity -yet provide some opportunities for vegetative growth.
- ✓ Park is the only natural resource in a dense urban environment, debris removal and other improvements will enhance the user's experience.

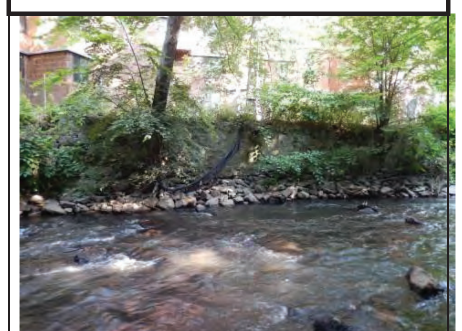
Tentatively Selected Plan Design

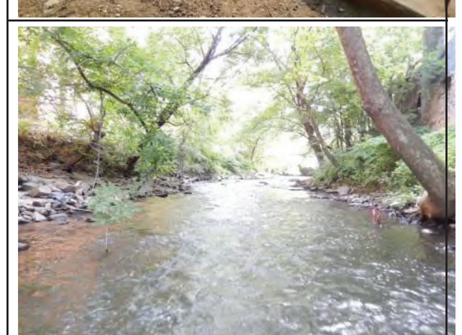
HRE- River Park/West Farm Rapids Park

Harlem River, East River, Long Island Sound Planning Region



★ Bronx River Park
● Other Restoration Sites in Region





Baseline Conditions and Water Resource Problems

- River Park/West Farm Rapids Park is approximately 900 feet in length, bisected by 180th Street, located within a **densely populated, urban area**.
- Strong anthropogenic pressures: proximity of commercial and residential developments, roads, and urban parks with **limited and/or disturbed natural areas**.
- **Wetland resources are extremely limited**: few very small pockets and **sparsely vegetated wetlands**.
- Uplands consist of developed areas and an urban park, interspersed with a few small woodlots. The woodlots are **fragmented and offer limited, if any, habitat resources** to organisms not adapted for an urban environment. The site's uplands are **further impaired by garbage and stormwater runoff**.
- The river's benthic substrate largely consists of large pieces of concrete, bricks, other construction debris, and some boulders. Several large shaded pools occur. **Algae and anthropogenic debris** are present throughout the site. **Engineered Channel** with most of the **shoreline is armored**, consisting of vertical concrete debris/stone armoring or engineered walls constructed of tires and other man-made materials.
- Stream Visual Assessment Protocol (SVAP) revealed score of 4.3 for overall **POOR water quality** (< 6 considered Poor)

Restoration Opportunities/Measures

- Invasive species removal with native planting
- Debris removal
- Channel modifications with instream structures
- Select native plantings
- Emergent wetland creation
- Shoreline softening
- River bed restoration

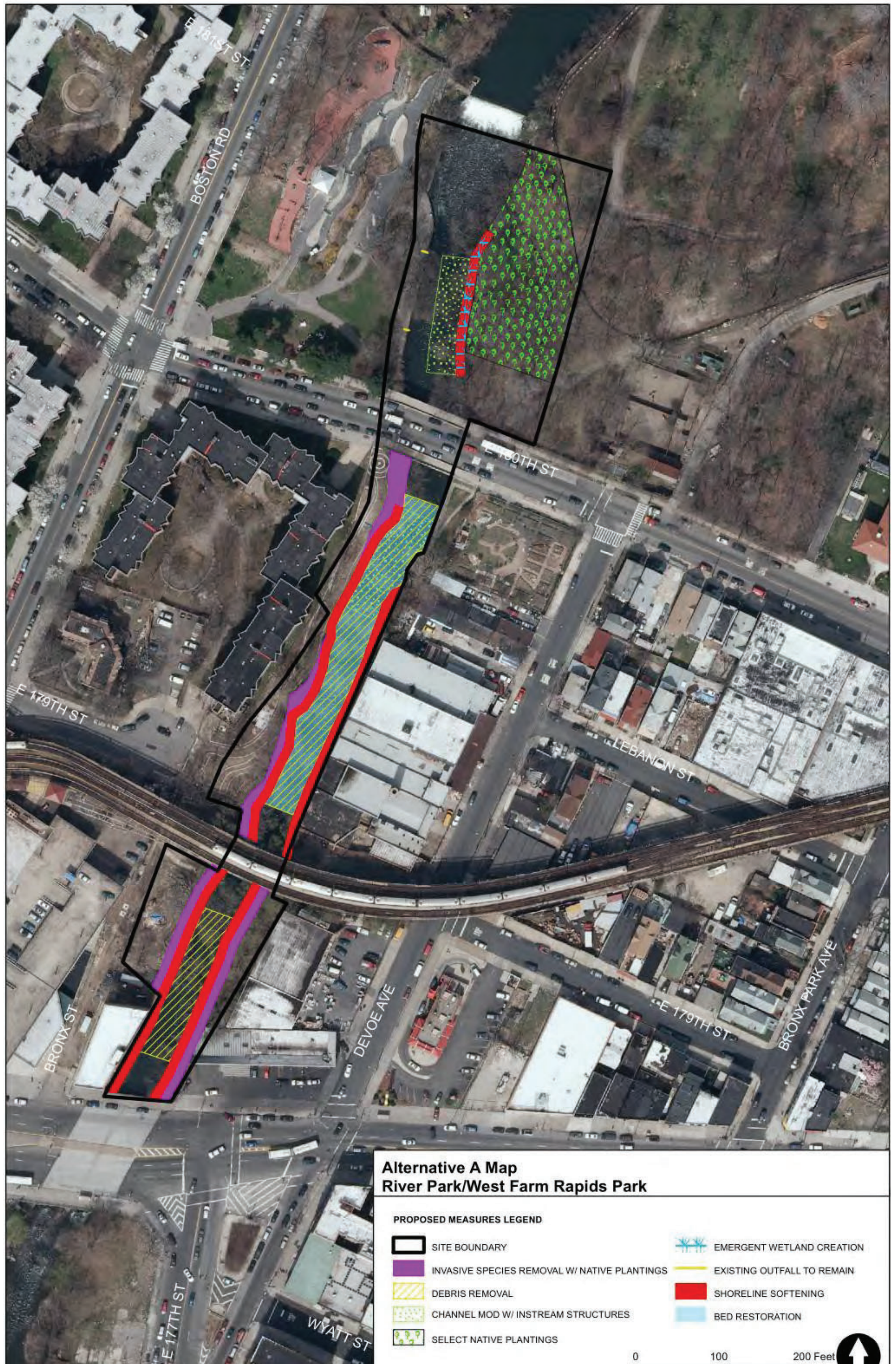
Alternative	A	B	C
Description	✓ Creation woodland area along the east side of the site with native upland trees and shrubs (~0.59 ac). ✓ Shoreline softening on the east and west channel banks (~0.31 ac) using boulders and facultative plants between the dam and 180th Street, stacked rock walls with brush layers along the east bank, and drilling with native plant materials along the west bank down stream of 180th Street. ✓ Creation of emergent wetlands (~0.04 ac). ✓ Channel modification between the dam and 180th Street (0.03 mi) with 3 instream cross vanes and 4 J-hooks. ✓ Removal of of invasive vegetation and replacement with native upland shrubs and herbaceous vegetation upslope from both banks of the river down stream of 180th Street (~0.20 ac). ✓ Removal of debris from river bottom downstream of 180th Street (0.52 ac along 0.07 mi stretch). ✓ Restoration of river bed by substrate excavation and replacement with with bedding stone (~0.36 ac). ✓ improvement of public access to the river.	✓ Creation woodland area along the east side of the site with native upland trees and shrubs (~0.59 ac). ✓ Shoreline softening on the east and west channel banks (~0.31 ac) using boulders and facultative plants between the dam and 180th Street, stacked rock walls with brush layers along the east bank, and drilling with native plant materials along the west bank down stream of 180th Street. ✓ Creation of emergent wetlands (~0.04 ac). ✓ Bed restoration between the dam and 180th Street (0.47 ac). ✓ Removal of of invasive vegetation and replacement with native upland shrubs and herbaceous vegetation upslope from both banks of the river down stream of 180th Street (~0.20 ac). ✓ Removal of debris from river bottom downstream of 180th Street (0.36 ac). ✓ Restoration of river bed by substrate excavation and replacement with with bedding stone (~0.36 ac). ✓ improvement of public access to the river.	✓ Creation woodland area along the east side of the site with native upland trees and shrubs (~0.59 ac). ✓ Shoreline softening on the east bank (~0.07 ac) using stacked rock walls with brush layers. ✓ Removal of of invasive vegetation and replacement with native upland shrubs and herbaceous vegetation upslope from both banks of the river down stream of 180th Street (~0.20 ac). ✓ Removal of debris from river bottom downstream of 180th Street (0.36 ac). ✓ Restoration of river bed by substrate excavation and replacement with with bedding stone (~0.36 ac). ✓ Improvement of public access to the river.
Average Annual Functional Capacity Units (AAFCUs)	0.380	0.379	0.069
Project Cost	$3,930,000	$3,880,000	$2,430,000
Annual Cost	$157,600	$155,590	$97,450
Average Cost/AAFCU	$414,726	$410,530	$1,412,250

Alternatives A and B are the "Best Buy Plans" and Alternative B is slightly more cost effective.

Significance of Restoration in the Region and at the Site

- ✓ Fulfills HRE mission by promoting Target Ecosystem Characteristics by increasing /improving wetlands, public access, shoreline and shallows, and habitat for fish, crabs and lobster.
- ✓ Created wetlands provide important habitats for migratory birds in a dense urban setting.
- ✓ Increased native biodiversity through wetlands creation and targeted reduction of invasive plant species
- ✓ Improved aquatic habitat, hydrologic flow regime and water quality
- ✓ Dense urban settings with limited natural environments; ecological enhancements increase the user experience of the park.
- ✓ Increased flood control value through wetlands creation
- ✓ Alternatives Improve water quality from score of 4.3 to 6.1 (Alternative A), 6.0 (Alternative B) and 5.9 (Alternative C)
- ✓ Improved public access

Tentatively Selected Plan Design



NYC Environmental Protection

NYC Parks

HRE- Bronxville Lake

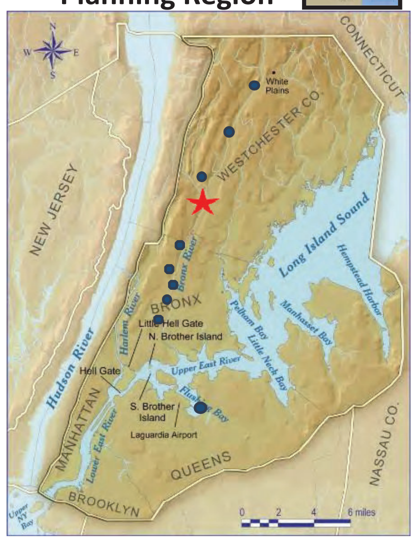
Baseline Conditions and Water Resource Problems

- River flows through a broad valley (~400-feet wide) with sides twenty to forty (20-40) feet high. The weir across the River at the southern end of the site creates a broad and shallow lake in the southern two-thirds (2/3) of the site.
- A park, part of the Bronx River Parkway Reservation maintained by the Westchester County Department of Parks, Recreation, and Conservation, surrounds the lake. The park consists largely of maintained lawns with trees, with several pockets of emergent wetlands that are landscaped and mowed.
- **Canada geese and their fecal matter** throughout the site and an **odor of sewage** present downwind of the weir.
- Edge of lake has **narrow and sparsely vegetated wetlands**. Wetlands extend to ~ five (5) feet in width for short distances on western side of lake. Several **sediment bars** have formed with limited amounts of emergent vegetation within the lake.
- Several small pockets of **interspersed mowed wetlands in shallow depressions in the uplands**.
- The majority of the uplands at this site are maintained lawns with isolated trees located within the park and Parkway right-of-way. Dominated by deciduous species, **small woodlots are present but fragmented and provide limited habitat value**.
- The broad, shallow lake in the southern portion of the site is subject to **nutrient-enriched runoff** from the park. Several **drainage pipes** that empty into the lake from the Parkway and other upland areas were observed at the site. The shoreline in the northern portions of the site and the area in the south adjacent to the bridge are armored with large boulders. Around the lake, the short **banks are generally vertical**, with the upper bank predominantly lined with a single row of trees (e.g., alders, maples, etc.) that are impacted with **heavy vine growth**. To the north, the channel is narrower with steeper and higher banks.
- Stream Visual Assessment Protocol (SVAP) revealed score of 2.9 for overall **POOR water quality** (< 6 considered Poor)

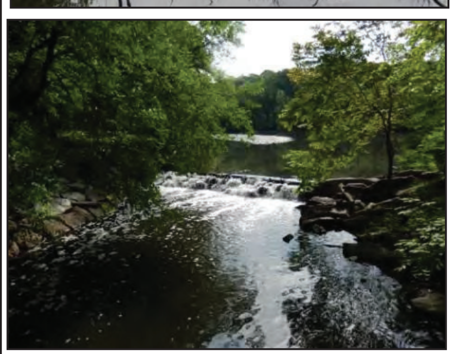
Restoration Opportunities/Measures

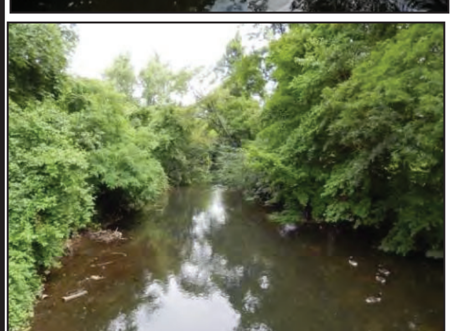
- Invasive species removal and native plantings
- Channel realignment with in stream structures
- Forested subshrub wetland creation
- Emergent wetland creation
- Select native plantings
- Sediment load reduction
- Weir modification (fish passage)
- Forebay installation

Harlem River, East River, Long Island Sound Planning Region



★ Bronxville Lake
• Other Restoration Sites in Region





Alternative	A	B	C
Description	✓ Native planting: upland trees and shrubs in the northwest portion of the site along the Bronx River Parkway (~1.3 ac) and along the southeast portion of the lake (~0.09 ac). ✓ Construction of a rip rap forebay upstream of the lake (0.43 ac). ✓ Channel realignment (1.28 ac) with replacement of bed material and construction of 11 instream cross vanes. ✓ Creation of emergent wetlands between the channel and the lake banks (3.67 ac) and forested and scrub/shrub wetlands around the lake perimeter (1.02 ac). ✓ Modification of the existing rock weir at the southern end of the lake to facilitate fish passage. ✓ Removal invasive vegetation (0.03 ac) and replacement/addition of native species (1.40 ac). ✓ Sediment load reduction with installation of vegetated swales, bioretention basins, and rain gardens at three locations (0.24 ac). ✓ Improved public access to the river.	✓ Native planting: upland trees and shrubs in the northwest portion of the site along the Bronx River Parkway (~1.3 ac) , and along the southeast portion of the lake (~0.09 ac). ✓ Construction of a rip rap forebay upstream of the lake (0.43 ac). ✓ Channel bed restoration with excavation and bedding stone installation (~1.28 ac). ✓ Creation of emergent wetlands in narrow strips along the banks of the lake (0.59 ac) ✓ Creation of forested and scrub/shrub wetlands around sections of lake perimeter and in filled areas (2.90 ac). ✓ Modification of the existing rock weir at the southern end of the lake to facilitate fish passage. ✓ Removal invasive vegetation (0.03 ac) and replacement/addition of native species (1.40 ac). ✓ Sediment dredging in two small sections of the channel. ✓ Sediment load reduction with installation of vegetated swales, bioretention basins, and rain gardens at three locations (0.24 ac). ✓ Improved public access to the river.	✓ Native planting: upland trees and shrubs in the northwest portion of the site along the Bronx River Parkway (~1.3 ac) , and along the southeast portion of the lake (~0.09 ac). ✓ Construction of a rip rap forebay upstream of the lake (0.43 ac). ✓ Channel bed restoration along the intervening river channel (0.37 ac). ✓ Creation of emergent wetlands in smaller and narrower strips along the lake shore (~0.2 ac) ✓ Creation of forested and scrub/shrub wetlands east bank of the river, upstream of the lake (0.57 ac). ✓ Installation of fish passage to link the lake and the river downstream of the existing weir. ✓ Removal invasive vegetation (0.03 ac) and replacement/addition of native species (1.40 ac). ✓ Sediment dredging both broad, shallow lobes of lake. ✓ Sediment load reduction with installation of vegetated swales, bioretention basins, and rain gardens at three locations (0.24 ac). ✓ Improved public access to the river.
Avg Annual Funct. Capacity Units (AAFCUs)	7.469	5.342	1.613
Project Cost	$20,570,000	$14,090,000	$12,760,000
Average Annual Cost	$828,060	$565,750	$512,350
Average Cost/AAFCU	$110,867	$105,906	$317,630

Significance of Restoration in the Region and at the Site

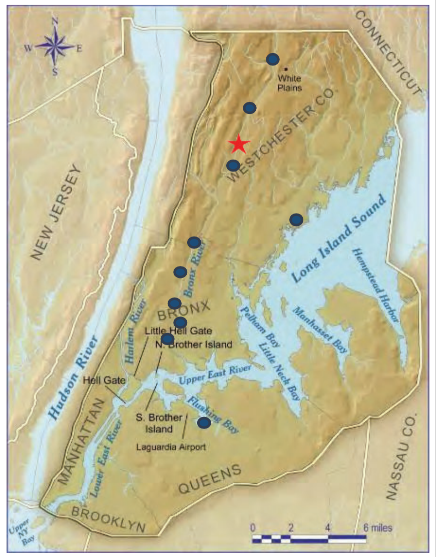
- ✓ Improved aquatic habitat and water quality
- ✓ Improved flow regime and improved fish connectivity-providing access for anadromous species
- ✓ Created wetlands provide important habitats for migratory bird.
- ✓ Increased native biodiversity through wetlands creation and targeted removal of invasive plant species
- ✓ Created forested wetlands may provide a potential habitat/roosting resource for endangered bat species, if present.
- ✓ Increased flood control value through wetlands creation
- ✓ Alternatives Improve water quality from score of 2.9 to 5.8 (Alternative A), 4.9 (Alternative B) and 4.6 (Alternative C)
- ✓ Improved public access

** Alternatives A and B are "Best Buy Plans and Alternative B is the most cost effective

Tentatively Selected Plan Design

HRE- Crestwood Lake

Harlem River, East River, Long Island Sound Planning Region



★ Crestwood Lake
● Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems (EPW Report)

- Crestwood Lake site flows through a broad valley (~400- to 600-feet wide), the sides of which are approximately 20 feet in elevation. At the southern end, the River is dammed, forming a broad, shallow lake approximately three (3) times the width of the river upstream. On the Westside of the lake, there is a confluence with a small tributary of moderate flow named Troublesome Creek. A walking trail and lawns with trees border the eastern side of the lake; woodlots and lawns bordering the northwest side of the lake are part of the Bronx River Parkway Reservation. A portion of the southeast side of the project overlaps the Parkway Oval Recreation area.
- **Canada geese and their fecal matter** present throughout the site.
- Around the lake, the wetlands generally consist of a vegetated strip that varies in width from two to ten (2-10) feet.
- The majority of the uplands are maintained lawns with single trees and woodlands. In the northern portion of the site, wetlands are bounded by a **thin riparian strip** with several dense pockets of **invasive vegetation**.
- The majority of the site is a broad and shallow lake habitat subject to **nutrient enriched runoff** from the lawns and potential upstream sources.
- In the northern portion of the site, a small reach of shady river channel exists with a rock and sand bottom.
- **Armored shoreline** on northern and southern ends adjacent to the roadway and pedestrian bridges, respectively.
- A vegetated sediment bar is present at the Troublesome Creek tributary confluence and several additional **sediment bars**, both vegetated and mudflat, are present within the lake.

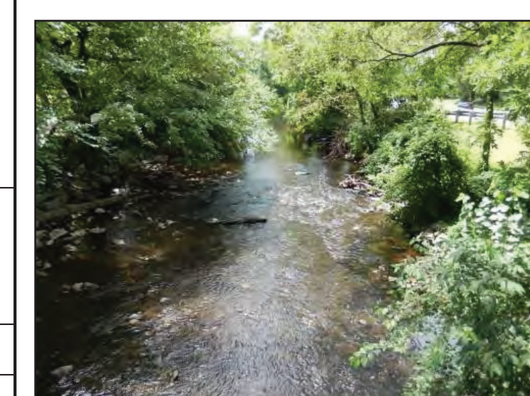
Restoration Opportunities/Measures

- Invasive species removal and replacement with native plantings
- Select native plantings
- Channel modification with in-stream structures
- Emergent wetland creation
- Weir modification (fish passage)
- Forebay installation
- Path installation
- Public access

Alternative	A	B	C
Description	✓ Native planting of upland trees and shrubs at three in the western portion of the site along the Bronx River Parkway areas (1.12 ac). ✓ Invasive species removal and native planting along the lake shore and at two other locations near the weir (0.14 ac). ✓ Construction of two rip rap forebays with access roads at the upstream end of the lake, and at the Troublesome Creek tributary confluence. ✓ Channel realignment, replacement of bed material and construction of 11 instream cross vanes (1.24 ac). ✓ Creation of emergent wetlands (4.79 acres) between the channel and the lake banks. ✓ Modification of existing rock weir at the southern end of the lake to include slopes and pools in order to promote fish passage. ✓ Improved public access to the river.	✓ Native planting of upland trees and shrubs at three in the western portion of the site along the Bronx River Parkway areas (1.12 ac). ✓ Invasive species removal and native planting along the lake shore and at two other locations near the weir (0.14 ac). ✓ Construction of two rip rap forebays with access roads at the upstream end of the lake, and at the Troublesome Creek tributary confluence. ✓ Channel bed restoration: excavation and installation of bedding stones (1.24 ac). ✓ Creation of emergent wetlands at a single location at the river inlet along the west bank of the lake (0.94 ac). ✓ Modification of existing rock weir at the southern end of the lake to include slopes and pools in order to promote fish passage. ✓ Improved public access to the river.	✓ Native planting of upland trees and shrubs at three in the western portion of the site along the Bronx River Parkway areas (1.12 ac). ✓ Invasive species removal and native planting along the lake shore and at two other locations near the weir (0.14 ac). ✓ Construction of two rip rap forebays with access roads at the upstream end of the lake, and at the Troublesome Creek tributary confluence. ✓ Creation of emergent wetlands at a single location at the river inlet along the west bank of the lake (0.32 ac). ✓ Installation of fish passage to link the lake and the river downstream of the weir. ✓ Sediment dredging in the channel and the lake to create deeper pools (1.21 ac). ✓ Improved public access to the river.
Average Annual Functional Capacity Units (AAFCUs)	13.267	6.154	5.185
Project Cost	$26,780,000	$13,580,000	$12,240,000
Avg Annual Cost	$1,078,053	$545,970	$491,470
Avg Cost/ AAFCU	$81,250	$88,720	$94,790

Significance of Restoration in the Region and at the Site

- ✓ Improved flow regime
- ✓ Improved fish connectivity- providing access for anadromous species
- ✓ Created wetlands providing important habitats for migratory birds
- ✓ Increased native biodiversity through wetlands creation, plantings and targeted reduction of invasive vegetation
- ✓ Created forested uplands providing a habitat for endangered bat species
- ✓ Improved water quality and aquatic habitat
- ✓ Increased flood control value through wetlands creation

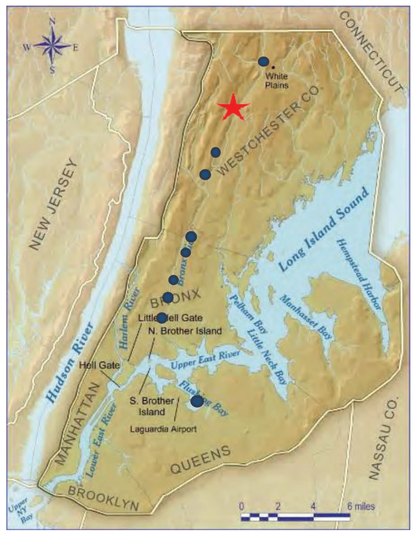


** Alternative A is the "Best Buy Plan"

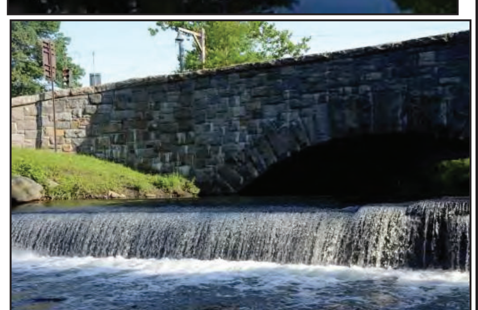
Tentatively Selected Plan Design

HRE- Harney Road & Garth Woods

Harlem River, East River, Long Island Sound Planning Region



★ Harney Road/Garth Woods
• Other Restoration Sites in Region



Baseline Conditions and Water Resource Problems

- The majority of the **Harney Road** site is located north of Harney Road between the northbound and southbound lanes of the Bronx River Parkway. The eastern portion of the site is bounded by Parkway's northbound lanes. The southbound lanes cut through the western portion of the site.
- The **channel is over-widened and shallow**, with a ponded area upstream of the weir located immediately south of Harney Road bridge.
- A paved path and park on the east side of the River are part of the Bronx River Parkway Reservation maintained by the Westchester County Department of Parks, Recreation, and Conservation.
- Along the water's edge, the **wetlands are often very narrow**. Within the mowed lawn area west of the Parkway, several emergent wetlands occur in depressional areas. **These wetlands are also mowed**. Banks south of Harney Road are armored.
- This site's upland landscape essentially consists of road embankment slopes. On the western side, the slopes are steep narrow between the channel and Parkway, with a strip of lawn and some pockets of trees and shrubs. The eastern side is wider, with shallower slopes of maintained lawns and a strip of woodland adjacent to the Parkway. On the eastern side of the site, just north of Harney Road, a **buried storm drain is causing sediment deposition and minor erosion**. West of the southbound lanes of the Parkway, there is a large mowed lawn area with few single trees; as stated above, pockets of emergent wetlands are present within the lawn.
- North of Harney Road, the River is an **over-widened, broad (~60 feet wide), slow moving channel**, with depths often less than two (2) feet. A single deep pool exists at the northern end, just below the Garth Woods site. The banks are generally vertical and show signs of moderate erosion. **Dense growths of Japanese knotweed** were also observed along the banks. Immediately south of Harney Road, the River flows over a four (4)-foot high weir, creating swifter flows and a semi-vegetated alluvial bar.
- The **Garth Wood site is immediately north of the Harney Road Site,** consists of a large forested area, traversed by the Bronx River Parkway Reservation path on the east, and bordered by the Bronx River on the west. **Wetlands are absent along the western shoreline** and consist of **very thin strips of sparse emergent vegetation along the eastern shoreline** occurring in wet depressions within the adjacent forests, mostly within the remnant channel east/north of the river. Evidence of likely vernal pools was also observed within the forested areas. The majority of the uplands consist of **invasive dominated** deciduous forest characteristic in structure to that of a floodplain forest.
- Stream Visual Assessment Protocol (SVAP) score of 4.0 characterized as **poor water quality** (<6 considered poor water quality)

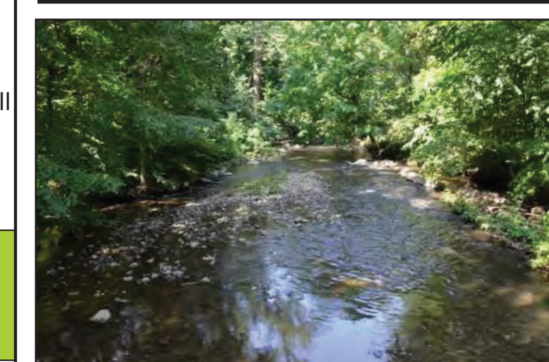
Restoration Opportunities/Measures

- Invasive species removal and replacement with native plantings
- Channel modification with in stream structures
- Shoreline softening
- Forested and Scrub/Shrub wetland creation
- Emergent wetland creation
- Weir modification (fish passage)
- Installation of select native plantings
- Sediment load reduction
- Installation of select native plantings

Alternative	A-2	B	C
Description	✓ Modification of the existing weir at the southern end of the site to promote fish passage. ✓ Modification of 0.85 acres of the river channel upstream of Harney Road and a short off-site section of river channel downstream of the weir by replacing the bed material and construction of approximately 15 instream cross vanes. ✓ Creation of 0.79 acres of emergent wetlands along both shores of the river. ✓ Installation of native upland trees and shrubs between the created emergent wetlands on the east shore and the paved path. ✓ Construction of three culverts under the southbound lanes of Bronx River Parkway to transfer river water to emergent cattail-dominated wetlands created throughout most of the maintained lawn area on the west side. ✓ Removal of 0.03 acres of invasive Japanese knotweed from the west bank of the river, just north of Harney Road, and replacement with native, upland or wetland shrubs and herbaceous vegetation ✓ Installation of a raingarden/bioretention area at the upstream end of the buried storm drain. ✓ Softening a segment (190 linear feet) of the west bank of the river, down of the weir, by constructing a stacked rock wall with brush layers.	✓ The restoration measures included in Alternative A also are included in Alternative B, with the exception of channel modification with instream structures, upstream of Harney Road and shoreline softening. ✓ Alternative B will restore the channel bed by excavating and replacing 1.34 acres of bed material. ✓ Alternative B will not construct culverts under the southbound lanes of the Parkway. ✓ The extent of emergent wetland creation is restricted to 0.21 acres of cattail-dominated core described in Alternative A ✓ Native upland trees and shrubs will be planted within the Alternative A wet meadow. ✓ Weir modification will not incorporate slopes and pools to promote fish passage; the west bank of the river.	✓ Relative to Alternative B, Alternative C will not restore the river bed, nor will the channel be modified. ✓ Forested and scrub/shrub wetland creation will replace approximately 0.52 acres of emergent wetland creation within the maintained lawn to the west of the southbound lanes of the Parkway. Emergent wetland creation will reduce to approximately 0.21 acres. ✓ The existing weir at the southern end of the site will not be modified; rather, a fish passage will be installed to link the upstream and downstream segments of the river.
	Note: For each alternative, the same actions are proposed for the Garth Woods site. The actions are the following: ✓ Creation of forested and scrub/shrub wetlands along the west bank of the river at the upstream end of the site (0.03 ac). ✓ Select native plantings in the adjacent lawn, on both sides of the paved path (0.14 ac). ✓ Removal of invasive species near the northern border of the site and replacement with native upland or wetland shrubs and herbaceous vegetation (0.02 ac).		
AAFCUs	3.227	2.442	2.263
Project Cost	$6,990,000	$6,300,000	$3,640,000
Average Annual Cost	$281,030	$253,290	$146,160
Average Cost/AAFCU	$87,090	$103,720	$64,585

Significance of Restoration in the Region and at the Site

- ✓ Designed to compliment future habitat enhancements at Garth Woods to be performed by Westchester County.
- ✓ Restoration actions were designed to act in concert with viewscapes of the Bronx River Parkway.
- ✓ Improved aquatic habitat and water quality
- ✓ Increased native biodiversity through wetland creation.
- ✓ Created forested wetlands may provide potential habitat/roosting resources for endangered bat species, if present
- ✓ Secondary benefit of increased flood control through wetland creation
- ✓ Reduction of invasive plant species
- ✓ Water quality improved by Alternatives from baseline conditions (4.0) to scores of 5.8 (Alternative A), 5.0 (Alternative

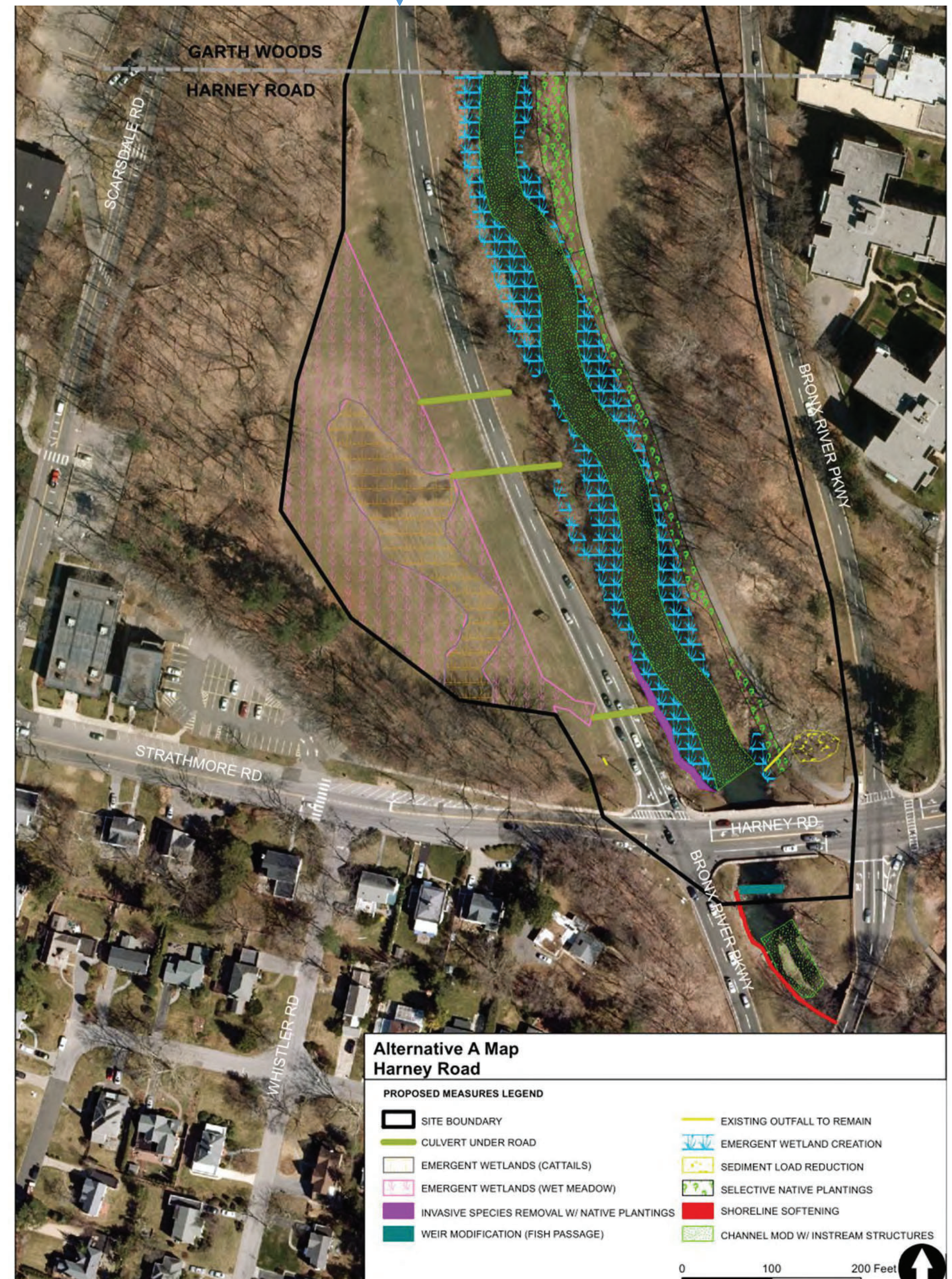


** Alternatives A and C are the "Best Buy Plans"; Alternative C is the most cost-effective although Alternative A could be justified.

Tentatively Selected Plan Design

Harney Road

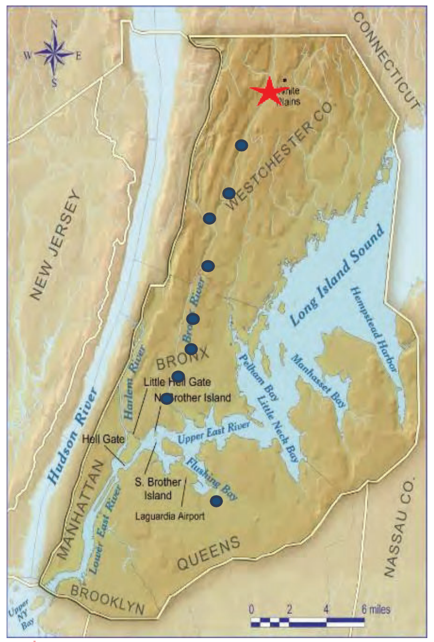
Garth Woods



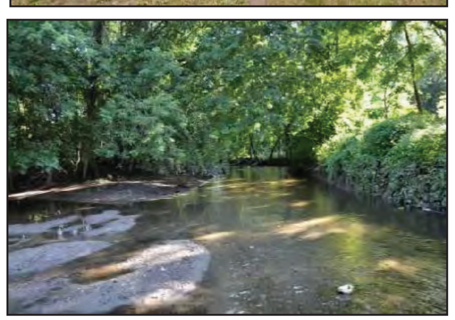
Westchester gov.com

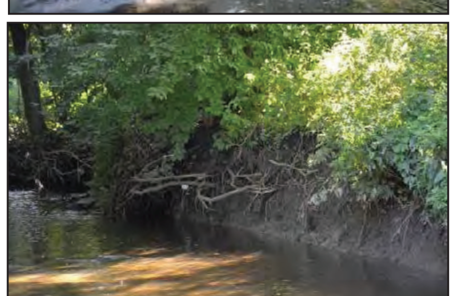
HRE- Westchester County Center

Harlem River, East River, Long Island Sound Planning Region



★ Westchester County Center
● Other Restoration Sites in Region





Baseline Conditions and Water Resource Problems

- The Westchester County Center site is bounded by the southbound lanes of the Bronx River Parkway to the west, the Metro North right-of-way to the east, and the Westchester County Center East Parking lot to the south, with large tracts of maintained lawn with trees. The topography is generally flat with the Bronx River flowing through the middle of the site. The only notable change in elevation is along the eastern boundary of the site where the embankment for the rail line rises about twenty to thirty (20-30) feet.
- Two tributaries: the Manhattan Brook and the Fulton Brook flow into the Bronx River at this site .
- Existing wetlands include thin, sparsely vegetated strips of emergent vegetation along the banks, and a few pockets of emergent species along a gas line next to the eastern boundary adjacent to the rail line. In the lower half of the site, along the western bank, larger pockets of emergent wetlands occur on a shelf that is of lower elevation.
- The majority of the uplands on site consist of flat, maintained park and right-of-way lawns with single or clustered trees. Adjacent to the banks, **thick stands of Japanese knotweed and numerous vines dominate**. Along the easternmost portion of the site, a thin strip of woodlands occurs. Within these woodlands, there appear to be pockets of wetlands and potential vernal pool habitat.
- The river has a moderate flow with a mostly sandy bottom. It is generally shallow with some intermittent deep pools. Several mudflats and sparsely vegetated **sediment deposits** were observed; a large deposit, collecting some **garbage and debris** is located just north of the Fulton Brook.
- Sediment staining on vegetation, wrack lines, and other hydrologic indicators implies that this portion of the River is subject to **strong and high flows during storm events**.
- The river's **vertical banks** show sign of **active erosion and are sparsely vegetated**. Only the extreme southernmost portion and northern portion of the site have armored banks.

Restoration Opportunities/Measures

- Invasive species removal and replacement with native plantings
- Select native plantings
- Emergent wetland creation
- Channel realignment with in-stream structures
- Installation of sediment basin
- Installation of channel plug with native plantings
- Path creation
- Shoreline softening
- Bed restoration

Alternative	A	B	C
Description	✓ Realignment of river channel (4.79 ac) and section of Manhattan Brook, with excavation and replacement of bed material, construction of instream cross vanes ✓ Creation of emergent wetlands along both shores of the Bronx River and the Manhattan Brook. ✓ Construction of in-stream sediment basins in the Manhattan Brook and at the Fulton Brook confluence with the Bronx River. ✓ Construction of channel plugs at the upstream and downstream ends of the channel on the east side of the island. Planting of upland vegetation on the plugs. ✓ Native planting of upland trees and shrubs along the west side of the Parkway northbound lanes (~3.45 ac). ✓ Removal of invasive vegetation at two locations along the eastern boundary of the site, and replacement with select native vegetation (0.26 ac). ✓ Creation emergent wetlands along the east and west banks of the channel (4.79 ac). ✓ Construction of a 500-foot-long paved path to divert pedestrian traffic away from emergent wetlands creation.	✓ Channel modification (0.83 ac), excavation and replacement of bed material, and installation of 10 in-stream cross vanes and 6 J-hooks ✓ Creation of emergent wetlands along both shores of the Bronx River and the Manhattan Brook. ✓ Construction of in-stream sediment basins in the Manhattan Brook and at the Fulton Brook confluence with the Bronx River. ✓ Construction of channel plugs at the upstream and downstream ends of the channel on the west side of the island will shift the Fulton Brook confluence to the east. ✓ Native planting of upland trees and shrubs along the west side of the Parkway northbound lanes (~3.45 ac). ✓ Removal of invasive vegetation at two locations along the eastern boundary of the site and Manhattan Brook. Native planting along channel (0.28 ac). ✓ Creation emergent wetlands along the east and west banks of the channel (2.64 ac). ✓ Construction of a 500-foot-long paved path to divert pedestrian traffic away from emergent wetlands creation. ✓ Bank stabilization on the west bank with a tiered rock slope, and on the east bank with a stacked rock wall (285 lf).	✓ Creation of emergent wetlands along both shores of the Bronx River and the Manhattan Brook. ✓ Construction of in-stream sediment basins in the Manhattan Brook and at the Fulton Brook confluence with the Bronx River. ✓ Native planting of upland trees and shrubs along the west side of the Parkway northbound lanes (~3.45 ac). ✓ Removal of invasive vegetation at two locations along the eastern boundary of the site and Manhattan Brook. Native planting along channel (0.28 ac). ✓ Creation emergent wetlands along the east and west banks of the channel (2.64 ac). ✓ Construction of a 500-foot-long paved path to divert pedestrian traffic away from emergent wetlands creation. ✓ Bank stabilization on the west bank with a tiered rock slope, and on the east bank with a stacked rock wall (285 lf). ✓ Removal of debris from the upstream portion of the island (0.07 ac).
Average Annual Functional Capacity Units (AAFCUs)	9.642	7.259	6.112
Project Cost	$23,820,000	$14,080,000	$13,080,000
Avg Annual Cost	$957,660	$565,350	$524,520
Average Cost/AAFCU	$99,322	$77,882	$85,820

Significance of Restoration in the Region and at the Site

- ✓ Fulfills HRE mission by promoting Target Ecosystem Characteristics by increasing /improving wetlands, tributary connections, public access, shoreline and shallows, and habitats for fish, crabs and lobsters.
- ✓ Proposed restoration designed to compliment future Westchester County restoration actions at adjacent Fulton Brook.
- ✓ Restoration action designed to act in concert with viewscapes of the Bronx River Parkway.
- ✓ Improved habitat quality and water quality
- ✓ Improved flow regime
- ✓ Increased native biodiversity through wetlands creation
- ✓ Secondary benefit of increased flood control value through wetlands creation
- ✓ Created forested wetlands may provide a potential habitat/roosting resource for endangered bat species, if present.
- ✓ Reduction of invasive plant species
- ✓ Improved public access

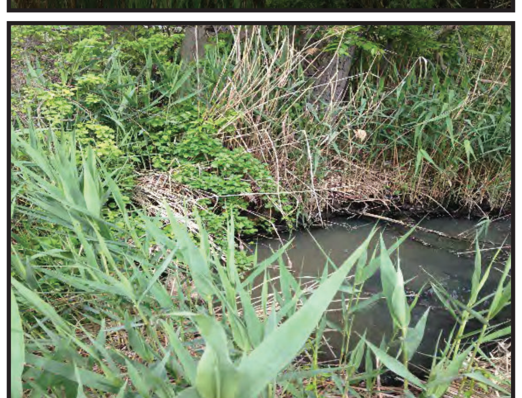
** Alternatives A and B are the "Best Buy Plans"; however, Alternative B is the most cost effective

Tentatively Selected Plan Design

HRE- Meadowlark Marsh

Hackensack River, Hackensack Planning Region

Meadowlark Marsh
Other Restoration Sites in Region



Baseline Conditions and Water Resource Problems

- The Hackensack Meadowlands is an ecologically significant wetlands complex in the heavily industrialized and densely populated NY Bight region that drains approximately 200 square miles of the Hackensack River basin.
- Significant pressure to continue to fill the remaining 8,500 acres of open waters and wetlands for industrial, commercial and residential use has greatly **fragmented this wetlands complex**. Meadowlark Marsh is an approximately 85-acre site within the Meadowlands, generally of **poor habitat value** that is largely **overrun by *phragmites australis***.
- **Tidal flow into the interior of the site is impeded by crushed and/or blocked culverts.**
- The Meadowlands support more than 7 dozen species of special interest or listed fish and bird species; they serve as important open space for migratory birds and provide flood storage. Further losses of wetlands and open space would lead to the continued decline of fish and wildlife populations in a heavily urbanized area where little such habitat remains.

Restoration Opportunities/Measures

- Emergent wetland creation (Low Marsh, High Marsh)
- Forested scrub shrub wetland creation
- Invasive species removal and native plantings
- Bank stabilization
- Coastal Maritime Forest
- Habitat for fish, crabs and lobster
- Secondary benefits of water quality improvements
- Public education/access

Alternative	A	B	C
Description	✓ Improvements and restoration to existing wetlands to include removal of debris, historic fill and invasive vegetation and re-introducing proper tidal inundation with the development of new, deepened and wider, secondary and tertiary channels (8,319 lf). Construction of 2 open span bridges to maintain access roads over proposed tidal channels. Restoration of low marsh (57.78 ac) by excavation and removal of 0.5 feet of sediment and *Phragmites* root mat and replanting with native species. Creation of high marsh by importing clean planting substrate (sand) and replanting with native species (6.89 ac). ✓ Debris, fill and invasive vegetation removal and planting of native trees and shrubs (2.33 ac). ✓ Restoration/creation of riparian shrub and wooded area (~2.31 ac). ✓ Removal of invasive plant species and creation of habitat connectivity along new mudflats/tidal channels (~12.33 ac) and existing habitat (2.58 ac). ✓ Excavation of top 0.5 ft of sediment plant (~ 46,609 cy), off-site disposal to remove any surface soil/roots of the invasive *Phragmites*. Excavation of additional sediments (120,584 cy) and off-site disposal. Importation of clean planting substrate (sand) to create high marsh areas (3,080 cy).	✓ Re-establishment of degraded portion of wetlands by re-introduction of proper tidal inundation with the development of new, deepened and wider, secondary and tertiary channels (7,086 lf). Invasive species removal and native species planting of low marsh (60.96 ac) and high marsh (5.01 ac). Installation of 1 culvert to maintain gas pipeline access road over proposed tidal channel. ✓ Forested and Scrub Shrub Wetlands – Debris, fill and invasive vegetation removal and planting with native trees and shrubs (2.33 ac). ✓ Restoration/creation of riparian shrub and wooded area (2.44 ac). ✓ Removal of invasive plant species and creation of habitat connectivity along new mudflats/tidal channels (~10.33 ac) and existing habitat (3.28 ac). ✓ Excavation of additional sediments (102,639 cy) and off-site disposal.	✓ Re-establishment of degraded portion of wetlands. Invasive species removal and native species planting of low marsh (60.21 ac) and high marsh (4.64 ac) by excavation and removal of 0.5 feet of sediment and *Phragmites* root mat and replanting with native species. Installation of 1 culvert to maintain gas pipeline access road over proposed tidal channel. ✓ Debris, fill and invasive vegetation removal and planting of native trees and shrubs to restore and create habitat (1.89 ac). ✓ Restoration/creation of maritime forest habitat through debris removal and native plantings (3.21 ac). ✓ Removal of invasive species to restore existing mudflats/tidal channels and associated habitats within the interior marsh (~12.72 ac). ✓ No sediment removal.
Average Annual Functional Capacity Units (AAFCUs)	306.02	307.25	294.22
Total Project Cost	$67,460,000	$59,690,000	$43,770,000
Annual Cost	$2,754,490	$2,437,230	$1,787,190
Average Cost/AAFCU	$9,000	7,932	$6,074

Alternatives B and C were "Best Buy Plans" and Alternative C is the most cost-effective plan

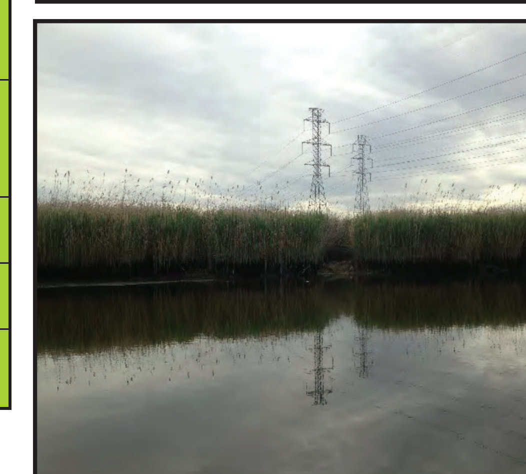
Significance of Restoration in the Region and at the Site

✓ The restoration of Meadowlark Marsh will contribute greatly to the joint effort among many public interest groups, local, state and Federal agencies and academia to restore and/or enhance the remaining 8,500 acres of open water and wetlands.

✓ Once Meadowlark Marsh is restored, it will combine with the adjacent and previously restored Bellman's Creek Marsh to create a contiguous expanse of approximately 100 acres.

✓ The Meadowlands are located within the Atlantic Flyway, a significant coastal pathway for migratory birds; the wetlands provide food and resting ground for hundreds of migratory bird species as well as breeding habitat for more than 60 resident bird species. Numerous juvenile fish species depend on the Meadowlands for nursery habitat

✓ The only other large estuarine wetlands complex in the NY Metropolitan area is the Jamaica Bay Wildlife Refuge, another significant restoration concern within the HRE study area.



Tentatively Selected Plan Design

Source: NJGIN NJ 2015 Orthoimagery

Alternative A Map
Meadowlark Marsh, New Jersey Meadowlands

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- FORESTED AND SCRUB/SHRUB WETLAND
- EMERGENT WETLAND (HIGH MARSH)
- EMERGENT WETLAND (LOW MARSH)
- COASTAL AND MARITIME FOREST
- EXISTING HABITAT FOR FISH, CRAB AND LOBSTER
- HABITAT FOR FISH, CRAB AND LOBSTER

0 250 500 Feet

HRE- Metromedia Tract

Hackensack River, Hackensack Planning Region

★ Metromedia Tract
• Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems

- The Hackensack Meadowlands is an ecologically significant wetlands complex in the **heavily industrialized** and densely populated NY Bight region that drains approximately 200 square miles of the Hackensack River basin.
- Significant pressure to continue to fill the remaining 8,500 acres of open waters and wetlands for industrial, commercial and residential use has greatly **fragmented** this wetlands complex. The Metromedia tract is an approximately 67-acre site within the Meadowlands, generally of **poor habitat value** that is largely **overrun by *phragmites australis***.
- The Meadowlands support more than 7 dozen species of special interest or listed fish and bird species; they serve as important open space for migratory birds and provide flood storage. Further **losses of wetlands** and open space would lead to the continued decline of fish and wildlife populations in a heavily urbanized area where little such habitat remains.

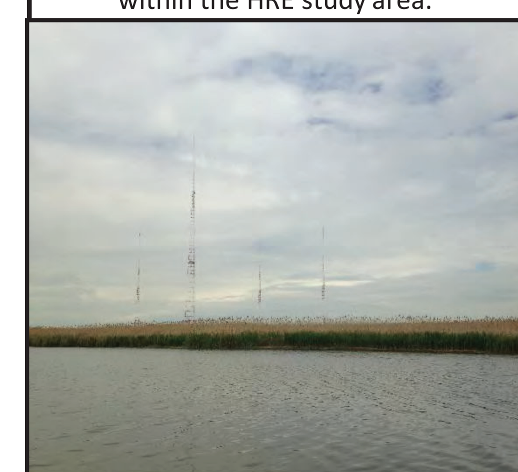
Restoration Opportunities/Measures

- Emergent wetland creation (Low Marsh, High Marsh)
- Forested scrub shrub wetland creation
- Invasive species removal and native plantings
- Bank stabilization
- Coastal Maritime Forest
- Habitat for fish, crabs and lobster
- Secondary benefits of water quality improvements
- Public education/access

Alternative	A	B	C
Description	✓ Reconnect fragmented areas within the parcel, introduce new tidal channels and make improvements to the existing channels. ✓ Create approximately 38.2 acres of low marsh, 13.0 acres of high marsh, 5.3 acres of scrub-shrub and 11.5 acres of maritime upland ✓ Removal of approximately 38,000 cy of excavated material to an upland disposal facility in order to remove the top 0.6 inches of invasive root mass. ✓ A 1-ft cap of clean soil growing medium is required at high marsh elevations in order to prevent invasive recolonization.	✓ Reconnect fragmented areas within the parcel, introduce new tidal channels and make improvements upon the existing channels. ✓ Create approximately 43.1 acres of low marsh, 4.5 acres of high marsh and 11.8 acres of scrub-shrub ✓ Removal of approximately 63,000 cy of excavated material to an upland disposal facility in order to remove the top 0.6 inches of invasive root mass. ✓ A 1-ft cap of clean soil growing medium is required at high marsh elevations and above in order to prevent invasive recolonization.	✓ Reconnect fragmented areas within the parcel, introduce new tidal channels and make improvements upon the existing channels. ✓ Create approximately 50.6 acres of low marsh, 4.1 acres of high marsh, 3.5 acres of scrub-shrub and 1.1 acres of maritime upland ✓ Removal of approximately 74,000 cy of excavated material to an upland disposal facility to remove the top 0.6 inches of invasive root mass. ✓ A 1-ft cap of clean soil growing medium is required at high marsh elevations and above in order to prevent invasive recolonization.
Average Annual Functional Capacity Units (AAFCUs)	187.1	202.72	198.37
Total Project Cost	$18,459,600	$31,930,600	$19,076,600
Average Annual Cost	$750,820	$1,298,730	$775,910
Average Cost/AAFCU	$4,010	$6,407	$3,914

Significance of Restoration in the Region and at the Site

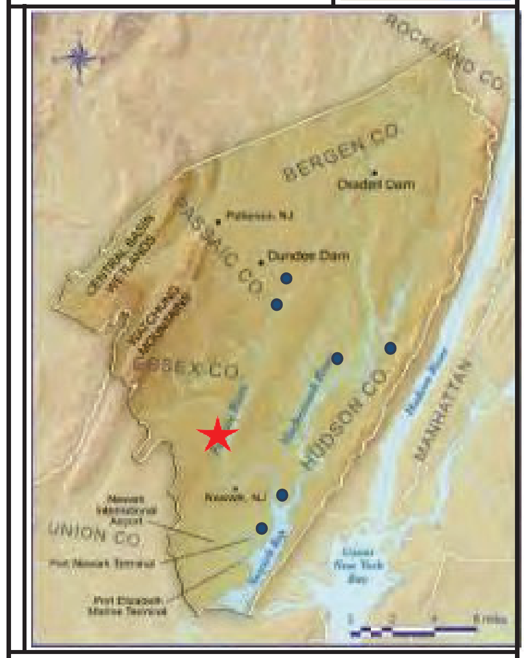
- ✓ The restoration of the Metromedia Tract will contribute greatly to the joint effort among a coalition of public interest groups, local, state and Federal agencies and academia to restore and/or enhance the remaining 8,500 acres of open water and wetlands.
- ✓ Once the Metromedia Tract is restored, it will combine with an adjacent previously restored tract to create a contiguous connected expanse of approximately 200 acres.
- ✓ The Meadowlands are located within the Atlantic Flyway, a significant coastal pathway for migratory birds; the wetlands provide food and resting ground for hundreds of migratory bird species as well as breeding habitat for more than 60 resident bird species. Numerous juvenile fish species depend on the Meadowlands for nursery habitat
- ✓ The only other large estuarine wetlands complex in the NY Metropolitan area is the Jamaica Bay Wildlife Refuge, another significant restoration concern within the HRE study area.



Tentatively Selected Plan Design

HRE- Essex County Branch Brook Park

Passaic River, Lower Passaic Planning Region



★ Essex County Branch Brook Park
• Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems (EPW Report)

- This site contains of approximately 4,200 linear feet of Branch Brook and adjacent parkland in Newark, NJ.
- The surrounding environment consists primarily of commercial and residential developments and roadways.
- The site includes a day-lighted section of Branch Brook as well as 3 larger pond features (Branch Brook Lake, Clarks Pond, and an unnamed pond) that were created using weirs.
- Branch Brook Park was established by Essex County as the first county park in the nation.
- The park is notable as having the largest collection of cherry blossom trees in the United States.
- The park is four miles long and a quarter mile wide and includes open grassland with patches of forest stands that line Branch Brook.
- The stream and adjacent forest areas experience considerable amounts of **anthropogenic trash**.
- The ponds suffer from **algal blooms and eutrophication** indicative of excess nutrient inputs.
- The stream is characterized by the presence of **invasive vegetation.**

Restoration Opportunities/Measures

- Emergent wetland creation (Low Marsh, High Marsh)
- Forested scrub shrub wetland creation
- Invasive species removal and native plantings
- Bank stabilization
- Shoreline softening
- Secondary benefits of water quality improvements
- Public education/access

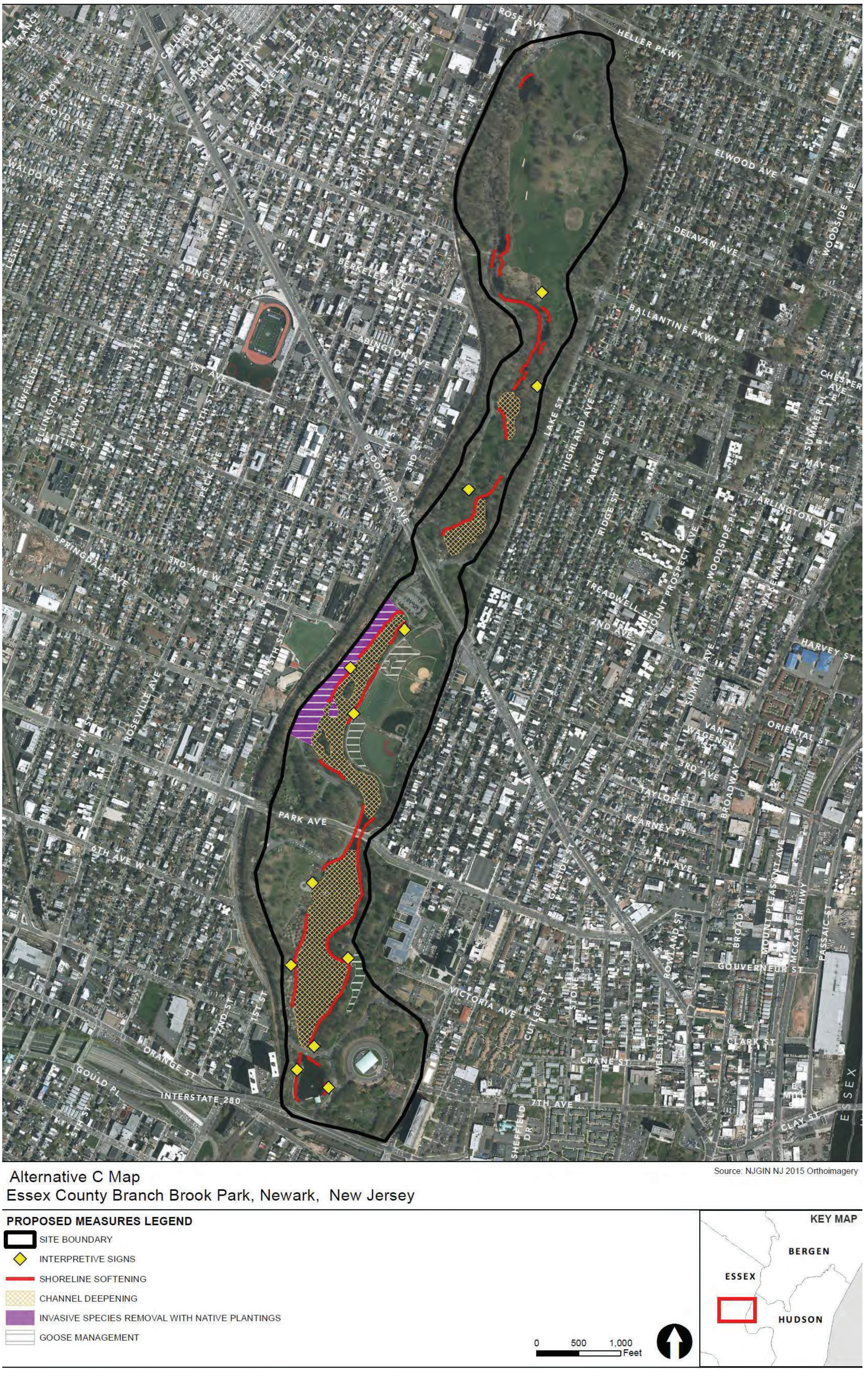
Alternative	A	B	C
Description	✓ Debris, fill, pipes, and invasive vegetation removal and planting of native trees and shrubs (26.3 ac). ✓ Invasive plant removal with native plantings to create a riparian forest accessible to avian migrants and residents. ✓ Tributary Connections – Stream Naturalization and Clearing – Decrease channelization in 2.04 acres to restore freshwater stream to provide a range of quality habitats to aquatic organisms. ✓ Channel dredging to restore freshwater stream (23.52 ac). ✓ Floodplain erosion control through management of steep slopes, planting of understory vegetation, and control of surface runoff and foot traffic (8.25 ac). ✓ Planting of native vegetation to reduce damage to habitat and water quality by Canada geese (29.98 ac). ✓ Installation of sediment basins and clean silt from existing storm drains and plant wetland (3.8 ac). ✓ Support to ongoing public access improvements by installing 17 interpretative signs, improving access to the water and creating linkages to other recreational areas, as well as providing increased opportunities for boating, hiking, education, and passive recreation	✓ Remove debris and invasive vegetation and increase the density of 22.9 acres of wetland and riparian native vegetation ✓ Remove invasive plant species and plant with native vegetation to create a riparian forest accessible to avian migrants and residents. ✓ Channel dredging to restore freshwater stream and floodplain (17.07 ac). ✓ Floodplain erosion control through management of steep slopes, planting of understory vegetation, and control of surface runoff and foot traffic (8.25 ac). ✓ Planting of native vegetation to reduce damage to habitat and water quality by Canada geese (29.98 ac). ✓ Installation of sediment basins and clean silt from existing storm drains and plant wetland (5.32 ac). ✓ Install retention basins and plant wetland vegetation ✓ Support to ongoing public access improvements by installing 17 interpretive signs.	✓ Invasive plant removal and planting of native vegetation (5.23 ac).. ✓ Channel dredging to restore freshwater stream and floodplain (23.52 ac). ✓ Planting of native vegetation to reduce damage to habitat and water quality by Canada geese (8.49 ac). ✓ Debris removal and erosion control on the banks and shorelines with stormwater control and planting native understory vegetation along (10,320 lf). ✓ Support to ongoing public access improvements through development of 12 new public interpretive signs.
Average Annual Functional Capacity Units (AAFCUs)	**142.82**	103.30	99.70
Total Project Cost	**$75,320,000**	$74,330,000	$19,870,000
Average Annual Cost	**$3,071,450**	$3,031,08	810,270
Average Cost/AAFCU	**$21,507,300**	$29,340	$8,128

Alternatives C and A are the "Best Buy Plans" and Alternative C is the most cost-effective.

Significance of Restoration in the Region and at the Site

- ✓ Shoreline stabilization will reduce erosion and turbidity in waters and improve aquatic habitat.
- ✓ Restoration and enhance actions would reduce nutrient inputs to the waters and increase opportunity for nutrient transformation.
- ✓ First County Park Provides opportunities for public education/engagement.
- ✓ Shoreline stabilization and habitat improvements will provide secondary benefits of flood control to a flood prone area.
- ✓ Stabilizes ecologically significant urban wetlands/riparian areas.
- ✓ Advancement of TECs and Regional Goals
- ✓ Environmental Justice

Tentatively Selected Plan Design



HRE- Dundee Island Park/Pulaski Park

Passaic River, Lower Passaic Planning Region

★ Dundee Island Park
● Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems

- This site consists of approximately 2,370 linear feet of the western shoreline of the Lower Passaic River approximately 1.3 miles downstream of the Dundee Dam in Passaic, NJ.
- An inactive set of railroad tracks and right-of-way border the site to the west and north; a church and commercial properties border the site to the south.
- The City of Passaic has established Dundee Island Park within the site which includes a soccer field, benches, a playground, a boat launch and fish consumption advisory signage.
- Flood-driven **woody debris and floatable trash** have been deposited along the shore of the site.
- Large ash trees have been removed from the shoreline and bank is now dominated by **invasive Japanese knotweed**.
- Within the boundary of the site the bank of the Passaic River is **very steep and stabilized with rip-rap and concrete**.

Restoration Opportunities/Measures

- Invasive species removal/native species plantings
- Bank stabilization
- Secondary benefits of water quality improvements
- Public education/access

Alternative	A	B	C
Description	✓ Debris removal, natural bank vegetation preservation, bank stabilization and shoreline softening by planting willow stakes in the existing riprap stream bank (~0.71 ac). ✓ Restoration of riparian vegetation through removal of debris and invasive plant species and planting of native trees and shrubs (~1.23 ac). ✓ Support City of Passaic plans for public access improvements through development of site trail and enhancement of existing trail (~1,580 lf).	N/A	N/A
Average Annual Functional Capacity Units (AAFCUs)	**1.29**	N/A	N/A
Project Cost	**$2,670,000**	N/A	N/A
Average Cost/AAFCU		N/A	N/A

* This project could be advanced with the Continuing Authorities Program (CAP) in conjunction with NJDEP, Trust for Public Land (TPL), County of Passaic and City of Passaic. The restoration would be a key component of the local plans for a community park following receipt of a future NJDEP grant to TPL and additional local funding sources.

Significance of Restoration in the Region and at the Site

- ✓ Shoreline stabilization will reduce erosion and turbidity in waters.
- ✓ Shoreline stabilization and habitat improvements will provide secondary benefits of flood control to a flood prone area.
- ✓ T&E species habitat will be enhanced; stabilizes ecologically significant urban wetlands/riparian areas.
- ✓ Enhancement actions would reduce nutrient inputs to the waters and increase opportunity for nutrient transformation.
- ✓ Provides for additional public access and education opportunities.
- ✓ Advancement of TECs and Regional Goals
- ✓ Environmental Justice

Tentatively Selected Plan Design

Source: NJGIN NJ 2015 Orthoimagery

Alternative A Map
Dundee Island Park/Pulaski Park, Passaic, New Jersey

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- BANK STABILIZATION / SHORELINE SOFTENING
- SELECT NATIVE PLANTINGS
- PUBLIC ACCESS

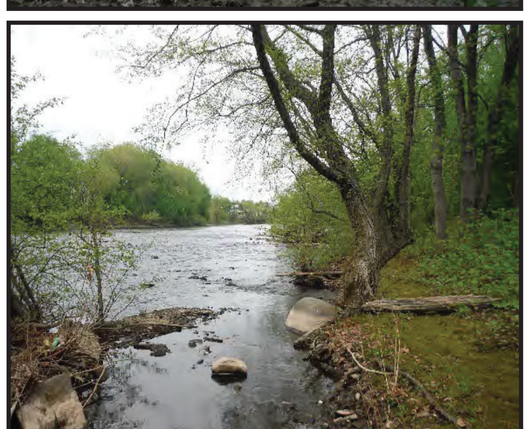
0 100 200 Feet

KEY MAP

HRE- Clifton Dundee Canal Green Acres Purchase

Passaic River, Lower Passaic Planning Region

★ Clifton Dundee Canal Green Acres
● Other Restoration Sites in Region



Baseline Conditions and Water Resource Problems

- This site consists of approximately 1,800 linear feet of the western shoreline of the Lower Passaic River downstream of the Dundee Dam in Clifton, NJ. Rt 21 and a commercial property border the landward side of the site.
- The City of Clifton has established Dundee Island Park within the site which includes a trail network, benches, interpretive signage and fish consumption advisory signage.
- This site includes the Safas property, which is subject to an **NJDEP environmental investigation/cleanup** (NJDEP case # E20050092). Large volumes of flood-driven **woody debris and floatable trash** has been deposited along the shore of the central portion of the site, immediately below a low, flat peninsula projecting out into the river.
- An ancient stone fish weir is present in the middle of the river between this site and the Semel Ave & River Road Parcel site. An **active vagrant campsite strewn with trash** was observed within the southern portion of the site near Ackerman Ave during the site visit.

Restoration Opportunities/Measures

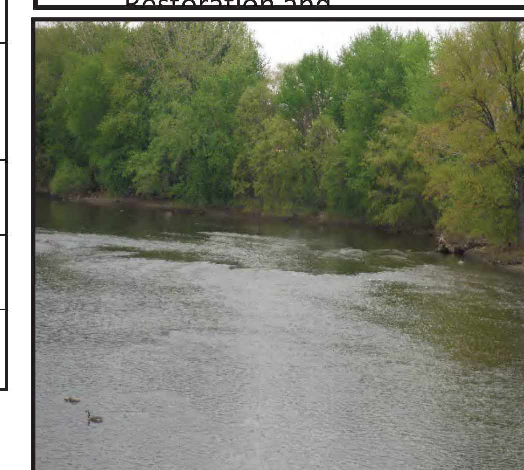
- Invasive species removal and native plantings
- Bank stabilization
- Secondary benefits of water quality improvements
- Public education/access

Alternative	A	B	C
Description	✓ Debris and invasive vegetation removal, re-grading, and planting of native emergent wetland (0.1 ac). ✓ Debris, fill and invasive vegetation removal and planting with native trees and shrubs to restore and create habitat for waterbirds (2.84 ac). ✓ Restoration and stabilization of riparian forest. Invasive species removal and planting with native vegetation to create a forest accessible to avian migrants and residents. Grading to improve hydrology and soil stability within the riparian zone (5.50 ac). ✓ Remove debris along stable shoreline (0.82 acres). ✓ Support Dundee Island Preserve plans for improvements to riparian floodplain by reconnecting riparian buffers and floodplains to the estuary to provide a range of quality habitats to aquatic organisms. ✓ Debris removal, improvement of shallow water habitat with incorporation and/or preservation of natural cobble and riffle structures (0.27 ac). ✓ Installation of sediment basin to treat stormwater runoff (0.11 ac). ✓ Support Dundee Island Preserve plans for improvements to public access. Creation of public trails through native vegetation habitat (1,081 lf), public overlook (0.01 ac), and public boat launch with access road.	✓ Debris and invasive vegetation removal, re-grading, and planting of native emergent wetland vegetation (0.1 ac). ✓ Remove invasive plant species and plant with native vegetation to create a forest accessible to avian migrants and residents. Conduct grading to provide proper hydrology and soil stability within the riparian zone (totaling 7.86 acres). ✓ Debris removal along stable shoreline (0.82 ac). ✓ Support Dundee Island Preserve plans for improvements to riparian floodplain by reconnecting riparian buffers and floodplains to the estuary to provide a range of quality habitats to aquatic organisms. ✓ Debris removal, improvement of shallow water habitat with incorporation and/or preservation of natural cobble and riffle structures (0.27 ac). ✓ Installation of sediment basin to treat stormwater runoff (0.11 ac). ✓ Support Dundee Island Preserve plans for improvements to public access. Creation of public trails through native vegetation habitat (1,081 lf) and public overlook (0.01 ac).	✓ Restoration and stabilization of riparian forest. Invasive species removal and planting with native vegetation to create a forest accessible to avian migrants and residents. Grading to improve hydrology and soil stability within the riparian zone (7.93 ac). ✓ Debris removal along stable shoreline (0.82 ac). ✓ Support Dundee Island Preserve plans for improvements to riparian floodplain by reconnecting riparian buffers and floodplains to the estuary to provide a range of quality habitats to aquatic organisms. ✓ Support Dundee Island Preserve plans for improvements to public access. Creation of public trails through native vegetation habitat (1,081 lf) and public overlook (0.01 ac).
Average Annual Functional Capacity Units (AAFCUs)	**14.43**	8.36	6.74
Project Cost	**$11,860,000**	$10,270,000	$8,990,000
Avg Annual Cost	**$476,210**	$412,370	$360,970
Average Cost/AAFCU	**$33,000**	$49,270	$53,640

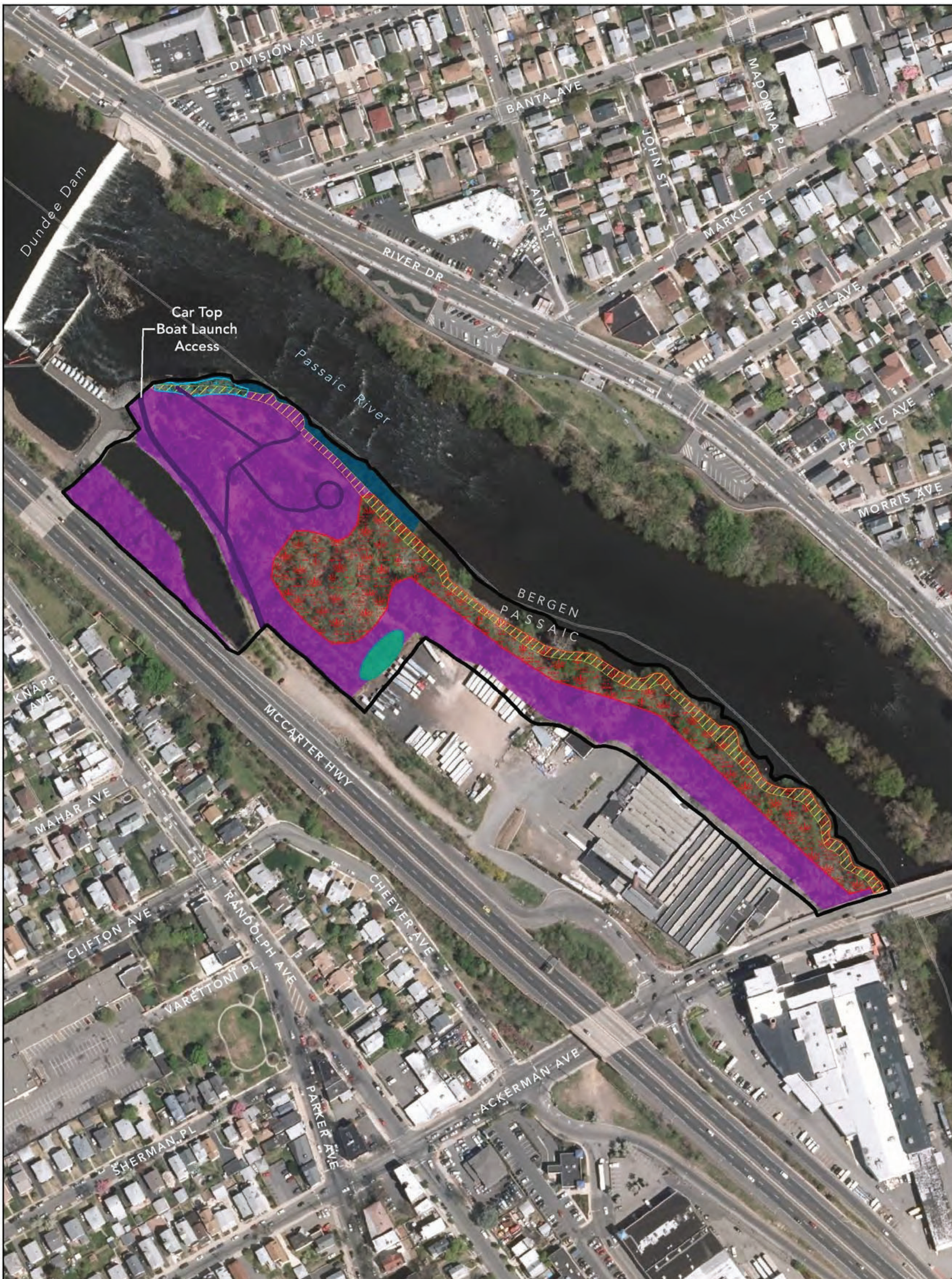
Alternative A is the "Best Buy Plan"

Significance of Restoration in the Region and at the Site

- ✓ Shoreline stabilization will reduce erosion and turbidity in waters.
- ✓ Restoration and enhancement actions would reduce nutrient inputs to the waters and increase opportunity for nutrient transformation.
- ✓ T&E species habitat will be enhanced; stabilizes ecologically significant urban wetlands/riparian areas.
- ✓ Shoreline stabilization and habitat improvements will provide secondary benefits of flood control to a flood prone area.
- ✓ Provides for additional public access and education opportunities.
- ✓ Advancement of TECs and Regional Goals
- ✓ Environmental Justice:



Tentatively Selected Plan Design



Sour ce: NJGIN NJ 2015 Orthoimagery

Alternative A Map
Clifton Dundee Canal Green Acres Purchase and Dundee Island Preserve, Clifton, New Jersey

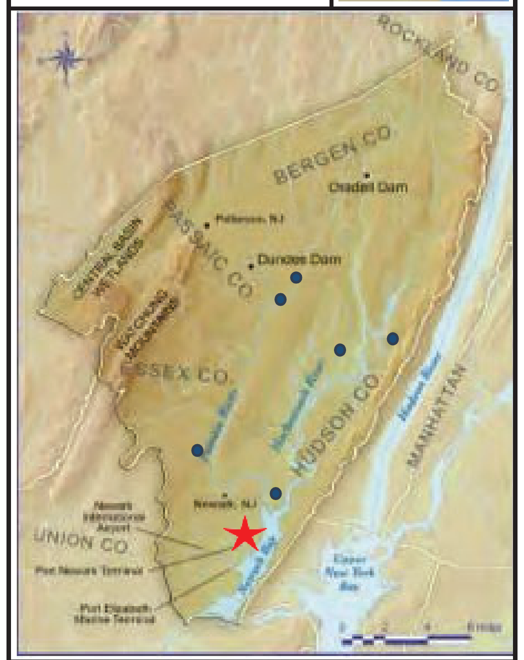
PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- PUBLIC ACCESS
- EMERGENT WETLAND
- FORESTED WETLAND & SCRUBSHRUB WETLAND
- DEBRIS REMOVAL
- HABITAT FOR FISH, CRAB AND LOBSTER
- INVASIVE SPECIES REMOVAL WITH NATIVE PLANTINGS
- SEDIMENT BASIN

0 125

HRE- Oak Island Yards (Deferred Lower Passaic River Site)

Passaic River, Lower Passaic Planning Region



★ Oak Island Yards
● Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems

- Oak Island Yards contains Newark's largest extent of tidal marsh, tidal creeks, and palustrine emergent wetland.
- The **dominant vegetative species are invasive** *Phragmites*, mugwart and sumac. The substrate type is predominantly fine (sand/silt/clay) with some coarse cobble/gravel. Hydrologic environments include tidal, subtidal, and intertidal.
- The water regime is permanently and intermittently flooded with a drainage pathway on the east-west southern property.
- This site is located along approximately 900 feet of Newark Bay and is bordered by a shipping container yard, railroad tracks, and a HESS petroleum tank farm. A semi-tidal ditch with a tide gate is located adjacent to the site, below the railroad track embankment on the southeast border of the site. Since the date of the project mapping aerial photo, the shipping container storage yard has been extended southeast to within approximately 100 feet of the pond and runs the full width of the northwestern boundary of the site. Also, a considerable amount of **rock and gravel fill** has been placed onsite since the aerial photo was taken. Rock fill extends from the shipping containers all the way to the river along the southeast portion of the site and has also been placed in the river. The remainder of the site is vegetated.

Restoration Opportunities/Measures

- USEPA Remedial Action followed by restoration
- Emergent wetland creation (Low Marsh, High Marsh)
- Forested scrub shrub wetland creation
- Invasive species removal and native plantings
- Bank Stabilization
- Coastal Maritime Forest
- Habitat for fish, crabs and lobster
- Secondary benefits of water quality improvements
- Public education/access

Alternative	A	B	C
Description	✓ Restoration and creation of low marsh (7.13 ac). ✓ Creation of new tidal channels (1,821 lf). ✓ Debris and invasive vegetation removal, re-grading and planting of native emergent high marsh vegetation (0.73 ac). ✓ Debris, fill and invasive vegetation removal and planting of native trees and shrubs (0.84 ac). ✓ Stabilization of riparian forest by removing invasive species and planting with native vegetation (1.86 ac). ✓ Debris removal and preservation of natural bank vegetation (0.23 ac). ✓ Invasive plant removal and creation of habitat connectivity along new mudflats/tidal channels (1.02 ac) and existing habitat (1.32 ac). ✓ Provide Oyster Reef habitat (0.08 acres- not included in cost). ✓ Improved public access to water and increased opportunities for boating, hiking, education, and passive recreation by upgrading existing pedestrian path, replacing portion of path with pier deck system on southern perimeter of property (3,711 lf), and constructing overlook pier and dock for kayak and canoe launch (0.04 ac). ✓ Deepening and/or capping of contaminated sediment will be required conducted as part of the EPA Superfund Program.	✓ Restoration and creation of low marsh (5.97 ac).0 ✓ Creation of new tidal channels (1,987 lf). ✓ Planting of emergent high marsh vegetation (1.48 ac). ✓ Debris, fill and invasive vegetation removal and planting of native trees and shrubs (0.84 ac). ✓ Stabilization of riparian forest by removing invasive species and planting with native vegetation (1.86 ac). ✓ Debris removal and preservation of natural bank vegetation (0.33 ac). ✓ Invasive plant removal and creation of habitat connectivity along new mudflats/tidal channels (1.31 ac) and existing habitat (1.40 ac). ✓ Improved public access to water (3,711 lf), and construction of overlook pier and dock for kayak and canoe launch (0.04 ac). ✓ Deepening and/or capping of contaminated sediment will be required conducted as part of the EPA Superfund Program.	✓ Restoration and creation of low marsh (2.43 ac). ✓ Creation of new tidal channels (1,369 lf). ✓ Planting of emergent high marsh vegetation (5.66 ac). ✓ Debris, fill and invasive vegetation removal and planting of native trees and shrubs (0.84 ac). ✓ Stabilization of riparian forest by removing invasive species and planting with native vegetation (1.86 ac). ✓ Debris removal and preservation of natural bank vegetation (0.33 ac). ✓ Invasive plant removal and creation of habitat connectivity along new mudflats/tidal channels (0.54 ac) and existing habitat (1.55 ac). ✓ Improved public access to water (3,711 lf), and construction of overlook pier and dock for kayak and canoe launch (0.04 ac). ✓ Deepening and/or capping of contaminated sediment will be required as part of the EPA Superfund Program.
Avg Annual Functional Capacity Units (AAFCUs)	**30.77**	29.03	29.54
Project Cost	**$31,000,000**	$31,290,000	$29,390,000
Avg Annual Cost	**$1,244,720**	$1,256,370	$1,180,080
Average Cost/AAFCU	**$40,450**	$43,280	$39,950

Alternatives A and C were "Best Buy Plans" and Alternative A can be justified as TSP

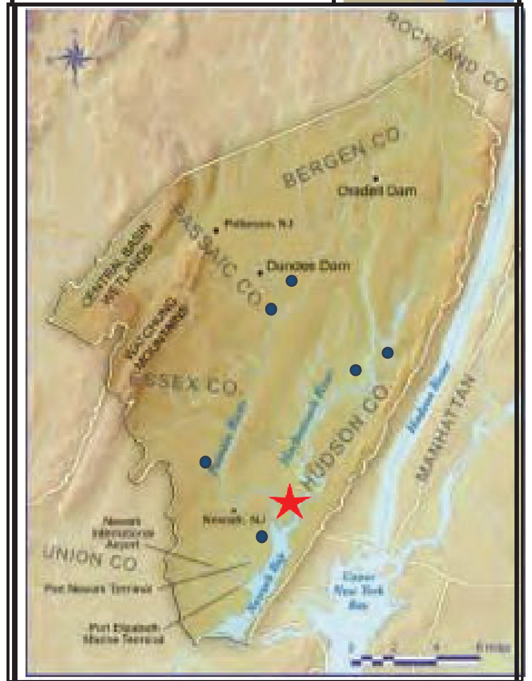
Significance of Restoration in the Region and at the Site

- ✓ Creates/restores habitat (wetlands) lost, improves hydrology and functionality of site.
- ✓ Restoration would improve tidal flow and improve water quality through nutrient update and exchange.
- ✓ Habitats will provide secondary benefits of flood control to a flood prone area.
- ✓ T&E species habitat will be expanded; stabilizes ecologically significant urban wetlands/riparian areas.
- ✓ Advancement of TECs and Regional Goals: Alternative A restores ~5acres more low marsh
- ✓ Environmental Justice: restoration in underserved communities of Newark NJ that have been significantly impacted
- ✓ Improves

Tentatively Selected Plan Design

HRE- Kearny Point (Deferred Lower Passaic River Site)

Passaic River, Lower Passaic Planning Region



★ Kearny Point
• Other Restoration Sites in Region

Baseline Conditions and Water Resource Problems

- The Kearny Point restoration site is a **decommissioned industrial facility** built entirely of **historic fill dominated by invasive species**. It contains a forested area on the eastern half of the site which is the location of an active bald eagle nest.
- This site consists of a 300 to 1,000 foot wide area located along approximately 3,000 feet of the northern shore of Newark Bay in Kearny, NJ.
- The surrounding environment consists entirely of **commercial develo**pments and roadways.
- Adjacent commercial developments include Hudson County Correctional Center and River Terminal, which is a massive distribution warehouse that includes the former site of a Western Electric's Kearny Works manufacturing plant and the Kearny Yard of Federal Shipbuilding and Drydock Company.
- Within the site boundary, half of the site is an active construction soil sorting site and half of the site is an undeveloped forested area.

Restoration Opportunities/Measures

- USEPA Remedial Action followed by Restoration
- Emergent wetland creation (Low Marsh, High Marsh)
- Forested scrub shrub wetland creation
- Invasive species removal and native plantings
- Bank stabilization
- Coastal Maritime Forest
- Habitat for fish, crabs and lobster
- Secondary benefits of water quality improvements
- Public education/access

Alternative	A	B	C
Description	✓ Re-establishment of existing low marsh along the eastern portion of the point and creation of new marsh along the western portion of the point. Creation of native emergent low marsh (25.98 ac). ✓ Debris and invasive vegetation removal and planting native emergent high marsh vegetation (0.41 ac). ✓ Debris, fill and invasive vegetation removal and planting with native trees and shrubs (0.99 ac). ✓ Stabilization of riparian forest and protection of area for continued use by bald eagles. Invasive plant species removal and planting with native vegetation to create a forest accessible to avian migrants and residents (6.55 ac). ✓ Debris removal and preservation of natural bank vegetation of existing bank stabilization (1,724 lf). ✓ Creation of new tidal channels (1.82 ac). ✓ Creation of an elevated path system that spans several habitats and that leads to a public overlook (1,614 lf). ✓ Deepening and/or capping of contaminated sediment will be required conducted as part of the EPA Superfund Program.	✓ Re-establishment of existing low marsh along the eastern portion of the point and creation of new marsh along the western portion of the point. Creation of native emergent low marsh (18.62 ac). ✓ Debris and invasive vegetation removal and planting native emergent high marsh vegetation (2.18 ac). ✓ Debris, fill and invasive vegetation removal and planting with native trees and shrubs (2.33 ac). ✓ Stabilization of riparian forest and protection of area for continued use by bald eagles. Invasive plant species removal and planting with native vegetation to create a forest accessible to avian migrants and residents (11.28 ac). ✓ Debris removal and preservation of natural bank vegetation of existing bank stabilization (1,771 lf). ✓ Creation of new tidal channels (1.81 ac). ✓ Creation of an elevated path system that spans several habitats and that leads to a public overlook (~ 3,097 lf). ✓ Deepening and/or capping of contaminated sediment will be required conducted as part of the EPA Superfund Program.	✓ Re-establishment of existing low marsh along the eastern portion of the point and creation of new marsh along the western portion of the point. Creation of native emergent low marsh (8.77 ac). ✓ Debris and invasive vegetation removal and planting native emergent high marsh vegetation (1.69 ac). ✓ Debris, fill and invasive vegetation removal and planting with native trees and shrubs (1.84 ac). ✓ Stabilization of riparian forest and protection of area for continued use by bald eagles. ✓ Creation of new tidal channels (0.49 ac). ✓ Creation of an elevated path system that spans several habitats and that leads to a public overlook (4,455 lf). ✓ Deepening and/or capping of contaminated sediment will be required conducted as part of the EPA Superfund Program.
Average Annual Functional Capacity Units (AAFCUs)	145.00	135.01	125.27
Project Cost	$86,010,000	$79,850,000	$61,380,000
Annual Cost	$3,511,920	$3,260,390	$2,506,240
Avg Cost/AAFCU	$24,220	$24,150	$20,007

Alternatives A and C were "Best Buy Plans", Alternative C most cost-effective

Significance of Restoration in the Region and at the Site

✓ Leverages prior and ongoing regional wetland restoration and enhancements within watershed.

✓ Restoration would improve tidal flow and improve water quality through nutrient update and exchange, improve connectivity of habitats.

✓ Habitats will provide secondary benefits of flood control to a flood prone area.

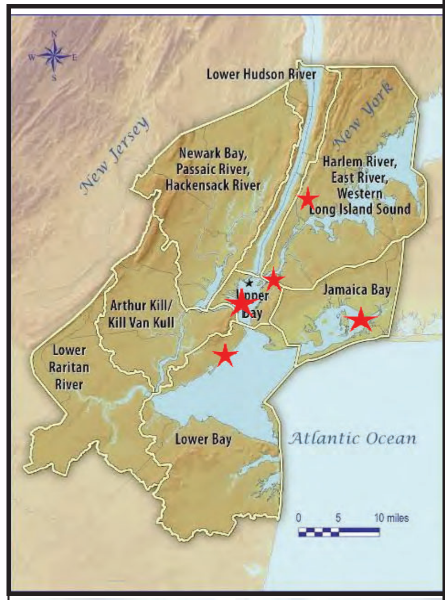
✓ T&E species habitat will be expanded; stabilizes ecologically significant urban wetlands/riparian areas.

✓ Kearny Point restores significant acreage of wetland habitat to achieve TEC goals

✓ Environmental Justice: Lower Passaic River damages from impacts and loss of habitat to underserved community

Tentatively Selected Plan Design

HRE – SMALL SCALE OYSTER RESTORATION



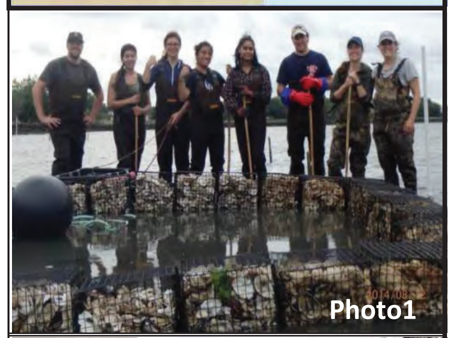


Photo1


Photo2


Photo3

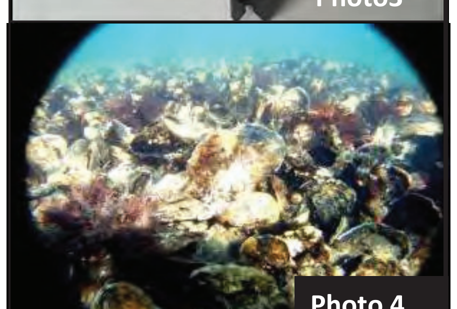


Photo 4

Prior to European colonization, oysters and oyster reefs were key components of the estuarine habitat in HRE. It is believed that approximately 350 square miles of oyster beds were present in the HRE. Principal concentrations occurred long the Brooklyn, Manhattan, and Queens shorelines, Jamaica Bay, and Hudson and East Rivers.

Due to **overharvesting, pollution and habitat disturbances**, **oysters became practically non-existent** by the mid 20th Century. However, with the passage of the Clean Water Act and other environmental legislation, water quality has improved and limited isolated populations do exist in a few areas of the HRE. Initial pilot programs to restore oysters began in the early 2000s, such as the Oyster Restoration Research Partnership Program (ORRP), a partnership of over 30 not-for-profit organizations, Federal (including NYD), state and city agencies, scientists and citizens. Research by the ORRP, comprised of partners at NYCDEP, NY/NJ Baykeeper, the New York Harbor School, the USCE, and the Hudson River Foundation, showed that artificial reef structures and planted oysters can survive, grow, reproduce and improve biodiversity in the HRE. However, there are not yet enough adult oysters spawning in the estuary to supply the amount of larvae needed to support consistent growth of natural reefs. Thus, a targeted oyster restoration effort, as proposed, in the HRE would promote and enhance the oyster recovery to attain the TEC Goal of 20+ acres of oyster beds by the year 2020 - as well as provide critical scientific information on how to restore oysters more efficiently in the future.

As part of the HRE, five sites were selected for oyster restoration throughout the estuary. The sites were selected based on past successes and/or to work in concert with other ecological improvements. The sites are generally along the shoreline in depths of water that range from 3-12 feet in depth.

Restoration Opportunities/Measures

- Habitat Creation and Improvement
- Shoreline Stabilization
- Public education/access
- Water Quality Improvement

Site	**Governors Island**	**Soundview Park**	**Jamaica Bay**	**Naval Station Earle**	**Bush Terminal**
Partner	NY Harbor Foundation	Hudson River Foundation	NYCDEP	NY/NJ Baykeeper	NY Harbor Foundation
Pilot	Many prior experiments /restoration efforts as part of the ORRP and Harbor School have occurred. The laboratory and aquaculture facilities at the school can grow more than a million oysters per year.	ORRP Phase I 2010-2012 2013 Community Based Restoration of Oyster Reef Habitat in the Bronx River. To date, one of the largest oyster restoration projects in the HRE.	NYCDEP has conducted studies in Jamaica Bay on oysters from 2010-2015 and documented oyster survival. Current oyster pilot is ongoing at this site.	The NY/NJ Baykeeper has conducted oyster restoration at NWS Earle since 2010 on a small 0.25-acre plot. Oyster survival has been documented.	Complements other restoration work by NYCDP&R at the adjacent Bush Terminal Piers Park. Close proximity to Harbor School.
			Recommended Oyster Restoration Techniques		
Description	✓ **Gabion Blocks** (Photo 1). The blocks are 12x3x3 ft wire cages (smaller cages shown in photo) filled with oyster shells pre-seeded with spat. (1.66 ac) ✓ **Oyster Condos** (Photo 2) - Triangular structures; mimics the rugosity (three dimensionality) of an oyster reef. (1.79 ac) ✓ **Hanging Trays/Super Trays** (Photo 3). The trays are submerged and suspended from a float or pier to serve as larval source for adjacent habitat. (0.68 ac) Rationale: Restoration designed to place reproductive stock (hanging trays) in close proximity to suitable hard substrate (condos and gabion blocks) for settlement. The use of Governors island, in concert with the Harbor School, provides facilities, technical experts and a cost-effective means for construction and maintenance, as well as an excellent teaching/research opportunities for future generations of scientists.	✓ **Spat on Shell (SoS)**. (Photo 4). Produced by the Harbor School using local broodstock, with a veneer layer of mollusk shell on a base of rock/rubble. Suited to lower energy environments with firm substrate, or in combination with other techniques that shelter the SoS from strong currents and smothering by sediments, and prevent sinking into loose substrate. (0.83 ac) ✓ **Gabion Blocks**. (0.14 ac) Rationale: Restoration designed to build on past successes. Restoration will occur in an area with subtidal rock out crops to form a ~2.75 ac reef/bed complex The design would continue to provide excellent research opportunities.	✓ **Oyster Beds (shells, gravel, porcelain)** (.5 ac) ✓ **Hanging Trays/Super Trays** 200 trays (1ft x 5 ft) place oysters vertically in the water column, with immediate benefits to water quality as oysters filter the water and can disperse veliger (larvae) to nearby constructed reefs, beds (>0.5 ac), or other hard substrate as receiver site. Rationale: Builds on past success of NYCDEP and provides valuable information on substrates (e.g., shells, gravel, etc.), recruitment, and settlement patterns of oysters spawned from the hanging tray stocks.	✓ **Spat on Shell (SoS)** (3.10 ac) ✓ **Gabion Blocks** (3.20 ac) ✓ **Reef Balls** https://www.youtube.com/watch?v=lbr4e_-NNZM - (Photo 5). Reef balls are half-dome, concrete structures, with holes that allow water to flow through, and fish and other aquatic creatures to inhabit the interior. Although used successfully to construct intertidal reefs, reef balls are better suited to subtidal areas to avoid damage from waves and currents. (1.30 ac) Rationale: Builds on past success of NY//NJ Baykeeper. Security provided by Naval forces would eliminate any potential poaching.	✓ **Spat on Shell (SoS)** (31.65 ac) ✓ **Gabion Blocks** (8.48 ac) provide protection for adjacent spat on shell habitat ✓ **Oyster Condos** (3.49 ac) ✓ **Hanging Trays/Super Trays** (0.1 ac) Rationale: Would serve as a model for the re-utilization of derelict portions of the harbor shoreline and has positive synergistic effect with adjacent park development. The derelict piers provide wave attenuation and depth variability provide habitat diversity. Site is close to Harbor School resulting in reduced transport costs for future placement of oysters. Provides excellent public access, stewardship and future study.
Project Cost	**$4,730,000**	**$740,000**	**$400,000**	**$7,200,000**	**$31,960,000**

Significance of Restoration in the Region and at the Site

- ✓ http://nynjbaykeeper.org/resources-programs/restoration/
- ✓ Builds/expands on previous successful oyster restoration in the HRE
- ✓ Achieves the HRE Regional Goal of establishing 20 acres of reef habitat across several sites by 2020 and advances the Billion Oyster Program (BOP) to restore one billion live oysters to New York Harbor over the next twenty years. (https://www.youtube.com/watch?v=eKOBhp29RSI)
- ✓ Ecological Uplift includes:
  - **Improve habitat quality for invertebrates, fish and vegetation;**
  - **Improve ecosystem function**
  - **Improve water quality through filtration of nutrients, water turbidity, nitrogen, phosphorous, organic carbon;**
  - **Carbon sequestration**
  - **Stabilize the shoreline to prevent erosion; and**
  - **Wave attenuation**
- ✓ Innovative solution to reutilizing derelict shorelines and piers.
- ✓ Restores an important estuarine species in NY Harbor.
- ✓ Provides unique opportunity to work with Harbor School for construction and maintenance of reefs


Photo 5

Tentatively Selected Plan Design

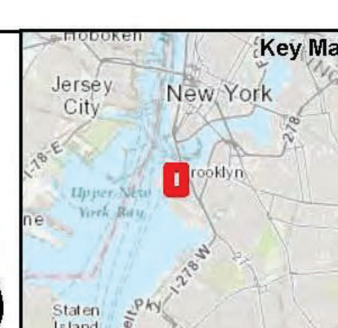
Source: NYS GIS Clearinghouse 2014 Orthoimagery

Hudson-Raritan Estuary (HRE) Feasibility Study
Governors Island, New York City, New York

PROPOSED MEASURES LEGEND

SITE BOUNDARY
HANGING TRAYS
GABION BLOCKS
OYSTER CONDOS

0 200 400 Feet



New York HARBOR FOUNDATION

Tentatively Selected Plan Design

Hudson-Raritan Estuary (HRE) Feasibility Study
Soundview Park, Bronx, New York

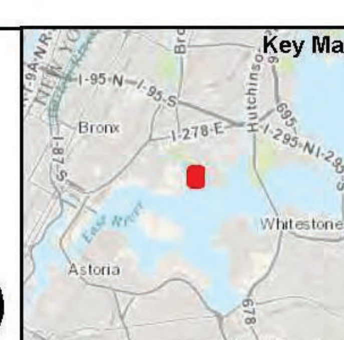
Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- GABION BLOCKS
- SPAT-ON-SHELL*
- EXISTING SPAT-ON-SHELL
- EXISTING HARD ROCK SUBSTRATE
- EXISTING SHELL BASE

*Existing shell base (2013) to be set with 250,000 additional spat on shell

0 100 200 Feet



Tentatively Selected Plan Design

Hudson-Raritan Estuary (HRE) Feasibility Study
Jamaica Bay, Queens, New York

Source: NYS GIS Clearinghouse 2013 & 2014 Orthoimagery

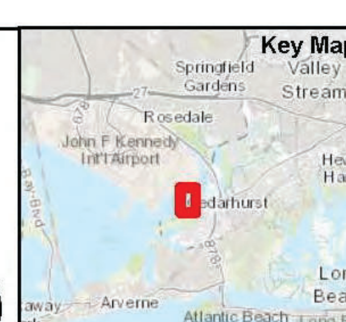
PROPOSED MEASURES LEGEND

SITE BOUNDARY

OYSTER BEDS (SHELLS, GRAVEL AND/OR PORCELAIN)

OYSTER STRUCTURES (HANGING SUPER TRAYS AND CABLE)

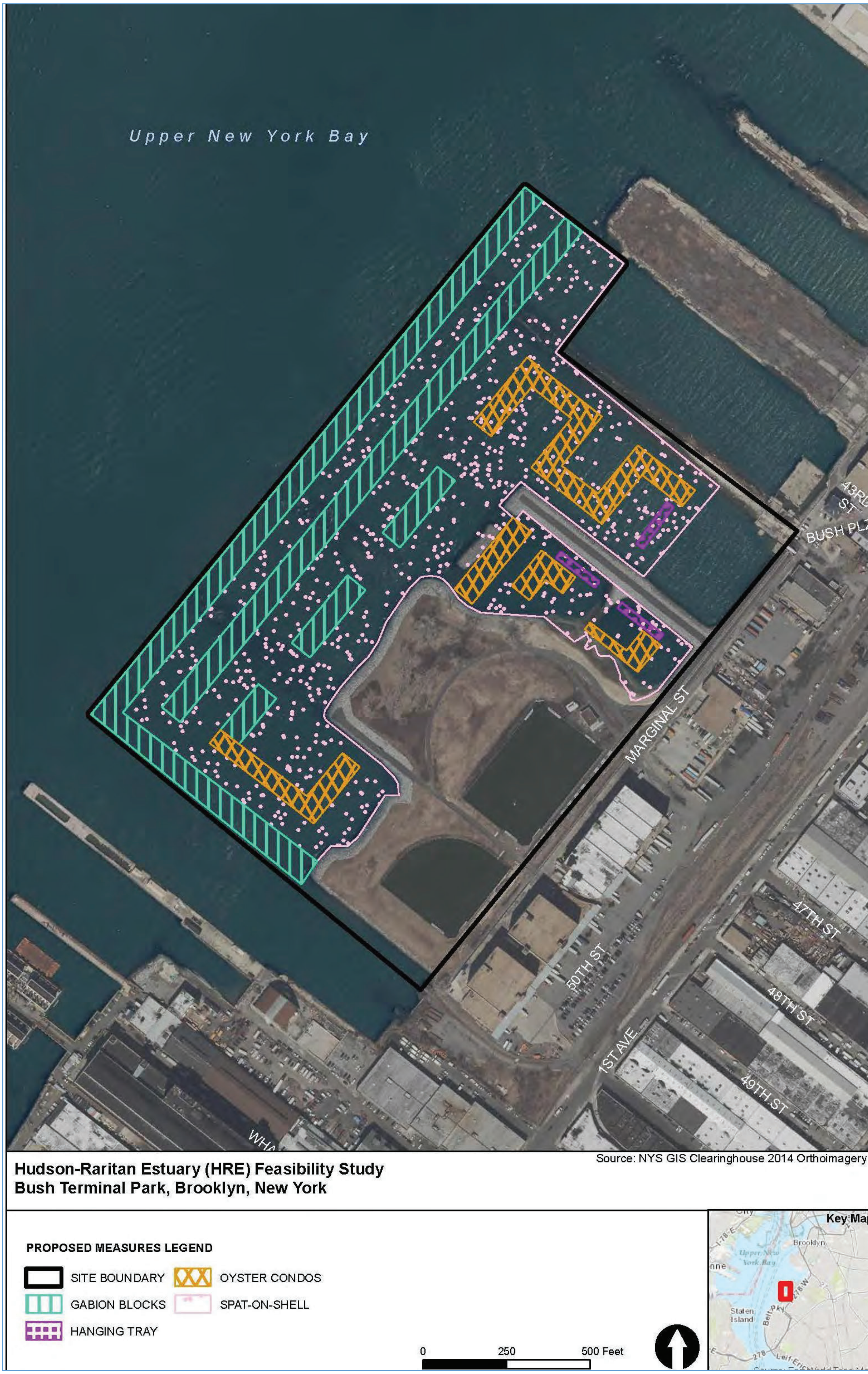
0 200 400 Feet



Source: Esri World Topo Map

Tentatively Selected Plan Design

Tentatively Selected Plan Design

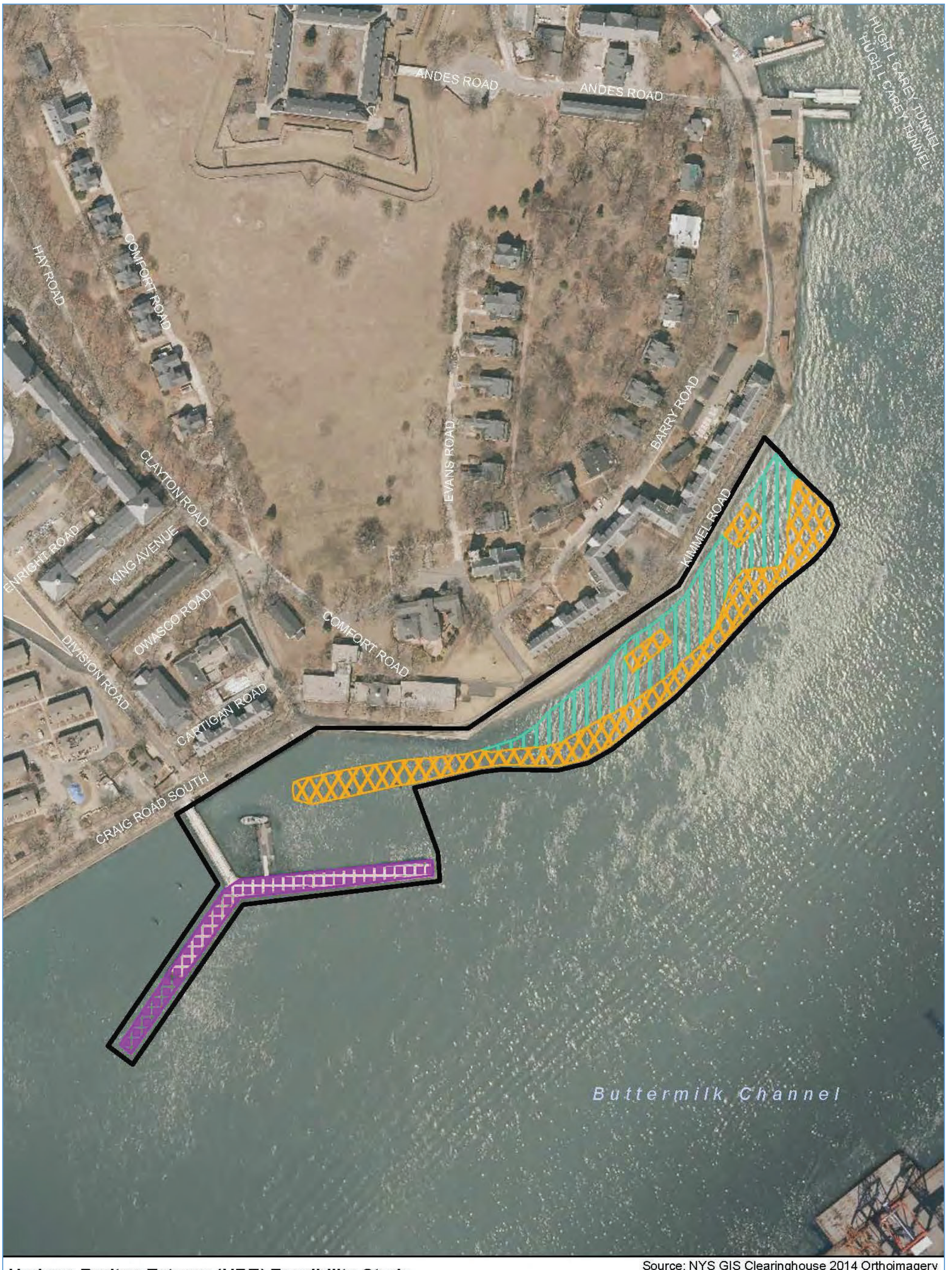


Hudson-Raritan Estuary (HRE) Feasibility Study
Bush Terminal Park, Brooklyn, New York

PROPOSED MEASURES LEGEND

SITE BOUNDARY
OYSTER CONDOS
GABION BLOCKS
SPAT-ON-SHELL
HANGING TRAY

Tentatively Selected Plan Design



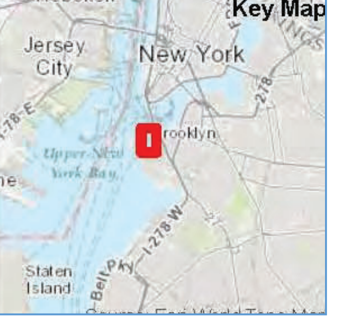
Hudson-Raritan Estuary (HRE) Feasibility Study
Governors Island, New York City, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

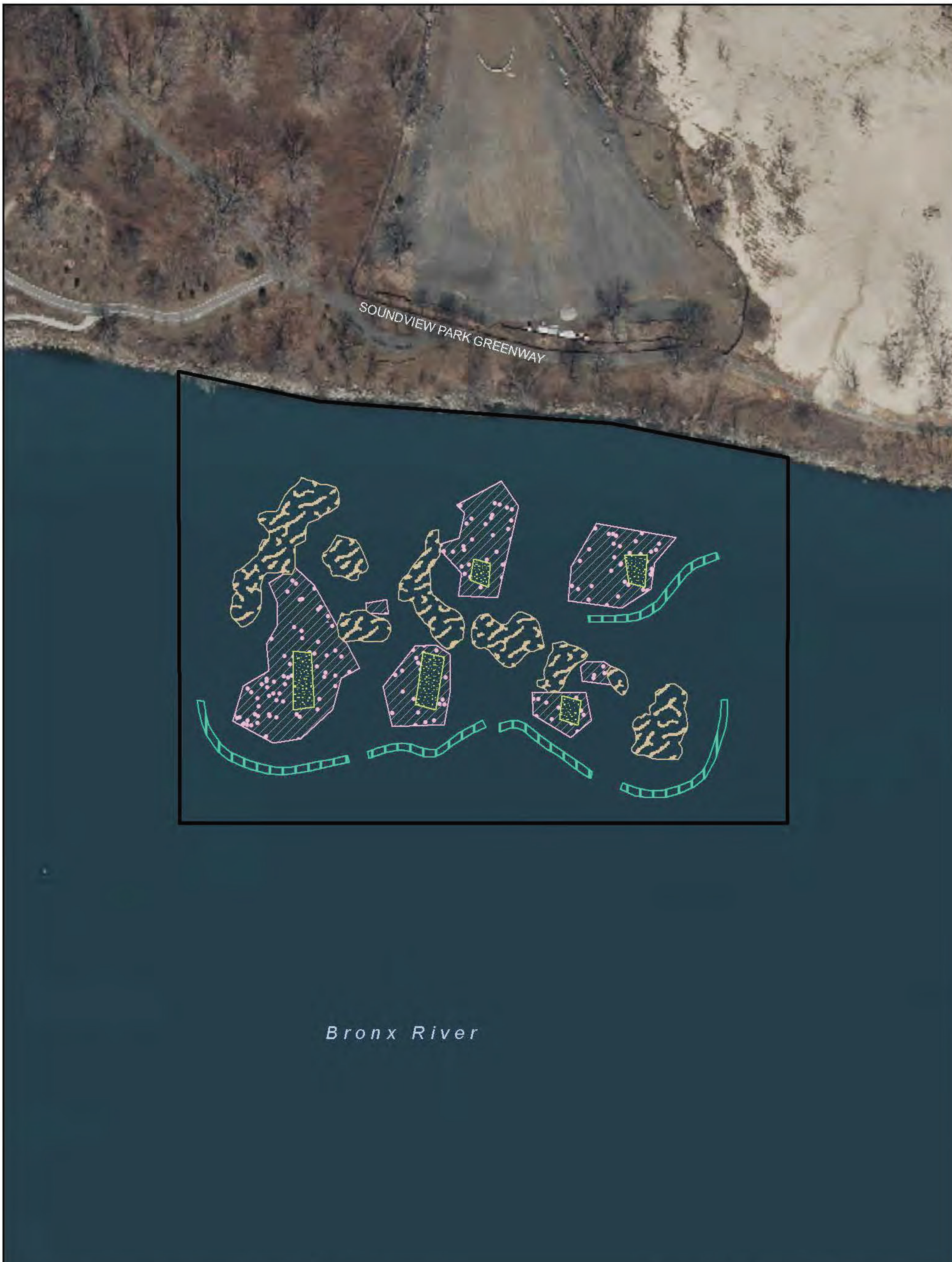
PROPOSED MEASURES LEGEND

SITE BOUNDARY
HANGING TRAYS
GABION BLOCKS
OYSTER CONDOS

0 200 400 Feet



Tentatively Selected Plan Design



Hudson-Raritan Estuary (HRE) Feasibility Study
Soundview Park, Bronx, New York

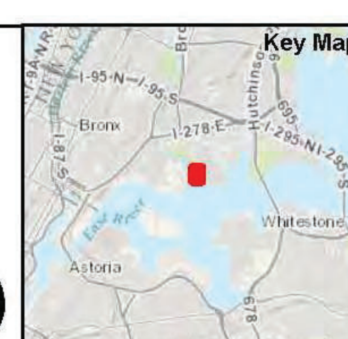
Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- GABION BLOCKS
- SPAT-ON-SHELL*
- EXISTING SPAT-ON-SHELL
- EXISTING HARD ROCK SUBSTRATE
- EXISTING SHELL BASE

*Existing shell base (2013) to be set with 250,000 additional spat on shell

0 100 200 Feet



Tentatively Selected Plan Design

Hudson-Raritan Estuary (HRE) Feasibility Study
Jamaica Bay, Queens, New York

Source: NYS GIS Clearinghouse 2013 & 2014 Orthoimagery

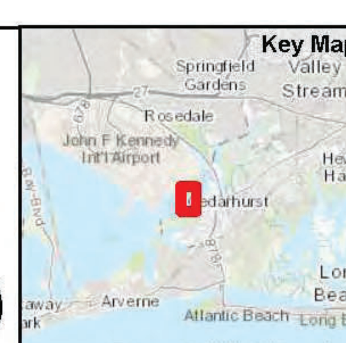
PROPOSED MEASURES LEGEND

SITE BOUNDARY

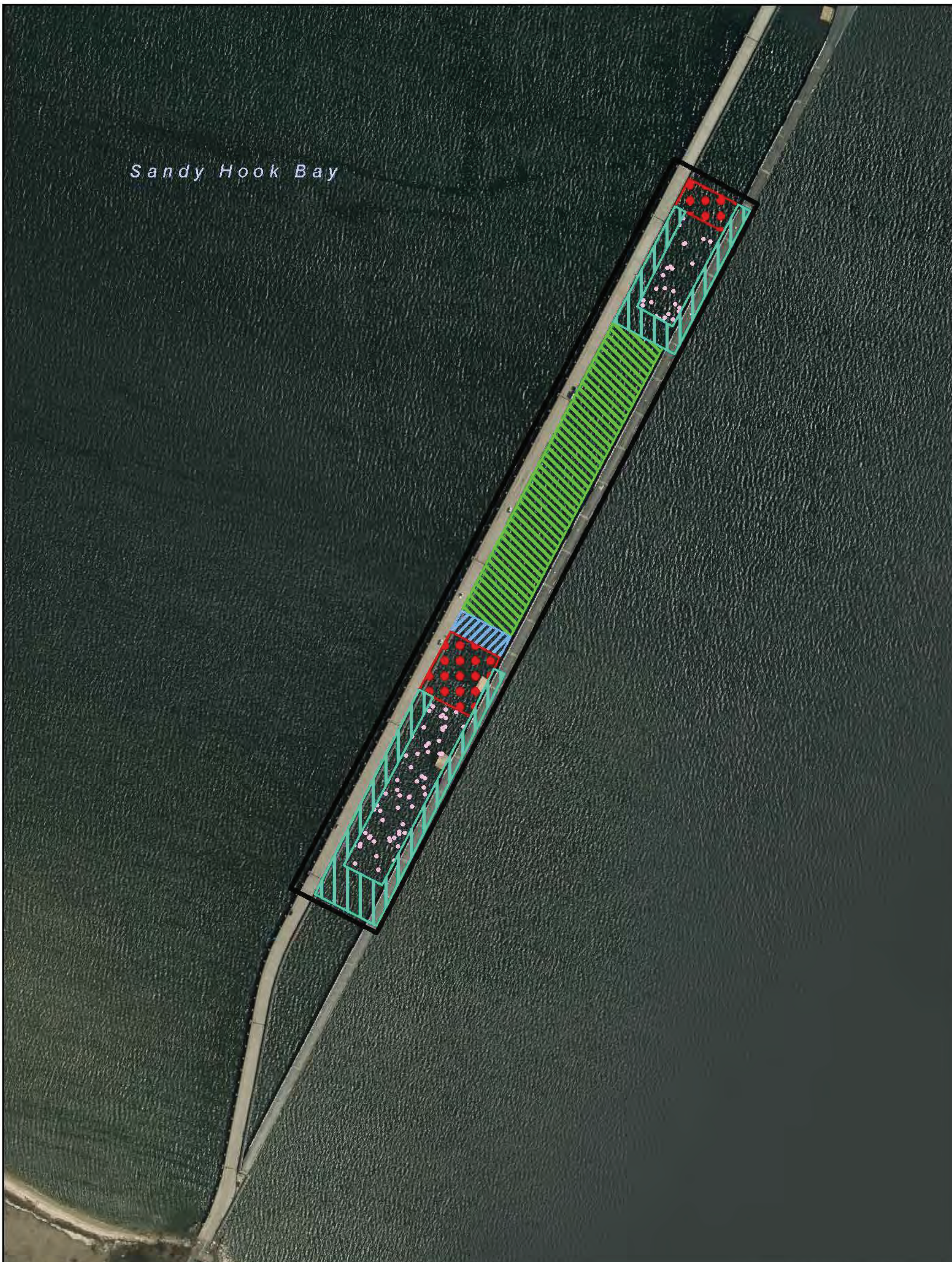
OYSTER BEDS (SHELLS, GRAVEL AND/OR PORCELAIN)

OYSTER STRUCTURES (HANGING SUPER TRAYS AND CABLE)

0 200 400 Feet



Tentatively Selected Plan Design



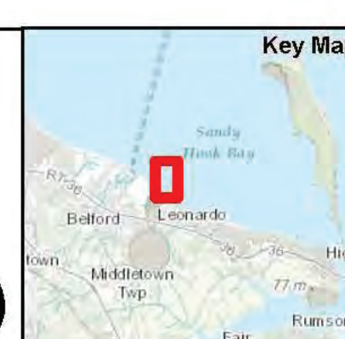
Hudson-Raritan Estuary (HRE) Feasibility Study
Navy Earle Pier, Middletown, New Jersey

Source: NJGIN 2015 Orthoimagery

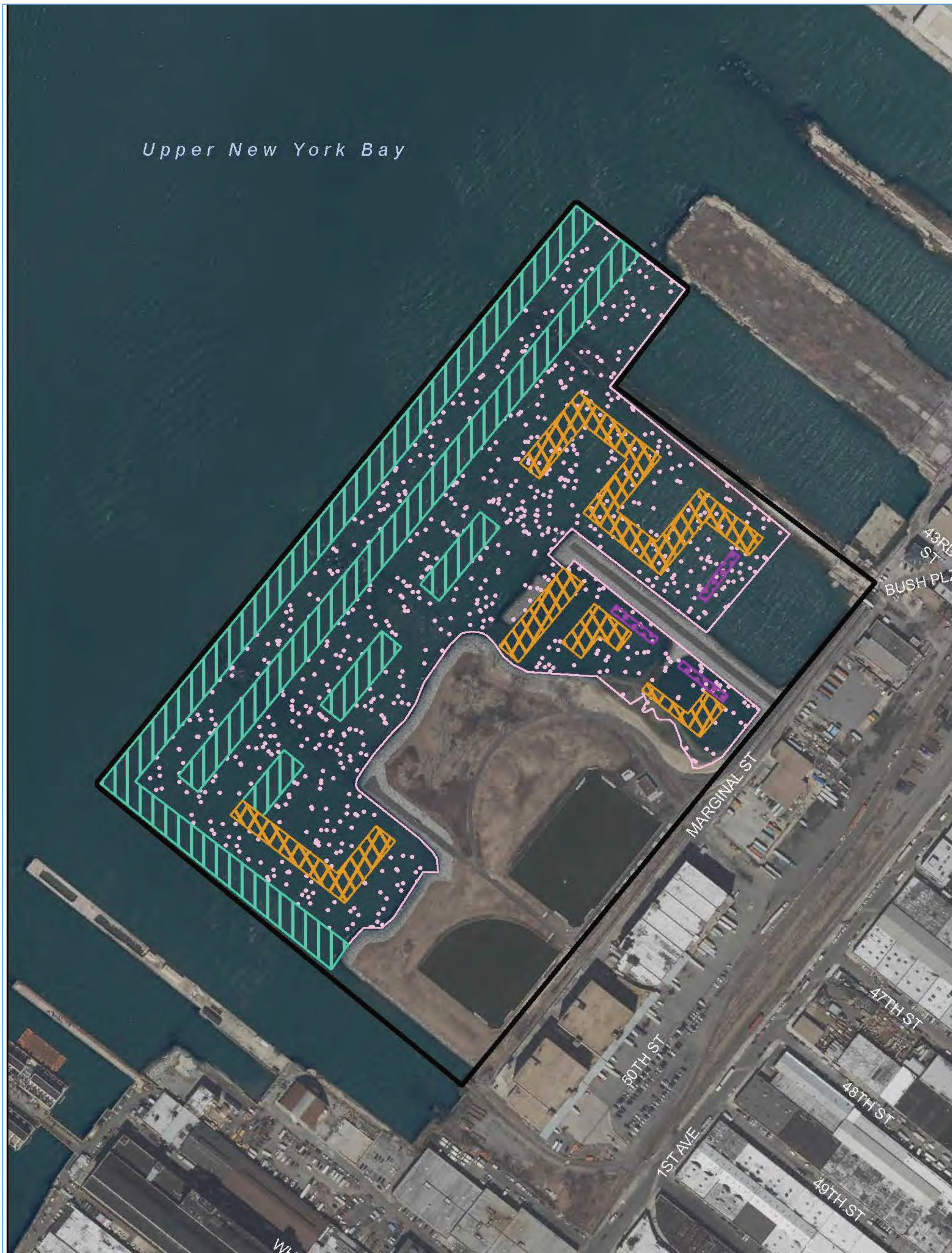
PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- GABION BLOCKS
- OYSTER CONDOS
- REEF BALLS
- SPAT-ON-SHELL
- EXISTING OYSTER ENHANCEMENT AREA
- OYSTER AREA UNDER DEVELOPMENT

0 300 600 Feet



Tentatively Selected Plan Design



Hudson-Raritan Estuary (HRE) Feasibility Study
Bush Terminal Park, Brooklyn, New York

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- GABION BLOCKS
- HANGING TRAY
- OYSTER CONDOS
- SPAT-ON-SHELL

0 250 500 Feet

New York Harbor Foundation

APPENDIX B

Avian Resources of the HRE Study Area

Table 1. Migratory Birds of the Passaic River Area.

* is a State listed species and ! indicates a State species of concern

Accipiter cooperii	Cooper's hawk
Accipiter striatus	Sharp-shinned hawk (!)
Actitis macularius	Spotted sandpiper (!)
Agelaius phoeniceus	Red-winged blackbird
Aix sponsa	Wood duck
Ammodramus savannarum	Grasshopper sparrow (*)
Anas platytrhyncos	Mallard
Archilochus colubris	Ruby-throat hummingbird
Ardea Herodias	Great blue heron (!)
Baelophus bicolor	Tufted titmouse
Bombycilla cedrorum	Cedar waxwing
Branta bernicla	Brant
Branta canadensis	Canada goose
Bubo virginianus	Great horned owl
Buteo jamaicensis	Red-tailed hawk
Buteo lineatus	Red-shouldered hawk
Buteo platypterus	Broad-winged hawk (!)
Butorides virescens	Green heron
Caprimulgus carolinensis	Chuck-will's-widow
Caprimulgus vociferous	Whip-poor-will (!)
Cardinalis cardinalis	Northern cardinal
Carpodacus purpureus	Purple finch
Carduelis pinus	Pine siskin
Cathartes aura	Turkey vulture
Catharus fuscescens	Veery (!)
Catharus guttatus	Hermit thrush
Catharus minimus	Gray-cheeked thrush
Catharus ustulatus	Swainson's thrush
Certhia americana	Brown creeper
Chaetura pelagica	Chimney swift
Charadrius vociferous	Killdeer
Chen caerulescens	Snow goose
Chondestes grammacus	Lark sparrow
Chordeiles minor	Common nighthawk (!)
Circus cyaneus	Northern harrier (*)
Cistothorus palustris	Marsh wren
Coccyzus americanus	Yellow-billed cuckoo
Colaptes auratus	Northern flicker

Columba livia	Rock dove
Contopus virens	Eastern wood pewee
Coragyps atratus	Black vulture
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Corvus ossifragus	Fish crow
Cyanocitta cristata	Blue jay
Cygnus olor	Mute swan
Dendroica caerulescens	Black-throated blue warbler (!)
Dendroica castanea	Bay-breasted warbler
Dendroica cerulea	Cerulean warbler (!)
Dendroica discolor	Prairie warbler
Dendroica dominica	Yellow-throated warbler
Dendroica fusca	Blackburnian warbler (!)
Dendroica magnolia	Magnolia warbler
Dendroica pensylvanica	Chestnut-sided warbler
Dendroica petechia	Yellow warbler
Dendroica striata	Blackpoll warbler
Dendroica tigina	Cape May warbler
Dendroica virens	Black-throated green warbler (!)
Dimetella carolinensis	Gray catbird
Dryocopus pileatus	Pileated woodpecker
Empidonax minimus	Least flycatcher (!)
Empidonax trailii	Willow flycatcher
Empidonax virescens	Acadian flycatcher
Falco columbarius	Merlin
Falco peregrinus	Peregrine falcon (*)
Falco sparverius	American kestrel (!)
Gavia immer	Common loon
Geothypis trichas	Common yellowthroat
Haemorhous mexicanus	House finch
Haliaeetus leucocephalus	Bald eagle (*)
Helmitheros vermivora	Worm-eating warbler (!)
Hirundo rustica	Barn swallow
Hylocichla mustelina	Wood thrush (!)
Icteria virens	Yellow-breasted chat
Icterus galbula	Northern oriole
Icterus spurius	Orchard oriole
Junco hyemalis	Dark-eyed junco
Larus delawarensis	Ring-billed gull
Larus argentatus	Herring gull
Larus marinus	Great Black-backed gull
Megaceryle alcyon	Belted kingfisher
Melanerpes carolinus	Red-bellied woodpecker
Melospiza georgiana	Swamp sparrow
Melospiza lincolnii	Lincoln sparrow

Melospiza melodia	Song sparrow
Mergus merganser	Common merganser
Mimus polyglottos	Northern mockingbird
Mniotilta varia	Black-and-white warbler
Molothrus ater	Brown-headed cowbird
Myiarchus crinitus	Great-crested flycatcher
Oporornis formosus	Kentucky warbler (!)
Oporornis agilis	Connecticut warbler
Oporornis philadelphia	Mourning warbler
Otus asio	Eastern screech-owl
Pandion haliaetus	Osprey
Parkesia motacilla	Louisiana waterthrush
Parula americana	Northern parula
Passer domesticus	House sparrow
Passerculus sandwichensis	Savannah sparrow
Passerella iliaca	Fox sparrow
Passerina cyanea	Indigo bunting
Petrochelidon pyrrhonota	Cliff swallow
Phalacrocorax auritus	Double-breasted cormorant
Pheucticus ludovicianus	Rose-breasted grosbeak
Picoides pubescens	Downy woodpecker
Picoides villosus	Hairy woodpecker
Pipilo erythrophthalmus	Rufous-sided (Eastern) towhee
Piranga olivacea	Scarlet tanager
Piranga rubra	Summer tanager
Poecile atricapillus	Black-capped chickadee
Polioptila caerulea	Blue-gray gnatcatcher
Progne subis	Purple martin
Quiscalus quiscula	Common grackle
Regulus calendula	Ruby-crowned kinglet
Regulus satrapa	Golden-crowned kinglet
Sayornis phoebe	Eastern phoebe
Seiurus motacilla	Louisiana waterthrush
Seiurus noveboracensis	Northern waterthrush
Scolopax minor	American woodcock
Setophaga ruticilla	American redstart
Seiurus aurocapilla	Ovenbird
Sialia sialis	Eastern bluebird
Sitta Canadensis	Red-breasted nuthatch
Sitta carolinensis	White-breasted nuthatch
Sphyrapicus varius	Yellow-bellied sapsucker
Spinus tristis	American goldfinch
Spiza Americana	Dickcissel
Spizella arborea	American tree sparrow
Spizella pallida	Clay-colored sparrow
Spizella passerina	Chipping sparrow

Spizella pussilla	Field sparrow
Stelgidopteryx serripennis	Northern rough-winged swallow
Sturnella magna	Eastern meadowlark
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree swallow
Thryothurua ludovicianus	Carolina wren
Toxostoma rufum	Brown thrasher (!)
Tringa flavipes	Lesser yellowlegs
Troglodydes aedon	House wren
Troglodydes troglodydes	Winter wren (!)
Turdus migratorius	American robin
Tyrannus tyrannus	Eastern kingbird
Vermivora cyanoptera	Blue-winged warbler
Vermivora ruficapilla	Nashville warbler (!)
Vermivora peregrina	Tennessee warbler
Vireo flavifrons	Yellow-throated vireo
Vireo gilvus	Warbling vireo
Vireo griseus	White-eyed vireo
Vireo olivaceus	Red-eyed vireo
Vireo solitaries	Blue-headed vireo (!)
Wilsonia canadensis	Canada warbler (!)
Wilsonia pusilla	Wilson's warbler
Zenaida macroura	Mourning dove
Zonotrichia albicollis	White-throated sparrow
Zonotrichia leucophrys	White-crowned sparrow

Many of the above species were found in the Meadowlands Area, as surveyed by the New Jersey Audubon Society on behalf of the New Jersey Sport and Exposition Authority (formerly the New Jersey Meadowlands Commission, New Jersey Meadowlands Commission 2007).

Table 2. Birds of the Bronx River (New York City Department of Parks and Recreation and Bronx River Alliance 2005; New York City Department of Parks and Recreation 2017)

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* is a State listed species, ! is a State species of greatest conservation need, and + is a State species of conservation concern

Actitis macularia	Spotted Sandpiper
Agelaius phoeniceus	Red-winged Blackbird
Aix sponsa	Wood Duck
Anas platyrhynchos	Mallard
Anas rubripes	American Black Duck (!)
Ardea alba	Great Egret (!)
Ardea herdoias	Great Blue Heron
Aythya marila	Greater Scaup (!)
Bombycilla cedrorum	Cedar Waxwing

Branta canadensis	Canada Goose
Bucephala albeola	Bufflehead
Buteo jamaicensis	Red-tailed Hawk
Buteo platypterus	Broad-winged Hawk
Cardinalis cardinalis	Northern Cardinal
Carduelis tristis	American Goldfinch
Carpodacus mexicanus	House Finch
Catharus fuscescens	Veery
Ceryle alcyon	Belted Kingfisher
Chaetura pelagica	Chimney Swift
Chroicocephalus philadelphia	Bonaparte's Gull (!)
Colaptes auratus	Northern Flicker
Columbia livia	Rock Pigeon
Contopus virens	Eastern Wood-pewee
Corvus brachyrhynchos	American Crow
Corvus ossifragus	Fish Crow
Cyanocitta cristata	Blue Jay
Cygnus olor	Mute Swan
Dendroica coronata	Yellow-rumped Warbler
Dendroica discolor	Prairie Warbler (!)
Dendroica fusca	Blackburnian Warbler
Dendroica magnolia	Magnolia Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica petechia	Yellow Warbler
Dendroica striata	Blackpoll Warbler
Dendroica virens	Black-throated Green Warbler
Dumetella carolinensis	Gray Catbird
Egretta thula	Snowy Egret (!)
Empidonax traillii	Willow Flycatcher
Geothlypis trichas	Common Yellowthroat
Hirundo rustica	Barn Swallow
Hylocichia mustelina	Wood Thrush (!)
Icterus galbula	Baltimore Oriole
Larus argentatus	Herring Gull
Larus atricilla	Laughing Gull (!)
Larus marinus	Great Black-backed Gull
Melanerpes carolinus	Red-bellied Woodpecker
Meleagris gallopavo	Wild Turkey
Melospiza melodia	Song Sparrow
Mergus serrator	Red-breasted Merganser
Mimus polyglottos	Northern Mockingbird
Mnioltilta varia	Black and White Warbler

Molothrus ater	Brown-headed Cowbird
Myiarchus crinitus	Great crested flycatcher
Nyctanassa violacea	Yellow-crowned Night-Heron (!)
Nycticorax nycticorax	Black-crowned Night-Heron (!)
Otus asio	Eastern Screech Owl
Oxyura jamaicensis	Ruddy Duck (!)
Pandion haliaetus	Osprey (+)
Parula american	Northern Parula
Parus bicolor	Tufted Titmouse
Passer domesticus	House Sparrow
Phalacrocorax auritus	Double-crested Cormorant
Phasianus colchicus	Ring-necked Pheasant
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Piranga olivacea	Scarlet Tanager (!)
Plegadis falcinellus	Glossy Ibis (!)
Pluvialis dominica	American Golden Plover
Poecile atricapillus	Black-capped Chickadee
Quiscalus quiscula	Common Grackle
Regulus satrapa	Golden-crowned Kinglet
Seiurus aurocapillus	Ovenbird
Setophaga castanea	Bay-breasted Warbler (!)
Setophaga ruticilla	American Redstart
Setophaga tigrina	Cape May Warbler (!)
Sitta carolinensis	White-breasted Nuthatch
Spizella passerina	Chipping Sparrow
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Sterna hirundo	Common Tern (*, !)
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree Swallow
Thryothours ludovicianus	Carolina Wren
Tringa flavipes	Lesser Yellowlegs
Tringa melanoleuca	Greater Yellowlegs
Troglodytes aedon	House Wren
Turdus migratorius	American Robin
Vireo gilvus	Warbling Vireo
Vireo griseus	White-eyed Vireo
Vireo olivaceus	Red-eyed Vireo
Wilsonia canadensis	Canada Warbler (!)
Zenaida macroura	Mourning Dove
Zonotrichia albicollis	White-throated Sparrow

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APPENDIX C

Fish of the HRE Feasibility Study Area

Table 1. Fish of the Passaic and Hackensack Rivers (Louis Berger Group, Inc. 2014; TAMS 2004; and New Jersey Meadowlands Commission 2005).

Scientific Name	Common Name
Alosa aestivalis	Blueback Herring
Alosa pseudoharengus	Alewife
Alosa sapidissima	American Shad
Ameiurus nebulosus	Brown bullhead
Anchoa mitchilli	Bay anchovy
Anguilla rostrata	American eel
Bairdiella chrysoura	Silver perch
Brevoortia tyrannus	Atlantic menhaden
Caranx hippos	Crevalle jack
Catastomus commersoni	White sucker
Cynoscion regalis	Weakfish
Cyprinus carpio	Common carp
Dorosoma cepedianum	Gizzard shad
Ethoestoma olmstedi	Tessellated darter
Fundulus diaphanus	Banded killifish
Fundulus heteroclitus	Mummichog
Fundulus majalis	Striped killifish
Gasterosteus aculeatus	Threespine stickleback
Gobiosoma bosci	Naked goby
Gobionellas shufeldti	Freshwater goby
Leiostomus xantharus	Spot
Lepomis auritus	Redbreast sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Meirus catus	White catfish
Menidia beryllina	Inland (Tidewater) silverside
Menidia menidia	Atlantic silverside
Micropterus salmoides	Largemouth bass
Microgadus tomcod	Atlantic tomcod
Micropogonias undulatus	Atlantic croaker
Micropterus dolomieu	Smallmouth bass
Morone americana	White perch
Morone saxatilis	Striped bass
Mugil cephalus	Striped mullet
Notropis hudsonius	Spottail shiner
Obsanus tau	Oyster Toadfish
Paralichthys dentatus	Summer flounder

Perca flavescens	Yellow Perch
Prionotus carolinus	Northern searobin
Pomatomus saltatrix	Bluefish
Pomoxis nigromaculatus	Black crappie
Pseudopleuronectes americanus	Winter flounder
Selene setapinnis	Atlantic Moonfish
Syngnathus fuscus	Northern pipefish
Trinectes maculatus	Hogchoker

Table 2. Fish of the Arthur Kill/Kill Van Kull, Newark Bay, Upper New York Bay, and Lower New York Bay (U. S. Army Corps of Engineers 2013).

Scientific Name	Common Name
Alosa aestivalis	Blueback Herring
Alosa pseudoharengus	Alewife
Ammodytes americanus	American sandlance
Anchoa hepsetus	Striped anchovy
Anchoa mitchilli	Bay anchovy
Anguilla rostrata	American eel
Astroscopus guttatus	Northern stargazer
Bairdiella chrysoura	Silver perch
Brevoortia tyrannus	Atlantic menhaden
Caranx hippos	Crevalle jack
Caranx crysos	Blue runner
Catastomus commersoni	White sucker
Centropristis striata	Black sea bass
Clupea harengus harengus	Atlantic herring
Conger oceanicus	Conger eel
Cynoscion regalis	Weakfish
Dorosoma cepedianum	Gizzard shad
Enchelyopsus cimbrius	Fourbeard rockling
Ethoestoma olmstedi	Tessellated darter
Etropus microstomus	Smallmouth flounder
Fundulus diaphanus	Banded killifish
Fundulus heteroclitus	Mummichog
Fundulus majalis	Striped killifish
Gasterosteus aculeatus	Threespine stickleback
Gobiesox strumosus	Skilletfish
Gobiosoma bosci	Naked goby
Gobionellas shufeldti	Freshwater goby
Leiostomus xantharus	Spot
Gasterosteus aculeatus	Threespine stickleback
Gobiosoma bosci	Naked goby
Gobionellas shufeldti	Freshwater goby

Hippocampus erectus	Lined seahorse
Hypsoblennius hentz	Feather blenny
Lagodon rhomboides	Pinfish
Leiostomus xantharus	Spot
Menidia beryllina	Inland (Tidewater) silverside
Menidia menidia	Atlantic silverside
Merluccius bilinearis	Silver hake
Microgadus tomcod	Atlantic tomcod
Micropogonias undulatus	Atlantic croaker
Morone americana	White perch
Morone saxatilis	Striped bass
Mugil cephalus	Striped mullet
Mugil curema	White mullet
Myoxocephalus aenaeus	Grubby
Notropis hudsonius	Spottail shiner
Obsanus tau	Oyster Toadfish
Ophidion marginatum	Striped cusk-eel
Opisthonema oglinum	Atlantic thread herring
Ostraciidae sp.	Boxfish
Paralichthys dentatus	Summer flounder
Peprilus triacanthus	Butterfish
Prionotus carolinus	Northern searobin
Prionotus evolams	Striped searobin
Pomatomus saltatrix	Bluefish
Pollachius virens	Pollock
Pseudopleuronectes americanus	Winter flounder
Scomberomorus maculatus	Spanish mackerel
Scophthalmus aquosus	Windowpane
Selene setapinnis	Atlantic moonfish
Selene vomer	Lookdown
Sphoeroides maculatus	Northern puffer
Stenotomus chrysops	Scup
Syngnathus fuscus	Northern pipefish
Trichiurus lepturus	Atlantic cutlassfish
Trinectes maculatus	Hogchoker
Urophycis chuss	Red hake
Urophycis regia	Spotted hake

Table 3. Bronx River (Including Estuarine Portions) Fish (Crimmens and Larson 2006; U.S. Army Corps of Engineers 2006).

Scientific Name	Common Name
Alosa mediocris	Hickory Shad
Alsoa aestivalis	Blueback Herring

Anchoa mitchelli	Bay Anchovy
Anguilla rostrada	American Eel
Apeltes quadracus	Fourspine Stickleback
Brevoortia tyrannus	Atlantic Menhaden
Carassius auratus	Goldfish
Catostomus commersoni	White Sucker
Clupea harengus	Atlantic Herring
Cynoscion regalis	Weakfish
Cyprinus carpio	Common Carp
Dorosoma cepedianum	Gizzard Shad
Esox americanus	Grass or Redfin Pickerel
Etheostoma olmstedi	Tesselated Darter
Fundulus diaphanous	Banded Killifish
Fundulus heteroclitus	Mummichog
Fundulus majalis	Striped Killifish
Gobiosoma bosci	Naked Goby
Gobiosoma ginsburgi	Seaboard Goby
Ictalurus nebulosus	Brown Bullhead Catfish
Lepomis auritus	Redbreast Sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill Sunfish
Luxilus cornutus	Common Shiner
Menidia menidia	Atlantic Silverside
Microgadus tomcod	Atlantic Tomcod
Micropterus salmoides	Largemouth Bass
Morone americana	White Perch
Morone saxatilis	Striped Bass
Myoxocephalus scorpius	Shorthorn Sculpin
Notemigonus crysoleucas	Golden Shiner
Notropis hudsonius	Spottail Shiner
Peprilus triacanthus	Butterfish
Pomatomus saltatrix	Bluefish
Prionotus carolinus	Northern Searobin
Pseudopleuronectes americanus	Winter Flounder
Rhinichthys atratulus	Black-Nosed Dace
Rhodeus sericeus	Bitterling
Semotilus atromaculatus	Creek Chub
Stenotomus chrysops	Scup
Synathus fuscus	Northern Pipefish
Tautogolabrus adspersus	Cunner
Urophycis regia	Spotted Hake

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APPENDIX D

Supporting Studies on Contaminants Impacts to HRE Biota

Grass shrimp collected from a variety of sites surrounding Staten Island, New York (within the Arthur Kill/Kill Van Kull and Lower Bay planning regions) were found to exhibit differences in prey capture ability, with those from Richmond Creek (adjacent to a landfill) exhibiting lower rates of prey capture than those from nearby Nassau Creek (impacted by historic smelting activities) (Perez and Wallace 2004). Grass shrimp from both Staten Island creeks had lower rates of prey capture than did those from Great Kills Harbor, a relatively clean area on the eastern shore of Staten Island. Previously healthy shrimp became impaired following exposure to sediments collected from Richmond Creek. Behavioral analyses showed that shrimp collected from Richmond Creek relied on less active prey capture strategies and were generally less effective predators as compared to shrimp from Great Kills Harbor.

Adult blue crabs from the Hackensack Meadowlands (within the Newark Bay/Hackensack River/Passaic River planning region) had reduced ability to capture juvenile blue crabs and adult mummichogs (both active prey) compared to crabs from a reference site in Tuckerton, NJ (Reichmuth *et al.* 2009). Other less active prey, including ribbed mussels (*Geukensia demissa*) and fiddler crabs (*Uca pugilator*), were eaten at equivalent frequencies by crabs from the two locations. Additionally, the stomachs of crabs from the Hackensack Meadowlands contained much more algae, plant material, detritus, and sediment, and much less crab, fish, and other live food, than did the stomachs of crabs from the reference site (although this could reflect reduced availability of live food in the HRE). When control crabs were placed in cages within the Hackensack Meadowlands, or fed food from the Hackensack Meadowlands in the laboratory, their ability to capture prey declined significantly, indicating that the effects were the result of environmental factors rather than population differences. Conversely, crabs collected in the Hackensack Meadowlands and caged at a reference site showed significant improvements in their ability to capture prey.

A variety of studies have demonstrated that organisms including mummichog, grass shrimp, fiddler crabs, blue crabs, and bluefish from Piles Creek, NJ (within the Arthur Kill/Kill Van Kull planning region) have impaired feeding abilities and are more vulnerable to predation relative to organisms from reference locations (eastern Long Island; Tuckerton, NJ) (see reviews by Weis *et al.* 2001; Weis *et al.* 2011; Weis and Candelmo 2012). Organisms captured from Piles Creek were less active, less able to capture prey, and more vulnerable to predation (Smith and Weis 1997). Fish from Piles Creek displayed altered neurotransmitter levels and thyroid function and histopathology (Zhou, John-Alder, et al., 1999; Zhou, Rademacher, et al., 1999), which may underlie the altered behaviors (Smith *et al.* 1995). Further, Toppin *et al.* (1987) found that mummichogs from Piles Creek had reduced growth and a shorter life span in comparison to fish from reference areas. Correspondingly, Bass *et al.* (2001) found that grass shrimp from Piles Creek are larger than those from a reference area, and demonstrated through controlled laboratory studies that the observed size differences appear related to lower rates of predation on grass shrimp in Piles Creek, rather than to genetic or environmental factors within the grass shrimp population.

Goto and Wallace (2011) evaluated the effects of legacy contamination on the trophic ecology of the mummichog in five creeks of Staten Island, including Piles Creek, NJ (within the Arthur Kill/Kill Van Kull and Lower Bay planning regions). The authors examined the effects of mercury-contaminated sediments on mummichog prey and concluded that chronic pollution in Arthur Kill tributaries appears to directly (through chemical bioaccummulation) and indirectly (through reduced benthic prey availability) alter feeding habits and strategies of mummichogs in these highly urbanized tidal marshes. Correspondingly, Goto (2009) reported that mercury-laden sediments of the Arthur Kill and adjacent marshes were strongly associated with reduced abundance, biomass, and diversity of the benthic macroinfaunal assemblage.

Multiple adverse reproductive impacts were observed in mummichog collected from Newark Bay (within the Newark Bay/Hackensack River/Passaic River planning region) (Bugel *et al.* 2010 and 2011). Females had decreased gonadal weight and inhibited gonadal development, while males had decreased gonadal weight and altered testis development. Both sexes also displayed a variety of molecular and morphological changes indicative of impaired reproductive health and endocrine disruption (Bugel *et al.* 2010). In addition, females collected from Newark Bay produced fewer eggs, and their hatched embryos suffered significantly greater mortality, as compared to females collected at a reference area in Tuckerton, NJ (Bugel *et al.* 2011). Dosing studies with 17β-estradiol revealed that the observed impacts resulted from a combination of altered regulation of vitellogenin and 17β-estradiol deficiency, which the authors speculated may have been due to the presence of aryl hydrocarbon receptor (AhR) agonists such as dioxins and PCBs (Bugel *et al.* 2010).

Laboratory populations of bluefish were fed common prey fish (menhaden [*Brevoortia tyrannus*] and mummichog) collected in either the Hackensack River (within the Newark Bay/Hackensack River/Passaic River Planning Region) or a reference area in Tuckerton, NJ (Candelmo *et al.* 2010). Bluefish fed prey fish from the Hackensack River had elevated tissue concentrations of PCBs, pesticides, and total mercury, and after four months displayed reduced feeding rates, activity, and growth compared to fish fed prey fish from the reference area. They also displayed irregular swimming behavior and disrupted schooling patterns. Bluefish captured in the Hackensack River also had elevated concentrations of PCBs, DDTs, and mercury, and the young-of-the-year were significantly smaller, compared to fish from reference locations, indicating that contaminant uptake and reduced feeding and/or growth also occurs in the field. Additionally, a relatively low percentage of bluefish caught in the Hackensack River contained food in their guts, as compared to bluefish from other locations (see, for example, Juanes and Conover 1994; Buckel *et al*. 1999; Gartland *et al.* 2006), providing further evidence of a reduced feeding rate by bluefish in the HRE. Bluefish from the HRE also displayed disrupted swimming patterns and schooling behavior, potentially increasing predation risk. Candelmo *et al.* (2010) speculated that consumption of prey fish with elevated contaminant concentrations may cause detrimental effects on migration, overwinter survival, and recruitment in bluefish populations.

Atlantic tomcod from the HRE (Lower Hudson River Planning Region) had higher incidences of neoplastic and preneoplastic lesions in livers than did tomcod from reference locations in Maine, Rhode Island, and Connecticut (Dey *et al.* 1993). External liver lesions were found in 59 percent of one-year-old fish from the HRE, while 93 percent of the two-year-old fish showed gross liver abnormalities. These conditions were not seen in fish from the reference locations. Chemical analysis of liver tissue from HRE tomcod revealed high levels of PCBs and the presence of several pesticides (DDx, chlordane, and dieldrin) and heavy metals. The authors suggested that chemical contamination in nursery areas in the lower estuary, combined with high-temperature stresses of summer, may contribute to the observed high prevalence of hepatic lesions. In addition, Wirgin *et al.* (1989) found that tomcod from the HRE had an extremely high incidence (55-90 percent) of histologically defined hepatocellular carcinomas, whereas tomcod from control sites in Maine rarely exhibited this condition.

Grasman *et al.* (2013) evaluated associations between immune function, pre-fledgling survival, and contaminants in herring gull (*Larus argentatus*) and black-crowned night-heron in Swinburne and Hoffman Islands in lower New York Harbor (within the Lower Bay planning region). T-cell function (as measured by the phytohemagglutinin [PHA] skin response), lymphocyte proliferation, and pre-fledgling survival were all reduced relative to reference locations. Highly significant correlations between measures of the PHA response and dioxins and PCBs provided strong evidence that these chemicals contributed to immunosuppression in the study population, and likely indicates significant impacts on disease resistance and survival (Grasman *et al.* 2013).

Although no studies evaluating the biological effects of mercury on birds in the HRE have been published, mercury concentrations in feathers and eggs of marsh wrens (*Cistothorus palustris*) in the Hackensack Meadowlands (within the Newark Bay/Hackensack River/Passaic River planning region) have been found to exceed effects concentrations for nesting success in Carolina wrens, presented in Jackson *et al.* (2011). Tsipoura *et al.* (2008) collected eggs, feathers, and blood from red-winged blackbirds, marsh wrens, and tree swallows in three different marshes (Kearny Marsh, Marsh Resources, and Riverbend) within the Hackensack Meadowlands. Average concentrations of mercury in marsh wrens eggs collected at Marsh Resources, Secaucus, New Jersey, and concentrations of mercury in feathers of marsh wrens from all three sampling locations (adjusted to wet weight concentrations using a feather moisture content of 16 percent; Kock 2006), were approximately at levels demonstrated by Jackson *et al.* (2011) to induce a 20 percent reduction in nesting success in Carolina wren.

Wintermyer and Cooper (2003) studied the effects of dioxin and dioxin-like compounds on egg development and fertilization of the eastern oyster and evaluated the potential for restoring oyster populations in the New York/New Jersey Harbor area. The two study sites were located in Newark Bay and the Arthur Kill (within the Newark Bay/Hackensack River/Passaic River and the Arthur Kill/Kill Van Kull planning regions). The study found that despite some recent improvements of water quality in the HRE, dioxins, furans, and PCBs were still bioavailable in Newark Bay and that 2,3,7,8-TCDD impaired gonadal development, egg viability, and larval production in oysters transplanted into the Arthur Kill. The authors concluded that due to the documented adverse effects of these compounds on the oyster, restoration efforts in Newark Bay and the Arthur Kill were unlikely to result in successful recruitment of oysters in these areas.

Particularly relevant to this study is that the Corps has identified four potential oyster restoration projects in the HRE (Bush Terminal, Governor’s Island, Soundview Park, and the mouth of

Jamaica Bay). In the Mitigation Recommendation Section of this report we have provided recommendations regarding contaminants testing to address this concern.

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APPENDIX E

Pre-Construction Site Characterization

Sediment/Soil

- For all proposed projects (tidal and non-tidal) within the HRE, the Corps should conduct a screening-level characterization of sediment or soil (hereinafter referred to as "sediment") in what will be the top 0-30 centimeters (cm) of the final project grade. Samples should be collected from all habitat types, including tidal creeks, intertidal marsh side-slopes, and marsh plains, within each wetland disturbance area (WDA), to be identified in consultation with the stakeholder agencies (Service, Corps, NOAA, NJDEP and NYSDEC). Sediment or soil cores from the top 0-30 cm of the final project grade should be split into what will be the top 0-15 cm and 15-30 cm horizons of the final project grade for separate laboratory analysis. Additionally, the Corps should collect sediment cores from the top 0-15 cm of the existing tidal and non-tidal creeks (*i.e*., those not part of project construction) within, and in the vicinity of, the project site. The samples collected for pre-construction characterization will be used to determine whether contaminated material below the proposed final project grade and /or existing creek sediments should be removed and /or capped prior to grading.

- Within each WDA and the tidal creeks requiring characterization, the number and location of samples to be collected and analyzed should be in accordance with a final sampling plan submitted to and approved by the Service, NOAA, and each respective State agency.

- Appropriate numbers and types of quality assurance/quality control (QA/QC) samples should be collected and analyzed, including duplicates, blanks, and standards. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of 10 percent of the total number of samples, with minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

- The Corps should seek concurrence from the Service, NOAA, NJDEP, and NYSDEC prior to any sampling plan being implemented at a specific site.

The Service recommends that the Corps choose one of the two recommended sampling methodologies in their sediment characterization investigation.

<u>Sediment Sampling Methodologies</u>

1. Discrete Sampling

For HRE restoration projects located in New York, the Service recommends using the formula cited in Appendix F of the NYSDEC Screening and Assessment of Contaminated Sediment

Guidance found in New York State Department of Environmental Conservation (2014) to determine the number of samples to be collected pre- and post-construction.
New York State assigns different dredging factors (DF) to guide development of a sampling plan. Dredging factors range from a value of one-half to three and are determined on a site-specific basis. Habitats potentially associated with a DF of one, where there is no previous data and there is no suspected likelihood of appreciable contamination (see New York State Department of Environmental Conservation 2014), within the HRE in New York may include western Long Island Sound, parts of the Bronx, and the South Shore of Staten Island. The highest DF (three) should be applied in contaminated areas, such as the Arthur Kill, Kill Van Kull, and the Gowanus Canal. The higher DFs will increase the number of samples per acre within an individual project site, relative to lower DFs.

DF should equal 3 for sites:

- with documented contamination from past sediment data; or
- in areas of established fish consumption advisories or a history of spills or site-specific contaminant concerns (*e.g.*, copper, mirex, dioxin, and PCBs) in the drainage basin; or
- where there is a likelihood of contamination and dredging has not occurred in the last five years (New York State Department of Environmental Conservation 2014).

For projects in New Jersey, the Service recommends following the Ecological Evaluation Technical Guidance "EETG;" (New Jersey Department of Environmental Protection 2015a), developed by the NJDEP Site Remediation Program (SRP) under the Site Remediation Reform Act (N.J.S.A. 58:10C-1 et seq.) (New Jersey Department of Environmental Protection 2012). The EETG includes information on how to conduct an Ecological Evaluation (EE) to investigate for the co-occurrence of environmentally sensitive natural resources (ESNRs), contaminants of potential ecological concern (COPECs), and contaminant migration pathways from a source area to the ESNRs. The results of the EE will indicate whether or not additional ecological evaluation (*i.e.*, an ecological risk assessment or ERA) is warranted at a project site. The EETG includes recommendations for sampling and analytical methods, including detection limits; Ecological Screening Criteria (ESC; New Jersey Department of Environmental Protection 2009) to use in determining whether there is potential for contaminants to impact ESNRs; and procedures for the derivation of site-specific ecological risk-based remediation goals.

With regard to the number and location of samples for marsh plains, the NJDEP's *"Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil"* (Soil-SI, RI, RA TG) (New Jersey Department of Environmental Protection 2015b), section 3.6.11 should be followed. Collection of soil samples should be biased toward suspected areas of the greatest contamination. If there is no basis for biasing, then random sampling of these areas is recommended as follows:

- Grid the area to be sampled and give each grid node an identification number.
- Base the grid nodes chosen for sampling on the numbers selected from a random number chart.
- Sample areas of less than 10 ac at a rate of at least one sample for every two acres.
- For areas greater than 10 ac, a reduced frequency may be appropriate.

For tidal and non-tidal creeks associated with each WDA, NJDEP does not prescribe an exact sample number or location of samples; however the EETG, section 5.3.2.2 should be followed and depositional areas should be targeted. The NJDEP routinely recommends a sample transect approach, with spacing between transects generally ranging between 50 and 200 ft apart, depending on creek length.

Additional information for field sampling plan design, implementation, and field QA/QC procedures can be found in NJDEP's *"Field Sampling Procedures Manual"* ("FSPM"; New Jersey Department of Environmental Protection 2005).

2. Incremental Sampling Methodology

An alternative to using the above discrete sampling methodologies is the Incremental Sampling Methodology (ISM), which was developed by USEPA for use in their Superfund Program (Interstate Technology and Regulatory Council 2012; U.S. Environmental Protection Agency 2011). The ISM is "…a structured composite sampling and processing protocol that reduces data variability and provides a reasonably unbiased estimate of mean contaminant concentrations in a volume of soil targeted for sampling." By using a recommended number of sampling increments and combining and subsampling them in a prescribed manner, more consistent and reproducible results can be obtained, yielding more defensible decisions with a smaller analytical investment. Note that NJDEP SRP and NYSDEC guidance documents do not incorporate ISM for the purposes of risk characterization; therefore, it is important that the decision to use the ISM to characterize a project site be made in consultation with the appropriate stakeholder agencies.

<u>Sediment Sample Analysis</u>

Sediment samples collected at all proposed HRE project sites should be analyzed for the following compounds using the methods indicated below. Appropriate numbers and types of QA/QC samples should also be collected and analyzed, including blanks, duplicates, and standards, as indicated above. Additional guidance is available in New Jersey Department of Environmental Protection (2014) and New York State Department of Environmental Conservation (2014).

- Target Analyte List (TAL) Metals: USEPA Method 6010/6020
- Mercury: USEPA Method 7471A
- Target Compound List (TCL) volatile organics: USEPA Method 8260
- TCL semi-volatile organics: USEPA Method 8270D
- Organochlorine pesticides: USEPA Method 8081
- PCBs, as congeners: USEPA Method 1668A
- 2,3,7,8-chloro substituted dioxins and furans (17 congeners): USEPA Method 1613
- Grain Size Distribution
- Percent Moisture
- Total organic carbon
- pH

Sample Detection Limits and Sediment Evaluation - HRE projects in New York

- Analyte-specific detection limits should be below Class A sediment classification concentrations as set forth in New York State Department of Environmental Conservation (2014), with the exception that detection limits for individual PCBs and dioxin and furan congeners should be below 1 ppt. No construction can proceed until these data are obtained and reviewed by the appropriate stakeholders for their adequacy in assessing existing environmental conditions.

- Contaminant concentrations should be demonstrated to be within or below the Class B sediment classification concentrations as set forth in New York State Department of Environmental Conservation (2014), with the exception of total PCBs (sum of congeners), for which a threshold value of 20 parts per billion (ppb) should be used.

- Sediment exceeding Class B sediment classification concentrations should be removed to a depth such that the Class B concentrations are achieved in each of the top 0-15 cm and 15-30 cm horizons of sediment at the final project grade. Alternatively, areas with exceedances at project depth can be capped (or excavated and capped, depending on desired final elevation) with two feet of clean material, in which case post-excavation sampling to document clean conditions is not required.

Sample Detection Limits and Sediment Evaluation - HRE projects in NJ

- Analyte-specific detection limits for sampling conducted as part of the EE should be below the ESCs identified in New Jersey Department of Environmental Protection (2009). Notwithstanding the EETG recommendation for PCB congener and dioxin/furan analyses on a subset of samples, for HRE projects in New Jersey, PCB congener and dioxin/furan analyses should be completed for all samples, pursuant to recommendations by the Bureau of Environmental Evaluation and Risk Assessment, Environmental Toxicology and Risk Assessment Unit (BEERA/ETRA) for NJDEP, Land Use Regulation-lead wetland mitigation/restoration projects. Contaminant concentrations should be determined to be below the ESCs. If ESCs are exceeded, the procedures outlined in the EETG should be followed to determine whether further ecological evaluation and/or sediment removal is appropriate. A remedial action to achieve the ESC or background contaminant levels may be implemented in lieu of performing an ERA, in accordance with the EETG. However, no construction can proceed until data used to evaluate a site are obtained and reviewed by the stakeholders for their adequacy in assessing existing environmental conditions.

- If a project site passes the screening-level characterization (*i.e.*, is determined to have levels of contamination below risk thresholds), additional evaluation or remediation is not necessary, although the Corps should provide a pre-construction assessment report as indicated in the “Reporting” section, below. If, however, contamination exceeds acceptable thresholds, the Corps should remove sediment as necessary to attain clean conditions within the top 30 cm of the final project grade, and document such in accordance with the terms of the "Post-Construction Baseline Assessment" section below. Alternatively, areas with exceedances at project depth can be capped (or excavated and capped, depending on desired final elevation) with two feet of clean material, in which case post-excavation sampling to document clean conditions is not required. Project sites requiring remediation will also be subject to pre- and post-construction biological sampling, described below.

Biota

- If the pre-construction site characterization indicates that sediment within the top 0-30 cm of the final project grade requires remediation, then the Corps should develop a biological sampling plan, in consultation with the Stakeholder agencies, to be implemented prior to undertaking remediation. The biological sampling will establish baseline (pre-construction) conditions and, together with post-construction monitoring data, be used to evaluate the potential impact of recontamination, should it occur, on biota. All biota should be collected during the time period from May through August. Biological sampling is not necessary if sediment does not require remediation.

- Within each previously-characterized WDA in both New York and New Jersey, the Corps should collect a minimum of fifteen mummichog, fifteen fiddler crabs, and sufficient lycosid and tetragnathid spiders and amphipods to form five composite samples of each taxon. These samples should be chemically characterized using the analytical methodologies and detection limits listed for sediments, above. For non-tidal wetland or brackish water projects, additional or different species may be identified for collection, should sufficient numbers of the above species not be available. Biological and sediment samples should be collocated, to the extent possible.

- Because of the demonstrated usefulness of mussels in tidal environments as sentinel organisms both to evaluate the rate of biological uptake and to establish biota-sediment accumulation factors (BSAFs) generally (see, for example, Kimbrough *et al.* 2008; Burkhard 2009; and ASTM International 2013), the Service requests that caged mussel bioaccumulation studies be used to evaluate recontamination and bioaccumulation for tidal wetland projects in close proximity to contaminated sediments. The protocols for mussel monitoring should be consistent with those presented in ASTM International method E2122 (ASTM International 2013). The Corps should place sufficient caged mussels within each previously-characterized WDA and reference location(s) to provide a minimum of fifteen individual mussels for tissue analysis three months after placement. Note that the recommendation to conduct mussel monitoring only applies to tidal wetland restoration projects.

- Three months after placement of mussel cages, fifteen mussels should be collected and composited to form five samples from each WDA/reference location(s) to be chemically characterized using the analytical methodologies listed below.

- As previously described for sediment sampling, appropriate numbers and types of QA/QC samples, including duplicates, blanks, and standards, should be collected and analyzed along with biological samples. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of 10 percent of the total number of samples, with a minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

- Generally speaking, tissue samples should be analyzed for the following compounds using the methods indicated below, although this list may be modified based on the pre-construction site characterization contaminant results, in consultation with the stakeholder agencies.

    - TAL metals: USEPA Method 6010
    - Mercury: USEPA Method 7471A
    - Organochlorine pesticides: USEPA Method 8081
    - PCBs, as congeners: USEPA Method 1668A
    - 2,3,7,8-chloro substituted dioxins and furans (17 congeners): USEPA Method 1613
    - Total Lipid Content (percent)
    - Percent Moisture

- Analyte-specific detection limits should be the same as those identified for sediment, above, unless otherwise indicated by the Service. Tissue concentrations should be compared to critical body residues (CBRs) identified for the 2014 Focused Feasibility Study for the Lower Eight Miles of the Lower Passaic River (Appendix B in Louis Berger Group *et al.* 2014).

Reporting

- For each project, a report should be provided presenting the results of the pre-construction site assessment, including sediment sampling methodologies and sample depths. Reports should include a figure or figures depicting sampling locations, along with comprehensive analytical data in tabular format, including units, detection limits, summary statistics (*i.e*., mean, 95 percent upper confidence level [UCL], *etc*.) and comparisons to the appropriate screening levels and CBRs, as described above. Results from any quality assurance samples analyzed should be included as well. The report should be forwarded to the list of contacts provided above.

REFERENCES

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APPENDIX F

Post-Construction Baseline Assessment

The following recommendations are applicable to a majority of the proposed HRE projects involving tidal wetlands and should be followed for project sites that require sediment remediation or capping. For non-tidal wetland projects, many of these recommendations will still apply; however, the biological species evaluated will likely change. Prior to the Corps undertaking any post-construction sampling in either tidal or non-tidal wetlands, further coordination with the identified stakeholder agencies will be necessary.

Sediment

- If the pre-construction characterization results in contaminated sediment being removed, the Corps should collect sample cores separated into horizons corresponding to the top 0-1 cm, 1-15 cm, and 15-30 cm below the final project grade surface in the waterways, side-slopes, and marsh plain surfaces within each previously-characterized WDA. The 0-1 cm samples will be used to establish baseline conditions for evaluating recontamination post-construction, while the 1-15 and 15-30 cm horizons will be used to document successful remediation of site sediments (Note that if contaminated sediments are protected by a two-foot cap, sampling and analysis of the 1-15 and 15-30 cm horizons to document clean conditions will not be required.). Sampling regimes and laboratory methods used to collect and characterize these samples should follow the recommendations described under Appendix E, above.

- The Service recommends that sediment at nearby off-site (background) locations be sampled simultaneously with project sites post-construction to aid in establishing regional conditions and evaluating post-remediation contaminant trends. Sampling and analytical procedures should be the same at both background and project sites.

- As described in Appendix E, appropriate numbers and types of QA/QC samples should be collected and analyzed. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of 10 percent of the total number of samples, with minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

Biota

- It is anticipated that construction activities (*i.e.*, removal of soil or sediment, sediment placement of cap or the mechanical removal of vegetation) will have a negative impact on biota. Therefore, biological sampling is not recommended as part of the post-construction baseline assessment. However, the Service recommends that at the completion of construction, the Corps place caged mussels within remediated tidal wetland project sites to establish study populations that will be left in place for the duration of the post-construction monitoring period (see Appendix G, below). Sufficient numbers of mussels should be placed to provide a minimum of fifteen individuals for tissue analysis within each previously-characterized WDA and the reference location(s) at the end of the life of the monitoring period (*e.g.*, five years). Note that this recommendation only applies to tidal wetland restoration projects.

Reporting

- For each project, a report should be provided presenting the results of the post-construction baseline assessment, including sampling methodologies and sample depth. Reports should also provide a figure or figures depicting sampling locations, along with comprehensive analytical data in tabular format, including units, detection limits, summary statistics (*i.e.*, mean, UCL, *etc*.) and comparisons to the pre-construction baseline assessment data and to the appropriate screening levels, as described above. Results from any QA/QC samples analyzed should be included as well.

APPENDIX G

Post-Construction Monitoring

Post-construction monitoring should be undertaken at sites that have undergone sediment remediation (*i.e.*, removal or capping). This monitoring should include sediment and biological sampling and contaminant testing, and be conducted on an annual basis for the life of the monitoring period (for a minimum of five years after project completion).

Sediment

- The Corps should collect sediment samples from the top 0-1 cm below the final project surface in waterways, side-slopes, and the marsh surface of the tidal restoration projects and at background locations. The sampling regime (*i.e*., ISM or discrete sampling) should be the same as was used for the site's post-construction characterization. Laboratory methods should follow those described in Appendix E, above.

- If project construction incorporates placement of a cap, the integrity (*i.e.*, thickness) of the cap should be assessed to ensure that settlement and compaction and/or erosion are not compromising the ability of the cap to protect against exposure of biota to underlying contamination. If the integrity of the cap appears to be compromised, additional monitoring of pore water contaminant concentrations and/or benthic macroinvertebrate bioaccumulation evaluations may be recommended.

- Sediment samples collected for post-construction monitoring should be analyzed and evaluated using the same methods, detection limits, and threshold concentrations used for the pre-construction site characterization and post-construction baseline assessment (see Appendices E and F). Sediment and biological samples should be co-located to the extent possible.

Biota

- The Corps should collect biological samples (mummichog, fiddler crab, amphipods, and lycosid and tetragnathid spiders) within each previously-characterized WDA using the same sampling procedures, sample sizes, and analytical methods identified in Appendix E. All biota should be collected during the time period from May through August.

- For all tidal restoration projects, the Corps should place sufficient numbers of caged mussels to provide a minimum of fifteen individuals from each previously-characterized WDA and the reference location(s), to be analyzed as five composited samples per location three months after placement (*i.e.*, five samples per WDA/reference location, with each sample consisting of three composited individuals). Protocols for mussel monitoring should be consistent with those presented in ASTM method E2122 (ASTM International 2013). In addition, at the end of the life of the monitoring period, a minimum of fifteen individual mussels from each WDA and the reference location(s) should be collected from those placed at the completion of construction. These mussels should also be composited into five samples per WDA/reference location and analyzed in accordance with the recommendations presented in the Appendix E.

- Biological samples collected for post-construction monitoring should be analyzed and evaluated using the same methods, detection limits, and threshold concentrations provided for the pre-construction site characterization and post-grading baseline assessment, presented in Appendices E and F, respectively.

- As described in the Appendices E and F, appropriate numbers and types of QA/QC samples should collected and analyzed as part of both the sediment and biological assessments. Field duplicates should be collected at a rate of one per sampling category, or one per every 20 samples, whichever is greater. Field blanks should be collected at a rate of one per every 10 samples, with a minimum of one. Laboratory duplicates should be included at a minimum rate of one for every 20 samples.

Reporting

- Annual reports should be provided that summarize the results of each year's monitoring activities. Reports should include sampling methodologies, a figure or figures depicting sampling locations, and comprehensive data in tabular format, including units, detection limits, summary statistics (*i.e.*, mean, UCL, *etc*.) and comparisons to the pre-construction and post-construction baseline assessment data and to the appropriate screening levels, as described above. Results from any quality assurance samples analyzed should be included, as well.

- In addition, a final report should be provided that synthesizes the results from separate annual reports. The final report should evaluate data trends over the life of the project.

REFERENCES

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APPENDIX H

Plant and Animal Technical Guidance

Pollinators:

Increasing and Improving Pollinator Habitat through Landscaping:
https://www.doi.gov/sites/doi.gov/files/uploads/increasing-and-improving-pollinator-habitat-through-landscaping.pdf

Pollinator-friendly Best Management Practices for Federal Lands:
https://www.fs.fed.us/wildflowers/pollinators/BMPs/documents/PollinatorFriendlyBMPsFederalLands05152015.pdf

Supporting the Health of Honey Bees and Other Pollinators:
https://www.fws.gov/southwest/es/Documents/R2ES/Pollinators/6-Supporting_the_Health_of_Honey_Bees_and_Other_Pollinators_Oct2014.pdf

Monarch Joint Venture – Mowing: Best Practices for Monarchs:
http://monarchjointventure.org/images/uploads/documents/MowingForMonarchs.pdf

Pollinators in Natural Areas: A Primer on Habitat Management:
http://monarchjointventure.org/images/uploads/documents/pollinators_in_natural_areas_xerces_society.pdf

Conservation Cover (327) for Pollinators:
https://efotg.sc.egov.usda.gov/references/public/NJ/InstallGuideJobSheet_NewJersey_CnsrvCvr.pdf

Bats:

Indiana Bat Summer Survey Guidance:
https://www.fws.gov/Midwest/endangered/mammals/inba/inbasummersurveyguidance.html

Project	Low Marsh (acres): ***Plugs(Rate: 1 Forb Every 1 square foot)***	High Marsh (acres):***Plugs(Rate: 1 Forb Every 1 square foot)***
Jamaica Bay -Fresh Creek	13.6	2.5
Hawtree Point		0.07
Dubos Point	3.3	0.09
Brant Point	1.9	0.7
Bayswater State Park	2.5	0.04
Dead Horse Bay		
Elders Center Marsh Island	8.5	7.5
Duck Point Marsh Island	18.5	16.8
Pumpkin Patch- East Marsh Island	10.8	5.5
Pumpkin Patch-West Marsh Island	15.4	12.5
Stony Point Marsh Island	26	25.3
Flushing Creek	2.42	
Stone Mill Dam		
Bronx Zoo and Dam		
Shoelace Park		
Muskrat Cove		
River Park/West Farm Rapids Park		
Bronxville Lake		
Crestwood Lake		
Garth Woods/Harney Road		
Weschester County Center		
Meadowlark Tract	60.21	4.64
Meatromedia Marsh	38.2	13
Essex county Branch Brook		
Dundee Island Park		
Clifton Dundee Canal Green Acres		
Lower Passaic River "Deferred" Sit Oak Island Yards	7.3	
Lower Passaic River "Deferred site"Kearny Point	8.77	1.69
	217.4	90.33
Trees Needed ($6.00/gallon)		
Shrubs Needed ($6.00/gallon)		
Plugs Needed ($0.70/2" grasses and $1.10/2 and 3/8")	***9,469,944***	***3,934,775***
Livestakes Needed ($23.00/bundle of 50)		
Potential seeding(Marked * if possible seeding could be done)		
	Total Trees=	***557,477***

	Total Shrubs=	***1,156,509***
	Total Plugs=	***21,503,348***
	Total Livestakes=	***30,928***
**** There is a big difference between seeding projects and planting live plugs. Because there is not this level of detail in the proposals, these plant estimates are just that, estimates.**		
Espenses		
Trees Needed ($6.00/gallon)		
Shrubs Needed ($6.00/gallon)		
Plugs Needed ($0.70/2" grasses and $1.10/2 and 3/8" - $.90 for co	$6,628,960.80	$3,541,297.50
Livestakes Needed ($23.00/bundle of 50)		
Total Trees=	$3,344,862.00	
Total Shrubs=	$6,939,054.00	
Total Plugs= (averave used $1.02/plug)	$21,933,414.96	
Total Livestakes=	$14,226.88	
Overal Total=	$32,231,557.84	

SPECIES LISTS	Spartina alterniflora, Spartina cynosuroides,	Agalinis maritima, Amaranthus cannabinus, Bolboschoenus maritimus, Bolboschoenus robusts, Cyperus filicinus, Distichilis spicata, Euthamia graminifolia, Juncus gerardi, Limonium caroliniana, Panicum virgatum, Plantago maritima, Pluchea odorata, Sabatia stellaris, Salicornia depressa, Schenoplectus americanus, Schenoplectus pungens, Schenoplectus tabermontanii, Spartina patens, Spartina pectinata, Spartina x ceaspitosa, Solidago sempervirens, Suaeda calceoliformis, Symphyotrichum tenuifolium, Symphyotrichum subulatum, Teuchrium canadense, Typha angustifolia

Dune(acres):***Trees(Rate: 1 Tree Every 50 Square Feet) Shrubs(Rate: 1 Shrub Every 25 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)***	Creek/ Pool (acres):***Trees(Rate: 1 Tree Every 10 Square Feet)Shrubs(Rate: 1 Shrub Every 5 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****	Maritime Forest (acres):***Trees(Rate: 1 Tree Every 10 Square Feet)Shrubs(Rate: 1 Shrub Every 5 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****
	1.5	4.5
	0.07	2
		2.4
27.7		61
	0.14	
		3.21
		0.84
		1.84
27.7	1.71	75.79
24,132	***7,449***	***330,141***
48,265	***14,898***	***660,282***
1,206,612	***74,487***	***3,301,412***
	*	*

Additionally, our estimates will vary depending on if projects plan to include forbs in the plantings of the uplands/rivereine/forested wertland projects.		
$144,792.00	$44,694.00	$1,980,846.00
$289,590.00	$89,388.00	$3,961,692.00
$1,327,273.20	$87,894.66	$3,631,553.20

Ammophilia breviligulata, Cakile edentula, Cenchrus tribuloides, Cyperus grayi, Hudsonia tomentosa, Lechea maritima, Morella pennsylvanica, Nuttalanthus canadensis, Panicum amarum, Prunus maritima, Prunus serotina, Schizachyrium littorale, Solidago sempervirens	Alisma subcordatum, Alnus serrulata, Andropogon glomeratus, Andropogon virginicus, Anthoxanthum nitens spp. Nitens, Asclepias incarnate, Baccharis halmifolia, Carex annectens, Carex comosa, Carex crinite, Carex lupulina, Carex lurida, Carex stipata, Carex stricta, Carex vulpinoidea, Cephalanthus occidentalis, Chelone glabra, Cornus amomum, Desmodium canadense, Doellingeria umbellata, Eupatorium perfoliatum, Eutrochium maculatum, Helenium autumnale, Helianthis giganteus, Hibiscus moscheutos, Impatiens capensis, Iris prismatica, Iris versicolor, Juncus Canadensis, Juncus effuses, Leersia oryzoides, Lobelia cardinalis, Lobelia siphilitica, Ludwigia alternifolia, Lycopus virginicus, Onoclea sensibilis, Osmunda cinnamomea, Osmunda regalis, Peltandra virginica, Polygonum arifolium, Polygonum pensylvanica, Polygonum sagittatum, Pontederia cordata, Rhynchospora capitellata, Rosa palustris, Rumex verticillatus, Sagittaria latifolia, Schoenoplectus pungens, Schoenoplectus tabernaemontani, Scirpus atrovirens, Scirpus cyperinus, Sisyrinchium angustifolium, Sparganium eurycarpum, Spartina pectinate, Symphyotrichum novae-angliae, Symphyotrichum novi-belgii, Teucrium canadense, Thelypteris palustris, Tradescantia virginiana, Tripsacum dactyloides, Typha angustifolia, Typha latifolia, Verbena hastate, Vernonia novaboracensis, Viburnum dentatum, Viola cucullata	Acer rubrum Agalinus purpurea Agrostis perennans Andropogon gerardii Arctostaphylos uva-ursi Aristida dichotoma Aristida tuberculosa Baptisia tinctoria Carex pensylvanica Chrysopsis mariana Comptonia peregrina Eragrostis spectabilis Eupatorium album Gaylussacia baccata Gaylussacia frondosa Hudsonia ericoides Ilex glabra Lespedeza capitata Lyonia mariana Nuttallanthus canadensis Panicum virgatum Parthenocissus quinquefolia Plantago aristata Pteridium aquilinum Quercus ilicifolia Querucs marilandica Quercus prinoides Quercus stellata Rhus copallina Rubus hispidus Sassafras albidum Schizachyrium scoparium Solidago odora Tephrosia virginiana Trichostema dichotomum Vitis vulpina Vaccinium angustifolium Vaccinium pallidum

Maritime Scrubland(acres):***Trees(Rate: 1 Tree Every 30 Square Feet) Shrubs(Rate: 1 Shrub Every 10 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****	Coastal Scrub shrub/Grassland(acres):***Trees(Rate: 1 Tree Every 50 Square Feet) Shrubs(Rate: 1 Shrub Every 25 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****	Upland Forest and shrubland (acres):***Trees(Rate: 1 Tree Every 10 Square Feet)Shrubs(Rate: 1 Shrub Every 5 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****
11.3		
	1.7	
		0.59
		1.309
		1.12
		3.45
11.5	5.3	
22.8	7	6.469
33,106	***6,098***	***28,179***
99,317	***12,196***	***56,357***
993,168	***304,920***	***281,789***
*	*	*

$198,636.00	$36,588.00	$169,074.00
$595,902.00	$73,176.00	$338,142.00
$1,092,484.80	$274,428.00	$309,967.90

Acer rubrum, Agalinus purpurea, Amelanchier canadensis, Ammophila breviligulata, Andropogon virginicus, Aristida dichotoma, Aristida tuberculosa, Asclepias syriaca, Asclepias tuberosa, Carex pensylvanica, Celastrus scandens, Clethra alnifolia, Cyperus diandrus, Cyperus echinatus, Desmodium paniculatum, Eragrostis spectabilis, Eupatorium serotinum, Euthamia graminifolia, Gaylussacia baccata, Helenium flexuosum, Hudsonia tomentosa, Ilex opaca, Ionactis linariifolius, Juncus tenuis, Juniperus virginiana, Lespedeza capitate, Maianthemum stellata, Menispermum canadense, Morella pensylvanica, Nuttalanthus canadensis, Oenothera biennis, Oenothera fruticosa, Opuntia humifusa, Panicum virgatum, Parthenocissus quinquefolia, Photinia melanocarpa, Photinia pyrifolia, Pinus rigida, Plantago aristata, Potentilla canadensis, Prunus maritima, Prunus serotina, Rhus copallina, Rhus glabra, Rhus typhina, Rosa carolina, Rubus flagellaris, Rubus pensilvanicus, Rudbeckia hirta, Salix eriocephala, Salix nigra, Sambucus canadensis, Sassafras albidum, Schizacyrium scoparium, Scirpus pungens, Scirpus validus, Solidago rugosa, Solidago sempervirens, Sorghastrum nutans, Strophostyles helvula, Suaeda linearis, Suaeda maritima, Symphyotrichum ericoides, Symphyotrichum novi-belgii, Tridens flavus, Vaccinium corymbosum, Viburnum dentatum	Ammophila breviligulata, Andropogon virginicus, Aristida dichotoma, Aristida tuberculosa, Asclepias syriaca, Asclepias tuberosa, Desmodium paniculatum, Eragrostis spectabilis, Eupatorium altissimum, Eupatorium hyssopifolium, Euthamia caroliniana, Euthamia graminifolia, Ioncatis linariifolius, Juncus greenei, Krigia virginica, Lespedeza capitate, Morella pensylvanica, Nuttalanthus Canadensis, Oenothera biennis, Oenothera fruticose, Opuntia humifusa, Panicum virgatum, Plantago aristata, Potentilla canadensis, Pseudognaphalium obtusifolium, Rhus copallinum, Rubus flagellaris, Rudbeckia hirta, Schizachyrium littorale, Schizachyrium scoparium, Solidago canadensis, Solidago nemoralis, Solidago sempervirens, Sorghastrum nutans, Symphyotrichum ericoides, Symphyotrichum novae-angliae, Trichostema dichotomum	Acer negundo, Acer rubrum, Ageratina altissima, Allium canadense, Arisaema triphyllum, Athyrium felix-femina, Betula nigra, Bidens frondosa, Bohmeria cylindrical, Carex crinite, Carex intumescens, Carex lupulina, Carex radiate, Carex rosea, Carex vulpinoidea, Carya cordiformis, Carya ovata, Carya tomentosa, Celtis occidentalis, Cephalanthus occidentalis, Chelone glabra, Cinna arundinacea, Claytonia virginica, Clematis virginiana, Clethra alnifolia, Collinsonia Canadensis, Cornus amomum, Cornus racemose, Danthonia compressa, Erythronium americanum, Eubotrys racemose, Eupatorium perfoliatum, Eutrochium maculatum, Geranium maculatum, Geum canadense, Glyceria striata, Helianthus decapetalus, Hydrophyllum virginianum, Ilex verticillata, Impatiens capensis, Iris versicolor, Juncus tenuis, Juncus Canadensis, Lindera benzoin, Liquidambar styraciflua, Lobelia cardinalis, Lycopus americanus, Lysimachia ciliate, Nyssa sylvatica, Onoclea sensibilis, Osmorhiza longistyles, Osmunda cinnamomea, Osmunda claytoniana, Photinia pyrifolia, Platanus occidentalis, Polygonum hydropiperoides, Polygonum virginianum, Populus deltoides, Quercus bicolor, Quercus palustris, Rhododendron viscosum, Rhynchospora capitellata, Rosa palustris, Rubus occidentalis, Salix nigra, Sambucus canadensis, Scirpus atrovirens, Smilax herbacea, Spiraea alba var. latifolia, Spiraea tomentosa, Symplocarpus foetidus, Thalictrum pubescens, Ulmus americana, Vaccinium corymbosum, Viburnum dentatum, Vitis labrusca, Vitis riparia,

Scrub shrub wetland(acres):***Shrubs(Rate: 1 Shrub Every 5 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****	Meadow(acres):***Plugs(Rate: 1 Forb Every 1 square foot)****	Forested Wetlands(acres):***Trees(Rate: 1 Tree Every 10 Square Feet)Shrubs(Rate: 1 Shrub Every 10 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)***
	2.5	
2.9		1.4
0.17		
		2.84
3.07	2.5	
		18,469
26,920		***18,469***
134,600	***108,900***	***184,694***
***	***	***

$0.00	$0.00	$110,814.00
$161,520.00	$0.00	$110,814.00
$148,060.00	$98,010.00	$203,163.40

Acer rubrum, Asclepias incarnate, Bidens frondosa, Carex annectens, Carex atlantica, Carex comosa, Carex crinite, Carex lupulina, Carex lurida, Carex stipata, Carex stricta, Carex vulpinoidea, Cephalanthus occidentalis, Chelone glabra, Clematis virginiana, Clethra alnifolia, Cornus amomum, Cornus racemosa, Decodon verticillatus, Desmodium canadense, Doellingeria umbellata, Dryopteris cristata, Dulichium arundinaceum, Eubotrys racemosa, Eupatorium perfoliatum, Hibiscus moscheutos, Ilex glabra, Ilex verticillata, Impatiens capensis, Iris prismatica, Juncus Canadensis, Juncus effuses, Leersia oryzoides, Lindera benzoin, Lobelia cardinalis, Lobelia siphilitica, Ludwigia alternifolia, Lyonia lingustrina, Lysimachia ciliate, Mikania scandens, Onoclea sensibilis, Osmunda cinnamomea, Osmunda regalis, Peltandra virginica, Photinia floribunda, Photinia pyrifolia, Polygonum arifolium, Polygonum hydropiperoides, Polygonum sagittatum, Rhododendron viscosum, Rhynchospora capitellata, Rosa palustris, Sambucus canadensis, Scirpus atrovirens, Sisyrinchium angustifolium, Spiraea alba var. latifolia, Spiraea tomentosa, Symphyotrichum novae-angliae, Thalictrum pubescens, Thelypteris palustris, Vaccinium corymbosum, Vernonia novaboracensis, Viburnum dentatum, Viola cucullata, Woodwardia areolate, Woodwardia virginica	Acer negundo, Agrostis hyemalis, Agrostis scabra, Andropogon virginicus, Apocynum cannabinum, Aristida oligantha, Asclepias syriaca, Baccharis halmifolia, Betula populifolia, Bidens frondosa, Carex blanda, Celtis occidentalis, Desmodium paniculatum, Eragrostis spectabilis, Eupatorium serotinum, Euthamia graminifolia, Juglans nigra, Juncus tenuis, Juniperus virginiana, Krigia virginica, Leptolomoa cognatum, Oenothera biennis, Panicum virgatum, Parthenocissus quinquefolia, Plantago aristata, Populus deltoides, Populus grandidentata, Potentilla canadensis, Potentilla simplex, Prunus serotina, Quercus palustris, Rhus copallina, Rhus glabra, Rhus typhina, Rubus flagellaris, Rubus pensilvanicus, Schizachyrium scoparium, Solidago canadensis, Solidago juncea, Solidago nemoralis, Solidago rugosa, Solidago sempervirens, Strophostyles helvula, Symphyotrichum ericoides, Symphyotrichum leave, Symphyotrichum pilosum, Tridens flavus, Verbena urticifolia	Acer rubrum Ageratina altissima Allium canadense Athyrium felix-femina Betula allegheniensis Betula lenta Bidens frondosa Carex blanda Carex lupulina Carex radiata Carex rosea Carex scoparia Carex stipata Carex swanii Carya ovata Carya tomentosa Chimaphila maculata Cinna arundinacea Clethra alnifolia Cornus amomum Corylus americana Cryptotaenia canadensis Danthonia spicata Decodon verticillatus Dennstaedtia punctilobula Diospyros virginiana Dryopteris carthusiana Eutrochium maculatum Eupatorium perfoliatum Eurybia divaricata Fagus grandifolia Geranium maculatum Glyceria obtusa Juncus tenuis Juglans nigra Lindera benzoin Liquidambar styraciflua Liriodendron tulipifera Mitchella repens Osmunda cinnamomea Osmunda claytoniana Parthenocissus quinquefolia Penthorum sedodies Polygonum arifolium Polygonum hydropiperoides Polygonum sagittatum Populus tremuloides Pyrola rotundifolia Prunus serotina Quercus alba Quercus bicolor Quercus coccinea Quercus rubra Ranunculus arborvitus Rhynchospora capitellata Rubus occidentalis Rubus pensilvanicus Rubus hispidus Sanicula canadensis Solidago caesia Smilacina racemosa Symphyotrichum cordifolium Symplocarpus foetidus Triadenum virginianum Thalictrum pubescens Ulmus americana Vaccinium corymbosum Viburnum dentatum Viola cucullata Viola x primulifolia Viola sororia Vitis labrusca Vitis riparia Woodwardia virginica

Emergent Wetlands(acres):***Plugs(Rate: 1 Forb Every 1 square foot)***	Wooded Riparian(acres):***Trees(Rate: 1 Tree Every 10 Square Feet)Shrubs(Rate: 1 Shrub Every 5 Square Feet)Plugs(Rate: 1 Forb Every 1 square foot)****	Willow Live stakes(acres): ***(Rate: 1 Livestake every 1 sqare foot)***
	0.3	
0.54	0.56	
	6.45	
	0.61	
0.04	0.2	
0.59		
4.79		
0.79	0.02	
2.64	0.28	
	13.72	
	1.23	0.71
	1.86	
9.39	25.23	0.71
		O23M2:O32
	109,903	
	219,805	
409,028	***1,099,019***	
		30,928
	***	

$0.00	$659,418.00	$0.00
$0.00	$1,318,830.00	
$482,653.04	$1,208,920.90	
		$14,226.88

Alisma subcordatum, Alnus serrulata, Andropogon glomeratus, Andropogon virginicus, Anthoxanthum nitens spp. Nitens, Asclepias incarnate, Baccharis halmifolia, Carex annectens, Carex comosa, Carex crinite, Carex lupulina, Carex lurida, Carex stipata, Carex stricta, Carex vulpinoidea, Cephalanthus occidentalis, Chelone glabra, Cornus amomum, Desmodium canadense, Doellingeria umbellata, Eupatorium perfoliatum, Eutrochium maculatum, Helenium autumnale, Helianthis giganteus, Hibiscus moscheutos, Impatiens capensis, Iris prismatica, Iris versicolor, Juncus Canadensis, Juncus effuses, Leersia oryzoides, Lobelia cardinalis, Lobelia siphilitica, Ludwigia alternifolia, Lycopus virginicus, Onoclea sensibilis, Osmunda cinnamomea, Osmunda regalis, Peltandra virginica, Polygonum arifolium, Polygonum pensylvanica, Polygonum sagittatum, Pontederia cordata, Rhynchospora capitellata, Rosa palustris, Rumex verticillatus, Sagittaria latifolia, Schoenoplectus pungens, Schoenoplectus tabernaemontani, Scirpus atrovirens, Scirpus cyperinus, Sisyrinchium angustifolium, Sparganium eurycarpum, Spartina pectinate, Symphyotrichum novae-angliae, Symphyotrichum novi-belgii, Teucrium canadense, Thelypteris palustris, Tradescantia virginiana, Tripsacum dactyloides, Typha angustifolia, Typha latifolia, Verbena hastate, Vernonia novaboracensis, Viburnum dentatum, Viola cucullata	Acer negundo, Acer rubrum, Ageratina altissima, Allium canadense, Arisaema triphyllum, Athyrium felix-femina, Betula nigra, Bidens frondosa, Bohmeria cylindrica, Carex crinite, Carex intumescens, Carex lupulina, Carex radiata, Carex rosea, Carex vulpinoidea, Carya cordiformis, Carya ovata, Carya tomentosa, Celtis occidentalis, Cephalanthus occidentalis, Cinna arundinacea, Chelone glabra, Claytonia virginica, Clematis virginiana, Clethra alnifolia, Collinsonia canadensis, Cornus amomum, Cornus racemose, Danthonia compressa, Erythronium americanum, Eubotrys racemose, Eupatorium perfoliatum, Eutrochium maculatum, Geranium maculatum, Geum canadense, Glyceria striata, Helianthus decapetalus, Hydrophyllum virginianum, Ilex verticillata, Impatiens capensis, Iris versicolor, Juncus tenuis, Juncus canadensis, Lindera benzoin, Liquidambar styraciflua, Lobelia cardinalis, Lycopus americanus, Lysimachia ciliata, Nyssa sylvatica, Onoclea sensibilis, Osmunda cinnamomea, Osmunda claytoniana, Osmorhiza longistyles, Photinia pyrifolia, Platanus occidentalis, Polygonum hydropiperoides, Polygonum virginianum, Populus deltoides, Quercus bicolor, Quercus palustris, Rhododendron viscosum, Rhynchospora capitellata, Rosa palustris, Rubus occidentalis, Salix nigra, Sambucus canadensis, Scirpus atrovirens, Smilax herbacea, Spiraea alba var. latifolia, Spiraea tomentosa, Symplocarpus foetidus, Thalictrum pubescens, Ulmus Americana, Vitis labrusca, Vitis riparia, Vaccinium corymbosum, Viburnum dentatum	Cornus amonum, Cornus sericea, Salix eriocephala, Salix nigra, Sambucus canadensis, Cephalanthus occidentalis

Appendix F3:

Essential Fish Habitat Assessment

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

April 13, 2018

Peter Weppler, Chief
Environmental Analysis Branch
Planning Division
New York District
U.S. Army Corps of Engineers
26 Federal Plaza
New York, NY 10278-0900

RE: Draft Integrated Feasibility Report and Environmental Assessment (Draft FR/EA) for the Hudson-Raritan Estuary (HRE) Ecosystem Restoration Study

Dear Mr. Weppler:

Thank you for your letter dated April 5, 2018, regarding Draft Integrated Feasibility Report and Environmental Assessment (Draft FR/EA) for the Hudson-Raritan Estuary (HRE) Ecosystem Restoration Study. The Draft FR/EA considers the potential effects of a number of ecosystem restoration actions with the HRE Study Area which includes the area within a 25-mile radius of the Statue of Liberty. The tentatively selected plan includes the restoration of estuarine and freshwater wetlands, maritime and riparian forest habitat, oyster reefs, stream corridors and fish passage within the estuary. We have reviewed the FR/EA and we agree with your assessment that the implementation of the ecosystem restoration plan will result in long-term, net benefits to many federally managed species, their essential fish habitat, as well as many other NOAA trust resources. As stated in your letter, there may be a variety of impacts to EFH as each individual restoration project is implemented. These impacts may be temporary and related to construction activities, or they may result from permanent changes in habitat types. We agree that the most appropriate means of evaluating these impacts is to undertake project-specific EFH consultations as more detailed plans are developed for each action during the Pre-Engineering and Design Phase. We look forward to our continued coordination with your office on the HRE and the individual restoration actions as they are developed. If you have any questions or need additional information, please do not hesitate to contact Ursula Howson in our New Jersey field office at ursula.howson@noaa.gov or (732) 872-3116.

Sincerely,

Karen M. Greene

Karen Greene
Mid-Atlantic Field Office Supervisor
Habitat Conservation Division

Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

Appendix F
Essential Fish Habitat

Draft Integrated Feasibility Report & Environmental Assessment
January 2017

Prepared by the New York District, North Atlantic Division, U.S. Army Corps of Engineers

A partnership for the future

New Jersey Department of Environmental Protection

Department of Transportation — The State of New Jersey

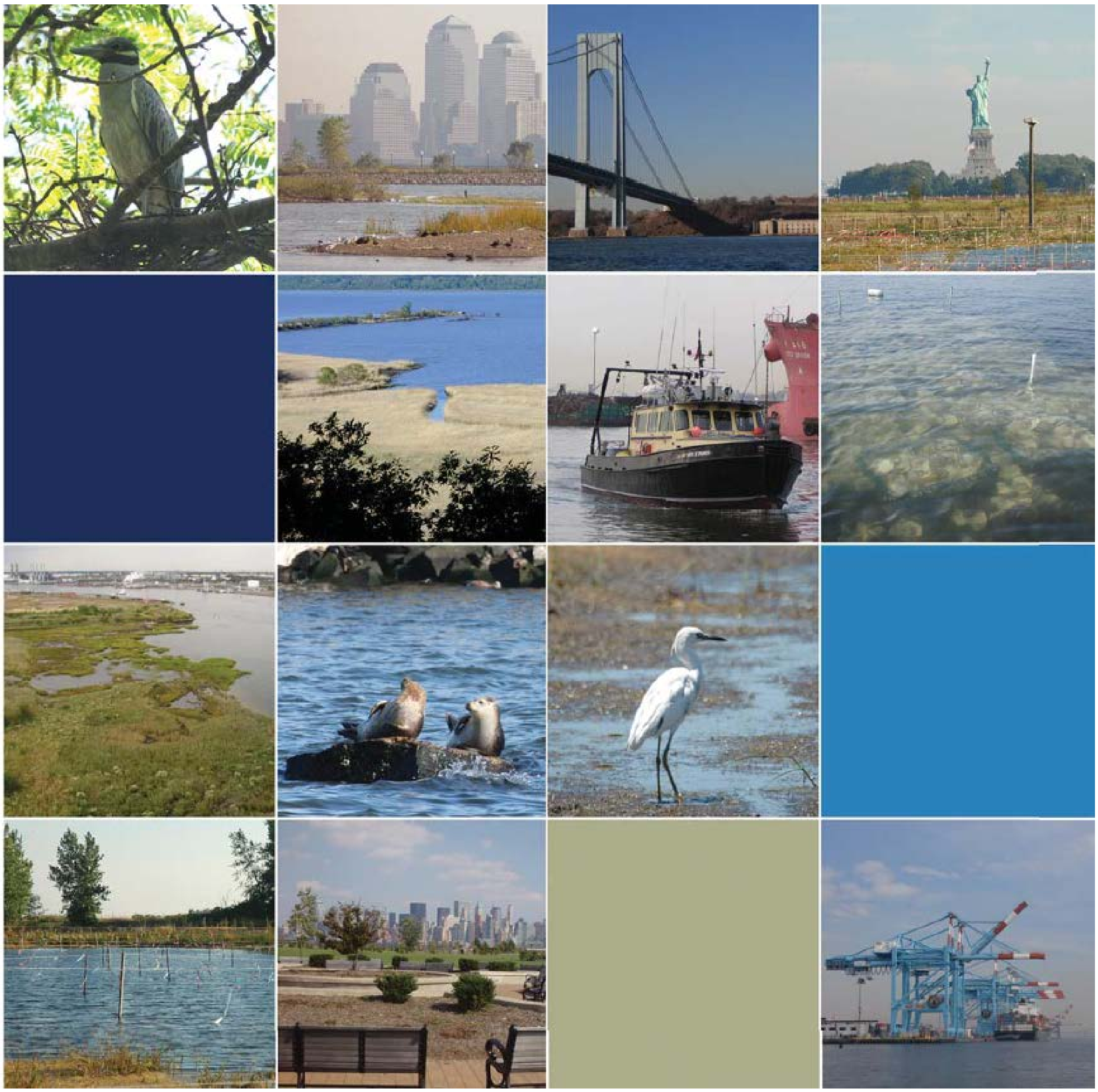
New Jersey Sports & Exposition Authority — NJSEA

NYC Environmental Protection

NYC Parks

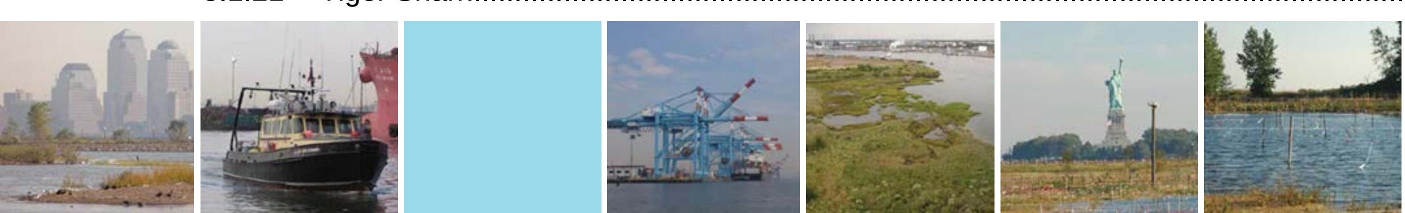
Westchester County New York

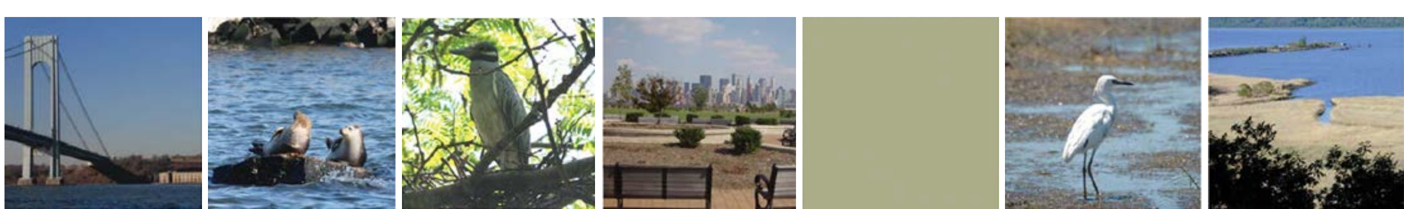
Department of Environmental Conservation — New York State



Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study
Appendix F: Essential Fish Habitat

Table of Contents





List of Figures

List of Tables

Chapter 1: Introduction

1.1 Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

The Hudson-Raritan Estuary (HRE) Ecosystem Restoration Feasibility Study (HRE Feasibility Study) is an effort to develop a long-term strategy to restore and enhance degraded environments within the estuary in partnership with regional stakeholders. The HRE study area (Figure 1-1) is within the boundaries of the Port District of New York and New Jersey, and, as identified in the United States Army Corps of Engineers (USACE) study authorization, is approximately defined by a 25-mile radius from the Statue of Liberty (shown as star in Figure 1-1). The study area includes all tidally influenced portions of rivers flowing into New York and New Jersey Harbor, including the Hudson, Raritan, Hackensack, Passaic, Shrewsbury, and Navesink Rivers and the East River from the Battery to Hell Gate (USFWS, 1997). Located within the most densely populated area of the country and including the largest port on the east coast, the HRE has tremendous ecological, historical, cultural, and recreational significance.

A total of 296 restoration sites were identified for investigation in the HRE within eight (8) planning regions. These sites were evaluated and screened, resulting in a subset of sites to be recommended for construction.

A total of 33 restoration sites are recommended in the following five (5) planning regions: Jamaica Bay, Harlem River, East River, and Western Long Island Sound; Newark Bay, Hackensack River, and Passaic River; Upper Bay; and Lower Bay. The recommended restoration sites reflect the highest priorities of local sponsors, and comprise 31 sites for near-term construction and two (2) sites for construction following United States Environmental Protection Agency (USEPA) remedial action, termed Tier 2 sites. Table 1-1 enumerates the recommended sites and Figure 1-2 identifies the locations of the sites. The Lower Raritan River, Arthur Kill/Kill Van Kull, and Lower Hudson River planning regions do not contain restoration sites selected for construction at this time.

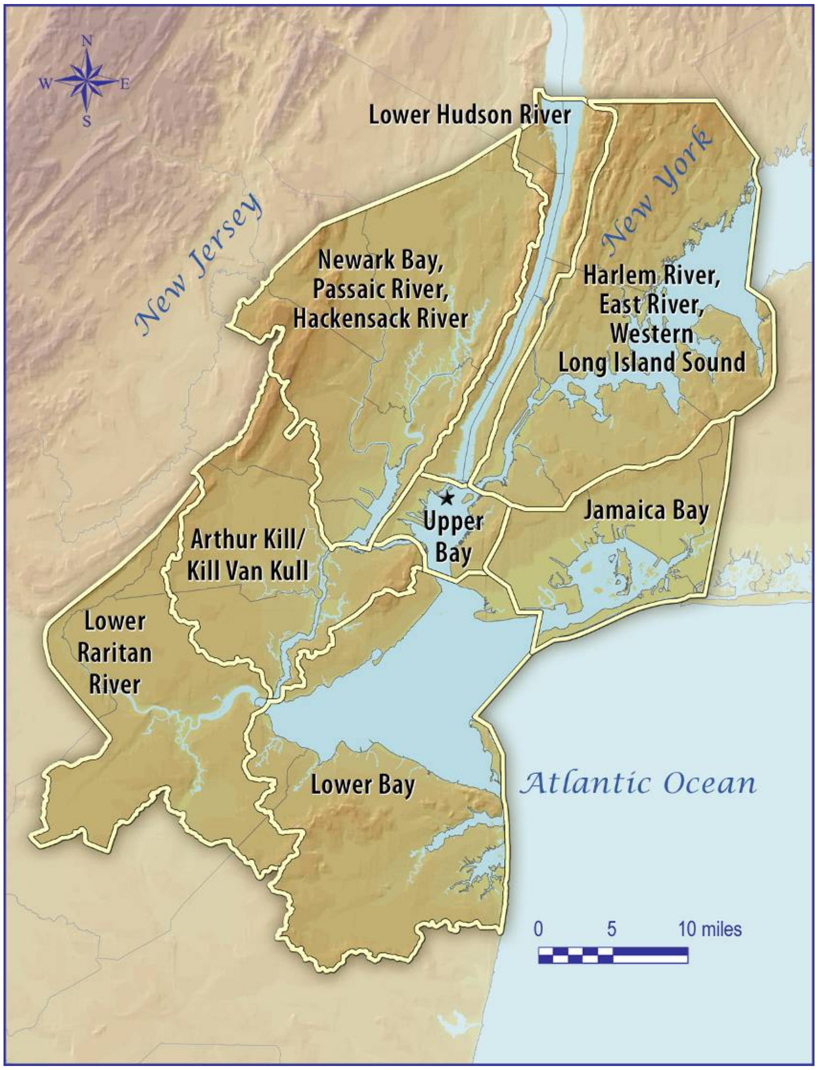


Figure 1-1: HRE Planning Regions.

Table 1-1: Recommended Restoration at HRE Sites.

Location	Recommended Restoration	Site
Jamaica Bay Planning Region		
Jamaica Bay	Estuarine Habitat Restoration	• Brant Point • Bayswater Point State Park • Dubos Point • Hawtree Point • Fresh Creek • Dead Horse Bay
	Jamaica Bay Marsh Island Restoration	• Duck Point • Pumpkin Patch East • Pumpkin Patch West • Stony Creek • Elders Center
	Small-Scale Oyster Restoration	• Jamaica Bay, Head of Bay
Lower Bay Planning Region		
Sandy Hook Bay	Small-Scale Oyster Restoration	• Naval Weapons Station Earle
Newark Bay, Hackensack River, and Passaic River Planning Region		
Hackensack River	Estuarine Habitat Restoration	• Meadowlark Marsh • Metromedia Tract
Lower Passaic River	Tier 2 Estuarine Habitat Restoration	• Kearny Point • Oak Island Yards
	Freshwater Riverine Habitat Restoration	• Essex County Branch Brook Park • Dundee Island Park • Clifton Dundee Canal Green Acres
Harlem River, East River, and Western Long Island Sound Planning Region		
Flushing Creek	Estuarine Habitat Restoration	• Flushing Creek
Bronx River	Freshwater Riverine Habitat Restoration	• Shoelace Park • Bronxville Lake • Crestwood Lake • Westchester County Center • River Park/West Farm Rapids Park • Muskrat Cove • Garth Woods/Harney Road • Bronx Zoo and Dam • Stone Mill Dam
	Small-Scale Oyster Restoration	• Soundview Park
Upper Bay Planning Region		
Upper New York Bay	Small-Scale Oyster Restoration	• Bush Terminal • Governors Island

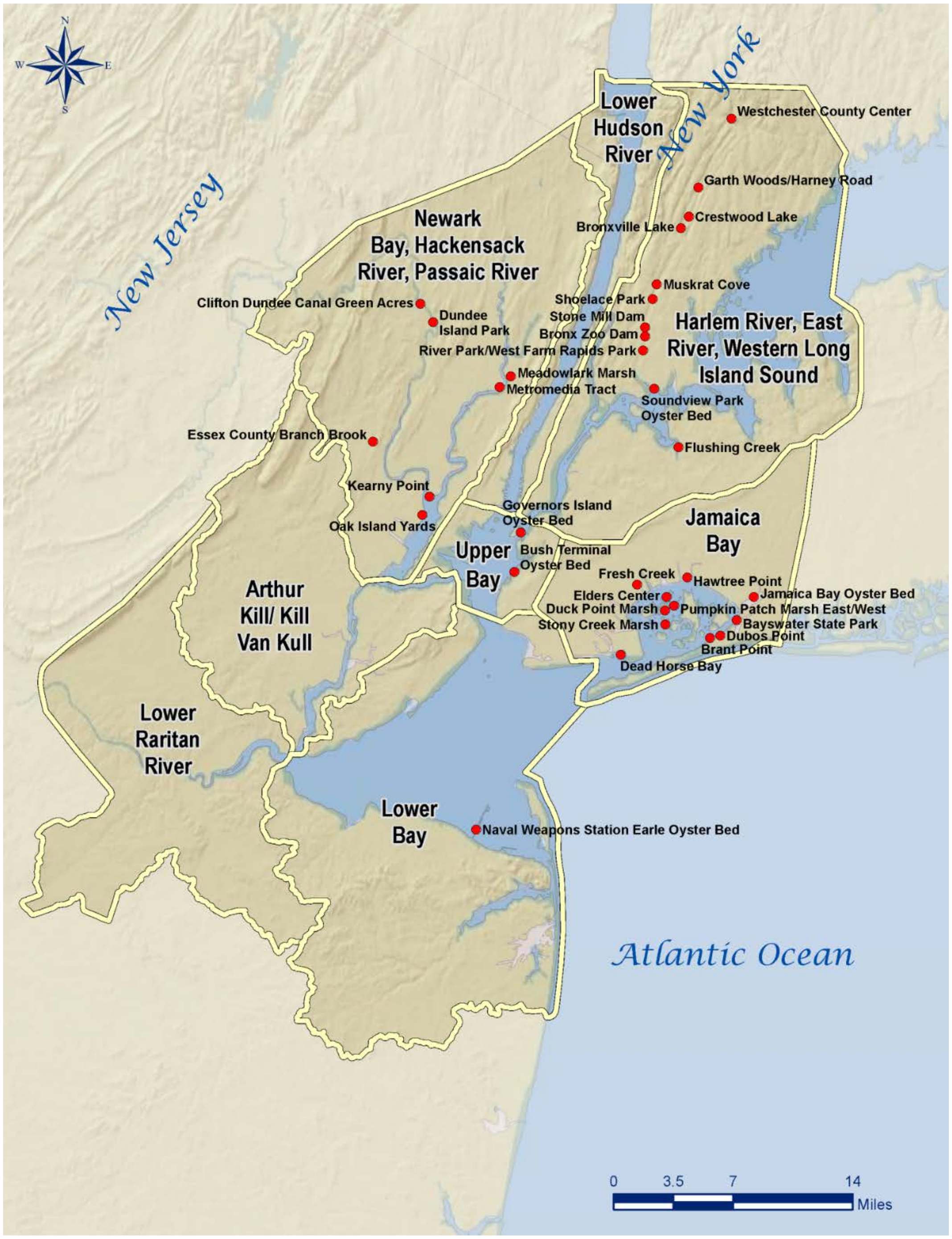


Figure 1-2: Locations of HRE Restoration Sites.

1.2 Essential Fish Habitat

This essential fish habitat (EFH) assessment has been prepared to demonstrate that the proposed project would be in compliance with the requirements of 50 Code of Federal Regulations Part 660.920 implementing the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). This assessment is applicable to the proposed work within the HRE.

EFH is defined in the Magnuson-Stevens Act as those waters and substrates necessary for spawning, breeding, or growth to maturity of managed fish species. As required by the Magnuson-Stevens Act, the National Marine Fisheries Service (NMFS) promulgated regulations to provide guidance to the regional fishery management councils for EFH designation. The regulations further clarify EFH by defining waters, to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, which may encompass a substrate to include sediment, hard bottom, structures underlying the waters, and associated biological contribution to a healthy ecosystem; and areas used for spawning, breeding, feeding, or growth to maturity to cover a species' full life cycle.

In accordance with the EFH designation made by NMFS, this assessment has been prepared to address potential impacts to the following 23 species for which EFH has been designated in the HRE: Atlantic butterfish; Atlantic cod; Atlantic mackerel; Atlantic salmon; Atlantic sea herring; black sea bass; bluefish; blue shark; cobia; dusky shark; king mackerel; monkfish; pollock; red hake; sandbar shark; sand tiger shark; scup; silver hake; Spanish mackerel; summer flounder; tiger shark; winter flounder; and windowpane flounder. The required contents of an EFH assessment are stipulated in the Magnuson-Stevens Act. An EFH assessment form is provided at the end of this document as an attachment.

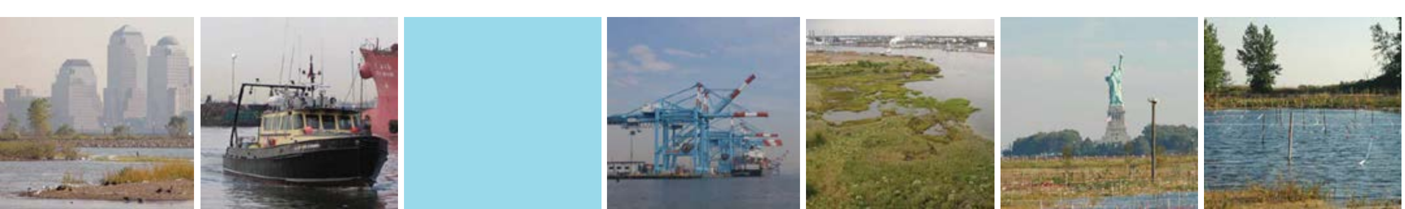
Of the 33 recommended restoration sites, Westchester County Center, Crestwood Lake, Bronxville Lake, Garth Woods/Harney Road, Bronx Zoo and Dam and Stone Mill Dam are located upstream of a dam or impoundment. All other sites are adjacent to tidal waterbodies.

Chapter 2: **Purpose and Need**

The purpose of the proposed actions is to restore and sustain a regionally- and nationally-important mosaic of habitats within the human-dominated landscape, in a cost-effective and socially feasible manner, with minimal risks, and supported by monitoring and adaptive management to ensure the success of the restoration objectives. The need for the proposed actions comes from recognizing that valuable natural resources in the HRE have declined to a point that the ecosystem may no longer be self-sustaining without immediate intervention to curtail significant ecological degradation.

As identified in the HRE Comprehensive Restoration Plan (USACE and Port Authority of New York and New Jersey, 2009a, 2009b, 2014, 2016), the HRE study area has suffered extensive losses in wetland habitat and aquatic vegetation communities such as eelgrass beds. Approximately 300,000 acres of tidal wetlands and sub-tidal waters were filled in the study area and only about 20 percent (15,500 acres) of historic tidal wetlands remain. Without wetlands, which function as storage areas for flood runoff, most of the current overland runoff and leachate enters directly into open water. The losses of shoreline vegetation have resulted in increased turbidity, shoreline erosion, and reductions in wildlife breeding and wintering grounds. Moreover, alterations in tidal exchange have transformed much of the remaining
shallow water and salt marsh habitat from the originally diverse wetland plant assemblages to monocultures of invasive species. Almost all of the approximately 224,000 acres of freshwater wetlands that existed in New York City prior to the American Revolution were filled or otherwise eliminated.

In addition to eliminating much of the HRE study area's aquatic habitat, the construction of bulkheads and piers, and placement of shoreline fill have greatly reduced the physically diverse near-shore zone of shallow, soft-bottom habitats, rocky outcroppings, wetlands, and sand beaches. The littoral zone historically found in the estuary was structurally complex with diverse physical characteristics,



supporting resident fish populations as well as attracting large populations of migratory and transient fish for spawning and feeding. These complex and productive waters were ideal nursery areas for young fish, particularly where benthic structure and/or plant communities existed. The construction of piers slowed near-shore waters and promoted extensive sediment accumulation, which in concert with other forms of shoreline hardening, contributed to the loss of physically complex habitat, greatly reducing the quality of spawning and nursery areas.

Because of the inherent complexities associated with the near shore zone (varied ownership, mixed land use, etc.), restoration solutions within the HRE need to be coordinated and integrated and resources leveraged with existing state, local government, non-governmental organization, or private entity programs. As ecosystem restoration is one of the primary missions of the USACE Civil Works, the USACE is well suited to take the lead on this large-scale restoration effort and has the ability to use expertise in water-related resource problems to seek ecosystem construction authority within the HRE.

Chapter 3: Description of the Proposed Actions

Near-term construction under the proposed actions are to occur in five (5) planning regions. They are as follows:

3.1 Jamaica Bay Planning Region

For the sites within the Jamaica Bay Planning Region, the tentatively selected plan (TSP) would restore or create low and high marsh, implement erosion control and shoreline stabilization methods, and reduce the sediment load at each site. The restoration and creation of wetlands would improve the overall water quality of the sites due to the ability of wetlands to naturally filter water. Wetlands remove sediments suspended in the water column as water passes through them, which would not only improve water quality, but also would improve the benthic habitat for shellfish species and the fluvial habitat for fish living in the water system. Also, the creation of wetlands would increase the acreage for species living within the existing wetlands. Implementing shoreline stabilization and erosion control methods at the Jamaica Bay restoration sites would prevent and slow natural erosion and maintain acreage within each of the sites. The primary negative impacts of implementing most of the restoration actions include the temporary resuspension of sediments, as well as short-term increased rates of erosion.

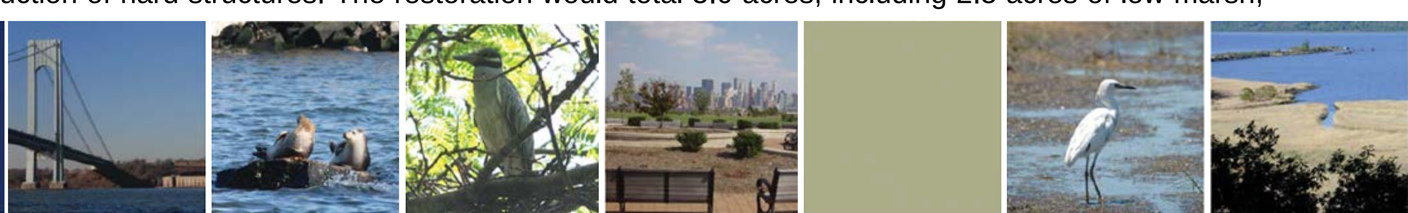
The following are the specific plans for each restoration site within the Jamaica Bay Planning Region:

3.1.1 Brant Point

Restoration at the Brant Point site would target the preservation and restoration of wetlands and combat erosion with offshore breakwaters at the site. The TSP would restore 1.9 acres of low marsh and 0.7 acres of high marsh and associated habitats, as well as approximately 2.4 acres of coastal and maritime forest. This plan would also create approximately 2.5 acres of meadow (grasslands) and protect already existing marsh habitat present at the site. The installation of three (3) rock mounds would protect the point from the ongoing erosion and can be used as refugia by various species.

3.1.2 Bayswater Point State Park

Restoration at Bayswater Point State Park would remove invasive-dominated communities by regrading and creating a tidal channel and associated salt marsh. It would also protect the eroding point with the construction of hard structures. The restoration would total 5.0 acres, including 2.5 acres of low marsh,



0.4 acres of high marsh, 0.8 acres of creek/pool (habitat for fish, crab, and lobster), and 0.7 acres of beach/dune. Hard structures would cover approximately 0.6 acres, including armoring of the point and training structures at the mouth of the channel.

3.1.3 **Dubos Point**

Restoration would maximize marsh habitat protection by implementing a training structure along the entire western and north shores. These shorelines are currently exposed to high wave forces from Jamaica Bay and existing protective measures are beginning to fail. This alternative also would restore approximately 2.0 acres of coastal and maritime forest, 3.3 acres of low marsh, and 0.9 acres of high marsh, by creating 0.7 acres of tidal channels (habitat for fish, crab, and lobster) in existing uplands currently dominated by common reed and by regrading the area to elevations suitable for tidal salt marsh establishment.

3.1.4 **Hawtree Point**

Under the TSP, the restoration measures at Hawtree Point entail restoring 1.7 acres of coastal scrub/shrub and grassland habitat in the existing invasive vegetation dominated areas. Regrading and grubbing would remove the invasive species, native grasses and shrubs would be planted, and an existing patch of salt marsh hay (0.07 acres) would be excavated and replaced. Restoration also would include the creation of a barrier to motorized vehicles. By placing boulders along the boundary of the restoration area, the newly created habitats, as well as the preserved existing marshes, would be protected from vehicle access but would still be accessible to pedestrians.

3.1.5 **Fresh Creek**

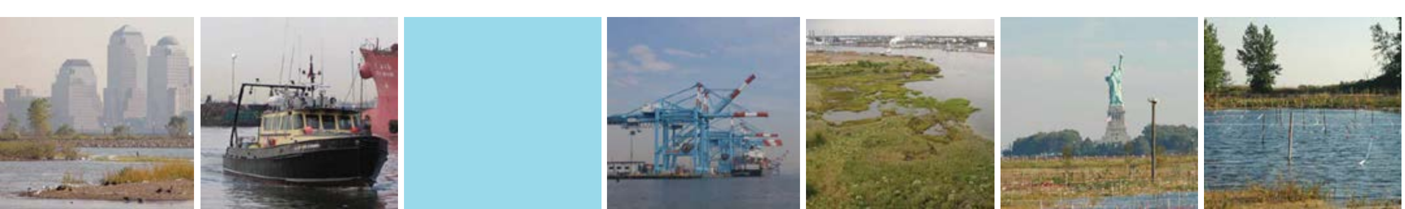
The restoration measures that would be implemented under the TSP at Fresh Creek include basin filling and re-contouring. The head of the basin would be filled to create tidal marshes and creeks, and the basin would be re-contoured to the mouth of Fresh Creek. Re-contouring the basin would decrease water residence time, thus improving dissolved oxygen levels and water quality. A tidal marsh system with protective buffers would be created, including 13.6 acres of low marsh, 2.5 acres of high marsh, 43.9 acres of creek/pool, and 11.3 acres of maritime forest.

3.1.6 **Dead Horse Bay**

The restoration measures for Dead Horse Bay would modify and realign channels, stabilize riverbanks, shorelines, and landfills, create wetlands, reduce sediment load, and restore stream geomorphology. This alternative would remove landfill and create dunes on approximately 28 acres of the site and would restore 61 acres of maritime forest on the southern parcel of the site. Roughly 9.0 acres of existing beach would be preserved in the northern parcel. The area would be stabilized with geotubes beneath the dunes to preclude erosion of the site into the remaining landfill. To stabilize the tidal creek and protect the existing beach habitat, training structures would be created on the banks at the mouth of the creek. A tidal channel of approximately 4.0 acres would be built in the northern parcel and approximately 31 acres of low marsh and 7.0 acres of high marsh would be restored.

3.1.7 **Jamaica Bay Marsh Islands**

Selected restoration measures for the Jamaica Bay marsh islands would expand rapidly eroding low and high marsh land by depositing sand fill to the dimensions of the 1974 footprint, thereby



reestablishing a system of marsh islands and reinforcing the sustainability of the individual islands. A description of the restoration at each marsh island site is provided below.

3.1.7.1 Duck Point

Installation of an atoll terrace at Duck Point would harness natural processes of sediment transport to promote wave and turbidity attenuation, sediment accretion, and sustainability. The TSP also restores 15.4 acres of low marsh and 12.5 acres of high marsh. Construction on the atoll terrace would take place offshore of the Duck Point marsh island.

3.1.7.2 Pumpkin Patch East

Restoration measures included in the TSP would increase land above mean tide level (-0.27 feet North American Vertical Datum of 1988) from the existing less than 5.0 acres to 35.3 acres. Also included is the restoration of 18.5 acres of low marsh and 16.8 acres of high marsh. Tidal channels will also be restored.

3.1.7.3 Pumpkin Patch West

The restoration of 10.8 acres of low marsh and 5.5 acres of high marsh is proposed for Pumpkin Patch West. The TSP will also restore tidal channels within the marsh.

3.1.7.4 Stony Creek

The TSP at Stony Creek includes the restoration of 26 acres of low marsh and 25.3 acres of high marsh. The restoration will also include tidal channels throughout the marsh.

3.1.7.5 Elders Center

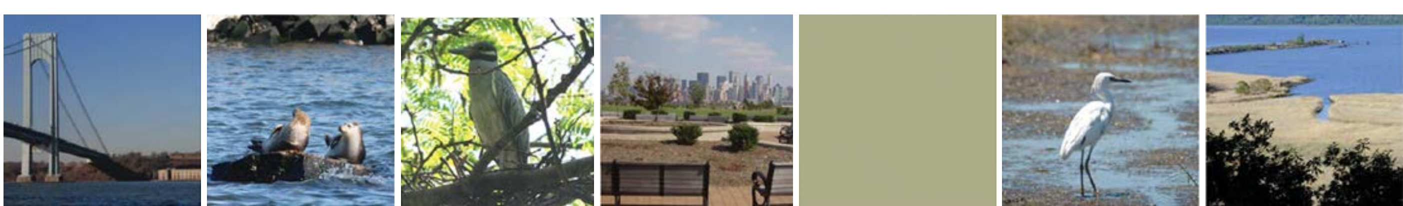
Restoration at Elders Center would establish a potential area for natural sediment deposition and accretion and restore 8.5 aces low marsh and 7.5 acres of high marsh. The TSP would connect two prior restoration areas.

3.1.8 Jamaica Bay, Head of Bay

At the Head of Bay restoration site, the TSP would restore oysters and oyster habitat by installing super trays on 0.5 acres and constructing 0.5 acres of oyster beds. Successful oyster restoration is expected to improve water quality through filtration, improve marine habitat quality, stabilize the shoreline, and sequester carbon.

3.2 Harlem River, East River, and Western Long Island Sound Planning Region

In the Harlem River, East River, and Western Long Island Sound Planning Region, the TSP would restore riverbeds, soften shorelines, create wetlands, remove invasive species, install fish ladders, sediment traps, and riprap forebays, and modify weirs for fish passage. The creation of sediment traps would help deposit sediment that has been suspended in the water column. This would improve the water quality of the system, thus promoting more benthic and aquatic life. Fish ladder installation and weir modifications would promote fish mobility within the river. The creation of wetlands would improve water quality and wildlife habitat within the planning region. Construction done in the rivers or channels



could disturb and, over a short period of time, reduce the water quality of the river and result in changes to existing depositional features.

3.2.1 **Flushing Creek**

At the Flushing Creek restoration site, the TSP would restore low marsh and preserve existing upland forest. Approximately 2.4 acres would be regraded and planted to restore low marsh and 6.6 acres of upland forest would be preserved.

3.2.2 **Shoelace Park**

Restoration measures proposed for this site include: realignment of the channel with natural meanders and restoration of large tracts of forested wetlands along the banks, channel modification with instream structures for 1.3 miles resulting in a substantial increase of aquatic habitat value, bank stabilization with environmental engineering techniques that provide vegetation coverage along the banks (greater than 1.1 miles on both sides), sediment load reduction with bank stabilization and installation of rain gardens and bioretention basins, and invasive species removal and replacement with native plantings over approximately 6.5 acres. Public access to the river would be maintained in the post-construction condition.

3.2.3 **Bronxville Lake**

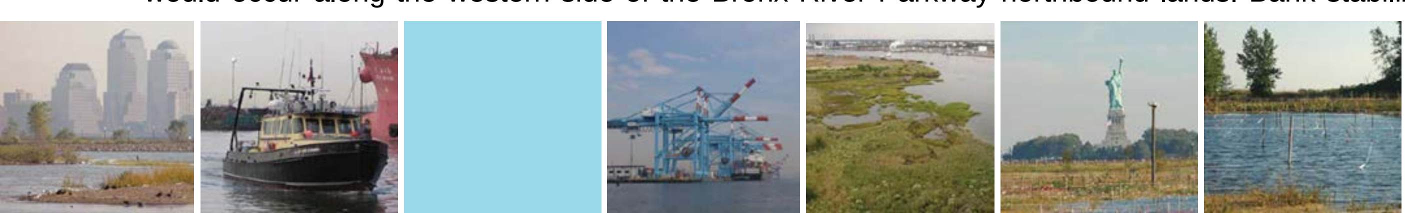
The TSP would construct a riprap forebay upstream of the lake, restore approximately 1.3 acres of the bed of the river, and modify the existing rock weir at the lake outlet to promote fish passage. Invasive vegetation would be removed, native wetland vegetation and upland shrubs and trees would be planted, and 0.6 acres of emergent wetland, and 2.9 acres of forested and scrub/shrub wetlands would be created. Sediment control and water quality best management practices (BMPs) and public access improvements would be installed.

3.2.4 **Crestwood Lake**

The TSP for Crestwood Lake includes the construction of two (2) riprap forebays with access roads, channel realignment, replacement of bed material, construction of 11 instream cross vanes (1.24 acres), and the modification of the existing rock weir. The riprap forebays would be constructed at the upstream end of the lake and at the Troublesome Creek tributary confluence. Modification of the existing rock weir at the southern end of the lake would create slopes and pools in order to promote fish passage.
Approximately 1.3 acres of invasive species would be removed and replaced with native plantings.

3.2.5 **Westchester County Center**

Restoration measures proposed for Westchester County Center include approximately 0.8 acres of channel modifications and 2.6 acres of emergent wetland creation along both shores of the Bronx River and along Manhattan Brook. In-stream sediment basins are proposed in Manhattan Brook and at the Fulton Brook confluence with the Bronx River. Channel realignment is proposed through installation of channel plugs at the upstream and downstream ends of the channel on the west side of the island, thereby shifting the Fulton Brook confluence to the east. Additionally, removal of approximately 0.3 acres of invasive vegetation along the eastern boundary of site and along Manhattan Brook and replacement with native plantings is proposed. Approximately 3.4 acres of native upland plantings would occur along the western side of the Bronx River Parkway northbound lands. Bank stabilization,



totaling 285 linear feet, is proposed on the west bank with a tiered rock slope and on the east bank with a stacked rock wall). Emergent wetland creation is proposed along the east and west banks of the Bronx River and construction of a 500-foot-long paved path would divert pedestrian traffic away from emergent wetland creation areas.

3.2.6 River Park/West Farm Rapids Park

At the Bronx West Farm Rapids Park site, the TSP would soften shorelines, restore riverbeds, remove debris from the river, and create emergent wetlands. Boulders and facultative plants between the dam and 180th Street, stacked rock walls with brush layers along the east bank, and drilling with native plant materials along the west bank downstream of 180th Street would be used to soften the banks of the east and west channels (0.31 acres). Riverbed substrate would be excavated and replaced with bedding stone (0.36 acres) and bed restoration would occur between the dam and 180th Street (0.47 acres). Also, debris would be removed from the river bottom downstream of 180th Street (0.36 acres).

3.2.7 Muskrat Cove

Muskrat Cove restoration includes approximately 0.5 acres of invasive species removal with native plantings on the upland slopes and along both banks throughout the length of the site, river bank stabilization between Nereid Avenue and the rail line bridge over the river, construction of vegetated cribwalls, softening using drilling with native plant materials (1,350 linear feet), removal of debris and log jams from the river (1.2 acres), channel modification along two (2) segments (1.2 acres), and installation of a sediment basin at an existing outfall to reduce sediment loads reaching the river.

3.2.8 Garth Woods/Harney Road

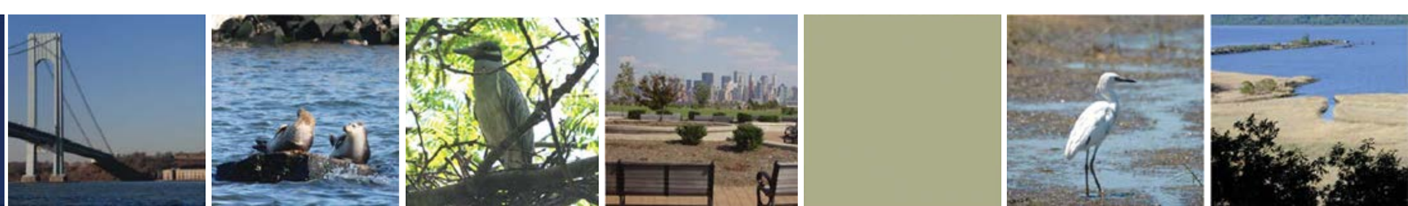
For the Garth Woods and Harney Road site, the TSP would include the modification of the existing weir, modification of approximately 0.8 acres of the river channel by replacing bed material and constructing 15 instream cross vanes, creation of 0.8 acres of emergent wetland along both shores, installation of native upland plantings, construction of three (3) culverts, removal of invasive vegetation and replacement with native wetland or upland vegetation, installation of bioretention area, and shoreline softening along a 190-linear foot segment of the west bank.

3.2.9 Bronx Zoo and Dam

Restoration for the Bronx Zoo and Dam site includes installing a fish ladder (0.04 acres) to link the excavated channel area upstream of the dams to the river channel below the dams, installing a sediment trap to reduce sediment loads reaching the river, and removing debris between the dams (0.09 acres). Approximately 0.6 acres of invasive species would be removed and replaced with native plantings.

3.2.10 Stone Mill Dam

Restoration at the Stone Mill Dam site would include installation of a fish ladder to link the slow-flowing pool upstream of the dam and the faster-flowing channel downstream of the dam. Additionally, placement of clay-pipe fish attractors at both the upstream and downstream ends of the fish ladder would function as refuge habitats for fish. Planting of native vegetation is proposed along the east bank of the river, abutting the fish ladder, and removal of invasive vegetation and replacement with native vegetation from a small area along the west bank, immediately downstream of the dam, is also proposed.



3.2.11 **Soundview Park**

Oyster restoration methods for the Soundview Park site include installing approximately 0.8 acres of spat on shell and 0.1 acres of wire cages/gabions substrate. The restoration is designed to build on past successes and provide significant research opportunities.

3.3 Newark Bay, Hackensack River, and Passaic River Planning Region

In the Newark Bay, Hackensack River, and Passaic River Planning Region, the TSP would restore high marsh, low marsh, scrub/shrub wetland, tidal channels, and maritime forest, and would remove invasive species and plant native vegetation. Additionally, freshwater stream channels would be dredged, riparian forest would be restored, banks would be stabilized, and native vegetation would be planted. The restoration and creation of wetlands would improve the overall water quality of the sites, due to the ability of wetlands to naturally filter water, and would improve the benthic habitat for shellfish species and the fluvial habitat for fish living in the water system. The primary negative impacts of implementing most of the restoration actions include the resuspension of sediments and short-term increased rates of erosion.

3.3.1 **Meadowlark Marsh**

At the Meadowlark Marsh restoration site, the TSP would remove invasive vegetation and plant native marsh, scrub/shrub, and forest vegetation. Approximately 12.7 acres of tidal channels and mudflats, 60.2 acres of low marsh, and 4.6 acres of high marsh would be restored, and 3.2 acres of maritime forest habitat would be created. Two (2) open-span bridges and a culvert would be installed to maintain gas pipeline access.

3.3.2 **Metromedia Tract**

To reconnect fragmented habitats on the restoration site, the TSP would create and restore tidal channels. Approximately 50.6 acres of low marsh and 4.1 acres of high marsh, 3.5 acres of scrub/shrub wetland, and 1.1 acres of maritime forest habitat would be created or restored.

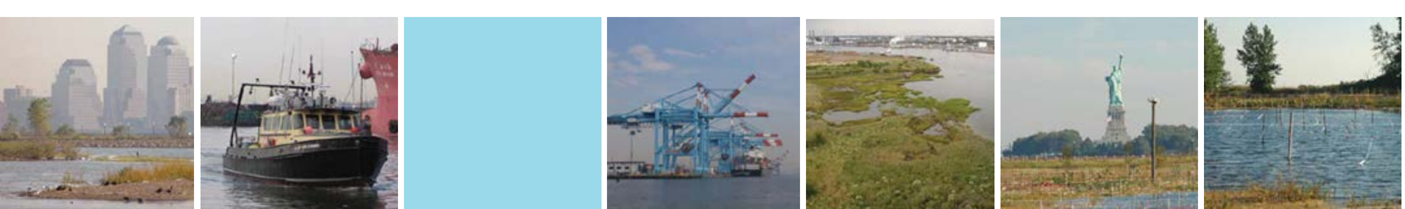
3.3.3 **Kearny Point, Tier 2**

The TSP would remove debris, fill, and invasive vegetation, and plant native marsh, scrub/shrub, and

forest vegetation. Approximately 0.5 acres of tidal channels would be created, 8.8 acres of low marsh would be restored, an elevated path system would be constructed, and a portion of the shoreline along Newark Bay would be stabilized. USEPA remedial action would be required prior to restoration.

3.3.4 **Oak Island Yards, Tier 2**

The TSP would remove debris, fill, and invasive vegetation, and plant native marsh, scrub/shrub, and riparian forest vegetation. Approximately 1,820 linear feet of tidal channels would be created, 7.1 acres of low marsh would be restored, an existing path would be upgraded, an overlook pier and dock would be constructed, and portions of the shoreline along Newark Bay would be stabilized. USEPA remedial action would be required prior to restoration.



3.3.5 Essex County Branch Brook Park

At the Essex County Branch Brook Park site, the TSP would remove debris and invasive vegetation, plant native upland vegetation, dredge approximately 23.5 acres of the existing stream channel, and soften the stream shoreline. Approximately 10,320 linear feet of bank would be stabilized. Interpretive signs would be installed to support ongoing public access improvements.

3.3.6 Dundee Island Park

The TSP would stabilize the bank and soften the shoreline of the river at the site, remove debris and invasive vegetation, and plant approximately 1.2 acres of native shrubs and trees. An existing trail would be enhanced and extended to support planned public access improvements.

3.3.7 Clifton Dundee Canal Green Acres

The TSP would remove debris and invasive vegetation, plant approximately 2.8 acres of native shrubs and trees, restore and stabilize 5.5 acres of riparian forest, install cobble and riffle structures to restore shallow water habitat, and install a sediment basin to treat stormwater runoff. Trails, an overlook, and a boat launch with access road would be constructed to support plans to improve public access.

3.4 Upper Bay Planning Region

Proposed restoration measures in the Upper Bay Planning Region consist of oyster habitat creation at the Governors Island and Bush Terminal restoration sites. The proposed oyster restoration measures would build upon other restoration activities conducted in the area, which together would provide incremental improvements to shoreline stabilization, water quality, and aquatic habitat.

3.4.1 Bush Terminal

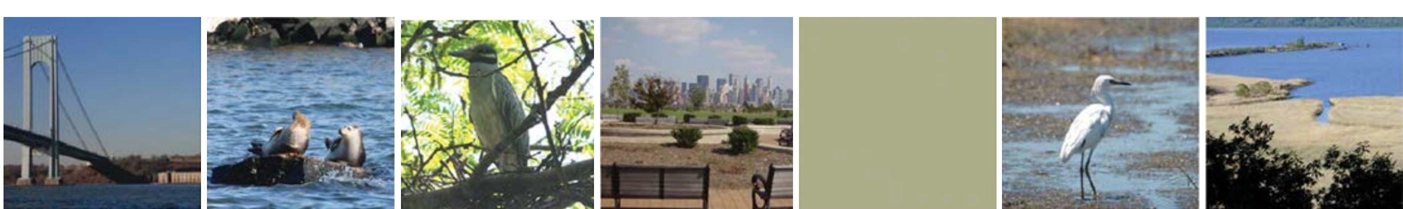
Restoration at Bush Terminal would include installation of approximately 31.7 acres of spat on shell habitat. Approximately 0.1 acres of super trays would be installed as a source of oyster larvae that would settle on the adjacent new hard substrate, comprising 8.5 acres of wire cages/gabions and 3.5 acres of oyster condos.

3.4.2 Governors Island

Oyster restoration at the site would include installation of 0.7 acres of super trays suspended from a float or pier to serve as a larval source for settlement on adjacent new hard substrate, comprising 1.7 acres of wire cages/gabions and 1.8 acres of oyster condos.

3.5 Lower Bay Planning Region

Proposed restoration measures in the Lower Bay Planning Region consist of oyster habitat creation at the Naval Weapons Station Earle site. The proposed oyster restoration measures would build upon other restoration activities conducted in the area and together would provide incremental improvements to shoreline stabilization, water quality, and aquatic habitat.



3.5.1 Naval Weapons Station Earle

At Naval Weapons Station Earle, oyster restoration methods would include installing 3.10 acres of spat on shell, 3.20 acres of wire cages/gabions substrate, and reef balls over 1.30 acres.

Chapter 4: Hudson-Raritan Estuary Aquatic Habitat

The HRE is composed of numerous waterways and waterbodies that ultimately drain into the estuary. These waterways and waterbodies are estuarine in nature, and the waters rarely drop below 20 parts per thousand in salinity. Many of the waterbodies within the New York Harbor are referred to as rivers (e.g., East River, Kill Van Kull) but are more correctly identified as tidal straits. A tidal strait is a narrow waterbody that connects two larger tidal waterbodies.

The main freshwater riverine input into New York Harbor is the Hudson River. The Hudson River flows from north to south along the west side of Manhattan. The river empties into the Upper Bay at the southern tip of Manhattan, where it meets the East River and the Kill Van Kull. At the northern tip of Manhattan, the Harlem River connects the Hudson River to the East River.

4.1 Jamaica Bay Planning Region

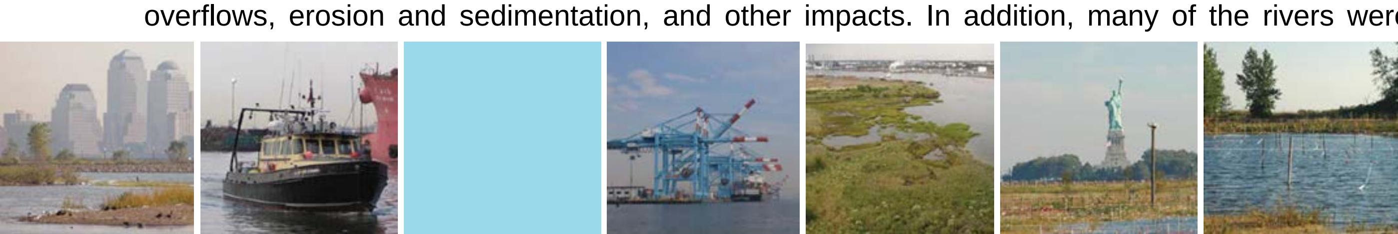
Jamaica Bay is in the Coastal Plain physiographic province. The center of the bay is dominated by subtidal open water and extensive low-lying islands with areas of salt marsh, intertidal flats, and uplands. Tributaries include Thurston Basin, Bergen Basin, Shellbank Basin, Spring Creek, Hendrix Creek, Paerdegat Basin, and Mill Basin. Jamaica Bay encompasses approximately 39 square miles and lies within Kings, Queens, and Nassau Counties in New York. The USACE maintains navigation depths between 18 and 33 feet. The bay is in the Southern Long Island watershed (United States Geological Survey Hydrologic Unit 2030202).

Today, because of landfilling and sewer diversions, the freshwater wetlands of Jamaica Bay comprise less than 1.0 percent of their historic coverage (New York City Department of Environmental Protection, 2016). The bay's original network of freshwater and brackish creeks has been shortened, straightened, bulkheaded, and channelized, with two-thirds of the freshwater runoff diverted through four (4) water pollution control plants.

The bay and barrier beach sediments are composed predominantly of sand and gravel derived from glacial outwash and marine sources. Surficial deposits on Long Island are glacial in origin with morainal deposits to the north and outwash deposits to the south.

4.2 Harlem River, East River, Long Island Sound Planning Region

The Harlem River, East River, and Long Island Sound Planning Region comprises a series of tidal straits and bays in the northeastern portion of the HRE. The planning region is fed by several small freshwater rivers and tidal inlets (e.g., Bronx River, Hutchison River). First settled in the 1600s, the shorelines and waterbodies within the planning region have undergone considerable development and alteration, often with sparse remnants of tidal wetlands, sandy/gravelly beaches, and upland habitats (Regional Plan Association, 2003; USACE, 2004) that were once commonplace. Most shorelines in the planning region consist of bulkheads and riprap. Moreover, the rivers that flow into the planning region are urban rivers that were rechanneled and whose shorelines were altered through the centuries. Both the freshwater and tidal waters have perturbations to water quality resulting from combined sewer overflows, erosion and sedimentation, and other impacts. In addition, many of the rivers were once



used by anadromous fish as spawning grounds; however, development and damming have limited the upstream movement of these species.

Sediments vary depending upon location as a result of the complex flow patterns existing in Long Island Sound and in the overall HRE. Surficial sediments include both glacial and postglacial deposits, with the most recent glaciation period ending about 21,000 years ago. Surficial glacial deposits include till and stratified drift. Postglacial deposits consist of sand, marsh deposits, and estuarine silt.

The main bodies of water in the planning area are the East River, the Harlem River, and Western Long Island Sound.

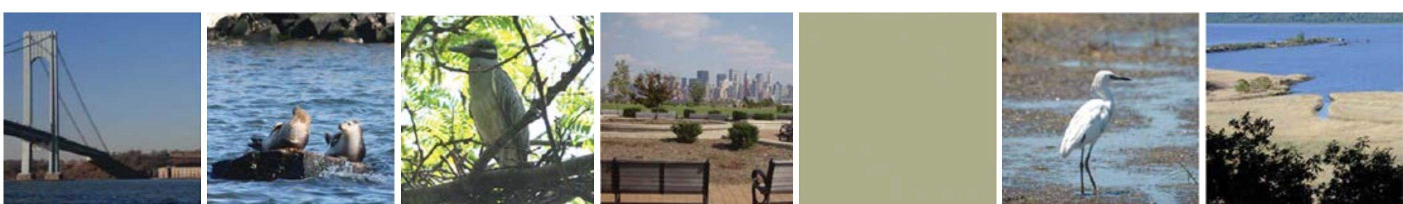
East River – The East River is a tidal strait driven by the differences in tide between its two ends, and tidal currents are strong throughout most of the East River, with maximum current exceeding 5.0 knots. From the western boundary of Long Island Sound (i.e., Throgs Neck and Hunts Point), the East River travels approximately 8.0 miles to the west, until reaching an area referred to as Hell Gate. At Hell Gate, the river turns south and travels about 8.0 miles until it joins the upper reaches of the New York Harbor near the Battery. The river varies in width from approximately 0.5 miles to 2.0 miles and is bounded to the north by the Bronx and to the south by the northwestern portion of Long Island. The deepest point of the East River is 115 feet, located between Long Island (Queens) and Wards Island. Generally, maximum bottom depths in the various reaches of the East River vary between 39 and 69 feet.

Harlem River – The Harlem River is also a tidal strait. The river is approximately 8.0 miles long and acts as the border between Manhattan (to the south) and the Bronx (to the north). The river connects the Hudson River at the northwestern-most tip of Manhattan Island to the East River at the northeastern-most tip of Manhattan Island. With the exception of Tibbets Brook and Little Hell Gate, the Harlem River tributaries are completely enclosed in culverts and often were redirected several city blocks from their historic route to allow for building or road construction.

Western Long Island Sound – The western section of Long Island Sound, between Queens and the Bronx, is where the sound narrows and connects to Upper New York Bay through the East River. Adult species with EFH listing, Atlantic herring and winter flounder, are known to utilize western Long Island Sound. However, since no restoration actions are proposed in Long Island Sound at this time, assessment of potential impacts will not be addressed in this appendix.

4.3 Newark Bay, Passaic River, and Hackensack River Planning Region

The Newark Bay, Hackensack River, and Passaic River Planning Region is composed of two (2) major rivers, a bay, and their tributaries in the northwestern portion of the HRE. The region is in the Piedmont Lowlands physiographic province, a low-lying area of wide valleys and small hills. The region also has numerous wetlands and floodplains. The Hackensack and Passaic Rivers receive water from tributaries in Bergen, Passaic, Hudson, Essex, and Union Counties and discharge to Newark Bay. The Hackensack and Passaic River Basins and Newark Bay have been a center of industrial activity since the Industrial Revolution. As a result, hundreds of chemical, paint, and pigment manufacturing plants, petroleum refineries, and other large industrial facilities were located along their banks. Newark Bay is used by many fish as nursery habitat, although its shorelines and river channels were greatly modified by bulkheads and riprap.



The region is also characterized by ridges of igneous rock and traprock interrupting the rolling sedimentary sandstones, shales, and deep red soils (USFWS, 1997). Newark Bay sediments tend to be a fine-grained combination of silts, clays, and sands, reflecting the deposition of sediments from river input at the northern end and tidal input at the southern end (USACE, 1999).

The main bodies of water in the area are Newark Bay, the Hackensack River, and the Passaic River.

Newark Bay – Newark Bay is a tidal bay in northeastern New Jersey that forms at the junction of the Hackensack and Passaic Rivers. The bay is approximately 5.6 miles long, varies in width between 0.6 and 1.2 miles, and ranges in depth between 30 and 50 feet. The Hackensack and Passaic Rivers empty into the bay from the north. The bay is connected to the Upper New York Bay by the Kill Van Kull and to Raritan Bay by the Arthur Kill. To the east is Bergen Neck, a heavily urbanized peninsula, home to the cities of Jersey City and Bayonne. To the west are the cities of Newark (New Jersey's most populous city) and Elizabeth, which compose a highly urban and heavily populated area, as well as a transportation hub. To the south is the northern coast of Staten Island. Shooters Island, the only island in the bay, is an uninhabited bird sanctuary off the northern shore of Staten Island. The bay is home to the Port Newark–Elizabeth Marine Terminal, the largest port in the eastern United States and one of the busiest ports in the world.

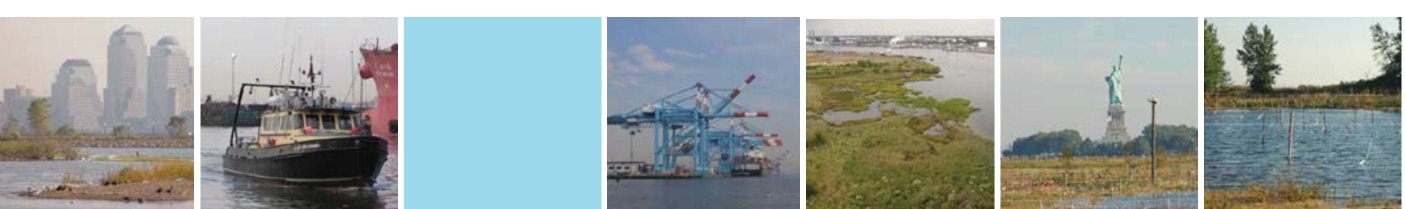
Hackensack River – The Hackensack River is approximately 45 miles long, varies in width between approximately 150 and 160 yards, and varies in depth between 10 and 30 feet. The river originates in New York State, near the northeastern border of New York and New Jersey, less than three (3) miles west of the Hudson River. The river has been dammed and impounded at several points for the creation of reservoirs (Oradell Reservoir, Lake DeForest, Lake Tappan) before it reaches its mouth at Newark Bay. The river also runs through the New Jersey Meadowlands (also known as the Hackensack Meadowlands).

Passaic River – The Passaic River is 80 miles long and generally less than 100 yards wide and 30 feet deep. The river has several tributaries, including Rockaway River, Pompton River, Saddle River, and Dead River. It flows through developed suburban and urban New Jersey. Much industry developed along the river, leading to large amounts of pollution in the lower river.

4.4 Upper Bay Planning Region

The Upper Bay is surrounded by New Jersey and Staten Island to the west, Manhattan to the north, and Brooklyn to the east. Land in the Upper Bay Planning Region is almost entirely developed. Unhardened shoreline habitat and valuable aquatic habitat in the Upper Bay are limited. The Upper Bay perimeter is heavily urbanized, dominated by bulkheads, piers, and shoreline fill that have greatly reduced the abundance of natural nearshore habitats, such as rocky outcroppings, wetlands, and sand beaches (Sanderson, 2005). Most of the shorefront land use within the Upper Bay is commercial and industrial, with a few public parks and open spaces (such as the recreational grasslands in Liberty State Park, which includes 40 acres of salt marsh). Flora and fauna include many species that tolerate the wide range of conditions and disturbances in their physical environment, allowing them to utilize urban and developed areas for shelter and forage. Three (3) islands are in the upper part of the bay, close to Manhattan: Liberty Island, Ellis Island, and Governors Island.

This area has the most complex distribution of sediments. The Upper Bay sediment varies from coarse sands and gravels in high-energy areas to fine-grained silts and clays in low energy areas.



Aside from the Upper Bay, the other main water bodies in the planning area are the East River (described previously), the Gowanus Canal, and Kill Van Kull.

Gowanus Canal – The Gowanus Canal is in Brooklyn. It is 1.8 miles long and 100 feet wide. The canal is infamous for being one of the most polluted waterbodies in the country. Seven (7) bridges span the canal, which is bulkheaded on both sides. The area around the canal is highly urbanized due to the years of industry that historically dominated the Gowanus area of Brooklyn.

4.5 Lower Bay Planning Region

The Lower Bay Planning Region contains both deep and shallow water, including Lower New York Bay and Raritan Bay, as well as Sandy Hook Bay. The region is bordered to the north by Staten Island and Brooklyn and on the south by Monmouth County.

Lower New York Bay is influenced by Jamaica Bay, Upper New York Bay, the Atlantic Ocean, and dozens of freshwater tributaries. Raritan Bay receives inputs from the Raritan River and Newark Bay and its tributaries via the Arthur Kill. Sandy Hook Bay receives inputs from the Navesink and Shrewsbury Rivers, which are wide tidal rivers with a few dredged material and salt marsh islands at the confluence of the two rivers, surrounded by mostly residential development and separated from the Atlantic Ocean by developed barrier beaches. Major waterbodies in the Lower Bay Planning Region provide a combination of marine and estuarine habitats that support diverse ecological communities (USACE, 2004). Of the major waterbodies within the planning region, Lower New York Bay generally provides deeper, marine habitat, while the Raritan Bay-Sandy Hook Bay complex encompasses shallower waters.

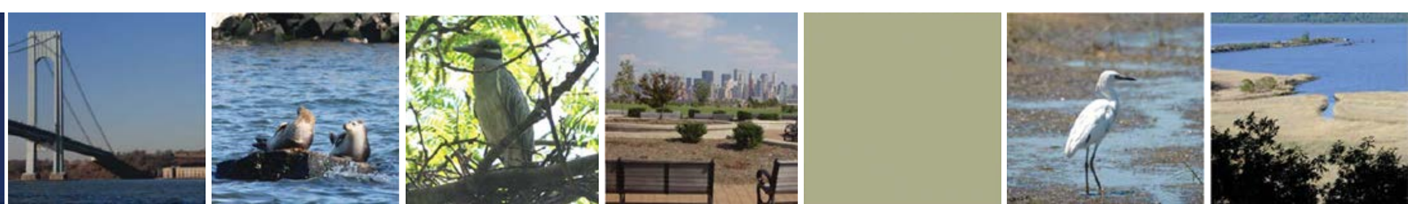
Most of the sediments in this area are marine deposited sedimentary sands, gravels, and clays. The Lower Bay area of the HRE has sediments made up mostly of sand, varying in grain size. Lower New York Bay sediments in the area just south of the Narrows are characterized by gravelly sands underlying the main channel, with finer-grained sands, clays, and silts to the east and west of it. Extensive deposits of sand characterize the northern part of the Lower New York Bay. Sediment contamination in Raritan Bay is generally the result of the outflow from the Arthur Kill and the Raritan River. The highest toxicity levels are found in western Raritan Bay.

Chapter 5: General Distribution and Life History of Managed Fish Species

This assessment has been prepared to address the potential impacts of the proposed action on the habitat of the 23 managed species for which EFH has been designated in the HRE. Tables 2 through 6 identify the EFH species in all planning regions. Section 5.A provides further detail on each species.

Table 5-1: Summary of EFH Designations for Jamaica Bay Planning Region.

Managed Species	Eggs	Larvae	Juveniles	Adults
Atlantic salmon (*Salmo salar*)				X
Pollock (*Pollachius virens*)			X	
Silver hake (*Merluccius bilinearis*)	X	X	X	
Red hake (*Urophycis chuss*)	X	X	X	
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X



Managed Species	Eggs	Larvae	Juveniles	Adults
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)			X	X
Monkfish (*Lophius americanus*)	X	X		X
Bluefish (*Pomatomus saltatrix*)			X	X
Atlantic butterfish (*Peprilus triacanthus*)	X	X	X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Summer flounder (*Paralichthys dentatus*)		X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Black sea bass (*Centropristis striata*)			X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Sand tiger shark (*Carcharias taurus*)		X		
Blue shark (*Prionace glauca*)				X
Dusky shark (*Carcharhinus obscurus*)		X		
Sandbar shark (*Carcharhinus plumbeus*)		X	X	X
Tiger shark (*Galeocerdo cuvier*)		X		

Source: NOAA, 2016.
10’x10’ square coordinates: 40° 40.0’N, 73° 40.’W, 40° 30.0’N, 73° 50.0’W
40° 40.0’N, 73° 50.’W, 40° 30.0’N, 74° 00.0’W

Table 5-2: Summary of EFH Designations for Harlem River, East River, and Western Long Island Sound Planning Region.

Managed Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod (*Gadus morhua)*			X	X
Pollock (*Pollachius virens*)			X	X
Red hake (*Urophycis chuss*)		X	X	X
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)		X	X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Atlantic butterfish (*Peprilus triacanthus*)		X	X	X
Atlantic mackerel (*Scomber scombrus*)			X	X
Summer flounder (*Paralichthys dentatus*)		X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Black sea bass (*Centropristis striata*)			X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Sand tiger shark (*Carcharhias taurus*)		X		
Dusky shark (*Carcharhinus obscurus*)		X		
Sandbar shark (*Carcharhinus plumbeus*)		X	X	X

Source: NOAA, 2016.
10’x10’ square coordinates: 40° 50.0’N, 73° 50.’W, 40° 40.0’N, 74° 00.0’W
40° 50.0’N, 73° 40.’W, 40° 40.0’N, 73° 50.0’W
41° 00.0’N, 73° 40.’W, 40° 50.0’N, 73° 50.0’W

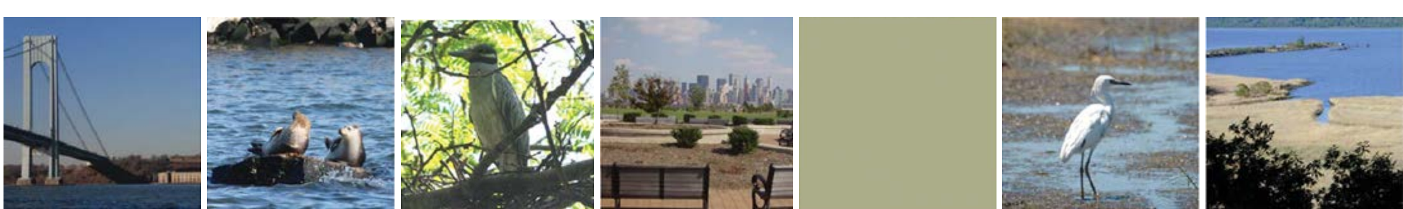


Table 5-3: Summary of EFH Designations for Newark Bay, Hackensack River, and Passaic River Planning Region.

Managed Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Red hake (*Urophycis chuss*)		M,S	M,S	M,S	
Winter flounder (*Pseudopleuronectes americanus*)	M,S	M,S	M,S	M,S	M,S
Windowpane flounder (*Scophthalmus aquosus*)	M,S	M,S	M,S	M,S	M,S
Atlantic sea herring (*Clupea harengus*)		M,S	M,S	M,S	
Bluefish (*Pomatomus saltatrix*)			M,S	M,S	
Atlantic butterfish (*Peprilus triacanthus*)		M	M,S	M,S	
Atlantic mackerel (*Scomber scombrus*)			S	S	
Summer flounder (*Paralichthys dentatus*)		F,M,S	M,S	M,S	
Scup (*Stenotomus chrysops*)	S	S	S	S	
Black sea bass (*Centropristis striata*)			M,S	M,S	
King mackerel (*Scomberomorus cavalla*)	X	X	X	X	
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X	
Cobia (*Rachycentron canadum*)	X	X	X	X	

Source: NOAA, 2016.
S = includes the seawater salinity zone;
M = includes the mixing water/brackish salinity zone;
F = includes the tidal freshwater salinity zone
10’x10’ square southeast corner boundary: 4040/7350; 4040/7400; 4030/7350; 4030/7400; 4030/7410; 4020/7350; 4020/7400; 4020/7410; 4010/7420

Table 5-4: Summary of EFH Designations for Upper Bay Planning Region.

Managed Species	Eggs	Larvae	Juveniles	Adults
Red hake (*Urophycis chuss*)	X	X	X	X
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)		X	X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Atlantic butterfish (*Peprilus triacanthus*)		X	X	X
Atlantic mackerel (*Scomber scombrus*)			X	X
Summer flounder (*Paralichthys dentatus*)		X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Black sea bass (*Centropristis striata*)			X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Sand tiger shark (*Carcharias taurus*)		X		
Dusky shark (*Carcharhinus obscurus*)		X	X	
Sandbar shark (*Carcharhinus plumbeus*)		X		X

Source: NOAA, 2016.
10'x10' square coordinates: 40° 50.0'N, 74° 00.'W, 40° 40.0'N, 74° 10.0'W
40° 40.0'N, 74° 00.'W, 40° 30.0'N, 74° 10.0'W

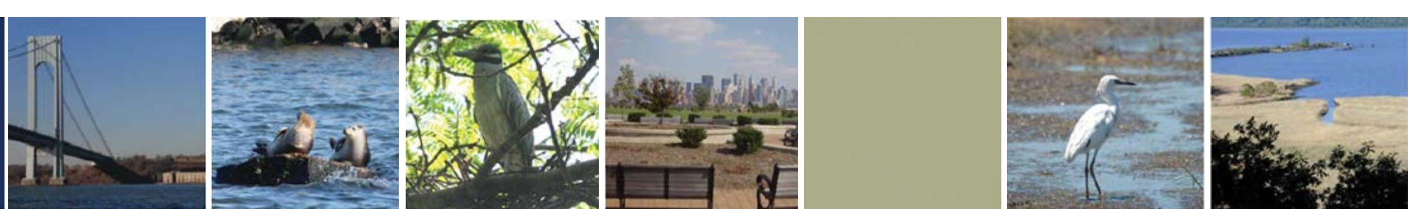


Table 5-5: Summary of EFH Designations for Lower Bay Planning Region.

Managed Species	Eggs	Larvae	Juveniles	Adults
Red hake (*Urophycis chuss*)	X	X	X	
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)		X	X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Atlantic butterfish (*Peprilus triacanthus*)		X	X	X
Atlantic mackerel (*Scomber scombrus*)			X	X
Summer flounder (*Paralichthys dentatus*)		X	X	X
Scup (*Stenotomus chrysops*)			X	X
Black sea bass (*Centropristis striata*)			X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Sand tiger shark (*Carcharias taurus)*				
Dusky shark (*Carcharhinus obscurus*)		X	X	
Sandbar shark (*Carcharhinus plumbeus*)		X	X	X
Source: NOAA, 2016. 10'x10' square coordinates: 40° 30.0'N, 74° 00.'W, 40° 20.0'N, 74° 10.0'W 40° 40.0'N, 74° 00.'W, 40° 30.0'N, 74° 10.0'W				

5.1 Managed Fish Species

The majority of the general distribution and life history information presented in this assessment is based upon Status of the Fishery Resources off the Northeastern United States (NOAA, 1998). Where additional references were used, they are cited as appropriate.

5.1.1 **Atlantic Butterfish**

The Atlantic butterfish (*Peprilus tricanthus*) ranges from Newfoundland to Florida, but is primarily found from the Gulf of Maine to Cape Hatteras. Butterfish migrate in response to seasonal changes in water temperature. During summer, butterfish move northward and inshore to feed and spawn. Spawning occurs during June to August and peaks progressively later at higher latitudes. During winter, butterfish move southward and offshore to avoid cool waters. Butterfish are primarily pelagic and form loose schools that feed upon small fish, squid, and crustaceans. Butterfish have a high natural mortality rate and are preyed upon by many species, including silver hake, bluefish, swordfish, and long-finned squid (Cross et al., 1999).

5.1.2 **Atlantic Cod**

Atlantic cod (*Gadus morhua*) are found in the northwest Atlantic Ocean from Greenland to Cape Hatteras (North Carolina). Those distributed in United States waters are found in rough bottom waters between 32.8 and 492.1 feet and at temperatures between 32 and 50 degrees Fahrenheit (F). Juveniles begin their descent from the water column to the bottom habitats at sizes between 1.0 and 2.4 inches, and tend to remain on the bottom for the rest of their lives. They tend to move in schools, usually on the bottom, although they may also occur in the water column (NOAA, 1999a).

5.1.3 **Atlantic Mackerel**

The Atlantic mackerel (*Scomber scombrus*) is a fast-swimming, pelagic, schooling species distributed in the northwest Atlantic between Labrador and North Carolina. This population has two (2) major spawning components: a southern group that spawns primarily in the Middle Atlantic Bight during April and May, and a northern group that spawns in the Gulf of St. Lawrence in June and July. Both groups winter between Sable Island (off Nova Scotia) and Cape Hatteras in waters generally warmer than 44.6 degrees F, with extensive northerly (spring) and southerly (autumn) migrations to and from spawning and summering grounds. Mackerel feed upon small fish (Studholme et al., 1999).

5.1.4 **Atlantic Salmon**

Atlantic salmon (*Salmo salar*) are anadromous fish. They spend their lives in both freshwater and the open ocean. Atlantic salmon distribution ranges from northern Quebec southeast to Newfoundland and southwest to Long Island Sound (NOAA, 2016). Spawning occurs in late October to early November in Maine. In the spring, eggs will hatch and juveniles will spend about one (1) to two (2) years in bottom habitats of shallow gravelly pools in river and estuaries. Once reared, the salmon will migrate out to sea during the spring. Adults are primarily pelagic and will return to spawn in freshwater after spending one (1) to four (4) years at sea (NatureServe, 2015).

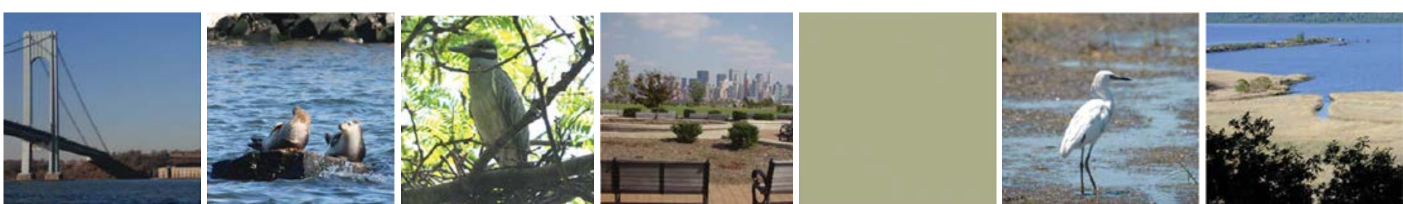
5.1.5 **Atlantic Sea Herring**

The Atlantic sea herring (*Clupea harengus*) is widely distributed in continental shelf waters from Labrador to Cape Hatteras. It is a migratory, schooling species that consumes plankton. Atlantic herring are usually seen swimming in vast schools offshore (Geiser, 1984). Primary spawning locations off the northeastern United States are located on the Maine coast, Jeffreys Ledge, Nantucket Shoals, and Georges Bank. Spawning occurs during late August to October. Eggs are demersal and are typically deposited on gravelly substrates (Reid et al., 1999).

5.1.6 **Black Sea Bass**

The NMFS has designated the East River as EFH for black sea bass (*Centropristus striata*) juveniles and adults. Black sea bass are strictly confined to salt water, appearing inshore during the first or second week in May and withdrawing again late in October or early in November. The substrate preferred by the black sea bass generally consists of shellfish and eelgrass beds, man-made structures in sandy-shelly areas, and offshore clam beds. During the part of the year when the black sea bass are inshore they are most plentiful on hard bottom, in water less than 115 feet, often around submerged wrecks. They are bottom feeders, subsisting chiefly on crabs, lobsters, shrimp, and various mollusks (Bigelow and Schroeder, 1953).

Juvenile and adult black sea bass occur in the demersal waters over the Continental Shelf from the Gulf of Maine to Cape Hatteras, North Carolina. Juvenile and adult black sea bass are found in the estuaries in the summer and spring in water warmer than 42.8 degrees F with salinities greater than 18 parts per thousand, but winter offshore from south of New York to North Carolina (Steimle et al., 1999a).



5.1.7 Bluefish

Bluefish are common inshore inhabitants of the New York Bight, arriving in May and usually departing by November. Two (2) major spawning aggregations are in the Mid-Atlantic – a spring spawning stock and a summer spawning stock. Most of the bluefish population in the New York Bight probably originates from the spring spawning stock. The spring spawners move into the waters where the Gulf Stream and the continental shelf waters meet between northern Florida and Cape Hatteras. Bluefish spawn as they migrate northward. North of Cape Hatteras, the adults move shoreward.

The smaller, post-spawned bluefish may spend summers in the Chesapeake and Delaware Bays and Albemarle Sound. Larger fish move north for a longer period than the smaller bluefish, and thus migrate farther. Some move into Long Island Sound and more northern areas. In autumn, bluefish migrate back to the wintering areas off south Florida and the South Atlantic Ocean.

Bluefish eggs are buoyant and pelagic and hatch in about two (2) days. The newly hatched larvae are also pelagic and remain in offshore waters for one (1) to two (2) months before migrating shoreward toward shallow-water nursery areas. Young-of-year bluefish typically first enter areas north of the George Washington Bridge in early June and remain there until at least early October. They are most common in more saline areas of the estuary. Salinity intrusions into the estuary appear to be a major determinant of geographic distribution within the estuary. Young-of-year bluefish are also abundant in areas of the estuary south of the George Washington Bridge and adjacent waterways, which are part of the larger, coastal distribution (Applied Science Associates, 2006).

5.1.8 Blue Shark

Blue sharks (*Prionace glauca*) are a highly migratory species and one of the widest-ranging sharks. They can be found in tropical, subtropical, and temperate pelagic waters. In the north Atlantic, blue shark can be found from Cape Hatteras, North Carolina to the Gulf of Maine. Blue shark is a viviparous species, and gives birth to live young. Litter sizes range from four (4) to 135 pups. Adult males typically are about five (5) to six (6) feet in length, whereas females are about seven (7) to eight (8) feet in length (NOAA, 2006).

5.1.9 Cobia

The cobia (*Rachycentron canadum*) is a fast swimming fish that can be found near shore or inshore inhabiting inlets, bays, mangrove swamps and is often seen around buoys, pilings, and wrecks. Cobia is distributed from Massachusetts to Argentina. Cobia primarily feed on crabs, squid, and small fish and can reach a size of up to 6.6 feet and 330.7 pounds, although they more commonly reach a size 22.0 to 110.2 pounds (Robbins et al., 1986).

5.1.10 Dusky Shark

The NMFS has designated Jamaica Bay, Hudson River Estuary, and the Raritan Bay including Sand Hook Bay around Sandy Hook as EFH for dusky shark (*Carcharhinus obscurus*) larvae. Neonate/early juveniles of the dusky shark are found in shallow coastal waters, inlets, and estuaries to the depth of 75.5 feet from the eastern end of Long Island to Cape Lookout, North Carolina. The dusky shark is viviparous. Its diet consists of flounder, flatfish, starfish, and squid (McCandless et al., 2014).

5.1.11 King Mackerel

The king mackerel (*Scomberomorus cavalla*) is a fast swimming fish that roams in schools. Their distribution ranges along the western coast of the Atlantic Ocean from North Carolina to Massachusetts and also in the Gulf of Mexico (Beaumariage, 1973). They prefer warm waters and are found along reefs and in coastal waters. Peak spawning occurs from May to early July and in late July to early August. King mackerel primarily feed on other fish and reach a size of up to 5.6 feet and 99.2 pounds (NMFS, 2017).

5.1.12 Monkfish

Monkfish (*Lophius americanus*), also known as goosefish, is found from the southern and eastern parts of the Grand Banks, Newfoundland, and the northern side of the Gulf of St. Lawrence, to the Atlantic coast of Florida, although it is most commonly found north of Cape Hatteras, North Carolina. Spawning occurs from spring through early fall with a peak in May-June. Males typically reach sexual maturity after four (4) years and females after five (5) years. Their eggs float freely at the surface and are subject to actions of wind, currents, and waves. Time to hatching ranges from six (6) to seven (7) days at 59 degrees F to approximately 100 days at 41 degrees F. Monkfish are a common component of the ichthyoplankton community in the Middle Atlantic. Adults spend most of their time on the bottom, usually in a depression or partially covered in sediment, but they have been reported at the surface. They are found in bottom water temperatures ranging between 32 and 75.2 degrees F (NOAA, 1999b).

5.1.13 Pollock

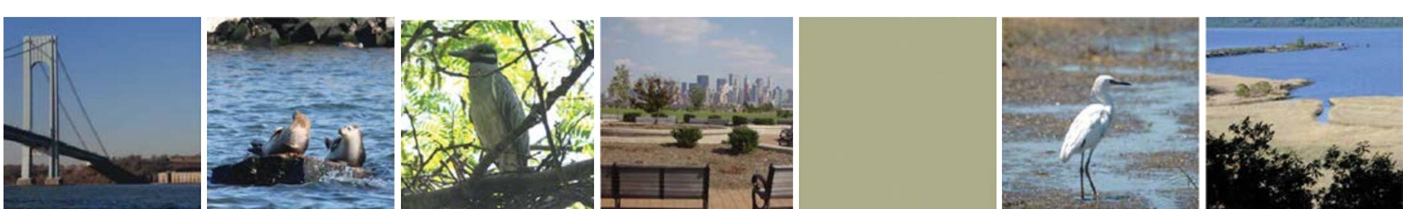
Pollock (*Pollachius virens*) occur in the Northwest Atlantic where they are most abundant on the western Scotian Shelf, and in the Gulf of Maine. Spawning occurs in winter. Sexual maturation is essentially complete by age six (6), although more than 50 percent of fish are mature by age three (3). Juvenile pollock are common in inshore areas, but move offshore as they grow older. Generally, pollock adults are found in waters below 57.2 degrees F and from depths of 147.6 to 656.2 feet with salinities over 30 parts per thousand (Cargnelli et al., 1999).

5.1.14 Red Hake

Red hake (*Urophycis chuss*) are distributed from the Gulf of St. Lawrence to North Carolina, but are most abundant between Georges Bank and New Jersey. Red hake undergo extensive seasonal migrations, moving into shallow waters to spawn in spring and summer and offshore to deep waters in the winter. Spawning occurs from May through November. The eggs are buoyant (Geiser, 1984) and are generally found in water temperatures below 50.0 degrees F. The first months of a red hake's life are spent drifting at or near the surface and fry of 0.5 to 3.9 inches have been observed in summer under floating eelgrass or rockweed. Juvenile red hake are often found near benthic habitats with abundant shell fragments, including areas with abundant sea scallops. Adult red hake are often found in water temperatures below 53.6 degrees F from depths of 32.8 to 98.4 feet with a salinity range of 33 to 34 parts per thousand (Steimle et al., 1999b). The red hake's diet consists primarily of shrimp, squid, bergalls, small eels, spearing, sand eels, and the young of other species (Geiser, 1984).

5.1.15 Sandbar Shark

The sandbar shark (*Carcharhinus plumbeus*) can be found from Cape Cod, Massachusetts to Florida, including the Gulf of Mexico and Caribbean Sea (NOAA, 2016). It is a migratory species, spending winters in southern waters and summers in northern waters. Sandbar sharks are found near shore at



depths of 65.6 to 213.3 feet. In the northern hemisphere, mating occurs from May to June. Average length of gestation range from eight (8) to 12 months and is dependent on geological location. Litter size ranges from six (6) to 13 pups. In the western Atlantic, pups are born from June to August. Sandbar shark diet consists of bottom fish, shellfish, skates, stingrays, squid, shrimp, crabs, mollusks, and other smaller sharks (Florida Museum of Natural History, 2016).

5.1.16 **Sand Tiger Shark**

Sand tiger sharks (*Carcharias taurus*) are coastal sharks that inhabit warm and temperate waters excluding the eastern Pacific (Compagno, 1984). The Long Island Sound and Jamaica Bay were identified as EFH habitat for neonate/early juvenile sand tiger sharks (NOAA, 2016). Their habitat ranges from the surf zone, in shallow bays, and around rocky coral reefs. Sand tiger sharks are an ovoviviparous species. Mating occurs between March and April and the average litter size is about one (1) to two (2) pups. Their diet consists of other small sharks, rays, squid, crab, and lobster (NOAA, 2010).

5.1.17 **Scup**

Scup (*Stenotomus chrysops*) occur primarily in the Middle Atlantic Bight from Cape Cod to Cape Hatteras. Seasonal migrations occur during spring and autumn. In summer, scup are common in inshore waters from Massachusetts to Virginia, while in winter, scup are found in offshore waters between Hudson Canyon and Cape Hatteras. Spawning occurs during summer months (Steimle et al., 1999c).

5.1.18 **Silver Hake**

Silver Hake (*Merluccius bilinearis)* are demersal fish and are found in waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Middle Atlantic south to Cape Hatteras. Eggs are pelagic and are about 0.88 to 0.95 millimeters in diameter. Eggs hatch in about two (2) days at 68 degrees F. Larvae are pelagic and are about 0.1 to 0.13 inches long. Juveniles and adult silver hake migrate to deeper waters off the continental self when water temperatures begin to decline in the autumn. Adults will return to shallow waters in the spring and summer to spawn. Spawning begins in January in the Middle Atlantic Bight and then, during May, spawning will occur off the coast of the Gulf of Maine, southern and southeastern Georges Bank, and the south of New England. Known as an important predator species, Silver Hake feed on a diet of fish, crustaceans, and squid. Young will feed on euphausiids, shrimp, amphipods, and decapods (Morse et al., 1999).

5.1.19 **Spanish Mackerel**

The Spanish mackerel (*Scomberomorus maculatus*) is a fast swimming fish that roams in large schools. Spanish mackerel can be found near shore congregating around channels and bays. Spanish mackerel are distributed from Cape Cod to South Florida, although they are rarely found north of the Chesapeake Bay (Robbins et al., 1986). Spawning occurs from July to August and as late as September. Larvae can be found within inshore waters at temperatures of about 68 to 86 degrees F. Juveniles prefer estuarine and coastal waters. Adult habitat ranges from tidal estuaries to open water and adults prefer water temperatures of 69.8 to 80.6 degrees F (ASMFC, 2016).

5.1.20 **Summer Flounder**

Summer flounder (*Paralichthys dentatus*), or fluke, occur from the southern Gulf of Maine to South Carolina. Summer flounder are concentrated in bays and estuaries from late spring through early autumn, when an offshore migration to the outer continental shelf is undertaken. On the outer shelf they are found at depths up to 147.6 feet. Many summer flounder come close inshore when the waters are warm, but the great majority of the population, especially larger fish, lies farther offshore at that time of year (Bigelow and Schroeder, 1953). Spawning occurs offshore during autumn and early winter and the larvae are transported toward coastal areas by prevailing water currents.

Development of post-larvae and juveniles occurs primarily within bays and estuarine areas. Summer flounder often bury themselves in the soft bottom of the ocean or river. They consume small fish, most notably small mossbunker, squid, mackerel, sea robins, sand eels, killifish, and spearing (NOAA, 1999c).

5.1.21 **Tiger Shark**

Tiger sharks (*Galeocerdo cuvier*) are found in warm waters in both deep oceanic and shallow coastal regions. They occur in the North Atlantic Ocean off the coast at approximately 40 degrees north to 0 degrees north. On rare occasions, tiger shark may be encountered north of the Middle Atlantic Bight. They reach reproductive maturity at approximately 9.5 feet total length. Litters consist of approximately 35 to 55 pups (NOAA, 2006).

5.1.22 **Winter Flounder**

Winter flounder (*Pleuronectes americanus*) are distributed in the northwest Atlantic from Labrador to Georgia. The species is found in brackish and salt water habitats. Abundance is highest from the Gulf of St. Lawrence to Chesapeake Bay. Optimum substrate for adults and juveniles is silty sand. The diet consists primarily of benthic invertebrates. Movement patterns are generally localized. Winter flounder undertake small-scale migrations into estuaries, embayments, and saltwater ponds in winter to spawn, subsequently moving to deeper water during summer. Winter flounder tend to return to the same spawning locations in consecutive years. Optimum water temperature for spawning is 33.8 to 41 degrees F. Females usually produce between 500,000 to 1.5 million eggs. Eggs are adhesive and settle to the bottom (New England Fishery Management Council, 1998).

Generally, winter flounder release their eggs within areas that are less than 50 degrees F, with salinities from 10 to 30 parts per thousand, and in depths of less than 16.4 feet. Larval winter flounder are often found in shallow water between depths less than 19.7 feet (New England Fishery Management Council, 1998). Juvenile and adult flounder can be found in waters up to 164.0 to 328.0 feet in depth, respectively. The NMFS has designated the East River as EFH for winter flounder eggs, larvae, juveniles, and adults.

5.1.23 **Windowpane Flounder**

Windowpane flounder (*Scopthalmus aquosus*), also known as sand flounder, are distributed on the northwest Atlantic continental shelf from the Gulf of St. Lawrence to Florida. This species inhabits large estuaries and is a shoal water benthic species that prefers sandy bottoms. However, it also frequents softer and muddier grounds (Bigelow and Schroeder, 1953). Peak spawning activity occurs in Middle Atlantic Bight waters (which extend from Montauk, New York to the Virginia/North Carolina border), in May and October (New England Fishery Management Council, 1998).

5.2 Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS), NMFS, and New York State Department of Environmental Conservation (NYSDEC) were consulted regarding the occurrence of rare, threatened, and endangered species and species of special concern in the vicinity of the project sites in each planning region. The aquatic species that were identified for each region are provided in the following sections.

5.2.1 Jamaica Bay

Four (4) species of sea turtles listed under the Endangered Species Act are seasonally present in the bay:

- Threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead (*Caretta caretta*).
- Threatened North Atlantic DPS of green (*Chelonia mydas*).
- Endangered Kemp's ridley (*Lepidochelys kempii*).
- Endangered leatherback sea turtle (*Dermochelys coriacea*).

These threatened and endangered sea turtles can be present in the Jamaica Bay area from May to mid-November.

Adult and subadult Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) can be found in the Jamaica Bay Planning Area. The New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS are endangered, and the Gulf of Maine DPS is threatened in the area. Atlantic sturgeon eggs, larvae, or juvenile life stages will not be found in the waters of the Jamaica Bay Planning Area. Additionally, the shortnose sturgeon (*Acipenser brevirostrum*), of the adult and subadult life stages, is also present in these waters. The shortnose sturgeon is endangered throughout its range.

5.2.2 Harlem River, East River, and Western Long Island Sound Planning Region

Four (4) species of sea turtles listed by NMFS are seasonally present in the East River and adjacent bays:

- Threatened Northwest Atlantic Ocean DPS of loggerhead.
- Threatened North Atlantic DPS of green.
- Endangered Kemp's ridley.
- Endangered leatherback sea turtle.

Two (2) protected fish species, Atlantic sturgeon and shortnose sturgeon, were also identified by NMFS as being potentially present in the East River and adjacent bays.

5.2.3 Newark Bay, Hackensack, and Passaic River Planning Region

No threatened and/or endangered marine species were identified in this planning region.

5.2.4 Upper Bay Planning Region

Four (4) species of sea turtles listed by NMFS are seasonally present in the bay:

- Threatened Northwest Atlantic Ocean DPS of loggerhead.
- Threatened North Atlantic DPS of green.

- Endangered Kemp's ridley.
- Endangered leatherback sea turtle.

These threatened and endangered sea turtles can be present in the Upper Bay area from May to mid-November. Adult and subadult Atlantic sturgeon can be found in the Upper Bay Planning Area. The New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS are endangered, and the Gulf of Maine DPS is threatened in the area. Atlantic sturgeon eggs, larvae, or juvenile life stages will not be found in the waters of the Upper Bay Planning Area. Additionally, the shortnose sturgeon, of the adult and subadult life stages, is also present in these waters. The shortnose sturgeon is endangered throughout its range.

5.2.5 Lower Bay

Raritan Bay and Sandy Hook Bay support the greatest variety of state- and federally-listed threatened and endangered species (USFWS, 1997). Listed by the NMFS, four (4) species of sea turtles listed under the Endangered Species Act are seasonally present in the Lower Bay Planning Region:

- Threatened Northwest Atlantic Ocean DPS of loggerhead.
- Threatened North Atlantic DPS of green.
- Endangered Kemp's ridley.
- Endangered leatherback sea turtle.

These threatened and endangered sea turtles can be present in the Lower Bay area from May to mid-November. Adult and subadult Atlantic sturgeon can be found in the Lower Bay Planning Area. The New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPS are endangered, and the Gulf of Maine DPS is threatened in the area. Atlantic sturgeon eggs, larvae, or juvenile life stages will not be found in the waters of the Lower Bay Planning Area. Additionally, the shortnose sturgeon (*Acipenser brevirostrum*), of the adult and subadult life stages, is also present in these waters. The shortnose sturgeon is endangered throughout its range.

Chapter 6: Analysis of Potential Effects

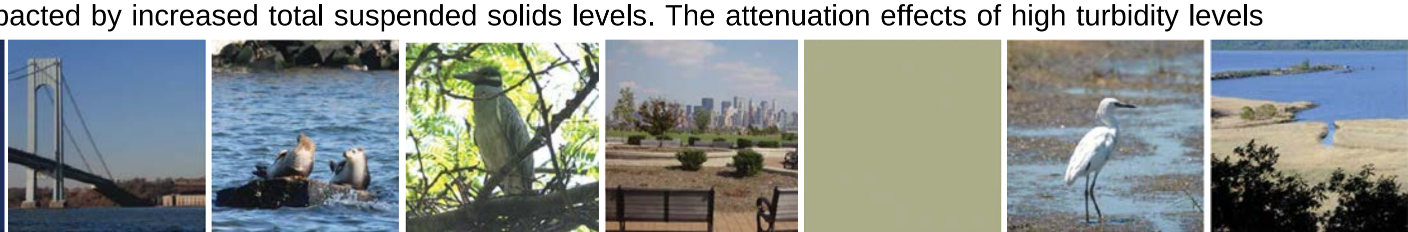
Impacts from the TSP to EFH and managed species in every planning area can largely be grouped under three (3) different types of impacts: sedimentation and burial, hydroacoustics, and habitat loss and alteration.

6.1 Sedimentation and Burial

Numerous species occur in the HRE. The aquatic fauna vary from motile and sessile benthic organisms to resident and early life stages of numerous fish species. These organisms could be impacted by sediment resuspension that may interfere with their methods of feeding (e.g., filter feeding) and/or impair their habitat due to an increase in suspended sediments or burial by deposited sediments.

6.1.1 Sedimentation

Benthic habitats can vary from densely vegetated beds of submerged aquatic vegetation to habitats with high rugosity (e.g., reefs, large boulders) to relatively flat, featureless sediment-dominated habitats. Although devoid of vegetation or lacking dramatic topographical variability, benthic sediments provide valuable habitat for numerous benthic invertebrates (e.g., worms, clams). Moreover, these interstitial organisms serve as prey species for fish, crabs, and other fauna. Submerged aquatic vegetation could be impacted by increased total suspended solids levels. The attenuation effects of high turbidity levels



would reduce a plant's ability to utilize sunlight. Impacts to submerged aquatic vegetation are especially acute during the growing season, from April to October.

Resuspension of estuarine sediments will have variable impacts on fish depending on species and life stage. Lethal levels of water column solids vary widely among species; one study found that the tolerance of adult fish for suspended sediment ranged from 580 milligrams per liter (mg/L) to 24,500 mg/L (Shrek et al., 1975 as cited in NMFS, 2003). Common impacts to fish are the abrasion of gill membranes (resulting in inability to collect oxygen), impairment of feeding, reduction in dissolved oxygen, and fatal impacts to early life stages. Increased total suspended solids can inhibit migratory movements as well. A study conducted in 1976 determined that total suspended solids concentrations as low as 350 mg/L blocked upstream migrations (NOAA, 2001).

Larval stage fish also have wide suspended sediment tolerance ranges; however, the reported data is generally thought to represent tolerance levels for only relatively short exposure periods (e.g., less than 24 hours) (Morgan and Levings, 1989). Beyond that timeframe, mortality can occur at concentrations as low as 1,300 mg/L (Morgan et al., 1983). Kiorboe et al., 1981, (as cited in Clarke and Wilber, 2000) indicate that hatching of striped bass and white perch can be delayed if daily sediment concentrations reach 100 mg/L. Wilbur and Clarke, 2001 (as cited in NMFS, 2003), indicate that hatching is delayed for striped bass and white perch at concentrations of 800 and 100 mg/L, respectively. In a 2003 biological opinion, the NMFS indicated that total suspended solids concentrations below 100 mg/L are not likely to affect eggs and larvae, at least over short durations (NMFS, 2003).

6.1.2 Burial

Benthic habitats can be buried by excessive sediment deposition. The burial would disrupt the physiological functions of plants and result in injury or mortality. Given the extremely limited amount of potential sediment deposition, it is anticipated that sediment deposition would not bury existing submerged aquatic vegetation beds in the project area and would result in minimal, if any, impacts to submerged aquatic vegetation.

Other dredging activities throughout the world have resulted in a buildup of organic matter within a dredged area that affected water quality (Szymelfenig and Kotwicki, 2006). Often, the organic matter accumulation leads to anaerobic conditions and hydrogen sulfide formation. The strong tidal action of most project areas, as well as the likely prop wash from vessel traffic, would result in a near daily flushing of any buildup of organic matter during the construction period.

When sediments are resuspended, they disperse throughout the water column and also settle to the bed of the waterway within which construction is occurring. Impacts from deposited sediments can pose significant threats to aquatic organisms. For fish species, burial of eggs can result in mortality. Winter flounder eggs were observed to be affected by thin layers of deposited sediments in laboratory conditions (Germano and Cary, 2005). Also, sediment deposits of 2.0 millimeters or greater over white perch eggs resulted in 100 percent mortality. Sediment deposition may have negative short-term impacts to adult and juvenile fish due to benthic habitat alterations and as a result of reduced foraging opportunities.

6.2 Hydroacoustics

Sound in water follows the same physical principles as sound in air. The major difference is that, due to the density of water, sound in water travels about 4.3 times faster than in air (approximately 4,900 feet per second versus 1,100 feet per second, respectively), and attenuates much less rapidly than in air.

Sound is a very critical source of environmental information for most vertebrates (e.g., Fay and Popper, 2000). While we most often think in terms of sound for communication (e.g., speech), perhaps the most important use of sound is to learn about one's environment. Indeed, humans and all other vertebrates have auditory systems that listen to the "acoustic scene" and can, from this, learn a great deal about the environment and the things in it (Bass and Ladich, 2008). And, whereas the "visual scene" is restricted by the field of view of the eyes and light level, the acoustic scene provides a three-dimensional, long distance sense that works under almost all environmental conditions. It is therefore likely that hearing evolved for detection of the acoustic scene (Fay and Popper, 2000) and that fish use sound to learn about their general environment, the presence of predators and prey, and, in many species, for acoustic communication. As a consequence, sound is important for fish survival, and anything that significantly impedes the ability of fish to detect a biologically relevant sound could decrease survival.

Intense sound can result in mortality, injury, and/or behavioral response. Generally, sounds in exceedance of 206 dB re 1 µPa (sound, expressed in decibels relative to one (1) micro-Pascal) are considered to be fatal to most fish species. This level of sound is rare and often required larger diameter steel piles, use of an impact hammer, and no sound attenuating devices (e.g., bubble curtains) to be produced. Of much greater concern from effects of pile driving and other intense sound sources with regard to fish is the potential for physiological effects that are not immediately lethal, but could ultimately lead to mortality. The potential physiological effects of pile driving on fish are highly diverse, and range from very small ruptures of capillaries in fins, which are not likely to have any impact on survival, to severe hemorrhaging of major organ systems, which could ultimately lead to death. Other potential effects include rupture of the swim bladder (the bubble of air in the abdominal cavity of most fish species that is involved in maintenance of buoyancy), barotraumas, and oscillations of the swim bladder (leading to nearby organ damage). In other words, an animal that has had physical or physiological damage may be less likely than an animal without damage to avoid a predator or find food.

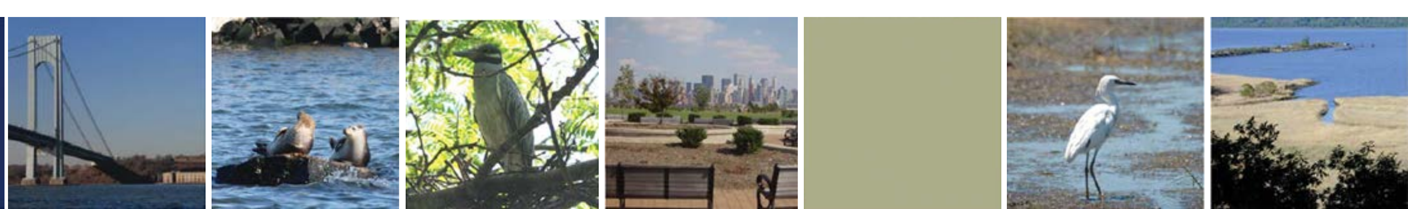
Sounds above RMS 150 dB are often associated with behavioral impacts. These impacts could range from a fish altering its course of travel to avoiding an area during construction.

6.3 Habitat Loss and Alteration

After construction activities cease, there would be some alterations to the benthic and open water column habitats of the planning regions. The impacted habitats are common in the HRE. Also, within the HRE, the impacted habitats do not contain spawning grounds, critical habitats, or important overwintering areas for endangered species. Many of the species that comprise a significant percent of the biomass of the lower Hudson estuary neither use the dredge footprint as a spawning ground or foraging areas. Finally, the TSP would actually result in positive effects to the benthic habit and open water column, primarily from increased acreage of oyster reefs and improved water quality through reduction of sedimentation and increase in wetlands.

Chapter 7: Analysis of Short-term and Long-term Impacts of the TSP

The expected environmental effects of implementing the TSP would be overwhelmingly beneficial to the flora, fauna, and public living within the HRE. Implementation of the TSP would result in a substantial first step to large-scale ecosystem restoration in the HRE. Also realized would be immediate positive benefits to water quality; habitat restoration and availability for a host of fauna, including anadromous



and catadromous species; and significant attempts to restore the eastern oyster (*Crassostrea virginica*), a once omnipresent keystone species in the HRE.

The restoration activities would result in some negative impacts to the environment. However, it is anticipated these impacts would be short-term and localized. All restoration activities would be performed in accordance with regulatory agency stipulations and contractors would employ BMPs at all times (e.g., use of silt curtains, adherence to sediment, and erosion control plans). Short-and long-term impacts are shown in Table 7-1.

7.1 EFH Species

The identified EFH species potentially could occur in the various planning areas. However, Atlantic cod, Atlantic salmon, blue shark, cobia, monkfish, and tiger shark are oceanic or deeper water species and likely would not be present. The other species could be present in the estuary and potentially in great numbers, especially during the warmer months of the year.

All of the 23 managed species identified in this assessment are highly motile species. It is anticipated that, during construction activities, if these species are present they would relocate to other habitats and/or be agile enough to avoid a deleterious interaction with construction-related equipment and vessels.

For fish that have designated EFH for eggs, the species with the greatest potential for impact is winter flounder, as this species, unlike the other species with designated EFH, have non-buoyant demersal eggs. This species also spawns in the shallow shoals where restoration work may occur. Winter flounder eggs were observed to be affected by thin layers of deposited sediments in laboratory conditions (Germano and Cary, 2005). Also, sediment deposits of 2.0 millimeters or greater over white perch eggs resulted in 100 percent mortality. Sediment deposition may have negative short-term impacts to adult and juvenile fish, due to benthic habitat alterations and as a result of reduced foraging opportunities.

Given the discrete portion of benthic habitat that may be disturbed, when compared to available habitat in the HRE, and coupled with the positive impacts of the TSP, direct physical impacts to the EFH designated species are anticipated to be very minor.

7.2 No Action Alternative

It is anticipated that under the no action alternative, water quality in the HRE, as well as finfish and shellfish habitats and nursery grounds, would continue to degrade and worsen. This outcome would result from hydrologic impairments, invasive species expansion, and continued compromised water quality, due to sediment suspension from shoreline erosion and stormwater runoff, and anthropogenic inputs, such as landfill leachate and illegal dumping.

7.3 Short Term Impacts

7.3.1 Water Quality

Under the TSP, habitat restoration and associated construction activities would cause short-term release or resuspension of sediments and a concomitant short-term increase in turbidity in waters near the restoration sites. Construction-related transport, storage, and handling of hydrocarbon fuels potentially could result in accidental spills and typically short-term, local water quality deterioration.

7.3.2 Shellfish and Benthic Habitat

The projects may have temporary impacts on local shellfish and benthic macroinvertebrate populations during construction, principally through an increase in sedimentation and turbidity. The filling of Fresh Creek will be timed to minimize impacts. By completing the filling of the basin during the summer, when dissolved oxygen levels are lowest, the number of motile species should be diminished as they would have migrated to better quality habitat. However, due to the poor habitat quality that exists and the low species numbers found at the sites during sampling, the impact is not expected to result in a significant loss of species and re-colonization is expected to begin quickly after completion of the construction and flourish under improved sediment and water quality.

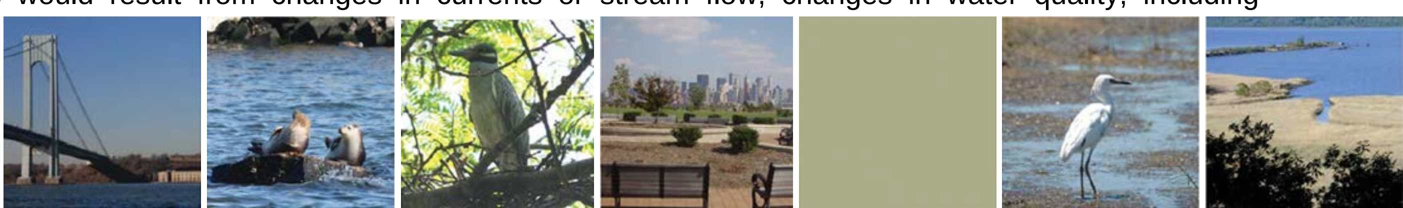
Construction associated with in-water and onshore restoration would result in short-term, negative impacts on shellfish, especially in aquatic areas designated for habitat conversion. Bivalves are slow-moving or sessile and would experience some degree of mortality or removal during construction in intertidal waters and subtidal shallows, and crab mortality and displacement likely would also occur during construction. Mortality of sessile and less motile species is expected on shellfish beds and habitats targeted for shoreline stabilization, filling for the expansion of wetlands or marsh island habitat, dredging, construction of instream structures, regrading, removal of remnant shoreline structures and debris, and oyster habitat creation or restoration. Likewise, areas designated for tidal channel and basin creation, bed restoration, or channel modification that would undergo dredging, filling, or regrading likely would experience some shellfish mortality. Onshore and in-water construction activities and dredging and soil deposition would cause short-term release or resuspension of sediments in nearby waters and a concomitant short-term increase in turbidity. This increase in turbidity and resuspension of sediments could have a short-term negative impact on shellfish (Wilber and Clarke, 2001; Knott et al., 2009). However, where benthic habitats suitable for shellfish are created or restored, and where existing shellfish habitat is not substantively changed or is restored, recovery of shellfish populations to levels that occurred prior to construction is expected to occur relatively rapidly.

7.3.3 Fish

Construction associated with in-water and onshore restoration would result in short-term, negative impacts to fish. Fish may be displaced due to noise, changes in currents or stream flow, and changes in water quality, including increases in turbidity from construction activities, in-water vessel movements and prop wash, and dredging. Suspension or resuspension of sediments or other materials may be injurious to fish, provide less suitable nursery habitats, or reduce hatching success and larvae development (Auld and Schubel, 1978; Wilber and Clarke, 2001; Bilkovic, 2011). Reduced water clarity can also affect fish by interfering with their ability to feed or by changing the composition of prey species (Newcombe and MacDonald, 1991). Short-term, negative impacts to fish and fish populations also would occur if construction activities deterred fish from using essential migratory pathways, breeding, foraging, or seeking shelter from predators. However, under the TSP, construction effects would have only short-term, localized influence and fish and managed EFH species would return to the area shortly after the cessation of construction activities. These short-term adverse effects would be outweighed by substantive long-term benefits.

7.3.4 Threatened and Endangered Species

In the short term, construction associated with implementation of the TSP potentially could displace or disturb rare, threatened, and endangered species on or in the vicinity of the restoration sites. Such effects would result from changes in currents or stream flow, changes in water quality, including



increases in turbidity, and construction-related noise Disruptions to marine wildlife are expected to be insignificant and short-term during construction, and BMPs would be employed to minimize impacts from suspended sediments. If construction activities are determined to make the water habitat unsuitable for wildlife, the use of timing restrictions or noise attenuating tools will be implemented. No threatened and/or endangered marine species were identified in the Newark Bay, Hackensack River, and Passaic River Planning Region.

7.4 Long Term Impacts

7.4.1 Water Quality

In the long term, creating or restoring wetlands and maritime or riparian forest, armoring and stabilizing shorelines, and establishing oyster habitat would improve water quality and provide nutrient removal and denitrification services. The restored habitats would reduce long-term turbidity by filtering and retaining stormwater runoff, providing storm surge and flood buffering, attenuating waves, and thereby reducing shoreline erosion. Improved tidal flushing and reduced water residency time, due to creating or restoring tidal channels and basins, would increase dissolved oxygen levels and reduce fecal coliform levels (Portnoy and Allen, 2006). Restored wetlands likewise would improve tidal flushing and increase dissolved oxygen levels. Groundwater resources may also benefit from restored wetlands, as wetlands filter pollutants moving between surface water and groundwater.

Establishing oyster habitat would improve water quality and provide nutrient removal and denitrification services. As filter feeders, oysters filter large quantities of organic particulates, including phytoplankton, from the water column. At high densities, oysters can filter large volumes of water, which can modify biogeochemical cycles and improve water quality in the surrounding environment. Filtered seston is digested and utilized for growth and maintenance of the organism, or is deposited by the organism on the sediment surface as feces (Dame and Patten, 1981; Bayne and Newell, 2013; Hadley et al., 2005; Kellogg et al., 2013). This removal and deposition of organic material can act as a buffer against eutrophication by removing nitrogen, carbon, and phosphorous from the water column, and depositing it in the sediment, where it becomes buried. Removal of seston reduces water turbidity, and reduces water concentrations of nitrogen, phosphorous, and organic carbon. Each of these factors is often elevated in waters adjacent to urban areas, such as the HRE. The organic molecules are digested and deposited, rather than settling to decay, which can cause oxygen debt and, in extreme conditions, anoxia. Removal of seston and nutrients from the water column eases the oxygen debt of the water.

Oyster habitat established under the TSP also would reduce turbidity, by mitigating shoreline erosion and filtering suspended solids and phytoplankton (Meyer et al., 1997; Coen et al., 2007; Scypher et al., 2011). The resulting reduction in turbidity under the TSP would provide long-term habitat enhancement for shellfish and fish communities, and aquatic vegetation (Cahoon et al., 1999; Paul and Meyer, 2001; Steinberg et al., 2004).

7.4.2 Shellfish and Benthic Habitat

Wetlands restoration would improve long-term water quality in the bays and rivers and, therefore, would provide enhanced environments for shellfish and fish communities. Tidal channel and basin creation or restoration would improve tidal flushing, and bed restoration and channel modification, by restoring river and stream channels, pools, and riffles, would help reestablish beneficial flow regimes. These improvements would contribute to improved habitat for shellfish (Portnoy and Allen, 2006). Also in the long term, oyster restoration would provide suitable habitat for other shellfish species (Steimle and Zetlin, 2000; Peterson et al., 2003; Scyphers et al., 2011). Increases in intertidal and subtidal habitat acreage, establishment of native tidal wetland vegetation, improved tidal connectivity and flushing, and improved sediment and water quality would result in a more diverse and abundant shellfish resource.

7.4.3 Fish

Wetland habitat restoration in HRE would directly benefit multiple life stages of resident, transient, and migratory fish species, by providing foraging, spawning, nursery, and refuge habitat. Creation of tidal channels and basin re-contouring would improve tidal flushing and restore natural salinity regimes, and bed restoration and channel modificationwould help reestablish beneficial flow regimes, which would contribute to an improved habitat for fish (Dibble and Meyerson, 2012). Shoreline stabilization would reduce long-term turbidity levels by reducing shoreline erosion. In the Bronx River, installing fish ladders and modifying weirs for fish passage would enhance the connectivity of the waterway and enable fish migration.

Oyster restoration would provide beneficial fish habitat (Grabowski and Peterson, 2007; Peterson et al., 2003; Scyphers et al., 2011). Oyster establishment and growth creates three-dimensional reefs, providing habitat for large numbers of species, including fish (Kellogg et al., 2013). Additionally, establishment of oyster reefs would provide water filtration and an attendant reduction in turbidity (Coen et al., 2007) and larval, juvenile, and adult oysters would provide a prey resource for many fish species, which would provide long-term benefits to fish.

7.4.4 Threatened and Endangered Species

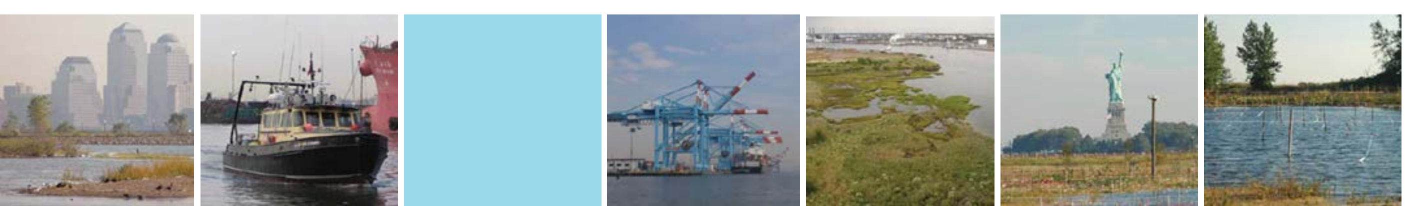
In the long term, implementation of the TSP would benefit rare, threatened, and endangered species, as the restoration measures would provide substantial improvement to estuarine, near-shore, and terrestrial habitats for marine threatened and endangered species in the HRE.

7.5 Conclusions – Analysis of Effects – EFH

With respect to EFH, construction activities under the TSP would employ BMPs to reduce construction impacts. A minor increase in turbidity and sedimentation would be generated by the proposed construction activities. If eggs and larvae are present during construction, they could be affected. During the construction period, adult and juvenile fish would leave the area of construction and move to nearby suitable locations outside the area of disturbance. Also, for a short period of time after construction, there would be a reduction in benthic organisms immediately adjacent to the in-water construction footprint; however, this area would be recolonized quickly. In the long term, due to marsh island and tidal channel restoration, and shoreline armoring, adverse effects would result from the removal of water column and benthic EFH. These impacts would occur over comparatively small, discrete areas and would not adversely impact local water flow and circulation. Therefore, implementation of the TSP may adversely affect EFH, but likely would result in minimal adverse effects as the resulting changes to EFH and its ecological functions would be relatively small and insignificant. On balance, however, it is anticipated that ecosystem restoration would result in long-term, net benefits to managed species (all life stages), associated species, and EFH. Moreover, removal of barriers to fish passage, through installing fish ladders and modifying weirs, would increase the habitat available to diadromous fish that use the Bronx River.

Table 7-1: Short-term and Long-term Impacts of the TSP

Planning Regions:	**Jamaica Bay**			**Harlem River, East River, and Western Long Island**			**Newark Bay, Hackensack River, and Passaic River**		**Upper and Lower Bays**
Restoration Type:	Estuarine Habitat	Marsh Island	Small Scale Oyster	Estuarine Habitat	Freshwater Riverine Habitat	Small Scale Oyster	Estuarine Habitat	Freshwater Riverine Habitat	Small Scale Oyster
Short-Term Impacts:									
Release or resuspension of sediments	X	X	X	X	X	X	X	X	X
Increase in turbidity	X	X	X	X	X	X	X	X	X
Potential accidental spill of construction-related fuels	X	X	X	X	X	X	X	X	X
Fish displacement from noise or water quality due to construction activities	X	X	X	X	X	X	X	X	X
Shellfish or benthic mortality during construction	X	X	X	X	X	X	X	X	X
Long-Term Impacts:									
Improved water quality through nutrient removal and denitrification services	X	X	X	X	X	X	X	X	X
Filtering and retention of stormwater runoff	X	X		X	X		X	X	
Buffering of storm surge and flood waters	X	X	X	X	X	X	X	X	X
Wave attenuation	X	X	X	X		X	X		X
Reduced shoreline erosion	X	X	X	X	X	X	X	X	X
Improved tidal flushing and reduced residency time	X	X		X			X		
Increased dissolved oxygen levels	X	X		X	X		X	X	
Reduced fecal coliform levels	X	X		X	X		X	X	
Additional forage, spawning, nursery and refuge habitat	X	X	X	X	X	X	X	X	X
Reduced turbidity by filtering suspended solids and phytoplankton			X			X			X
Improved fish migration with fish ladders and modified weirs								X	



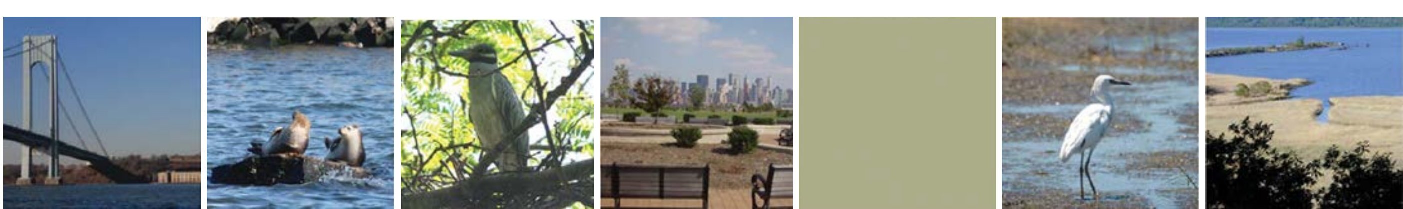
Chapter 8: **Cumulative Impacts**

For the purpose of this analysis, only actions with potential effects on the environment that are fundamentally similar to the anticipated effects of the TSP, in terms of the nature of the effects, the geographical area affected, and the timing of the effects were evaluated.

This cumulative effects analysis covers actions from the recent past through the 50-year planning period; assuming the proposed project is expected to be operational in 2020, the planning period of analysis is 2020 to 2070. The geographical action area, or region of influence, for this analysis comprises the Hudson-Raritan Estuary (HRE), including the following five (5) planning regions in which the TSP restoration sites are located:

- Jamaica Bay;
- Lower Bay;
- Newark Bay, Hackensack River, and Passaic River;
- Harlem River, East River, and Western Long Island Sound; and
- Upper Bay.

In review of known literature and government agency documents and websites, no known large-scale harbor wide developments were identified. Several actions are occurring along the coast, namely recovery projects developed in the aftermath of hurricane Sandy, waterfront revitalization plans, and continued improvements in sewer and waste water infrastructure. The improvements brought about by these actions would work in synergy with the proposed restoration in the HRE to uplift its ecology and the EFH in the region.



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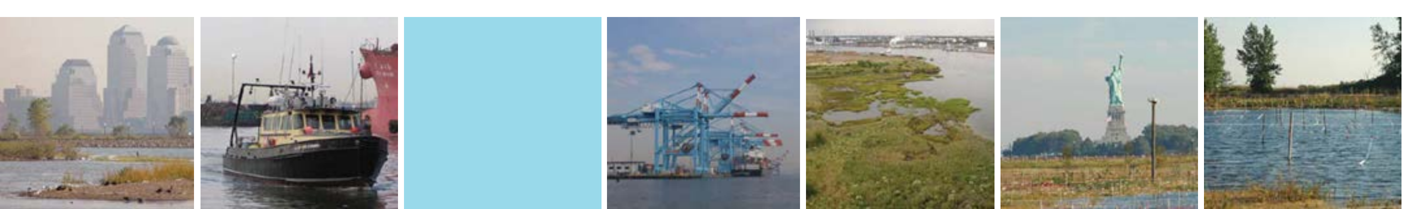

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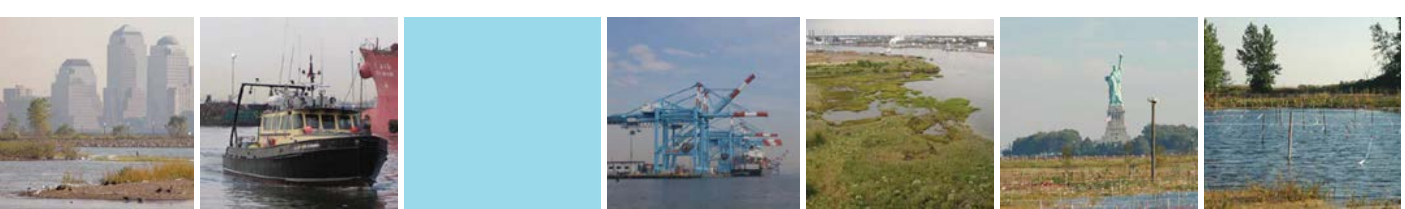

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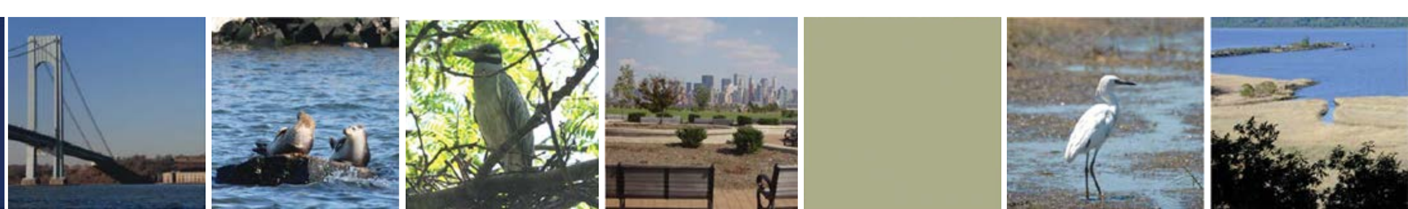

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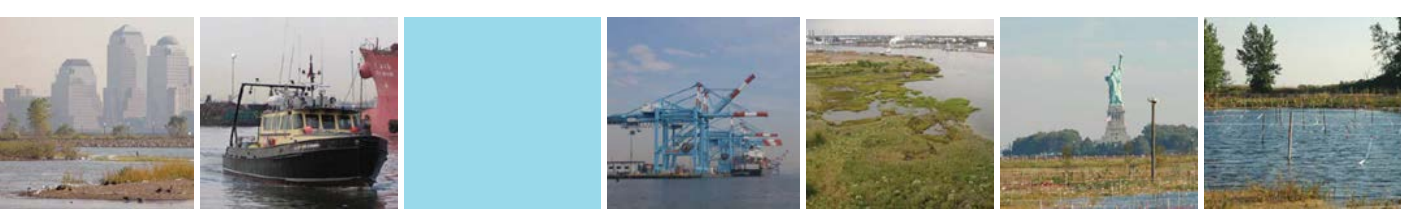

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Appendix F4:

Federal Aviation Administration Coordination

U.S. Department
of Transportation
**Federal Aviation
Administration**

Eastern Region, Airports Division

February 25, 2019

Mr. Peter Weppler
Department of the Army
U.S. Army Corps of Engineers, New York District
Jacob K. Javits Federal Building
26 Federal Plaza
New York, NY 10278-0090

Re: Proposed Hudson-Raritan Estuary (HRE) Ecosystem Final Integrated Feasibility Report and Environmental Assessment (Final FR/EA) for Study

Dear Mr. Weppler:

Thank you for bringing the FAA onboard this project in reference to the proposed Hudson-Raritan Estuary Ecosystem Feasibility Report and Environmental Assessment.

The staff at the Eastern Region, Safety and Standards Branch and the FAA's Wildlife Biologist in Washington DC, have reviewed the project recommendation, maps, site level features, and coordination plan, and have no major wildlife concerns with the project. Please work closely with the Port Authority of New York and New Jersey to ensure all their concerns are addressed.

Please continue to keep us up to date on the progress of the project. You can contact me anytime via email at frank.loprano@faa.gov or call 718-553-2543.

Sincerely,

Frank J. Loprano

Frank J. Loprano
Airport Certification Safety Inspector
Safety and Standards Branch
Airports Division

cc: AEA-610
NYADO
AAS-300
PANYNJ

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

Environmental Analysis Branch

November 19, 2018

Mr. Frank Loprano
Airport Certification Safety Inspector
Safety & Standards Branch, Airport Division
Federal Aviation Administration
159-30 Rockaway Boulevard
Jamaica, NY 11434

Dear Mr. Loprano,

Thank you to you and your colleagues on the recent consultation on the Hudson-Raritan Estuary (HRE) Ecosystem Restoration Study that occurred on September 6, 2018. The U.S. Army Corps of Engineers, New York District (District) is completing the Final Integrated Feasibility Report and Environmental Assessment (Final FR/EA) for Study. The District appreciated the opportunity to brief the FAA on the recommended plan and path forward to continued coordination. As determined in the meeting, the District is submitting the following documents to aid in your review:

- Synopsis of project level recommendation, site level features, and overview of coordination plan.
- Additional maps showing site perimeters, approach and departure airspace, surrounding habitat, and previously built marsh islands.

The District is currently working on site level plans for the Flushing Creek and Bay Ecosystem Restoration Project, this project is within the vicinity of LaGuardia Airport and will be included in the overall recommendation. The District will provide site level plans for this site as they become available.

As discussed, in order to satisfy our agency requirements, the District is required to obtain a formal concurrence from your agency upon completion of the study's coordination. The District appreciates your willingness to oversee this project for the three major international airports in the study area: LaGuardia, JFK, and Newark.

The study team looks forward to working closely with the FAA as detailed plans are developed in the Pre- construction Engineering and Design Phase. If you require any additional information, please contact Diana Kohtio of my staff at 917-790-8619.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

ENCL 1: Initial Coordination- HRE Site Level Features
CF: Francoeur, Laura, PANYNJ

HUDSON RARITAN ESTUARY ECOSYSTEM RESTORATION PROJECT

INITIAL COORDINATION

FEDERAL AVIATION ADMINISTRATION

US Army Corps of Engineers

New York District

NOVEMBER 2018

Contents

Project Level Recommendation-

The Hudson Raritan Estuary (HRE) Ecosystem Restoration Feasibility Report and Environmental Assessment provides a regional, comprehensive restoration plan to restore the HRE.

It is the culmination of decades of restoration and planning efforts by federal and state natural resource agencies, academic institutions, and non-governmental organizations.

The proposed plan will provide an opportunity to address the long-term degradation of the estuary and it provides for the restoration of coastal and freshwater wetlands, riparian habitat, oyster reefs, coastal and maritime forests, and fish passageways across 8 planning regions.

The Draft Feasibility Report includes the recommendation for the restoration of up to 33 sites

Site Level Features-

In accordance with the Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B and the Memorandum of Agreement with FAA to address aircraft-wildlife strikes, when considering proposed flood risk management measures, mitigation and restoration areas, the Corps must take into account whether the proposed action could increase wildlife hazards.

The closest airports to the study area that must comply with these standards are the LaGuardia and John F. Kennedy International Airports in Queens County, New York and Newark International Airport, Newark, New Jersey. To ensure to minimize the potential impacts there may be on the above referenced airports, the District used input FAA staff has provided to the District in the past in the selection and designing of the restoration sites.

The following section reviews the site level features of the recommended projects within FAA Perimeter Separation Criteria- a five mile range of airports to protect approach, departure, and circling airspace.

Jamaica Bay Planning Region- Marsh Islands

The Tentatively Selected Plan (TSP) recommendation at five marsh island sites is based on lessons learned and cost-effectiveness evaluations to develop the optimal marsh island size and design. The marsh island designs also considered Relative Sea Level Change (RSLC) projections in order to maximize sustainability and ecosystem benefits in the future. The District has already constructed and coordinated with FAA on Elders East and West, Yellow and Rulers Bar. The governing constraints used in the design development for each recommended plan are provided below and relate to the lessons learned:

- Minimum restoration area/volume: a minimum area for each site was defined based on the cost constraints of mobilization and demobilization (mob/demob) and the ratio of mob/demob to the overall project cost such that the cost of mob/demob is estimated to be less than 30 percent. Of the project costs, placement of this minimum area, and to a lesser extent the size of this minimum area, was informed by the location of the highest existing condition elevations and vegetation, the 1974 footprint, and the historic configuration of the marsh island footprint as indicted by historic aerial photography.
- Maximum restoration area: A maximum area for each site was delineated based on existing condition contours. Restoration beyond this contour represents a break point where the per-acre cost of restoration increases considerably. This constraint was well defined at some sites and less so at others and is discussed in detail in the site summaries provided below.

- Sustainability: This constraint consists of a number of related factors including the configuration of the selected plan which is constrained by minimum widths, contiguity, proximity to relatively high velocity currents, and existing channels.

Stony Creek-

The existing condition remnant marsh found at Stony Creek Marsh Island is well defined and characterized by relatively high elevations, much like its neighbor Yellow Bar Hassock marsh. The existing marsh is approximately 34 acres.

In the no-action alternative, erosion at Stony Creek marsh would likely continue, though the relatively high elevations may provide better short-to-medium term protection than the remaining Jamaica Bay marsh islands as whole. Geographic Information System analysis estimates that in1974, the marsh island had an area of approximately 84 acres. Almost 60 percent of the marsh island has been lost in the past 42 years. As with the other marsh islands, it is in danger of sea level rise, continued water quality stressors, and habitat fragmentation.

The minimum restoration area approximately coincides with the +2-foot North American Vertical Datum of 1988 (NAVD88) elevation contour, which coincides with the well-defined existing footprint of this marsh island, and encompasses an area of 34 acres. The maximum restoration area coincides with the -1-foot NAVD88 contour and encompasses an area of 72 acres.

The Tentatively Selected Plan (TSP) and these boundaries are shown in Figure 1. The TSP restores approximately 51 acres of marsh, with a total of 70 acres of regrading. The TSP is approximately midway between the maximum and minimum boundary. In this case, the actual acres of marsh restored can easily be increased or decreased by approximately 20 percent with only a marginal decrease in efficiency. The maximum boundary in this instance is not well defined; the slope from the island to offshore is relatively consistent. The maximum area is however also constrained by the area of 1974 footprint, which encompasses a total area of approximately 95 acres total and a land area of approximately 85 acres. A total restoration area closer to the minimum boundary of 34 acres is not recommended as this will result in an unacceptably high ratio of mobilization/demobilization costs to the total cost.

The TSP for Stony Creek marsh represents the most efficient effort of the five (5) marsh island restorations, with an average of 2,970 cubic yards of material needed per acre of marshland restoration. Sustainability issues for this effort are negligible, with the exception of the proximity of Horse Channel along the southeastern boundary of the site. This plan includes the creation of 26 acres of low marsh, 25.3 acres of high marsh, and five (5) tidal channels that, together, will provide both aquatic and wetland habitat. The proposed alternative also incorporates a minimal amount of scrub/shrub habitat, which will provide habitat diversity for the vegetation and wildlife on the island.

Pumpkin Patch East-

Marsh loss at Pumpkin Patch as a whole is approximately 1.3 acres per year between 1974 and 1994, with variation up to 2.5 acres per year between 2003 and 2005. In the no-action alternative, it is feasible that Pumpkin Patch East could disappear altogether.

Site specific planning constraints include:

- Existing bathymetry for sustainable sand placement; and
- NYSDEC regulatory footprint of marsh islands in 1974.

Restoration at Pumpkin Patch initially focused on the restoration of a single large island that would encompass Pumpkin Patch West, Pumpkin Patch East and an area further to the east.

The selected plans recommend two (2) separate restoration projects, Pumpkin Patch West and Pumpkin Patch East. Restoration in the area between these two (2) sites and to the east of Pumpkin Patch is not presently recommended due to concerns over sustainability and to the amount of material that would be needed to restore these areas. A future restoration of the area between these two (2) selected plans may be considered after the restoration of Elders Point Center which may have a positive effect on sediment transport and sustainability in this area and could be investigated using hydrodynamic modeling.

The minimum restoration area for Pumpkin Patch East coincides with the -2-foot NAVD88 elevation contour and encompasses an area of 22 acres. The maximum restoration area coincides with the -3-foot NAVD88 contour and encompasses an area of 52 acres. Existing condition depths are greater in this location when compared to marsh islands such as Yellow Bar Hassock and Stony Creek marsh, resulting in a significantly greater amount of material per acre needed for restoration. The recommended extent is based on the need to restore an area judged to be sustainable while containing project costs by staying within the higher elevations available at the site. Put another way, restoration to the -2-foot NAVD88 contour would compromise the overall sustainability of the restoration effort while a full build-out to the -3-foot NAVD88 contour would need increasingly greater material to restore the additional acreage beyond the recommended plan. The extent is also informed by the 1974 footprint, which served as a constraint, particularly along the western edge, contributing to concerns of erosion and sustainability.

The TSP (Figure 2) restores a total of 35 acres of salt marsh with a total of 52 acres to be graded. This restoration includes 18.6 acres of low marsh, 16.8 acres of high marsh, and six (6) tidal channels. The marsh island will provide significantly more wetland habitat than exists currently, especially when considered with the sister marsh island, Pumpkin Patch West. The restoration of these neighboring marsh islands reduces habitat fragmentation in the area.

Pumpkin Patch West-

Pumpkin Patch West is currently approximately four (4) acres. The average loss rate for Pumpkin Patch as a whole is approximately 1.3 acres per year, with variation up to 2.5 acres per year between 2003 and 2005. In the no-action alternative, it is feasible that Pumpkin Patch West could disappear altogether.

Site specific planning constraints include:

- Existing bathymetry for sustainable sand placement;
- NYSDEC regulatory footprint of marsh islands in 1974; and
- High erosion in portions of the site.

The governing constraint at this site is the minimum area judged necessary to achieve sustainability as well as the exiting condition bathymetry of the site. The minimum area coincides with -3-foot NAVD88 elevation contour and encompasses an area of 20 acres. Using this as a basis, the recommended plan was enlarged somewhat to better coincide with the 1974 footprint. A maximum restoration area was not delineated for Pumpkin Patch West as it was clearly evident that the only other option here would be to restore the area between Pumpkin Patch East and Pumpkin Patch West. Doing so would greatly increase the amount of material needed and was judged to be an inefficient approach given the evidence of high erosion in this area.

The TSP for Pumpkin Patch West (Figure 3) restores a total of 16.3 acres of salt marsh with a total of 30 acres to be graded. This includes 10.8 acres of low marsh and 5.5 acres of high marsh, returning this portion of Pumpkin Patch Marsh to the approximate dimensions of the 1974 footprint. As noted above, the area between Pumpkin Patch East and Pumpkin Patch

West may be a candidate for restoration, but should be considered only after the restoration of Elders Point Center and an investigation of the altered hydrodynamics of this area.

Duck Point with Atoll Terrace Restoration-

The existing elevations at Duck Point represent approximately 17 acres, more than half of which are at the lower end of the low marsh range. Duck Point has experienced a high rate of marsh loss at approximately 2.8 acres per year between 1974 and 1994. In the no-action alternative, this loss would continue and Duck Point would disappear over time.

Site specific planning constraints include:

- Existing bathymetry; and
- NYSDEC regulatory footprint from 1974.

Due to the relatively high elevations here, the governing constraint at this site is the maximum recommended restoration area. The minimum recommended restoration area coincides with the +1-foot NAVD88 elevation contour and encompasses an area of 19 acres. The maximum recommended restoration area coincides with the -1-foot NAVD88 elevation contour and encompasses an area of 42 acres.

In this instance, the TSP coincides with the maximum recommended restoration area and largely conforms to the 1974 footprint. The only modification made was to widen the center bar that connects the two (2) lobes of this marsh island so as to promote sustainability. This maximum buildout alternative is recommended due to the well-defined nature of this restoration site. The recommended plan for marsh restoration at Duck Point marsh (Figure 4) restores a total of 27.9 acres of salt marsh with a total of 41.5 acres to be graded. Of the 27.9 acres to be restored, 15.4 acres are low marsh and 12.5 acres are high marsh. Much like Stony Creek marsh, this represents an efficient restoration with a relatively small amount of cubic yards of material per acre of restoration.

The marsh restoration at Duck Point marsh is paired with the placement of a nine (9) acre atoll terrace, which is a targeted sand placement feature that resembles a vegetated berm. Extensive research on these features has been conducted by the Structures of Coastal Resilience project at the City University of New York. The theory behind the atoll terrace is that harnessing the natural wind and wave processes in Jamaica Bay will promote a continual cycle of recruiting additional material from the bay and then redistributing it, potentially strengthening the marsh's resilience to erosion over time. The atoll is placed in such a manner to capture sediment transported during both times of flood and ebb tide. The atoll terrace is a linking component in the system of completed and recommended projects within this area of Jamaica Bay.

Elders Point Center-

Elders Point Marsh was historically one (1) island but marsh loss in the center of the island created two (2) distinct islands separated by a mud flat. When the restoration of Elders Point East and Elders Point West were planned and implemented, it was infeasible to restore Elders Point Center based on the depth of the substrate in that area. The restoration was limited to an increase in size of 40 acres of new marsh at Elders Point East (2007) and 43 acres of new marsh at Elders Point West (2010). Presently, no marsh island exists above water between the two (2) islands and Elders Point Center would not exist in the no-action alternative.

However, following the implementation of restoration at Elders Point East (2007) and Elders Point West (2010), sediment has accumulated in the area of Elders Point Center, which has made restoration feasible and cost-effective. The creation of Elders Point Center will result in a continuous marsh island between Elders Point East and Elders Point West, adding benefits such as reduction in habitat fragmentation and the potential for ancillary coastal storm reduction benefits for nearby mainland communities such as Howard Beach.

The TSP at Elders Point Center restores 16 acres of salt marsh with a total of 33.6 acres of graded area (Figure 5). Of that, 8.5 acres are high marsh and 7.5 acres are low marsh. The design of the TSP is constrained by the presence of Elders Point East and Elders Point West, two (2) previous restoration projects and by the increasing depths found to the north and the south. As these conditions represent the governing constraints, no minimum or maximum recommended restoration areas were developed. The actual acres of marsh restored can easily be increased or decreased by approximately 20 percent with only a marginal decrease in efficiency at this site.

The restoration of Elders Point Center results in a contiguous Elders Point marsh island, much like it existed in pre-industrial times. This is especially promising, as the effort adds to the 83 acres already restored at Elders Point East and Elders Point West. As detailed in the Elders Point East monitoring report, Elders Point East is projected to match the reference marsh conditions. This progression bodes well for the future of Elders Point Center, as it will already have an ecological community on the adjacent marsh islands. A particularly salient point about Elders Point East is that it hosts egg-laying horseshoe crabs, whose eggs are an important source of food for migratory birds along the Atlantic Flyway.

Jamaica Bay Planning Region- Perimeter Sites

This Planning Region focus on sites along the perimeter of the Jamaica Bay and emphasize ecosystem restoration activities that involve modification of hydrology and/or aquatic habitat. Habitats targeted include wetlands, riparian and other aquatic systems, but also include adjacent maritime forest and grasslands as appropriate.

One (1) Jamaica Bay Perimeter site falls within the five (5) mile range of JFK International Airport.

Brant Point-

The Tentatively Selected Plan at Brant Point would restore 1.9 acres of low marsh and 0.7 acres of high marsh and associated habitats, as well as approximately 2.4 acres of coastal and maritime forest. The alternative also would create approximately 2.5 acres of meadow, or grasslands, and protect already existing marsh habitat present at the site. The TSP would maximize habitat protection by implementing a training structure along the north shores. These shorelines are currently exposed to high wave forces from Jamaica Bay and existing protective measures are beginning to fail. The TSP for the Brant Point restoration site is shown in Figure 6.

The absence of restoration work would lead to continued wetland loss due to erosion and illegal dumping and filling at the site. In addition, further upland areas would continue to reduce the expansion of the invasive and non-native habitat species. The restoration at the site would improve the habitat conditions, prevent erosion, and prevent illegal dumping with proper signage.

The East Rockaway Inlet to Rockaway Inlet and Jamaica Bay Reformulation Study included a suggestion for the potential modification of the design to replace some habitat along the inland perimeter (southern and eastern) of the site with a hardened CSRM measure, such as a floodwall. If this were to be implemented, the floodwall would be implemented by the non-federal sponsor at 100% cost.

The District does not anticipate an increase in hazardous wildlife above existing, as a result of this project. Further, habitat exchange from Phragmites to native habitat coupled with prevention of illegal dumping may decrease attractants to hazardous wildlife.

Oyster Restoration-

The HRE Ecosystem Restoration Feasibility Report and Environmental Assessment includes recommendations for three oyster restoration projects for near-term construction; one (1) proposed reef falls within the five (5) mile range of JFK International Airport.

Previous studies conducted by NYCDEP, in Jamaica Bay, demonstrated adequate conditions for survivability and laid the groundwork for the feasibility level conceptual plans and techniques recommended in the current project.

Jamaica Bay Head of Bay-

One of the proposed restoration sites is located within the Head of Bay, in somewhat quiescent waters of Jamaica Bay. Hydrodynamic modeling showed that the water currents at this site are very conducive to oyster larvae transport and settlement. The proposed restoration method is designed to act in concert with an identical effort by NYCDEP that occurred in 2016. The Tentatively Selected Plan will include the placement of approximately 0.4 acres of receiving beds made of suitable hard substrate and 200 one (1) foot by five (5) feet floating oyster bags. As such, there is a high likelihood of larval resettlement and beginning of an oyster reef. Hanging trays and various recruitment beds will be placed in the Head of Bay as part of the oyster restoration methods (Figure 7).

Bathymetric design features for oyster reefs that have been constructed within the HRE recently place the height of constructed reefs at least one (1) foot below mean low water; within ranges to provide adequate tidal flow and sufficient water column dissolved oxygen, and at elevations that help to prevent poaching (i.e., as deep as possible but well within range of oyster life requirements). Water depths in the head of Jamaica Bay are fairly deep, up to 33 feet deep. Salt marsh habitat fringes much of the shoreline area. The bottom is steeply sloped close to the shoreline, as depths of over 25 feet are located within 100 feet of the shoreline in many areas. The proposed oyster reef at Head of Bay will be completely submerged in a location that is several hundred feet from the shoreline (Figure 8); therefore, the District does not anticipate that this restoration project will serve as a wildlife attractant of concern to the Federal Aviation Administration.

Lower Passaic River and Hackensack River Planning Region-

The study area includes the lower 17 miles of the Lower Passaic River from Newark Bay to the Dundee Dam including tributaries Saddle River, Second River and Third River. The restoration planning within the area was conducted in coordination with the Superfund Program including shared data collection efforts informing site selection.

Projects in this planning region were divided into two site groupings (Tier 1 and Tier 2 [Deferred]) based on the timing and location of USEPA remedial actions. Significant data collection during the coordinated Remedial Investigation/ Feasibility Study was utilized to inform the restoration planning effort. Sites were screened in coordination with NJDEP, other partner agencies, Community Advisory Group (CAG) and a design charette with NJDEP and NOAA (June 2015).

The USEPA released the Record of Decision (ROD) for the cleanup of the lower 8.2 miles of the River in April, 2016. In September 2016, USEPA and Occidental Chemical entered into an agreement to prepare the remedial design for cleanup of the lower 8.2 miles of the Passaic to be conducted over four years. Following design, construction is expected to take approximately six (6) years to complete and is estimated at $1.38 billion.

Two (2) projects in the planning region are within the five (5) mile range of Newark Liberty International Airport, Kearny Point and Oak Island Yards. Both recommended projects are Tier 2 sites would be implemented following completion of the remedial action.

Kearny Point-

Restoration measures included in the Tentatively Selected Plan for Kearny Point are emergent wetland enhancement and creation, forested wetland creation, tidal channel creation, fish habitat creation and enhancement, bank stabilization and softening upland forest creation and enhancement, and public access and enhancement measures (Figure 9). This alternative was selected because it provides the greatest increase in wetland functional uplift. Wetland creation would provide flood storage and water quality improvement, and the creation of tidal channels would provide tidal flushing as well as new fish habitat.

Oak Island Yards-

The TSP for Oak Island Yards entails emergent wetland enhancement and creation, forested wetland creation, tidal channel creation, fish habitat creation and enhancement, bank stabilization, and public access and enhancement measures, results in the highest wetland functional uplift (Figure 10). Restoration would provide improved flood storage as well as nutrient and toxicant filtration which would help improve water quality. Creation of tidal channels would provide wetland flushing and outwelling of organic nutrients and detritus as well as provide fish habitat.

Due to the deferred status of the sites in this planning region (minimum of 8 years remaining on EPA actions); the District requests that the proposed site specific coordination (below) be deferred until design efforts are underway.

Proposed Coordination Plan-

The HRE Ecosystem Restoration Feasibility Study and Environmental Assessment is recommending nine (9) projects for construction that are within the Perimeter C, Minimum Separation Criteria for land-use practices that attract hazardous wildlife to the vicinity of John F. Kennedy and Newark Liberty International Airports.

To ensure to minimize the potential impacts there may be on the above referenced airports, the District used valuable input FAA staff has provided to the District in the past in the selection and designing of the restoration sites, specifically the constructed marsh island sites (Elders East, Elders West and Yellow Bar). Those islands were designed to marsh habitat only, to avoid the potential for creating roosting or nesting habitats that may attract large groups of island nesting birds. Based on previous assessments, design guidance, and proximity to AOA, the District does not feel that a Wildlife Hazard Assessment is warranted in the case of the above referenced proposed restoration sites. The District suggests that potential wildlife hazards be mitigated for by continued coordination with FAA throughout design, construction, monitoring, and long term maintenance periods of the projects.

More specifically, the District recommends the following coordination plan to ensure that the proposed ecosystem restoration activities do not impact airport operations.

Initial Coordination-

The District conducted an initial meeting with FAA staff on September 6th 2018. During this meeting the District team provided an overview presentation covering the HRE Project and proposed path forward to continued coordination.

This document serves as a follow up to that initial meeting and provides the project level recommendation, site level features, and overview of the proposed coordination plan. Additional maps showing site perimeters, approach and departure airspace, surrounding habitat, and previously built marsh islands are also provided (Appendix B) so that FAA can visualize the site level recommendations in the context of the regional landscape.

Following review of this document and any further materials requested by FAA, the District requests a response of concurrence with the coordination plan.

Coordination during Pre Engineering and Design Phase-

The District requests close coordination with FAA through review of the Plans and Specifications for Planting, Seeding, and Environmental Protection. Specifically, the District will seek input on the planting palette, seed mix, and herbivore protection protocol.

Input and review of Monitoring/Adaptive Management Plan and a long-term Operations and Maintenance Plan-

When conducting a feasibility study for a project under the ecosystem restoration mission, the USACE is required to create a monitoring and adaptive management plan to measure the success of the ecosystem restoration and to dictate the direction adaptive management should proceed, if needed. The monitoring and adaptive management plan includes a description of the monitoring activities, the criteria for success, and the estimated cost and duration of the monitoring. The Operations and Maintenance (O&M) Plan is formulated plan to guide maintenance of the project through its projected life span. The O&M Plan is created in collaboration with the Non-Federal Sponsor and provides maintenance guidance through the project life cycle.

The District requests close coordination with FAA through creation of these documents for input on invasive species management and an O&M plan for protection from hazardous wildlife.

Appendix A- Site Level Features

Table 1. Hudson Raritan Estuary (HRE) Ecosystem Restoration Feasibility Study Recommended Plan

Site	Proposed Habitat Types and Actions (Acres/Linear Feet)	Non-Federal Sponsor
Jamaica Bay Planning Region - Perimeter Sites		
Brant Point	Low Marsh (1.9 acres); High Marsh (0.7 acres); Maritime Forest (2.4 acres); Meadow Restoration (2.5 acres) [Total Habitat: 7.5 acres]	NYCDEP, NYC Parks, NYSDEC
Jamaica Bay Planning Region - Marsh Islands		
Elders Center Marsh Island	Low marsh (15.2 acres); High Marsh (10.9 acres); Scrub/Shrub (1.4 acres)= Total Marsh Island Creation (27.5 acres)/total Footprint (41.7 acres) using 284,891 CYD of dredge material	NYSDEC, NYCDEP
Duck Point Marsh Island	Low marsh (22.5 acres); High Marsh (14.3 acres); Scrub/Shrub (2.2 acres)= Total Marsh Island Creation (39 acres)/total Footprint (62.6 acres) using 213,776 CYD of dredge material	NYSDEC, NYCDEP
Pumpkin Patch-East Marsh Island	Low marsh (15.6 acres); High Marsh (10.1 acres); Scrub/Shrub (3.1 acres)= Total Marsh Island Creation (28.8 acres)/total Footprint (40.5 acres) using 351,952 CYD of dredge material	NYSDEC, NYCDEP
Pumpkin Patch-West Marsh Island	Low marsh (13.7 acres); High Marsh (8.6 acres); Scrub/Shrub (.9 acres)= Total Marsh Island Creation (23.2 acres)/total Footprint (32.9 acres) using 327,686 CYD of dredge material	NYSDEC, NYCDEP
Stony Point Marsh Island	Low marsh (26 acres); High Marsh (22.5 acres); Scrub/Shrub (3.4 acres)= Total Marsh Creation (52 acres)/total Footprint (69.6 acres) using 151,360 CYD of dredge material	NYSDEC, NYCDEP
Oyster Restoration		
Jamaica Bay - Head of Bay	Oyster restoration with spat on shell and gabions (32 acres)	NYCDEP
Lower Passaic River and Hackensack River Planning Region		
Kearny Point	Creation of: Low marsh (17.83 acres); High Marsh (2.53 acres); Forested Wetland (6.61 acres); Tidal Channels (3,404 feet); Fish Habitat (1.82 acres); Bank Stabilization and Shoreline Softening (1,724 feet); Trails (1,614 feet) .Enhancement to: Riparian Forest (6.95 acres); Fish Habitat (29.11 acres).	NJDEP
Oak Island Yards	Low Marsh (5.85 acres); High Marsh (1.31 acres); Forested Wetland (1.68 acres); Riparian Forest (1.86 acres); Tidal Channels (1,526 feet); Fish Habitat (0.89 acres); Bank Stabilization (0.22 acres); Trails (3,711 feet).	NJDEP

Figure 1. Stony Creek Marsh Tentatively Selected Plan

Figure 2. Pumpkin Patch East Tentatively Selected Plan

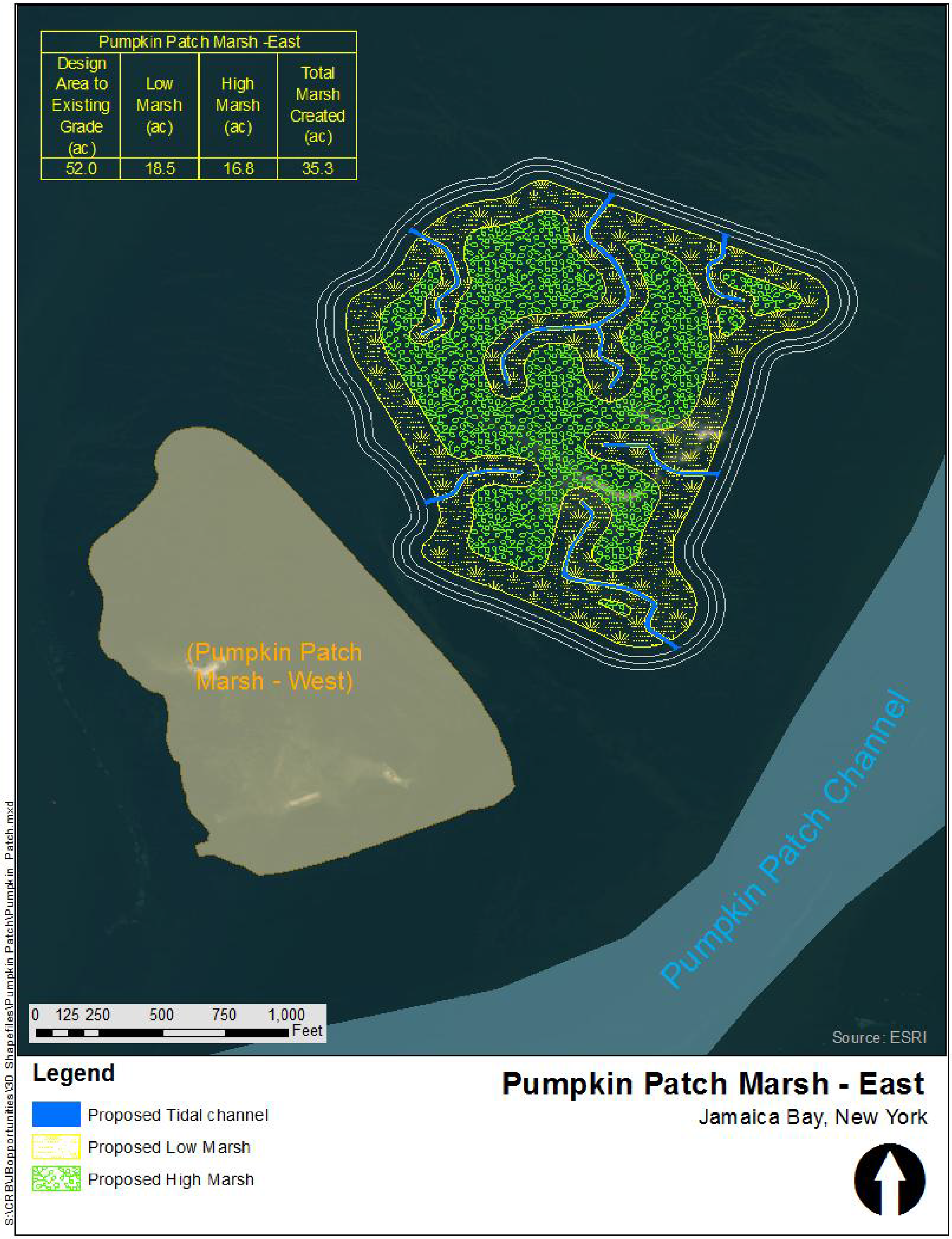


Figure 3: Pumpkin Patch West Tentatively Selected Plan

Figure 4: Duck Point Marsh with Atoll Terrace Tentatively Selected Plan

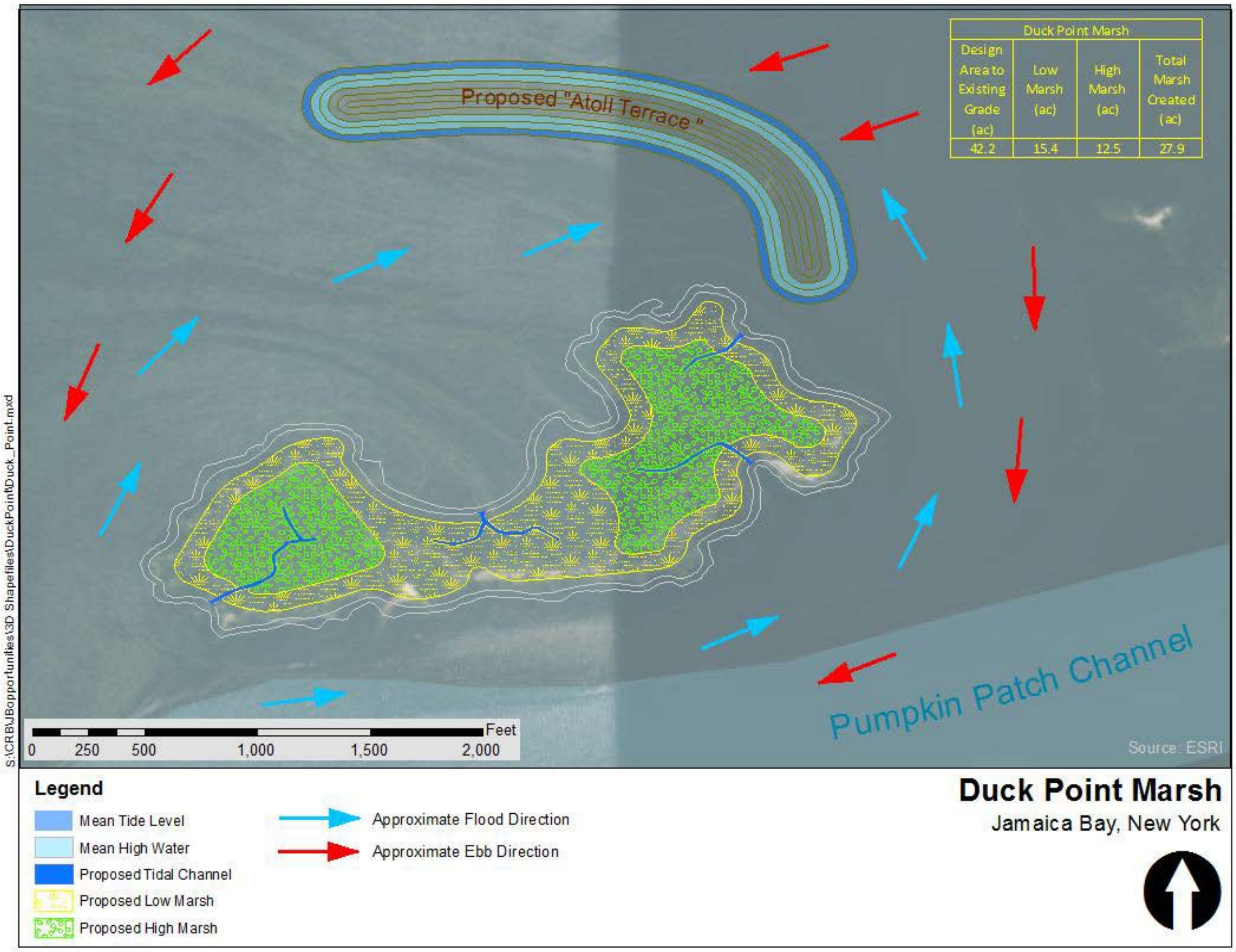


Figure 5: Elders Point Center Tentatively Selective Plan

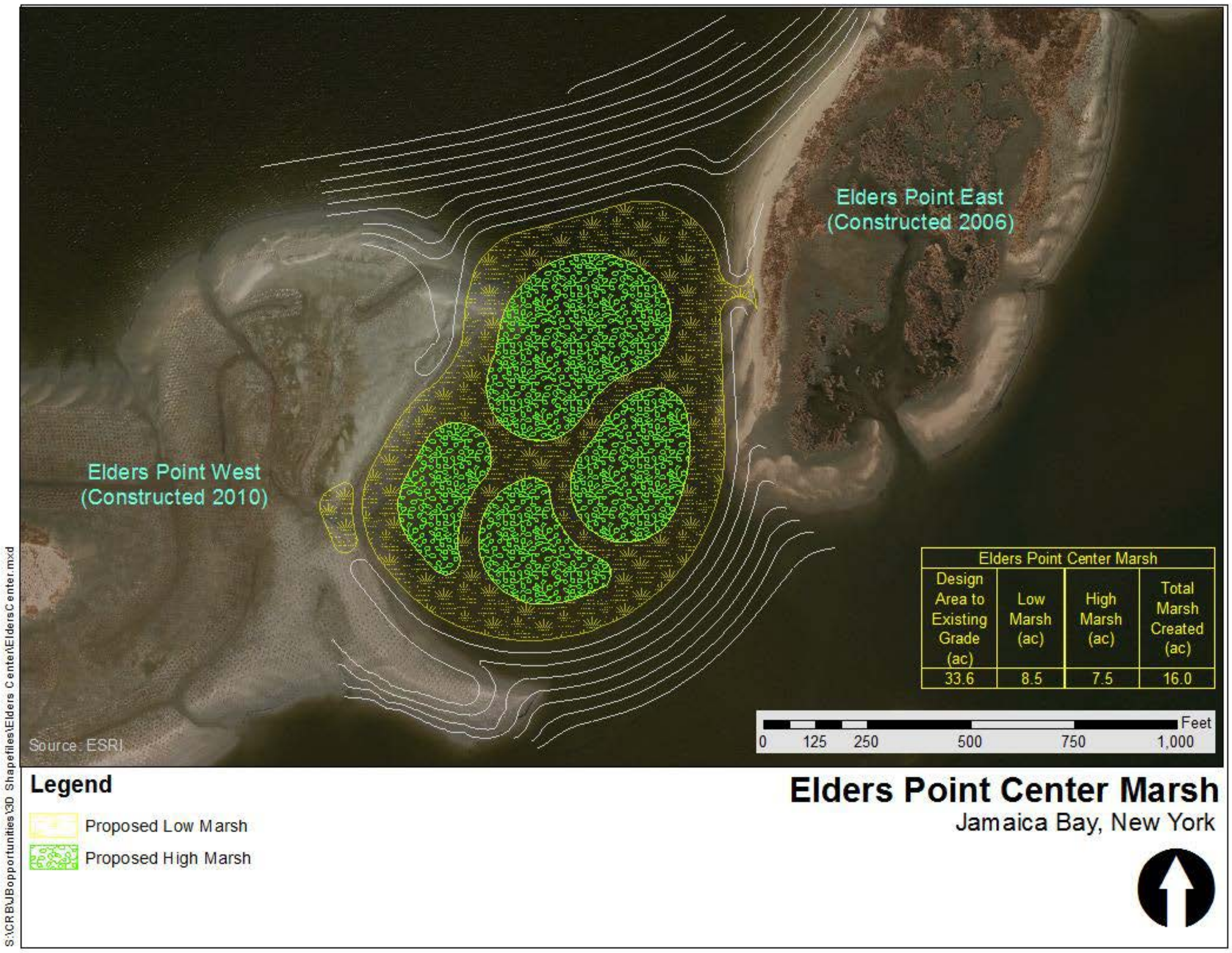


Figure 6: Tentatively Selected Plan for the Brant Point Restoration Site

Figure 7: Proposed Restoration Jamaica Bay Head of Bay

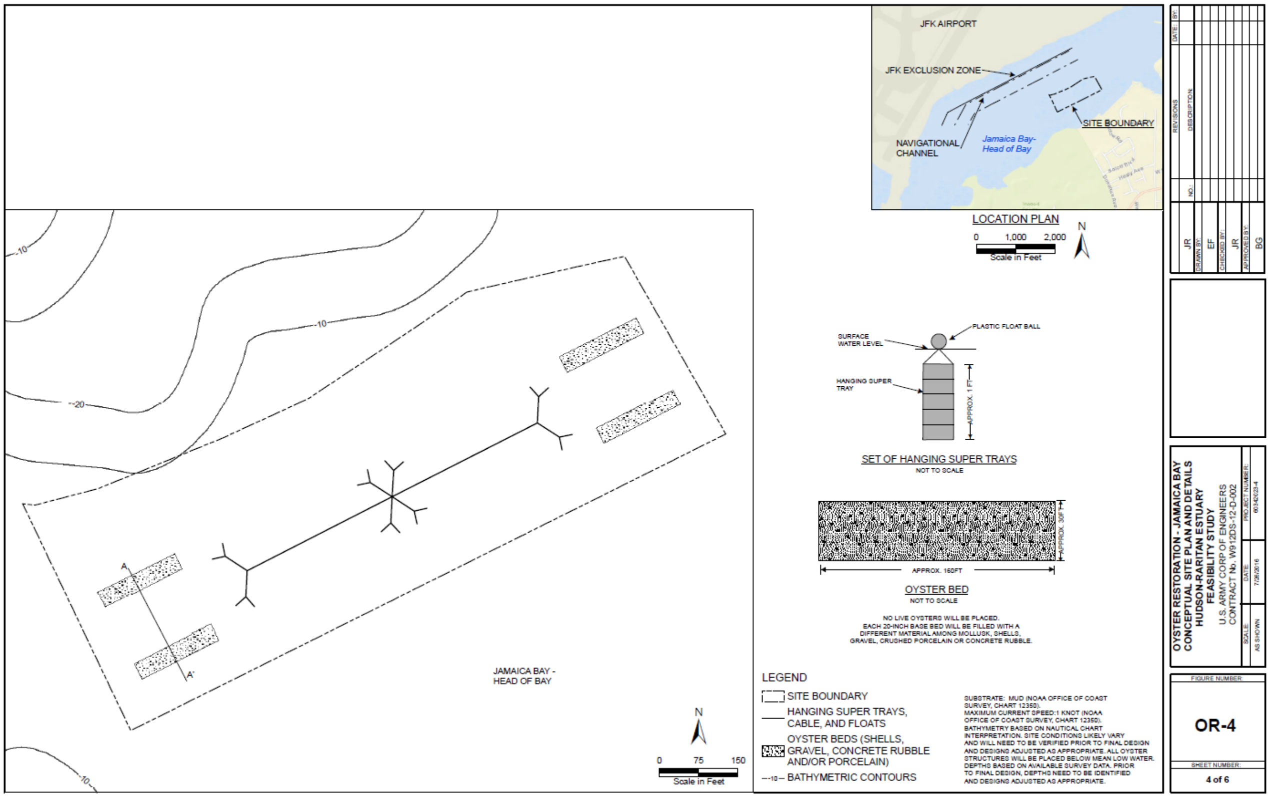


Figure 8: Jamaica Bay Head of Bay Proposed Restoration Site Location

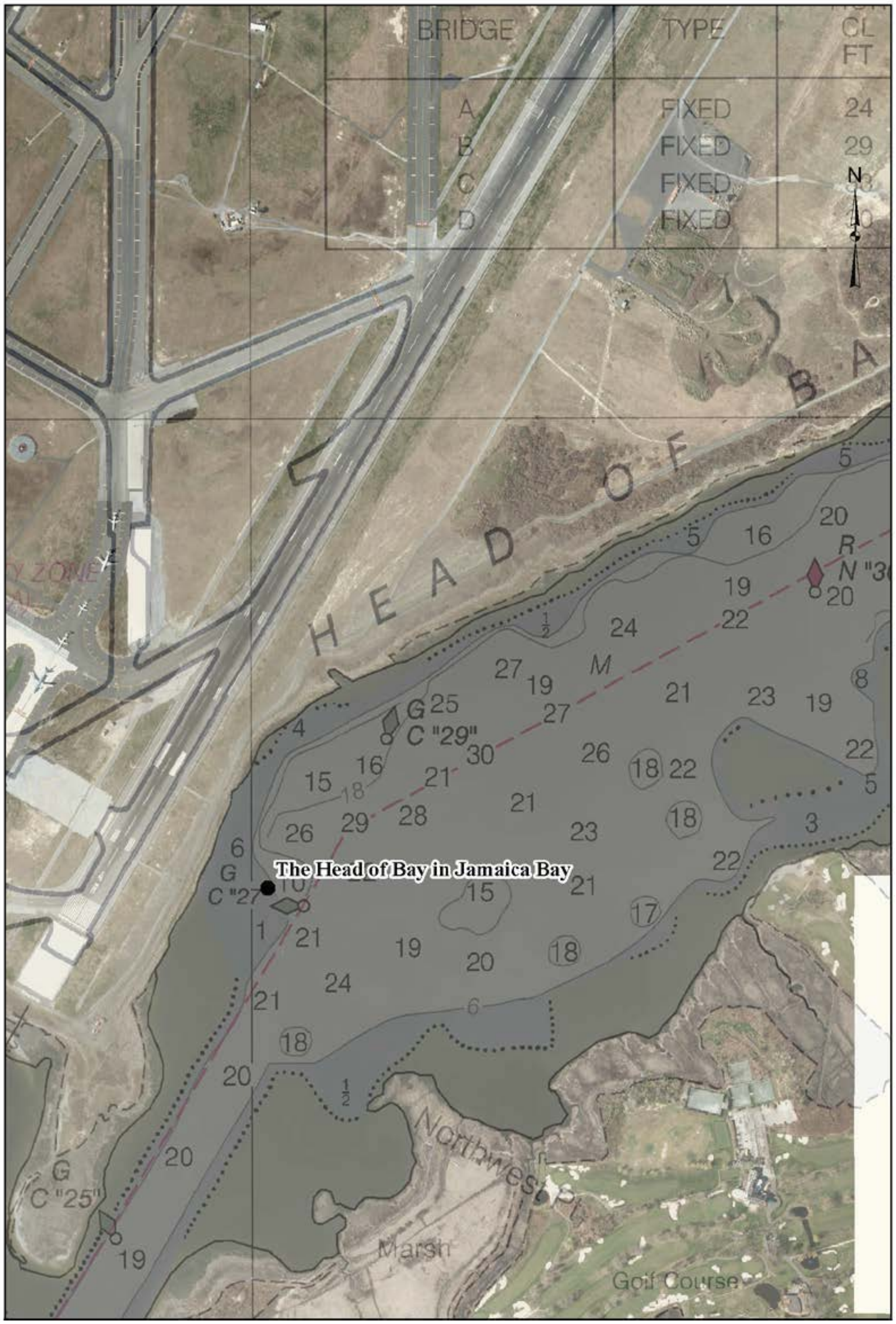


Figure 9: Kearny Point Tentatively Selected Plan (Deferred Site)

Figure 10: Oak Island Yards Tentatively Selected Plan (Deferred Site)

Appendix B- Additional Maps

Recommended Projects within a 5-Mile Range of John F. Kennedy International Airport

Recommended Projects within a 5-Mile Range of Newark Liberty International Airport

Appendix F5:

Programmatic Section 404(b)(1) Evaluation

Jamaica Bay Planning Region

404(b)(1) Analysis

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
DEAD HORSE BAY AQUATIC ECOSYSTEM RESTORATION PROJECT
BROOKLYN, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of the extensive intertidal and subtidal mudflats of Jamaica Bay where a total of 476,500 cubic yards (CY) of clean fill will be placed. A total of 483,090 CY of material will be excavated and re-used onsite. Materials that are not suitable for re-use will be disposed of at a registered landfill facility.

B. Quantity of Materials

1. Based upon conceptual design, approximately 476,500 CY of clean fill is required to restore the habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Area: The project area is within National Park Service's Gateway National Recreation Area and is adjacent to Floyd Bennett Field in Kings County, NY. Extensive historic landfilling activities across the entire site have resulted in marsh loss and a high proportion of invasive species. Erosion is claiming the western peninsula and exposing the solid waste landfill.

B. Preferred Alternative Description: The recommended plan maximizes marsh habitat by creating a tidal channel in the northern portion of the site and re-grading the existing upland Phragmites stand to salt marsh elevations to create a 31 acre tidal marsh system. On the southern point, the landfill at the shoreline will be removed and replaced with clean fill and sand from the northern portion of the site. By the removal action, the fringe marsh will be able to support native wetland plant species with high habitat value. This measure will serve as the least cost placement for the approximately 669,000 cubic yards that must be excavated to create the northern marsh. Additionally, the fill and sand will be planted with maritime plants and trees to achieve multiple benefits: 1) to stabilize the excavated fill, which is placed on site over 61 acres as the least cost placement option; 2) to act as a protective buffer for intertidal habitat (37 out of 61 acres, when counting to 300 feet. out from the intertidal habitat); and 3) adding additional habitat values associated with maritime forests, a major historical feature within the bay and integral to a fully functioning ecosystem to support species.

The proposed design requires the excavation of approximately 483,090 cubic yards (CY) of material over an area of approximately 40.9 acres. Approximately 46,710 CY of material from clearing and grubbing operations will be removed offsite. The remaining 436,380 CY of material will be placed at the Dead Horse Bay South site.

Landfill materials will be excavated from the water's edge and reused on site to the extent possible, creating dunes further inland that are capped by clean sand. Excavated materials that cannot be reused onsite will be removed and processed at a registered landfill facility.

Low marsh will be planted with Spartina alterniflora. High marsh will be planted with grasses (Distichlis spicata and Spartina patens) and shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica). Herbivory fencing will be used to protect the low and high marsh zones from grazing by geese and other birds. 6-foot high construction fence will be used to create 50' x 50' cells within the low and high marsh zones. The proposed areas will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species appropriate for a scrub-shrub vegetation community. Two feet of clean growing medium will be placed prior to planting. Grass plugs (Ammophila breviligulata) will be planted along with Forbs, Whip Shrubs and Gallon-size shrubs which include Baccharis halimfolia, Iva frutescens and Myrica penslvanica. Scrub-shrub planting also includes seeding of the area with a warm season/ grassland native seed mix.

In total this plan restores 19 acres of low marsh, 5.4 acres of high marsh, 2.31 acres of creek, and 14 acres of upland scrub shrub.

C. A constructed tidal channel will extend through the entire project site and will have a length of approximately 3,240 linear feet. The bottom elevation of the channel will be constructed below MTL to ensure flow more than 50% of the time. The existing narrow width and steep elevations within the site limited the ability to create a sinuous main channel, but small sinuous tributaries were added to the main channel close to its mouth and also at its farthest reach. The tidal channel will help sustain the planted wetlands and scrub-shrub vegetation communities.

D. There are no adverse impacts to wetlands.

E. Time and Duration of Disposal/Fill Placement

   It is anticipated that construction at the Dead Horse Bay site will begin in 2035 with a 23-month duration (completed in 2036).

F. Description of Disposal/Fill Placement Methods
   Construction equipment, such as hydraulic excavators, will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

Native vegetation will be planted from the tidal zone, for emergent wetland, to the upland and forested/scrub-shrub portions of the site.

2. Sediment Type

Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement

There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity and sedimentation. A sand cap will be placed over the newly dredged area to provide a clean substrate for benthic habitat. Use of best management practices during construction will minimize adverse impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
c) Clarity – Minor impacts may occur only during construction. Overall, the project goals are to improve water quality, including clarity.

d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.
f) Test – N/A
g) Nutrients – No adverse impacts to nutrients are anticipated.
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current patterns and flow may occur during ecosystem restoration. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A
   c) Stratification – N/A

3. Normal Water Fluctuations – Water fluctuations are primarily influenced by the tides of the region and are not expected to be affected by the restoration work.

4. Salinity Gradients – No impacts are anticipated.

5. Actions Taken to Minimize Impacts
   A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)

   There is potential for increased sedimentation and turbidity. Best management practices, such as staked hay bales and filtered sediment traps, will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column

a) Light Penetration – Short-term impacts during construction are possible, but particles will settle quickly.
b) Dissolved Oxygen – Short-term impacts due to disturbance of particulates are possible during construction. However, the proposed restoration work would result in fewer low dissolved oxygen events at the site.
c) Toxic Metals and Organics – Preliminary soil testing revealed the presence of contaminants. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. Restoration of the site will provide nutrient and toxicant filtration, which will help improve water quality.
d) Pathogens – N/A
e) Aesthetics – During construction, visual access may be temporarily restricted. The project will preserve and restore natural habitat along Jamaica Bay, thereby enhancing the area's scenic resources.
f) Others as Appropriate – N/A

3. Biota
   a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
   b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction; however, best management practices will be employed to minimize these impacts.
   c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7.

D. Contaminant Determinations

Materials to be used for construction (ie. clean fill) will be free of contaminants and come from a permitted source. Excavated materials will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated. There may be short-term impacts during construction; however, the proposed plan is expected to result in an increase in tidal wetlands.
   c) Mud Flats – No long-term adverse impacts are anticipated.
   d) Vegetated Shallows – No adverse impacts are anticipated.
   e) Bay Shoreline – No adverse impacts are anticipated.

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal is not likely to adversely affect endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
FRESH CREEK AQUATIC ECOSYSTEM RESTORATION PROJECT
BROOKLYN, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of the areas in and around the tidal wetlands of Fresh Creek, a tributary of Jamaica Bay where a total of 153,828 cubic yards (CY) of clean fill will be placed. A total of 193,220 CY of material will be excavated and re-used onsite. Materials that are not suitable for re-use will be disposed of at a registered landfill facility.

B. Quantity of Materials

1. Based upon conceptual design, approximately 153,828 CY of clean fill is required to restore the habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Area: The project area, under the jurisdiction of NYC Parks, is located in and along the tidal wetlands and adjacent upland bordering Fresh Creek, a tributary to Jamaica Bay, in Kings County, NY. The site includes beach, mudflat, salt marsh, coastal scrub/shrub forest, mature woodlands, and invasive plant species; it is surrounded by dense urban development and subject to combined sewer overflow (CSO) and stormwater outfalls.

Preferred Alternative Description: The recommended plan creates a tidal marsh system continuous around the basin and includes basin filling and re-contouring to improve water quality and low quality benthic habitat resulting from past dredging and fill activities, existing CSOs, and untreated storm water runoff. Excavation of 193,220 cubic yards of material from the channel, intertidal, and upland will be redistributed on site and capped with clean fill to create valuable upland scrub shrub and maritime forest habitat. Recommended actions will complement NYC Parks' small-scale restoration efforts and NYCDEP's salt marsh mitigation along the creek.

The proposed design requires the total excavation of approximately 193,200 CY of material over an area of approximately 34.8 acres. Approximately 42,000 CY will be removed off site, resulting from clearing and grubbing operations. The existing channel has a very deep pit toward its mouth, reaching a depth of almost -20 feet NAVD88. The National Park Service requested that the channel bottom be brought up to an even elevation of -10.0 feet NAVD so as to enhance tidal exchange and circulation. It is assumed that material excavated from the upland areas can be placed in the channel to increase the bottom elevation. The placed excavated material will then be capped with 3 feet of clean sand for a more desirable channel bottom, which will bring the final elevation to -10.0 feet NAVD88. The total length of the tidal channel will be approximately 7,500 linear feet. The channel bottom at the upper reach will gradually slope up from the existing grade and flatten out at an elevation below MTL.

Low marsh will be planted with Spartina alterniflora. High marsh will be planted with grasses (Distichlis spicata and Spartina patens) and shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica). Herbivory fencing will be used to protect the low and high marsh zones from grazing by geese and other birds. 6-foot high construction fence will be used to create 50’ x 50’ cells within the low and high marsh zones.

For scrub shrub upland areas, the proposed areas will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species appropriate for a scrub-shrub vegetation community. Two feet of clean growing medium will be placed prior to planting. Grass plugs (Ammophila breviligulata) will be planted along with Forbs, Whip Shrubs and Gallon-size shrubs which include Baccharis halimfolia, Iva frutescens and Myrica penslvanica. Scrub-shrub planting also includes seeding of the area with a warm season/ grassland native seed mix.

For the creation of Maritime forest, the area will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species. Two feet of clean growing medium will be placed prior to planting. Ferns and forbs, gallon-size shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica), three types of trees will be planted, including 1-feet to 4-feet canopy trees, 5-feet to 6-feet whip canopy trees and 1-gallon understory trees. Maritime forest planting also includes seeding of the area with a warm season/ grassland native seed mix.

In total this design will create approximately 16.1 acres of low marsh, 4.4 acres of high marsh, 3.6 acres of scrub shrub, 10.7 acres of maritime forest, and restoration of 45.8 acres of tidal channels and pools.

B. There are no adverse impacts to wetlands.

C. Time and Duration of Disposal/Fill Placement

   It is anticipated that construction at the Fresh Creek site will begin in 2027 with a 14-month duration (completion in 2028).

D. Description of Disposal/Fill Placement Methods

   Construction equipment, such as excavators, barges, and tugs will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

Native vegetation will be planted from the tidal zone, for emergent wetland, to the upland and forested/scrub-shrub portions of the site.

2. Sediment Type

Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement

There are no adverse impacts to wetlands and streams as a result of fill from the ecosystem restoration. Placement of fill at the head of the basin will result in the creation of tidal marshes and creeks.

4. Physical Effects on Benthos

No long-term impacts are anticipated to the benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporarily increased turbidity and sedimentation. A sand cap will be placed over the newly dredged area to provide a clean substrate for benthic habitat. Use of best management practices during construction will minimize adverse impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.

c) Clarity – Minor impacts may occur only during construction. Overall, the project goals are to improve water quality, including clarity.
d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.
f) Test – N/A
g) Nutrients – No adverse impacts to nutrients are anticipated.
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current patterns and flow may occur during ecosystem restoration. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A
   c) Stratification – N/A

3. Normal Water Fluctuations – Water fluctuations are primarily influenced by the tides of the region and are not expected to be adversely affected by the restoration work. Re-contouring the basin will decrease water residence time, thus improving the water quality.

4. Salinity Gradients – No impacts are anticipated.

5. Actions Taken to Minimize Impacts
   A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7.

C. Suspended Particulate/Turbidity Determinations
   1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)
      There is potential for increased sedimentation and turbidity. Best management practices, such as staked hay bales and filtered

sediment traps, will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column
    a) Light Penetration – Short-term impacts during construction are possible, but particles will settle quickly.
    b) Dissolved Oxygen – Short-term impacts due to disturbance of particulates are possible during construction. However, the proposed restoration work would result in decreased water residence time within the basin, thus improving dissolved oxygen levels.
    c) Toxic Metals and Organics – Preliminary soil testing revealed the presence of contaminants. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.
    d) Pathogens – N/A
    e) Aesthetics – During construction, visual access may be temporarily restricted. The project will preserve and restore natural habitat along Fresh Creek, thereby enhancing the area's scenic resources.
    f) Others as Appropriate – N/A

3. Biota
    a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
    b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction; however, best management practices will be employed to minimize these impacts.
    c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically

and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7.

D. Contaminant Determinations
Materials to be used for construction (ie. clean fill) will be free of contaminants and come from a permitted source. Excavated materials will be tested prior to re-use on site.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – No long-term adverse impacts are anticipated.
   b) Wetlands – No long-term adverse impacts are anticipated. There may be short-term impacts during construction; however, the proposed plan is expected to result in an increase in tidal wetlands.
   c) Mud Flats – No long-term adverse impacts are anticipated.
   d) Vegetated Shallows – No adverse impacts are anticipated.
   e) Bay Shoreline – N/A

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-1 Chapter 5 with supporting materials in Chapters 6 – 7).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. The proposal will not impact endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
JAMAICA BAY MARSH ISLANDS
AQUATIC ECOSYSTEM RESTORATION PROJECT
QUEENS, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of five tidal marsh islands in Jamaica Bay where a total of 1,329,665 cubic yards (CY) of clean fill will be placed.
   a) Duck Point – 213, 776 CY
   b) Stony Creek – 151, 360 CY
   c) Pumpkin Patch West – 327,686 CY
   d) Pumpkin Patch East – 351,952 CY
   e) Elders Center – 284,891 CY

B. Quantity of Materials

1. Based upon conceptual design, approximately 1,329,665 CY of clean fill is required to restore the habitats.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Areas and Project Descriptions:

1. Duck Point – The elevations at Duck Point represent approximately 17 acres, more than half of which are at the lower end of the low marsh range. The recommended alternative includes delivering 213,776 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 62.6 acres, 38.6 acres of which would be marsh. In total this design will create 24.9 acres of low marsh, 5.6 acres of high marsh, and 8.1 acres of scrub shrub.

   Three tidal channels are proposed, totaling approximately 2,730 linear feet, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

2. Stony Creek – The existing condition remnant marsh at Stony Creek is 34 acres. It is well defined and characterized by relatively high elevations compared to the remaining Jamaica Bay marsh islands as whole; however, almost 60 percent of the marsh island has been lost in the past 42 years. The

recommended alternative involves delivering 151,360 cubic yards of clean fill to the island and grading the sediment. This would make the total footprint of the island 69.6 acres, 51.9 acres of which would be marsh. In total this design will create 26 acres of low marsh, 22.5 acres of high marsh, and 3.49 acres of scrub shrub.

Five (5) tidal channels are proposed, totaling approximately 4,640 linear feet, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

3. Pumpkin Patch West – Pumpkin Patch West is currently approximately 4 acres. The recommended alternative includes delivering 327,686 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 32.9 acres, 23.2 acres of which would be marsh. In total this design will create 13.7 acres of low marsh, 8.6 acres of high marsh, and 0.9 acres of scrub shrub.

   Three (3) tidal channels are proposed, totaling approximately 0.74 acres, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

4. Pumpkin Patch East – Pumpkin Patch East is currently only approximately 8 acres. The recommended alternative (same as Alternative 3) includes delivering 351,952 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 40.5 acres, 28.8 acres of which would be marsh. In total this design will create 15.6 acres of low marsh, 10.1 acres of high marsh, and 3.1 acres of scrub shrub.

   Two (2) tidal channels are proposed, totaling approximately 0.58 acres, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

5. Elders Center – Elders Point Marsh was historically one island but marsh loss in the center of the island created two distinct islands separated by a mud flat. When the restoration of Elders Point East and Elders Point West were planned and implemented, it was infeasible to restore Elders Point Center based on the depth of the substrate in that area. The restoration was limited to an increase in size of 40 acres of new marsh at Elders Point East (2007) and 43 acres of new marsh at Elders Point West (2010). Presently, no marsh island exists above water between the two islands. The

recommended alternative includes delivering 284,891 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 41.7 acres, 27.5 acres of which would be marsh. In total this design will create 15.2 acres of low marsh, 10.9 acres of high marsh, and 1.4 acres of scrub shrub.

Four (4) tidal channels are proposed, totaling approximately 0.95 acres, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

6. All Sites - Low marsh will be planted with Spartina alterniflora. High marsh will be planted with grasses (Distichlis spicata and Spartina patens) and shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica). If determined to be necessary, herbivory fencing will be used to protect the low and high marsh zones from grazing by geese and other birds. 6-foot high construction fence will be used to create 50’ x 50’ cells within the low and high marsh zones.

   For scrub shrub upland areas, the proposed areas will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species appropriate for a scrub-shrub vegetation community. Two feet of clean growing medium will be placed prior to planting. Grass plugs (Ammophila breviligulata) will be planted along with Forbs, Whip Shrubs and Gallon-size shrubs which include Baccharis halimfolia, Iva frutescens and Myrica penslvanica. Scrub-shrub planting also includes seeding of the area with a warm season/ grassland native seed mix.

B. There are no adverse impacts to wetlands.

C. Time and Duration of Disposal/Fill Placement

   Anticipated Construction and Duration Times:

   1. Duck Point – Begin in 2027 and have a 16-month construction duration (completed in 2028).
   2. Stony Creek – Begin in 2025 and have a 20-month construction duration (completed in 2026).
   3. Pumpkin Patch West – Begin in 2033 and have a 12-month construction duration (completed in 2033).
   4. Pumpkin Patch East – Begin in 2037 and have a 14-month construction duration (completed in 2038).
   5. Elders Center – Begin in 2031 and have a 16-month construction duration (completed in 2032)

D. Description of Disposal/Fill Placement Methods

There are several construction methods available for the movement of material from the stockpile location to the marsh islands. The likely scenario, which was used in previous marsh island construction, is through the use of a hopper system and a series of booster pumps to re-slurry the material and deposit it on the existing footprint, where it would be re-graded to the desired elevation.

In order to effectively place the material being used for marsh restoration, geotextile tubes, as well as other methods (including hay bales and silt curtains) will be employed to serve as an initial containment of the sediment water slurry. By installing geotextile tubes, the slurry is isolated from the wave and current forces, allowing the construction contractor to pump the sediment in a more efficient manner. In addition to providing a barrier to external forces, the tubes will serve to prevent large portions of the slurry from entering the surrounding water column, which would increase turbidity and pose a threat to the native species.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope
   Native vegetation will be planted to restore the marsh habitat at each site.

2. Sediment Type
   Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement
   There are no adverse impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos
   No long-term impacts are anticipated to the benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporarily increased turbidity and burial. Use of best management practices during construction will minimize adverse impacts.

5. Other Effects
   No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts
   A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed,

documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-2 Chapter 8 with supporting materials in Chapters 9 – 10.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality
    a) Salinity – No adverse impacts are anticipated.
    b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
    c) Clarity – Minor impacts may occur only during construction. Overall, the project goals are to improve water quality, including clarity.
    d) Color – Minor short-term changes in color during construction are possible.
    e) Odor – No measureable impacts are anticipated.
    f) Test – N/A
    g) Nutrients – No adverse impacts to nutrients are anticipated.
    h) Eutrophication – N/A
    i) Others as Appropriate – N/A

2. Current Patterns and Circulation
    a) Current Patterns and Flow – Temporary changes in current patterns and flow may occur during ecosystem restoration. However, proper planning and best management practices will limit these disturbances.
    b) Velocity – No adverse impacts are anticipated.
    c) Stratification – N/A

3. Normal Water Fluctuations – Water fluctuations are primarily influenced by the tides of the region and are not expected to be adversely impacted from the project.

4. Salinity Gradients – No impacts are anticipated.

5. Actions Taken to Minimize Impacts
   A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the

selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-2 Chapter 8 with supporting materials in Chapters 9 – 10.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)

   There is potential for increased sedimentation and turbidity. Best management practices, such as staked hay bales and filtered sediment traps, will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column
   a) Light Penetration – Short-term impacts during construction are possible, but particles will settle quickly. The project will result in the creation of more marsh habitat in Jamaica Bay.
   b) Dissolved Oxygen – Short-term impacts due to disturbance of particulates are possible during construction.
   c) Toxic Metals and Organics – N/A
   d) Pathogens – N/A
   e) Aesthetics – During construction, visual access may be temporarily restricted, but will be restored post-construction. The project will preserve and restore natural habitat within Jamaica Bay, thereby enhancing the area's scenic resources.
   f) Others as Appropriate – N/A

3. Biota
   a) Primary Production, Photosynthesis – No adverse impacts are anticipated. The project will restore habitat areas and increase local and regional biodiversity.
   b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction due to increased turbidity and burial. However, best management practices, such as turbidity curtains, will be employed to minimize these impacts.
   c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned

Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-2 Chapter 8 with supporting materials in Chapters 9 – 10.

D. Contaminant Determinations
Materials to be used for construction (ie. clean fill) will be free of contaminants and come from a permitted source.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity and sedimentation during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated. Short-term impacts during construction are possible; however, the proposed plan is expected to result in an increase in salt marsh habitat.
   c) Mud Flats – N/A
   d) Vegetated Shallows – N/A
   e) Bay Shoreline – N/A

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-2 Chapter 8 with supporting materials in Chapters 9 – 10).

C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal is not likely to adversely affect endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

Harlem River/East River/Western Long Island Sound Planning Region 404(b)(1) Analysis

CLEAN WATER ACT 404(B)1 EVALUATION REPORT
BRONX ZOO AND DAM ECOSYSTEM RESTORATION PROJECT
BRONX, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by the wetland restoration will consist primarily of the replanting area along both banks and on the upland island upstream of the dams where 270 cubic yards of clean fill will be placed. Such fill is expected to be compromised of clean sand. Another 3,383 cubic yards of common fill and topsoil will be placed in areas regarded for wetland restoration and creation. Such fill is expected to be compromised of beneficially reused excavated material.

B. Quantity of Materials

1. Based upon the conceptual design, approximately 270 cubic yards of clean fill is required for native plantings and 3,383 cubic yards of common fill and topsoil will be required for wetland creation.

C. Source of Materials

1. Materials to be used for construction (i.e. clean sand) will come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

II. Description of the Proposed Project Site

A. The project area is located adjacent to the Bronx Zoo in Bronx County, NY. The site is an over-widened channel that experiences stagnation and constricted flow made worse by the two dams within the channel. Sewage sources and runoff from the Bronx Zoo contribute to the waste infiltration and distinct sewage odor of the water. The wetlands and upland woodlands within the site are relegated to thin strips of land dominated by invasive species.

B. The recommended plan for the Bronx Zoo and Dam site will improve aquatic habitat and water quality. Approximately 0.42 acres of invasive vegetation removal with native plantings will occur along both banks, on the upland island upstream of dams, and in additional locations downstream of the dams. Fish ladder installation will link 0.8 acres of area upstream of the dams to the river channel below the dams and open Bronx River access to anadromous fish. Creation of 1.16 acres of emergent wetlands along both banks upstream of the dams and along the west bank downstream of the dams will provide habitat for migratory birds and flood control. Creation of 0.48 acres of forested wetlands created along the east bank upstream of the dams may provide potential habitat for endangered bat species, if present. In total, 3,320 CY of material will be excavated during clearing and grubbing activities and to reach grade for the recommended habitats, excavated material will be beneficially reused on site to the extent possible. Additional restoration measures include removal of debris between dams, sediment trap installation to reduce sediment loads reaching the river, installation of 750 linear feet rock wall upstream of the river, and improved public access to the site.

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Bronx Zoo and Dam site will begin in 2025 and have an 11-month construction duration (completed in 2025).

E. Description of Disposal/First Placement Methods
Construction equipment, such as hydraulic excavators, will be utilized.

III. FACTUAL DETERMINATIONS

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope
   The restored wetland will be constructed with emergent and forested/scrub-shrub wetlands
2. Sediment Type
   Sediments similar to those present in the area will be utilized.
3. Dredged Fill/Material Movement
   There are no impacts to wetlands and streams as a result of fill from the wetland restoration.
4. Physical Effects on Benthos
   No long-term impacts are anticipated for benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporary increased turbidity. Use of best management practices during construction will minimize these impacts.
5. Other Effects
   No additional major impacts are anticipated from the project.
6. Actions Taken to Minimize Impacts
   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented,

and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water Quality
    a) Salinity – No adverse impacts are expected.
    b) Water Chemistry (pH, etc.) – No adverse impacts are expected.
    c) Clarity – Temporary increases in turbidity may occur during localized construction of the restored wetland and fish ladder installation. However, erosion and sediment control measures will be employed and may include a cofferdam and silt curtains. Overall, the project goals are to improve water quality, including clarity.
    d) Color – Possible minor short-term change during construction.
    e) Odor – Not measurable.
    f) Test – N/A
    g) Nutrients – N/A
    h) Eutrophication – N/A
    i) Others as Appropriate –N/A
2. Current Patterns and Circulation
    a) Current Patterns and Flow – N/A
    b) Velocity – N/A
    c) Stratification – N/A
3. Normal Water Fluctuations – N/A
4. Salinity Gradients – N/A
5. Actions Taken to Minimize Impacts

    A detailed alternative analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in Vicinity of Construction Site(s).

    Temporary increases in turbidity due to construction activity is expected but will be minimized by best management practices.
2. Chemical and Physical Properties of Water Column
    a) Light Penetration – Particles will settle fairly rapidly. Minor impacts are anticipated only during construction.
    b) Dissolved Oxygen

        Possible short-term impact due to in water disturbance of particulates during construction. However, proposed restoration work would result in fewer low dissolved oxygen events at the site.

c) Toxic Metals and Organics

Preliminary testing of soils has shown contaminant types and levels expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.

d) Pathogens – N/A.

e) Aesthetics

During construction, there will be temporary adverse impacts to aesthetics (viewsheds under construction). However, in the long-term, beneficial impacts to aesthetics are anticipated from restoration measures.

f) Others as Appropriate – N/A

3. Biota

a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction, however best management practices will be employed to minimize these potential impacts.

c) Sight Feeders – Fish and motile invertebrates may be affected due to temporary increases in turbidity during project construction, however these species will likely leave the area during construction activities. No trout production waters occur within the project area.

4. Action Taken to Minimize Impacts

A detailed alternative analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13.

D. Contaminant Determinations

Materials to be used for construction (i.e. clean sand) will come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction could block gills of nekton, however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during excavation or near shore construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by wetland construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
    a) Sanctuaries and Refuges – N/A
    b) Wetlands – No long-term adverse impacts are anticipated. There may be short-term impacts during construction, however, it is expected that the proposed project will result in an increase of tidal wetlands.
    c) Mud Flats – No adverse impacts are anticipated.
    d) Vegetated Shallows – No adverse impacts are anticipated.
    e) Bay Shoreline – N/A

IV. Finding of Compliance or Non-Compliance with the Restrictions on Discharge

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the wetland restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designated by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)1 EVALUATION REPORT
STONE MILL DAM ECOSYSTEM RESTORATION PROJECT
BRONX, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of invasive removal and replanting areas along the east and west banks of the river, where 265 cubic yards of topsoil will be placed.

B. Quantity of Materials

1. Based upon conceptual design, approximately 265 cubic yards of topsoil is required to restore the ecosystem.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil that will be conducive for native species growth. The material will be tested before being brought to the Stone Mill Dam area.

II. Description of the Proposed Project Site

A. The project area is within a steep valley in the New York Botanical Garden in Bronx County, NY. Wetlands are practically non-existent in the site and consist of few, very small (less than 5 square feet) discontinuous pockets of emergent vegetation. River samples often contain high levels of coliform bacteria and poor water quality due to illegal CSOs. The extreme channel habitats, including sediment laden pond, fast moving rocky channel and dam, impede fish movement and provide low to moderate fish and wildlife habitat..

B. The recommended plan for Stone Mill Dam increases and improves tributary connections, shorelines, and shallow water habitat. Fish ladder installation at this site is a critical component of the fish passage projects along the Bronx River and links the slow-flowing pool upstream of dam and the faster-flowing channel downstream of the dam. This measure will open up an additional 22.9 acres of upstream habitat for anadromous fish and restore 0.5 acres of the river bed. Approximately 0.032 acres of invasive removal and native vegetation plantings will occur along the east bank of the river abutting the fish ladder and along the west bank downstream of the dam.

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement
It is anticipated that construction at the Stone Mill Dam site will begin in 2025 and have an 8-month construction duration (completed in 2025).

E. Description of Disposal/First Placement Methods
Construction equipment such as hydraulic excavators will be utilized.

III. FACTUAL DETERMINATIONS

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope
Native vegetation will be planted in the upland portions of the site.
2. Sediment Type
Sediments similar to those present in the area will be utilized.
3. Dredged Fill/Material Movement
There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.
4. Physical Effects on Benthos
No long-term impacts are anticipated for benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporary increased turbidity. Use of best management practices during construction will minimize these impacts.
5. Other Effects
No additional major impacts are anticipated from the project.
6. Actions Taken to Minimize Impacts
A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water Quality
   a) Salinity – No adverse impacts are expected.
   b) Water Chemistry (pH, etc.) – No adverse impacts are expected.

c) Clarity – Temporary increases in turbidity may occur during construction of the fish ladder. However, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
d) Color – Possible minor short-term change during construction.
e) Odor – Not measurable.
f) Test – N/A
g) Nutrients – N/A
h) Eutrophication – N/A
i) Others as Appropriate –N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current pattern and flow may occur during fish ladder installation. However, proper planning and best management practices will limit these disturbances. Construction of the Stone Mill Dam project will improve connectivity between upstream and downstream portions of the dam.
   b) Velocity – N/A
   c) Stratification – N/A
3. Normal Water Fluctuations – N/A
4. Salinity Gradients – Not Applicable.
5. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in Vicinity of Construction Site(s).

   Temporary increases in turbidity due to construction activity is expected but will be minimized by best management practices.
2. Chemical and Physical Properties of Water Column
   a) Light Penetration – Particles will settle fairly rapidly. Minor impacts are anticipated only during construction.
   b) Dissolved Oxygen

Possible short-term impact due to in water disturbance of particulates during construction. However, proposed restoration work would result in fewer low dissolved oxygen events at the site.

c) Toxic Metals and Organics

Preliminary testing of soils has shown contaminant types and levels expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.

d) Pathogens – N/A

e) Aesthetics

During construction, visual access may be temporarily restricted during the construction, however, will return to their current levels post-construction.

f) Others as Appropriate – N/A

3. Biota

a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction, however best management practices will be employed to minimize these potential impacts.

c) Sight Feeders – Fish and motile invertebrates may be affected due to temporary increases in turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. It is expected that these species will relocate during construction and return shortly after completion of construction activities. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species. Post-construction, there will be increased navigation and spawning runs for fish due to the installed fish ladder.

4. Action Taken to Minimize Impacts

A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

D. Contaminant Determinations

Materials to be used for construction (i.e. clean sand) will come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction could block gills of nekton, however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during excavation or construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
    a) Sanctuaries and Refuges – N/A
    b) Wetlands – No long-term adverse impacts are anticipated.
    c) Mud Flats – No adverse impacts are anticipated.
    d) Vegetated Shallows – No adverse impacts are anticipated.
    e) Bay Shoreline – N/A

IV. Finding of Compliance or Non-Compliance with the Restrictions on Discharge

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

B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

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

D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).

F. The proposal will have no impact on marine sanctuaries designated by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)1 EVALUATION REPORT
SHOELACE PARK ECOSYSTEM RESTORATION PROJECT
BRONX, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of replanting areas along the western roadway embankment and the steeply sloped eastern bank where a total of 21,490 cubic yards of common fill, clean fill, and topsoil will be placed. A total of 40,430 cubic yards of material will be excavated during construction; to the extent possible, this material will be reused onsite for habitat creation.

B. Quantity of Materials

1. Based upon conceptual design, approximately 250 cubic yards of clean fill, 15,030 cubic yards of common fill, and 6,240 cubic yards of topsoil is required to restore the wetland.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil that will be conducive for native species growth. The material will be tested before being brought to the Shoelace Park area.

II. Description of the Proposed Project Site

A. The project area is adjacent to the Bronx River Parkway in Bronx County, NY. The site currently provides limited fish and wildlife habitat due to nearby urban development, significant habitat fragmentation, sedimentation issues, and dense growth of invasive species

The recommended plan increases and improves wetlands, public access, shoreline and shallows, and mudflat habitat. Native upland trees and shrubs will be planted along almost the entire length of the Bronx River Parkway roadway embankment along the west side of the site and on the steep slope along the east bank of the river. Forested and scrub/shrub wetlands totaling 1.1 acres will be created along two segments of the river on both banks. In stream work includes 5.7 acres of bed restoration will occur in the form of channel realignment using instream cross vanes and J-hooks and bed material replacement. 7,415 linear feet of banks will be stabilized using stacked rock walls with brush layers or crib walls between the forested wetland areas near the southern end of the site, and along the west bank at the southern end of site using a stacked rock wall with brush layers. Invasive species removal with native plantings along 7.9 acres will provide a wooded riparian corridor along the banks of the entire reach. Riparian woodlands and created forested wetlands would provide habitat resources that are currently very limited in the Bronx urban environment.

Additional restoration measures at Shoelace Park include installation of vegetation swales, bioretention basins, rain gardens along the east bank to reduce sediment loads reaching the river.

In total 40, 430 CY of material will be excavated during construction. 3,440 CY of material will be excavated during invasive species removal and select native plantings; 1, 010 CY will be excavated from the streambed and banks for construction of j-hooks and rock vanes; 8,910 CY will be excavated from the from the channel for in channel modifications and installation of an stone bottom; 18,400 CY will be excavated for sediment load reduction; 8,670 CY will be excavated during installation of the stepped rock wall. To the extent possible, this material will be reused onsite for habitat creation.

B. There are no impacts to wetlands.

C. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Shoelace Park site will begin in 2029 and have a 10-month construction duration (completed in 2029).

D. Description of Disposal/First Placement Methods

Construction equipment such as hydraulic excavators, cranes will be utilized.

III. FACTUAL DETERMINATIONS

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

   Native vegetation will be planted in the upland and forested/scrub-shrub portions of the site.

2. Sediment Type

   Sediments similar to those present in the area will be utilized.

3. Dredged Fill/Material Movement

   There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

   No long-term impacts are anticipated for benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporary increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

   No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water Quality
   a) Salinity – No adverse impacts are expected.
   b) Water Chemistry (pH, etc.) – No adverse impacts are expected.
   c) Clarity – Temporary increases in turbidity may occur during construction of the fish ladder. However, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
   d) Color – Possible minor short-term change during construction.
   e) Odor – Not measurable.
   f) Test – N/A
   g) Nutrients – N/A
   h) Eutrophication – N/A
   i) Others as Appropriate –N/A
2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current pattern and flow may occur during channel realignment. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A
   c) Stratification – N/A
3. Normal Water Fluctuations – N/A
4. Salinity Gradients – N/A
5. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in Vicinity of Construction Site(s).

   Temporary increases in turbidity due to construction activity is expected but will be minimized by best management practices.

2. Chemical and Physical Properties of Water Column

   a) Light Penetration – Particles will settle fairly rapidly. Minor impacts are anticipated only during construction.

   b) Dissolved Oxygen

      Possible short-term impact due to in water disturbance of particulates during construction. However, proposed restoration work would result in fewer low dissolved oxygen events at the site.

   c) Toxic Metals and Organics

      Preliminary testing of soils has shown contaminant types and levels expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.

   d) Pathogens – N/A.

   e) Aesthetics

      During construction, viewshed access may be temporarily restricted during the construction, however, will return to their current levels post-construction.

   f) Others as Appropriate – N/A

3. Biota

   a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

   b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction, however best management practices will be employed to minimize these potential impacts.

   c) Sight Feeders – Fish and motile invertebrates may be affected due to temporary increases in turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. It is expected that these species will relocate during construction and return shortly after completion of construction activities. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Action Taken to Minimize Impacts

A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

D. Contaminant Determinations

Materials to be used for construction (i.e. clean fill) will come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction could block gills of nekton, however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during excavation or construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated.
   c) Mud Flats – No adverse impacts are anticipated.
   d) Vegetated Shallows – No adverse impacts are anticipated.
   e) Bay Shoreline – N/A

IV. Finding of Compliance or Non-Compliance with the Restrictions on Discharge

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

B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section

404(b)(1) guidelines (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

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

D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).

F. The proposal will have no impact on marine sanctuaries designated by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)1 EVALUATION REPORT
BRONXVILLE LAKE ECOSYSTEM RESTORATION PROJECT
WESTCHESTER, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of replanting areas around the lake banks where 2,800 cubic yards of topsoil will be placed.

B. Quantity of Materials

1. Based upon conceptual design, approximately 2800 cubic yards of topsoil is required to restore the ecosystem.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil that will be conducive for native species growth. The material will be tested before being brought to the Bronxville Lake area.

II. Description of the Proposed Project Site

A. The project area is within a park that is part of the Bronx River Parkway Reservation in Westchester County, NY. The site is subject to nutrient-enriched runoff from the park and several drainage pipes that empty into the lake from the parkway and upland areas.

B. The recommended plan for Bronxville Lake will improve aquatic habitat, water quality, and flow regime. Invasive species removal and replanting with native upland trees and shrubs will occur in 1.39 acres of the northwest portion of the site along the Bronx River Parkway and in a small area along the southeast portion of the lake. Narrow strips of emergent vegetation will be created along 0.86 acres of the lake banks. Sections of the lake bottom will be filled and 2.49 acres of forested and scrub/shrub wetlands will be created in these areas; the remainder of the lake bottom will be retained in open water habitat. Sediment within two sections of the channel and adjacent lake bottom will be dredged. The bed of the channel will be restored by excavating the bottom and installing bedding stone along 0.65 acres. A 0.3 acres rip rap forebay will be constructed in the river channel upstream of the lake to cause sediment to settle out of flow. The existing rock weir at the southern end of the lake will be modified to facilitate fish passage, opening new habitat in the Bronx River to anadromous and catadromous fish. Due to the proximity of major arterial infrastructure, shorelines were engineered with excessive armor of concrete.

Additional restoration measures for Bronxville Lake site include installation of vegetated swales, bioretention basins, rain gardens at three locations to reduce sediment load to river, and improved public access.

In total 56,200 CY of material will be excavated during construction. 28,100 CY of material will be excavated from the shoreline, 21, 900 CY of material will be excavated during channel realignment; this material will beneficially reused on site to the extent possible. 4,100 CY of material excavated in clearing and grubbing activities for the forested scrub/shrub wetland and emergent wetland; similarly, 2, 100 CY of material will be removed during clearing and grubbing of invasive species and native plantings activities throughout the site, these materials will be removed from the site.

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Bronxville Lake site will begin in 2031 and have a 14-month construction duration (completed in 2032).

E. Description of Disposal/First Placement Methods

Construction equipment such as hydraulic excavators, barges, and tugs will be utilized.

III. FACTUAL DETERMINATIONS

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

   Native vegetation will be planted from the lake bottom, for forested and scrub/shrub wetland creation, to the upland areas of Bronxville Lake.

2. Sediment Type

   Sediments similar to those present in the area will be utilized.

3. Dredged Fill/Material Movement

   There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

   No long-term impacts are anticipated for benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporary increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water Quality
   a) Salinity – No adverse impacts are expected.
   b) Water Chemistry (pH, etc.) – No adverse impacts are expected.
   c) Clarity – Temporary increases in turbidity may occur during construction of the fish ladder. However, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
   d) Color – Possible minor short-term change during construction.
   e) Odor – Not measurable.
   f) Test – N/A
   g) Nutrients – N/A
   h) Eutrophication – N/A
   i) Others as Appropriate –N/A
2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current pattern and flow may occur during channel dredging. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A
   c) Stratification – N/A
3. Normal Water Fluctuations – N/A
4. Salinity Gradients – Not Applicable.
5. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in Vicinity of Construction Site(s).

   Temporary increases in turbidity due to construction activity is expected but will be minimized by best management practices.

2. Chemical and Physical Properties of Water Column

   a) Light Penetration – Particles will settle fairly rapidly. Minor impacts are anticipated only during construction.

   b) Dissolved Oxygen

      Possible short-term impact due to in water disturbance of particulates during construction. However, proposed restoration work would result in fewer low dissolved oxygen events at the site.

   c) Toxic Metals and Organics

      Preliminary testing of soils has shown contaminant types and levels expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.

   d) Pathogens – N/A.

   e) Aesthetics

      During construction, visual access may be temporarily restricted, however, will return to their current levels post-construction.

   f) Others as Appropriate – N/A

3. Biota

   a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

   b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction, however best management practices will be employed to minimize these potential impacts.

   c) Sight Feeders – Fish and motile invertebrates may be affected due to temporary increases in turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. It is expected that these species will relocate during construction and return shortly after completion of construction activities. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Action Taken to Minimize Impacts

A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

D. Contaminant Determinations

Materials to be used for construction (i.e. topsoil) will come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction could block gills of nekton, however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during excavation or construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
    a) Sanctuaries and Refuges – N/A
    b) Wetlands – No long-term adverse impacts are anticipated.
    c) Mud Flats – No adverse impacts are anticipated.
    d) Vegetated Shallows – No adverse impacts are anticipated.
    e) Bay Shoreline – N/A

IV. Finding of Compliance or Non-Compliance with the Restrictions on Discharge

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

B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designated by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)1 EVALUATION REPORT
GARTH WOODS/HARNEY ROAD ECOSYSTEM RESTORATION PROJECT
WESTCHESTER, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of replanting areas along both banks at the southern portion of the site and areas in the northernmost portion of the site where 1,250 cubic yards of common fill and 4,300 cubic yards of topsoil will be placed.

B. Quantity of Materials

1. Based upon conceptual design, approximately 1,250 cubic yards of common fill and 4,300 cubic yards of topsoil is required to restore the ecosystem.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil that will be conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. The project area is located north of Harney Road in Westchester County, NY and is bordered to the east and west by the Bronx River Parkway. The site contains thin strips of sparsely vegetated wetlands at Garth Woods and at Harney Road wetlands, often less than two feet wide. The broad and shallow channel and narrow wetland areas provide limited habitat for aquatic species.

B. At the Harney Road site, 2.19 acres of the river channel will be modified upstream of Harney Road and a short off-site section of the river channel downstream of the weir by replacing bed material and constructing instream cross vanes. Modification of the existing weir at the southern end of site, removing 30 cubic yards of concrete, will promote fish passage and provide new habitat for catadromous and anadromous fish species between Harney Road and Kensico Dam. 200 linear feet of the west bank downstream of the weir will be softened by constructing a stacked rock wall with brush layer. Along both shores of the river, 0.82 acres of emergent wetlands will be created. Invasive removal and native species plantings will occur between the emergent wetlands on the east shore and the paved path. Installation of a raingarden/bioretention area at the upstream end of the buried storm drain will control erosion and reduce sediment loads to the river. Finally, a 1.67 acre wet meadow will be created in the lawn area on the west side of the Bronx River Parkway.

The Garth Woods restoration project is restricted to the northernmost section of the site to complement future habitat enhancement to be performed by Westchester County. On the west bank of the river at the upstream end of the site, 0.57 acres of forested and scrub/shrub wetlands will be created. Invasive species removal with native plantings will occur along the lawn adjacent to the created wetlands, on both sides of the paved path and near the northern border of the site. Wetland creation will increase biodiversity, improve aquatic habitat and water quality, and increase flood control at both sites.

In total 7,260 CY of material will be excavated during clearing and grubbing for invasive species and native plantings activities and emergent wetland, wet meadow, forested scrub/shrub wetland creation.

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Garth Woods & Harney Road site will begin in 2027 and have a 10-month construction duration (completed in 2027).

E. Description of Disposal/First Placement Methods

Construction equipment such as hydraulic excavators and hydraulic hammers will be utilized.

III. FACTUAL DETERMINATIONS

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

   Native vegetation will be planted from the tidal zone, for emergent wetland creation, to the upland areas of Garth Woods/Harney Road.

2. Sediment Type

   Sediments similar to those present in the area will be utilized.

3. Dredged Fill/Material Movement

   There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

   No long-term impacts are anticipated for benthic species. There will be temporary impacts to benthic species, especially filter feeders, during construction due to temporary increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water Quality
   a) Salinity – No adverse impacts are expected.
   b) Water Chemistry (pH, etc.) – No adverse impacts are expected.
   c) Clarity – Temporary increases in turbidity may occur during construction of the fish ladder. However, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
   d) Color – Possible minor short-term change during construction.
   e) Odor – Not measurable.
   f) Test – N/A
   g) Nutrients – N/A
   h) Eutrophication – N/A
   i) Others as Appropriate –N/A
2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current pattern and flow may occur during channel dredging. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A
   c) Stratification – N/A
3. Normal Water Fluctuations – N/A
4. Salinity Gradients – Not Applicable.
5. Actions Taken to Minimize Impacts

   A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in Vicinity of Construction Site(s).

   Temporary increases in turbidity due to construction activity is expected but will be minimized by best management practices.

2. Chemical and Physical Properties of Water Column

   a) Light Penetration – Particles will settle fairly rapidly. Minor impacts are anticipated only during construction.

   b) Dissolved Oxygen

      Possible short-term impact due to in water disturbance of particulates during construction. However, proposed restoration work would result in fewer low dissolved oxygen events at the site.

   c) Toxic Metals and Organics

      Preliminary testing of soils has shown contaminant types and levels expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.

   d) Pathogens – N/A.

   e) Aesthetics

      During construction, visual access may be temporarily restricted, however, will return to their current levels post-construction.

   f) Others as Appropriate – N/A

3. Biota

   a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

   b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction, however best management practices will be employed to minimize these potential impacts.

   c) Sight Feeders – Fish and motile invertebrates may be affected due to temporary increases in turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. It is expected that these species will relocate during construction and return shortly after completion of construction activities. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Action Taken to Minimize Impacts

A detailed alternative analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

D. Contaminant Determinations

Materials to be used for construction (i.e. topsoil) will come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction could block gills of nekton, however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during excavation or construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated.
   c) Mud Flats – No adverse impacts are anticipated.
   d) Vegetated Shallows – No adverse impacts are anticipated.
   e) Bay Shoreline – N/A

IV. Finding of Compliance or Non-Compliance with the Restrictions on Discharge

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

B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-4 Chapter 9, with supporting analysis in Chapters 11 – 13).

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

D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).

F. The proposal will have no impact on marine sanctuaries designated by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
FLUSHING CREEK AQUATIC ECOSYSTEM RESTORATION PROJECT
QUEENS, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of the extensive intertidal and subtidal mudflats of Flushing Creek, bounded by Roosevelt Ave to the north, the Long Island Rail Road to the south, and the Van Wyck Expressway to the east, where a total of 72,636 cubic yards (CY) of clean fill will be placed. A total of 39,015 CY of material will be excavated, of which 26,815 CY will be placed in uplands and 12,200 CY will be removed from the site.

B. Quantity of Materials

1. Based upon conceptual design, approximately 72,636 CY of clean fill is required to restore the habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Area: The project site is located in a highly urbanized area in Queens, New York. In preparation for the World's Fair in 1939, there was significant stream straightening, filling of wetland areas, and headwater reconfiguration of Flushing Creek. Continued development in the area is leading to loss and degradation of tidal wetlands. Remaining wetlands are dominated by invasive species and limited to fringe areas. Currently, the site has low ecological value suffering from bank erosion, profusion of invasive species, low benthic and fish abundance and diversity, and poor water quality.

B. Preferred Alternative Description: The recommend design includes re-grading existing common reed-dominated marsh as well as conversion of existing mudflat areas to low marsh. High marsh and scrub shrub area will be established in the transitional zones between low marsh and upland maritime forest. The existing upland forest will be restored to a more diverse and functional maritime forest community. Finally, re-contouring along the mudflat will address issues of water quality and provide the appropriate hydrology necessary for persistence of the created habitat.

In total 39,015 CY of excavation will take place throughout the site with 12,200 CY to be taken off site and 26,815 CY to be beneficially re-used onsite to create upland habitat. Invasives (Phragmites) would be removed along with 1feet root mat and would be placed off-site. Other invasive species may be smothered or left on site in riparian area if not part of active restoration actions. Material excavated to create wetlands will be kept on-site and placed in upland and/or adjacent areas as needed. Cover requirements including 2-feet of cover in upland/riparian areas and 1-feet cover in wetland areas.

In total this design will restore 9.76 acres of low marsh, 2.47 acres of high marsh, and 1.8 acres of scrub/ shrub, and 3.89 acres of maritime forest.

C. There are no adverse impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Flushing Creek site will begin in 2025 and have a 10-month construction duration (completed in 2025).

E. Description of Disposal/Fill Placement Methods
Construction equipment, such as tractors, will be utilized to place clean fill at the site.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope
Native vegetation will be planted from the tidal zone, for intertidal wetland, to the upland and forested/scrub-shrub portions of the site.

2. Sediment Type
Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement
There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos
No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity. A sand cap will be placed over the newly dredged area to provide a clean substrate for benthic habitat. Use of best management practices during construction will minimize adverse impacts.

5. Other Effects
No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-3 Chapter 6 with supporting materials in Chapters 7 – 8.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality
   - a) Salinity – No adverse impacts are anticipated.
   - b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
   - c) Clarity – Minor impacts may occur only during construction. Overall, the project goals are to improve water quality, including clarity.
   - d) Color – Minor short-term changes in color during construction are possible.
   - e) Odor – No measureable impacts are anticipated. Dredging activities will remove sediments that are exposed at low tide and contribute to nuisance odors.
   - f) Test – N/A
   - g) Nutrients – No adverse impacts to nutrients are anticipated.
   - h) Eutrophication – N/A
   - i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   - a) Current Patterns and Flow – Temporary changes in current patterns and flow may occur during ecosystem restoration. However, proper planning and best management practices will limit these disturbances.
   - b) Velocity – N/A
   - c) Stratification – N/A

3. Normal Water Fluctuations – Water fluctuations are primarily influenced by the tides of the region and are not expected to be affected by the restoration work.

4. Salinity Gradients – No impacts are anticipated.

5. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-3 Chapter 6 with supporting materials in Chapters 7 – 8.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)

There is potential for increased sedimentation and turbidity. Best management practices will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column

a) Light Penetration – Possible short-term impacts during construction, but particles will settle quickly.
b) Dissolved Oxygen – Possible short-term impacts due to disturbance of particulates during construction. However, the proposed restoration work would result in fewer low dissolved oxygen events at the site.
c) Toxic Metals and Organics – Preliminary soil testing revealed the presence of contaminants. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. Restoration of the site will provide nutrient and toxicant filtration, which will help improve water quality.
d) Pathogens – N/A
e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to the current conditions post-construction. The project will preserve and restore natural habitat along the Flushing Creek, thereby enhancing the area's scenic resources.
f) Others as Appropriate – N/A

3. Biota
    a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
    b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction; however, best management practices will be employed to minimize these impacts.
    c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-3 Chapter 6 with supporting materials in Chapters 7 – 8.

D. Contaminant Determinations

Materials to be used for construction (ie. clean fill) will be free of contaminants and come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated. There may be short-term impacts during construction; however, the proposed plan is expected to result in an increase in tidal wetlands.
   c) Mud Flats – No long-term adverse impacts are anticipated.
   d) Vegetated Shallows – No adverse impacts are anticipated.
   e) Bay Shoreline – N/A

IV. Finding of Compliance or Non-Compliance with the Restrictions on Discharge

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-3 Chapter 6 with supporting materials in Chapters 7 – 8).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal is not likely to adversely affect endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

Lower Passaic River/Hackensack River/
Newark Bay Planning Region
404(b)(1) Analysis

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
BRANCH BROOK PARK AQUATIC ECOSYSTEM RESTORATION PROJECT
NEWARK, NEW JERSEY

I. General Description of Fill Material

A. General Characteristics of Material
   1. Areas impacted by the ecosystem restoration will consist primarily of approximately 4,200 linear feet of Branch Brook and three larger pond features, where a total of 92,020 cubic yards will be excavated and approximately 27,070 cubic yards of common fill, clean fill, and topsoil will be placed.

B. Quantity of Materials
   1. Based upon conceptual design, approximately 27,070 cubic yards of clean topsoil fill is required to restore the habitat.

C. Source of Materials
   1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Area: The Branch Brook Park site is located in Newark, New Jersey. The park is surrounded by commercial and residential developments and roadways. The stream and forest areas within the park experience considerable amounts of anthropogenic trash and are dominated by non-native, invasive vegetation. Ponds at the site suffer from algal blooms and eutrophication from excess nutrient runoff.

B. Preferred Alternative Description: The recommended plan for this site will enhance both terrestrial and aquatic habitats. Bed restoration in the form of pond deepening and stream naturalization will occur along 18.09 acres of aquatic habitat. Restoration measures also include 8.9 acres of invasive species removal and native plantings, 8.8 acres of forested/scrub-shrub wetland creation, and 10.25 acres of enhanced emergent wetlands. 3,170 CY will be excavated during stream naturalization and 55,020 CY will be excavated for pond deepening.

C. There are no adverse impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

   It is anticipated that construction at the Essex County Branch Brook Park site will begin in 2031 and have a 23-month construction duration (completed in 2032).

E. Description of Disposal/Fill Placement Methods

Construction equipment such as hydraulic excavators, pumps, barges, and tugs will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

Native vegetation will be planted in the upland and forested/scrub-shrub portions of the site.

2. Sediment Type

Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement

There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.

c) Clarity – Temporary increases in turbidity and sedimentation may occur during localized construction of the habitat restoration; however, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.
f) Test – N/A
g) Nutrients – N/A
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – Temporary changes in current patterns and flow may occur during stream naturalization and pond deepening. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A
   c) Stratification – N/A

3. Normal Water Fluctuations – N/A

4. Salinity Gradients – N/A

5. Actions Taken to Minimize Impacts
   A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

C. Suspended Particulate/Turbidity Determinations
   1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)
      Restoration will require in-water work and an increase in sedimentation and turbidity is anticipated. Best management practices will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column

a) Light Penetration – Minor impacts are anticipated only during construction and sediments are expected to settle quickly.
b) Dissolved Oxygen – Possible short-term impacts due to in-water particulate disturbance during construction; however, the proposed restoration would result in fewer low dissolved oxygen events at the site.
c) Toxic Metals and Organics – Preliminary testing has shown contaminant types and levels as would be expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.
d) Pathogens – N/A
e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to the current conditions post-construction. The project will preserve and restore natural habitat in Branch Brook Park, thereby enhancing the area's scenic resources.
f) Others as Appropriate – N/A

3. Biota

a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
b) Suspension/Filter Feeders – Minor, short-term impacts may occur during construction; however, best management practices will minimize these potential impacts.
c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an

analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

D. Contaminant Determinations
Materials to be used for construction (ie. fill and topsoil) will be free of contaminants and come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations
1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
a) Sanctuaries and Refuges – N/A
b) Wetlands – No long-term adverse impacts are anticipated.
c) Mud Flats – N/A
d) Vegetated Shallows – No long-term adverse impacts are anticipated.
e) Bay Shoreline – N/A

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).

F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
METROMEDIA AQUATIC ECOSYSTEM RESTORATION PROJECT
CARLSTADT, NEW JERSEY

I. General Description of Fill Material

A. General Characteristics of Material
   1. Areas impacted by restoration will consist of gradually sloped mud banks and bottoms of the Hackensack River where a total of 41,000 cubic yards (CY) of clean fill will be placed. A total of 38,000 CY of material will be excavated and removed from the site.

B. Quantity of Materials
   1. Based upon conceptual design, approximately 41,000 CY of clean fill is required to restore the habitat.

C. Source of Materials
   1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Area: The Metromedia track is located in Carlstadt, Bergen County, New Jersey. The site is bordered by the Hackensack River to the east and south and by the Marsh Resources Meadowlands Mitigation Bank to the north. The site is underdeveloped and dominated by common reed. The property also likely contains fill from unknown sources during construction of nearby radio towers.

B. Preferred Alternative Description: The recommended plan will increase diversity and improve fish and wildlife habitat as well as improving flood storage and water quality. 38,000 CY of material will be excavated and replaced with 41,000 CY of clean fill over an area of 67.3 acres.

   Three (3) tidal channels are proposed and existing channels will be enhanced, totaling approximately 6,270 linear feet, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

   Low marsh will be planted with Spartina alterniflora. High marsh will be planted with grasses (Distichlis spicata and Spartina patens) and shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica). If determined to be necessary, herbivory fencing will be used to protect the low and high marsh zones from grazing by geese and other birds. 6-foot high construction fence will be used to create 50’ x 50’ cells within the low and high marsh zones.

For scrub shrub upland areas, the proposed areas will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species appropriate for a scrub-shrub vegetation community. Two feet of clean growing medium will be placed prior to planting. Grass plugs (Ammophila breviligulata) will be planted along with Forbs, Whip Shrubs and Gallon-size shrubs which include Baccharis halimfolia, Iva frutescens and Myrica penslvanica. Scrub-shrub planting also includes seeding of the area with a warm season/ grassland native seed mix.

For the creation of Maritime forest, the area will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species. Two feet of clean growing medium will be placed prior to planting. Ferns and forbs, gallon-size shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica), three types of trees will be planted, including 1-feet to 4-feet canopy trees, 5-feet to 6-feet whip canopy trees and 1-gallon understory trees. Maritime forest planting also includes seeding of the area with a warm season/ grassland native seed mix.

In total this design will create 26.5 acres of low marsh, 11.7 acres of high marsh, and 9.7 acres of scrub shrub, and 4.1 acres of maritime upland habitat.

C. There are no adverse impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Metromedia Track site will begin in 2029 and have a 14-month construction duration (completed in 2030).

E. Description of Disposal/Fill Placement Methods
Construction equipment, such as a hydraulic excavator, will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope
Native vegetation will be planted from the tidal zone, for emergent wetland, to the upland and forested/scrub-shrub portions of the site.

2. Sediment Type
Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement
There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality
   a) Salinity – No adverse impacts are anticipated.
   b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
   c) Clarity – N/A
   d) Color – Minor short-term changes in color during construction are possible.
   e) Odor – No measureable impacts are anticipated.
   f) Test – N/A
   g) Nutrients – No adverse impacts to nutrients are anticipated. Overall, the project goals are to improve water quality, including nutrient filtration.
   h) Eutrophication – N/A
   i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – The construction site is primarily land-based or within the tidal zone. Temporary changes in current patterns and flow may occur during channel enhancement. However, proper planning and best management practices will limit these disturbances.
   b) Velocity – N/A

c) Stratification – N/A

3. Normal Water Fluctuations – The site receives minimal inundation by the tides of the region and water fluctuations are not expected to be affected by the restoration work.

4. Salinity Gradients – No impacts are anticipated.

5. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)

Restoration will occur primarily on land or within the tidal zone. However, some in-water work, with the potential for increased sedimentation and turbidity, may occur. Best management practices will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column

a) Light Penetration – N/A

b) Dissolved Oxygen – Possible short-term impacts due to disturbance of particulates during construction. However, the proposed restoration work would result in fewer low dissolved oxygen events at the site.

c) Toxic Metals and Organics – The project site likely contains fill from unknown sources during construction of nearby radio towers. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. Restoration of the site will also provide nutrient and toxicant filtration, which will help improve water quality.

d) Pathogens – N/A

e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to the current conditions post-construction. The project will preserve and restore natural habitat along the Hackensack River, thereby enhancing the area's scenic resources.
f) Others as Appropriate – N/A

3. Biota
a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction; however, best management practices will be employed to minimize these impacts.
c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

D. Contaminant Determinations
Materials to be used for construction (ie. fill and topsoil) will be free of contaminants and come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations
1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
    a) Sanctuaries and Refuges – No long-term adverse impacts are anticipated.
    b) Wetlands – No long-term adverse impacts are anticipated.
    c) Mud Flats – No long-term adverse impacts are anticipated.
    d) Vegetated Shallows – N/A
    e) Bay Shoreline – N/A

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
MEADOWLARK AQUATIC ECOSYSTEM RESTORATION PROJECT
RIDGEFIELD, NEW JERSEY

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by restoration will consist of the mudflat and common reed stand and root mat banks along Bellmans Creek where a total of 29,200 cubic yards (CY) of clean fill will be placed. A total of 64,400 CY of material will be excavated and removed from the site.

B. Quantity of Materials

1. Based upon conceptual design, approximately 29,200 CY of clean fill is required to restore the habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for native species growth. The material will be tested before being brought to the project area.

II. Description of the Proposed Project Site

A. Project Area: Meadowlark Marsh is bounded to the south by Bellmans Creek, to the north and west by the New Jersey Turnpike – Eastern Spur, and to the east by 83rd street and active railroad tracks in Ridgefield, Bergen County, NJ. The upland area of the site is currently used as a dirt track for off-road vehicles, limiting the habitat available in upland areas. Pesticide overspray into a portion of the site from the utility right-of-way has been observed.

B. Preferred Alternative Description: Restoration efforts at the site will improve fish and wildlife habitat as well as flood storage and nutrient and toxicant filtration for runoff from the surrounding developed areas. The entire site (71.5 acres) will be graded, with 64,400 CY of excavated material taken off site, approximately 53,600 cubic yards resulting from clearing and grubbing operations. High marsh and upland areas will be brought up to grade with 29,200 CY of fill and capped with clean material.

A broken culvert at the western edge of the middles of the site is restricting tidal flow and will have to be replaced. It is assumed that the culvert will be a 6-foot concrete box culvert, approximately 50 feet long. Four (4) tidal channels are proposed and existing channels will be enhanced, totaling approximately 7,700 linear feet, which will be extended into the site to enable tidal exchange within the sites, helping to sustain the planted wetlands and other vegetation communities. Tidal channel inverts are set at an elevation below MTL to ensure flow more than 50% of the time.

Low marsh will be planted with Spartina alterniflora. High marsh will be planted with grasses (Distichlis spicata and Spartina patens) and shrubs (Baccharis halimfolia, Iva frutescens and Myrica penslvanica). If determined to be necessary, herbivory fencing will be used to protect the low and high marsh zones from grazing by geese and other birds. 6-foot high construction fence will be used to create 50' x 50' cells within the low and high marsh zones.

For scrub shrub upland areas, the proposed areas will be cleared and grubbed of all existing invasive species, re-graded and planted with native salt-tolerant species appropriate for a scrub-shrub vegetation community. Two feet of clean growing medium will be placed prior to planting. Grass plugs (Ammophila breviligulata) will be planted along with Forbs, Whip Shrubs and Gallon-size shrubs which include Baccharis halimfolia, Iva frutescens and Myrica penslvanica. Scrub-shrub planting also includes seeding of the area with a warm season/ grassland native seed mix.

In total this design will create 56.2 acres of low marsh, 6.5 acres of high marsh, 5.4 acres of scrub shrub, and 4.6 acres of channels.

C. There are no adverse impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Meadowlark Marsh site will begin in 2033 and have a 13-month construction duration (completed in 2034).

E. Description of Disposal/Fill Placement Methods

Construction equipment, such as hydraulic excavators, will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

   Native vegetation will be planted from the tidal zone, for emergent wetland, to the upland and forested/scrub-shrub portions of the site.

2. Sediment Type

   Sediments similar to those present in the area will be utilized.

3. Dredged/Fill Material Movement

   There are no impacts to wetlands and streams as a result of fill from the ecosystem restoration.

4. Physical Effects on Benthos

   No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
c) Clarity – Minor impacts may occur only during construction. Overall, the project goals are to improve water quality, including clarity.
d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.
f) Test – N/A
g) Nutrients – No adverse impacts to nutrients are anticipated. Overall, the project goals are to improve water quality, including nutrient filtration.
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation

a) Current Patterns and Flow – The construction site is primarily land-based or within the tidal zone. Temporary changes in current patterns and flow may occur during channel enhancement. However, proper planning and best management practices will limit these disturbances.
b) Velocity – N/A

c) Stratification – N/A

3. Normal Water Fluctuations – Water fluctuations are primarily influenced by the tides of the region and are not expected to be affected by the restoration work.

4. Salinity Gradients – No impacts are anticipated.

5. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)

There is potential for increased sedimentation and turbidity. Best management practices will minimize these impacts and protect the water quality of surrounding resources.

2. Chemical and Physical Properties of Water Column

a) Light Penetration – N/A
b) Dissolved Oxygen – Possible short-term impacts due to disturbance of particulates during construction. However, the proposed restoration work would result in fewer low dissolved oxygen events at the site.
c) Toxic Metals and Organics – Utility access road and historic fill bisect the site. Pesticide overspray into a portion of the site from the utility right-of-way has been observed. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. Restoration of the site will provide nutrient and toxicant filtration, which will help improve water quality.
d) Pathogens – N/A
e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to the current conditions post-

construction. The project will preserve and restore natural habitat along the Hackensack River and Bellmans Creek, thereby enhancing the area's scenic resources.

f) Others as Appropriate – N/A

3. Biota

a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

b) Suspension/Filter Feeders – Minor short-term impacts may occur during construction; however, best management practices will be employed to minimize these impacts.

c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. This analysis is presented in the Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14.

D. Contaminant Determinations

Materials to be used for construction (ie. clean fill) will be free of contaminants and come from a permitted source. Materials being excavated will be tested for re-use on site prior to construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.

2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely swim away from the immediate disturbance area.

3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.

4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.

5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated.
   c) Mud Flats – No long-term adverse impacts are anticipated.
   d) Vegetated Shallows – N/A
   e) Bay Shoreline – N/A

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the ecosystem restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-5 Chapter 9 with supporting materials in Chapters 11 – 14).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

Oyster Reefs

404(b)(1) Analysis

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
NAVAL WEAPONS STATIONS (NWS) EARLE AQUATIC ECOSYSTEM RESTORATION PROJECT
MIDDLETOWN, NEW JERSEY

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by the oyster restoration will consist primarily in the area near the Naval Weapons Station Earle in Sandy Hook Bay where 350 cubic yards of clean fill will be placed.

B. Quantity of Materials

1. Based upon conceptual design, approximately 350 cubic yards of clean fill is required to restore oyster reef habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for oyster reef growth. The material will be tested before being brought to the NWS Earle project area.

II. Description of the Proposed Project Site

A. Project Area: The NWS Earle site is located in Sandy Hook Bay, New Jersey. Water depths at this site vary at the pier out into the channel from 12 to 40 feet. Previous oyster restoration studies by NY/NJ Baykeeper have been conducted at NWS Earle. There are no risks of oyster poaching at this site due to the proximity of the naval base. The United States Fish and Wildlife Service (USFWS) notes that the sediments of Raritan Bay and Sandy Hook Bay are predominantly sand, with some areas of gravelly sand overlaid with coarse to fine silt and fine to very fine sand, respectively (USFWS, 1997). Current speeds in the project area, based on NOAA current mapping, are usually less than one (1) knot.

B. Preferred Alternative Description: The recommended plan creates 10 acre oyster reef through installation of 1,010 oyster pyramids with 30 oyster castle blocks per pyramid and creation of 350 CY of spat-on-shell (SoS).

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Naval Station Earle site will begin in 2025 and have an 8-month construction duration (completed in 2025).

E. Description of Disposal/Fill Placement Methods

Construction equipment such as barges, cranes, boats, and divers will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope
Water depths at the NWS Earle vary from one (1) to 12 feet out to approximately the midpoint of the pier. Toward the end of the pier, water depths are 12 to 16 feet and reach over 40 feet out past the pier.

2. Sediment Type
Sediments to be placed in the project area include spat-on-shell.

3. Dredged/Fill Material Movement
There are no impacts to wetland and streams as a result of fill from the habitat restoration.

4. Physical Effects on Benthos
No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects
No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts
A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
c) Clarity – Temporary increases in turbidity may occur during localized construction of the habitat restoration; however, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.
f) Test – N/A

g) Nutrients – N/A
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – Current patterns and flow may be affected by the restoration work. Oyster reefs may act as natural wave attenuators, protecting nearby shorelines and other aquatic, tidal, and terrestrial habitats.
   b) Velocity – N/A
   c) Stratification – N/A
3. Normal Water Fluctuations – Water fluctuations are primarily affected by the tidal cycles of the region and are not expected to be affected by the restoration work.
4. Salinity Gradients – N/A
5. Actions Taken to Minimize Impacts - A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)
   Restoration will require in-water work and increased sedimentation and turbidity is anticipated. Best management practices will minimize these impacts and protect the water quality of surrounding resources.
2. Chemical and Physical Properties of Water Column
   a) Light Penetration – Minor impacts are anticipated only during construction and sediments are expected to settle quickly.
   b) Dissolved Oxygen – Possible short-term impacts due to in-water particulate disturbance during construction; however, the proposed restoration would result in fewer low dissolved oxygen events at the site.
   c) Toxic Metals and Organics – Contaminated sediments may be present in the project area due to historical use of the site. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, effectively filtering nutrients, sediment and phytoplankton from the water column.
   d) Pathogens – N/A
   e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to current conditions post-

construction. The project will preserve and restore natural habitat in Sandy Hook Bay, thereby enhancing the area's scenic resources.

f) Others as Appropriate – N/A

3. Biota
   a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
   b) Suspension/Filter Feeders – Minor, short-term impacts may occur during construction; however, best management practices will minimize these potential impacts.
   c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.
4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

D. Contaminant Determinations

Materials to be used for construction will be free of contaminants and come from a permitted source. The material will be tested before being brought to the NWS Earle project area.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely relocate to adjacent areas during construction disturbances.
3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
   a) Sanctuaries and Refuges – N/A
   b) Wetlands – No long-term adverse impacts are anticipated.
   c) Mud Flats – N/A
   d) Vegetated Shallows – N/A
   e) Bay Shoreline – No adverse impacts are anticipated.

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

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

B. Several alternatives to the oyster reef restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5).

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

D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).

F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
BUSH TERMINAL AQUATIC ECOSYSTEM RESTORATION PROJECT
BROOKLYN, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by the oyster restoration will consist primarily of the area near the southeastern portion of Upper Bay where 76,680 cubic yards of clean fill will be placed.

B. Quantity of Materials

1. Based upon conceptual design, approximately 76,680 cubic yards of clean fill is required to restore the habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for oyster reef growth. The material will be tested before being brought to the Bush Terminal project area.

II. Description of the Proposed Project Site

A. Project Area: The Bush Terminal site consists of eroding piers south of the Gowanus Canal on the western shore of Brooklyn. The piers were used for shipping during the industrial era. Due to this, as well as known historical dumping and the proximity to the Gowanus Canal, some level of contaminants may be present in the sediment. Water depth at the site varies from shallow to deep, allowing for good habitat diversity. Substrates identified by the NYSDEC include silt and silty snad (NYSDEC Benthic Mapper, 2015).

B. Preferred Alternative Description: The recommended plan for Bush Terminal would provide public access, awareness, and opportunities for future studies. Restoration measures for this site include 1,100 oyster gabions and 76,680 CY of spat-on-shell (SoS) to create 31.9 acre oyster reef.

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Bush Terminal site will begin in 2029 and have a 7-month construction duration (completed in 2029).

E. Description of Disposal/Fill Placement Methods
Construction equipment such as barges, cranes, boats, and divers will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

The project footprint for this site is completely submerged. Water depths range from intertidal along the shoreline to approximately 16 feet out to the ends of the remains of the old piers.

2. Sediment Type

Sediments to be placed in the project area include spat-on-shell.

3. Dredged/Fill Material Movement

There are no impacts to wetland and streams as a result of fill from the oyster reef restoration.

4. Physical Effects on Benthos

No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
c) Clarity – Temporary increases in turbidity and sedimentation may occur during localized construction of the habitat restoration; however, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.
f) Test – N/A
g) Nutrients – N/A
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation
    a) Current Patterns and Flow – Current patterns and flow may be affected by the restoration work. Oyster reefs may act as natural wave attenuators, protecting nearby shorelines and other aquatic, tidal, and terrestrial habitats.
    b) Velocity – N/A
    c) Stratification – N/A
3. Normal Water Fluctuations – Water fluctuations are primarily affected by the tidal cycles of the region and are not expected to be affected by the restoration work.
4. Salinity Gradients – N/A
5. Actions Taken to Minimize Impacts - A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

C. Suspended Particulate/Turbidity Determinations
1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)
   Restoration will require in-water work and increased sedimentation and turbidity is anticipated. Best management practices will minimize these impacts and protect the water quality of surrounding resources.
2. Chemical and Physical Properties of Water Column
    a) Light Penetration – Minor impacts are anticipated only during construction and sediments are expected to settle quickly.
    b) Dissolved Oxygen – Possible short-term impacts due to in-water particulate disturbance during construction; however, the proposed restoration would result in fewer low dissolved oxygen events at the site.
    c) Toxic Metals and Organics – Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.
    d) Pathogens – N/A
    e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to the current conditions post-construction. The project will preserve and restore natural habitat in Upper Bay, thereby enhancing the area’s scenic resources.
    f)
    g) Others as Appropriate – N/A

3. Biota
    a) Primary Production, Photosynthesis – No adverse impacts are anticipated.
    b) Suspension/Filter Feeders – Minor, short-term impacts may occur during construction; however, best management practices will minimize these potential impacts.
    c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.
4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

D. Contaminant Determinations

Materials to be used for construction will be free of contaminants and come from a permitted source. The material will be tested before being brought to the Bush Terminal project area.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites
    a) Sanctuaries and Refuges – N/A
    b) Wetlands – No long-term adverse impacts are anticipated.
    c) Mud Flats – N/A
    d) Vegetated Shallows – N/A
    e) Bay Shoreline – No long-term adverse impacts are anticipated.

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

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

B. Several alternatives to the oyster reef restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

CLEAN WATER ACT 404(B)(1) EVALUATION REPORT
HEAD OF JAMAICA BAY AQUATIC ECOSYSTEM RESTORATION PROJECT
QUEENS, NEW YORK

I. General Description of Fill Material

A. General Characteristics of Material

1. Areas impacted by the oyster restoration will consist primarily of the muddy area near the head of Jamaica Bay where 16,840 cubic yards of clean fill will be placed.

B. Quantity of Materials

1. Based upon conceptual design, approximately 16,840 cubic yards of clean fill is required to restore oyster reef habitat.

C. Source of Materials

1. Sources for fill material may include commercial sources proximal to the project area or offsite composition of soil conducive for oyster reef growth. The material will be tested before being brought to the Head of Jamaica Bay project area.

II. Description of the Proposed Project Site

A. Project Area: Head of Jamaica Bay is located in the northeast section of Jamaica Bay, adjacent to JFK Airport. Salt marsh habitat fringes much of the shoreline area. The bottom is steeply sloped close to the shoreline, with depths of up to 33 feet. Substrate in the area is primarily mud. Based on the nearest tidal current station in Jamaica Bay (Grass Hassock Channel), the current speeds in the eastern portion of the bay rarely exceed one (1) knot, making Head of Bay well suited for larval settlement and oyster restoration.

B. Preferred Alternative Description: The recommended plan will creates 10.1 acres of oyster reef through the placement of 9.85 acres of spat on shell placed on a substrate composed of shell and crushed porcelain. Structural complexity is created through placement of 337 gabions, 150 oyster castles and 470 super trays throughout the project area. The layer of substrate and spat on shell will be 12 inches thick and have a volume of 16, 840 cubic yards.

C. There are no impacts to wetlands.

D. Time and Duration of Disposal/Fill Placement

It is anticipated that construction at the Jamaica Bay – Head of Bay site will begin in 2027 and have a 4-month construction duration (completed in 2027).

E. Description of Disposal/Fill Placement Methods
Construction equipment such as barges, cranes, boats, and divers will be utilized.

III. Factual Determinations

A. Physical and Substrate Determinations

1. Substrate Elevation and Slope

Water depths in the head of Jamaica Bay are fairly deep, up to 33 feet deep. Salt marsh habitat fringes much of the shoreline area. The bottom is steeply sloped close to the shoreline, as depths of over 25 feet are located within 100 feet of the shoreline in many areas.

2. Sediment Type

Sediments to be placed in the project area include spat-on-shell.

3. Dredged/Fill Material Movement

There are no impacts to wetland and streams as a result of fill from the oyster reef restoration.

4. Physical Effects on Benthos

No long-term impacts are anticipated to the benthic species. There will be a temporary impact to benthic species, especially filter feeders, during construction due to temporarily increased turbidity and sedimentation. Use of best management practices during construction will minimize these impacts.

5. Other Effects

No additional major impacts are anticipated from the project.

6. Actions Taken to Minimize Impacts

A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality

a) Salinity – No adverse impacts are anticipated.
b) Water Chemistry (pH, etc.) – No adverse impacts are anticipated.
c) Clarity – Temporary increases in turbidity may occur during localized construction of the habitat restoration; however, best management practices will be employed. Overall, the project goals are to improve water quality, including clarity.
d) Color – Minor short-term changes in color during construction are possible.
e) Odor – No measureable impacts are anticipated.

f) Test – N/A
g) Nutrients – N/A
h) Eutrophication – N/A
i) Others as Appropriate – N/A

2. Current Patterns and Circulation
   a) Current Patterns and Flow – Current patterns and flow may be affected by the restoration work. Oyster reefs may act as natural wave attenuators, protecting nearby shorelines and other aquatic, tidal, and terrestrial habitats.
   b) Velocity – N/A
   c) Stratification – N/A
3. Normal Water Fluctuations – Water fluctuations are primarily affected by the tidal cycles of the region and are not expected to be affected by the restoration work.
4. Salinity Gradients – N/A
5. Actions Taken to Minimize Impacts - A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of Construction Site(s)
   Restoration will require in-water work, and increased sedimentation and turbidity is anticipated. Best management practices will minimize these impacts and protect the water quality of surrounding resources.
2. Chemical and Physical Properties of Water Column
   a) Light Penetration – Minor impacts are anticipated only during construction and sediments are expected to settle quickly.
   b) Dissolved Oxygen – Possible short-term impacts due to in-water particulate disturbance during construction; however, the proposed restoration would result in fewer low dissolved oxygen events at the site.
   c) Toxic Metals and Organics – Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Further sampling will be conducted during the next phase of this project. Overall, the proposed restoration is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils.
   d) Pathogens – N/A
   e) Aesthetics – During construction, visual access may be temporarily restricted; however, will return to the current conditions post-

construction. The project will preserve and restore natural habitat in Jamaica Bay, thereby enhancing the area's scenic resources.

f) Others as Appropriate – N/A

3. Biota

a) Primary Production, Photosynthesis – No adverse impacts are anticipated.

b) Suspension/Filter Feeders – Minor, short-term impacts may occur during construction; however, best management practices will minimize these potential impacts.

c) Sight Feeders – Fish and motile invertebrates may be affected by temporary increases in sedimentation, turbidity, noise, changes in currents or stream flow, and direct mechanical disturbance to habitat. These species are expected to relocate during construction and return shortly after the disturbance ceases. Best management practices and seasonal work windows will be implemented to minimize disturbances to aquatic species.

4. Actions Taken to Minimize Impacts – A detailed alternatives analysis was conducted to avoid and minimize impacts. This analysis is presented in the Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5.

D. Contaminant Determinations

Materials to be used for construction will be free of contaminants and come from a permitted source. The material will be tested before being brought to the Jamaica Bay project area.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton – No major impacts are anticipated.
2. Effects on Nekton – Temporary turbidity during construction may block gills of nekton; however, these species will likely relocate to adjacent areas during construction.
3. Effects on Benthos – Temporary construction impacts during construction may bury some benthic forms and the eggs/juveniles of nektonic species.
4. Effects on Aquatic Food Web – Impacts to aquatic organisms due to increased turbidity caused by construction activities would be temporary and minor.
5. Effects on Special Aquatic Sites

a) Sanctuaries and Refuges – No long-term adverse impacts are anticipated.

b) Wetlands – No long-term adverse impacts are anticipated.

c) Mud Flats – No long-term adverse impacts are anticipated.

d) Vegetated Shallows – N/A

e) Bay Shoreline – No long-term adverse impacts are anticipated.

IV. **Finding of Compliance or Non-Compliance with the Restrictions on Discharge**

A. No significant adaptations of the guidelines were made relative to this evaluation.
B. Several alternatives to the oyster reef restoration in the study area were considered. There are no practicable alternatives under the jurisdiction of Section 404(b)(1) guidelines (see Final EA Appendix E-6 Chapter 4 with supporting materials in Chapter 5).
C. The proposed action does not appear to violate applicable state water quality standards or effluent standards.
D. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
E. The proposal will have no adverse impact on endangered species or their Critical Habitats (Endangered Species Act of 1973).
F. The proposal will have no impact on marine sanctuaries designed by the Marine Protection, Research and Sanctuaries Act of 1972.

Appendix F6:

Coastal Zone Management

New York

Coastal Zone Management

STATE OF NEW YORK
DEPARTMENT OF STATE
ONE COMMERCE PLAZA
99 WASHINGTON AVENUE
ALBANY, NY 12231-0001
WWW.DOS.NY.GOV

ANDREW M. CUOMO
GOVERNOR

ROSSANA ROSADO
SECRETARY OF STATE

December 16, 2019

Peter Weppler
U.S. Army Corps of Engineers, NY District
Jacob K. Javits Federal Building
26 Federal Plaza
New York, New York 10278-0090

Re: F-2019-0990 (DA)
U.S. Army Corp of Engineers / NY District (Corps) submission of a consistency determination- proposed National Ecosystem Restoration Plan to restore degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural condition at the following proposed restoration sites within New York State's coastal boundary: Jamaica Bay sites (Dead Horse Bay, Fresh Creek, Marsh Islands), Bronx River Sites (Bronx Zoo and Dam, Stone Mill Dam, Shoelace Park, Flushing Creek), and Oyster Reef Sites (Bush Terminal, Head of Jamaica Bay).
Jamaica Bay, Bronx River, Flushing Creek, Gowanus Canal
Concurrence with Consistency Determination

Dear Mr. Weppler

The Department of State has completed its review of the Corps' consistency determination regarding the proposed restoration of several degraded ecosystems within New York City, with the New York City Local Waterfront Revitalization Policies

Based upon the information submitted, the Department of State concurs with the Corps' consistency determination regarding this matter.

Please feel free to contact Rebecca Ferres at (518) 473-2470 or e-mail at: rebecca.ferres@dos.ny.gov and reference file no. F-2019-0990 (DA).

Sincerely,

Gregory L. Capobianco
Office of Planning, Development and Community Infrastructure

GLC/MM/ RF

cc: COE/ NY District – Diana Kohtio
NYC LWRP- Cory Mann & Chris Wassif

NEW YORK STATE OF OPPORTUNITY. | Department of State

From:	Kohtio, Diana M CIV USARMY CENAN (USA)
To:	Kohtio, Diana M CIV USARMY CENAN (USA)
Subject:	FW: WRP Consistency Determination for the Hudson Raritan Estuary Ecosystem Restoration Project
Date:	Friday, January 10, 2020 3:51:21 PM

From: Cory Mann (DCP) [mailto:CMann@planning.nyc.gov]
Sent: Thursday, December 5, 2019 12:01 PM
To: Weppler, Peter M CIV USARMY CENAN (US) <Peter.M.Weppler@usace.army.mil>
Cc: Ferres, Rebecca (DOS) <Rebecca.Ferres@dos.ny.gov>; Michael Marrella (DCP) <MMarrel@planning.nyc.gov>
Subject: [Non-DoD Source] WRP Consistency Determination for the Hudson Raritan Estuary Ecosystem Restoration Project

Hello Peter,

We have completed the review of the project as described below for consistency with the policies and intent of the New York City Waterfront Revitalization Program (WRP).

Hudson Raritan Estuary Ecosystem Restoration Project: The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural condition at the following proposed restoration sites within New York State’s coastal area boundary {Jamaica Bay Perimeter sites (2), Jamaica Bay Marsh Islands (5), Bronx River sites (3), Flushing Creek, and an Oyster Reefs (2)}.

Based on the information submitted, the Waterfront Open Space Division, on behalf of the New York City Coastal Commission, having reviewed the waterfront aspect of this action, finds that the actions will not substantially hinder the achievement of any Waterfront Revitalization Program (WRP) policy and provides its finding to the New York State Department of State (DOS). Please note that the proposed action(s) are subject to consistency review and approval by the New York State Department of State (DOS) in accordance with the New York State Coastal Management Program.

This determination is only applicable to the information received and the current proposal. Any additional information or project modifications would require an independent consistency review.

For your records, this project has been assigned WRP #19-206. If there are any questions regarding this review, please contact me.

Best,

Cory

Cory Mann

Waterfront Planner

NYC DEPT. OF CITY PLANNING

Waterfront and Open Space Planning

120 BROADWAY, 31st FLOOR • NEW YORK, NY 10271

212-720-3623 | cmann@planning.nyc.gov <mailto:cmann@planning.nyc.gov>

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278-0090

October 16, 2019

REPLY TO
ATTENTION OF
Environmental Analysis Branch

SUBJECT: Consistency Determination for the Hudson Raritan Estuary Ecosystem Restoration Project

Mr. Michael Marrella
Director of Waterfront and Open Space
New York City Department of City Planning
120 Broadway, 31st Floor
New York, New York 10271

Dear Mr. Marrella,

The U.S. Army Corps of Engineers, New York District (District) has determined that the Hudson Raritan Estuary Ecosystem Restoration Project complies with both New York City Waterfront Revitalization Program (WRP) and New York State Coastal Zone Management (CZM) policies and project implementation will be conducted in a manner consistent with these polices. This letter provides the New York City's WRP with the required information to support District's consistency determination. The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural condition at the following proposed restoration sites within New York State's coastal area boundary {Jamaica Bay Perimeter sites (2), Jamaica Bay Marsh Islands (5), Bronx River sites (3), Flushing Creek, and an Oyster Reefs (2)}. A determination of Federal Consistency with both sets of coastal management policies is enclosed.

The District, requests that your office review the above proposed projects for consistency with City's WRP Policies.

I look forward to working with you and your staff on this effort. If you should have any questions, please contact Ms. Diana Kohtio of my staff at 917-790-8619 or diana.m.kohtio@usace.army.mil.

Sincerely,

WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.16 13:30:52 -04'00'

Peter Weppler
Chief, Environmental Analysis Branch

cc:
Maraglio (via email)

Attachments

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

October 15, 2019

Mr. Matthew Maraglio
Coastal Resources Specialist
New York State Department of State
Office of Planning, Development & Community Infrastructure
99 Washington Avenue, Suite 1010
Albany, NY 12231

Subject: Consistency Determination for the Hudson Raritan Estuary Ecosystem Restoration Project

Dear Mr. Maraglio:

The U.S. Army Corps of Engineers, New York District (District) has determined that the Hudson Raritan Estuary Ecosystem Restoration Project complies with both New York State and New York City Waterfront Revitalization Program (WRP) Coastal Zone Management (CZM) policies and project implementation will be conducted in a manner consistent with these policies. This letter provides the New York State Coastal Management Program Consistency Review Unit with information to support the District's consistency determination under the Coastal Zone Management Act, Section 307 (c) (1) and (2), and 15 CFR 930.35(d). The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural condition at the following proposed restoration sites within New York State's coastal area boundary {Jamaica Bay Perimeter sites (2), Jamaica Bay Marsh Islands (5), Bronx River sites (3), Flushing Creek, and an Oyster Reefs (2)}. A determination of Federal Consistency with both sets of coastal management policies is enclosed.

The District requests that your office review the recommended sites in the Hudson Raritan Estuary Ecosystem Restoration, for consistency with the State's CZM Policies.

Should you have any questions regarding this action or the above requests please contact the project biologist, Diana Kohtio, by phone (917) 790-8619, or by email at Diana.M.Kohtio@usace.army.mil.

Sincerely,

WEPPLER.PETER.M.1228647353
Digitally signed by WEPPLER.PETER.M.1228647353
Date: 2019.10.15 11:31:37 -04'00'

Peter Weppler, Chief
Environmental Analysis Branch

cc: Marrella (via email)

Attachments

HUDSON RARITAN ESTUARY ECOSYSTEM RESTORATION REPORT

COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

US ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT

OCTOBER 2019

TABLE OF CONTENTS

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Descriptions: The project area is under the jurisdiction of the National Park Service (within the boundaries of Gateway National Recreation Area) and is adjacent to Floyd Bennett Field in Kings County, NY. Extensive historic landfilling activities across the entire site have resulted in marsh loss and a high proportion of invasive species. Erosion is claiming the western peninsula and exposing the solid waste landfill.

The recommended plan maximizes marsh habitat by creating a tidal channel in the northern portion of the site and re-grading the existing upland *Phragmites* stand to salt marsh elevations to create a 31 acre tidal marsh system. On the southern point, the landfill at the shoreline will be removed and replaced with clean fill and sand from the northern portion of the site. By the removal action, the fringe marsh will be able to support native wetland plant species with high habitat value. This measure will serve as the least cost placement for the approximately 669,000 cubic yards that must be excavated to create the northern marsh. Additionally, the fill and sand will be planted with maritime plants and trees to achieve multiple benefits: 1) to stabilize the excavated fill, which is placed on site over 61 acres as the least cost placement option; 2) to act as a protective buffer for intertidal habitat (37 out of 61 acres, when counting to 300 ft out from the intertidal habitat); and 3) adding additional habitat values associated with maritime forests, a major historical feature within the bay and integral to a fully functioning ecosystem to support species.

Landfill materials will be excavated from the water's edge and reused on site to the extent possible, creating dunes further inland that are capped by clean sand.

Excavated materials that cannot be reused onsite will be removed and processed at a registered landfill facility. In total this plan restores 130.7 acres which includes 31 acres of low marsh, 7 acres of high marsh, 4 acres of creek, and 27.7 acres of dunes.

Schedule and Duration: The expected construction duration for Dead Horse Bay is 36 months, with construction currently scheduled for 2034.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Dead Horse Bay, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 3: *Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.*

The project is not expected to negatively impact boating within the area. During restoration activities traffic may be restricted to only shallow draft boats. No existing marinas or port will be affected; therefore, the project is consistent with this policy.

WRP Policy 3.4: *Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water use.*

The project includes shoreline protection strategies such as wetland creation, dune creation, and bank stabilization, which will protect the shoreline from recreational and commercial boat wave action; therefore, the project is consistent with this policy.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The goal of the tentatively selected plan design is consistent with the stated goal of this policy. The planned restoration will restore salt marsh and adjacent upland habitat, and improve water quality. The project is consistent with this policy.

<u>WRP Policy 4.1:</u> *Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.*

Dead Horse Bay is recognized as being within a Special Natural Waterfront Area (SNWA). The New York City Comprehensive Waterfront Plan recognizes SNWAs as large areas with significant open spaces and concentrations of natural resources including wetlands, habitats, and buffer areas. The purpose of this project is to restore coastal habitats, which is in direct accord with this policy.

<u>WRP Policy 4.3:</u> *Protect designated Significant Coastal Fish and Wildlife Habitats.*

Also Applicable: **<u>State Policy 7:</u>** *Significant Coastal Fish and Wildlife Habitat will be protected, preserved, and where practical, restored to maintain their viability as habitats.*

Restoration activities at Dead Horse Bay will improve and increase physical, biological, and chemical parameters including tidal inundation, flushing rates, turbidity, erosion control, vegetative diversity, wildlife habitat, habitat diversity, and water quality. Excavation will temporarily impact existing habitat; however, all work will be performed using best management practices for erosion control. Upland vegetation clearing and excavation will be executed only in areas that are currently dominated by introduced invasive species; planting and seeding of the native vegetative species will replace the existing invasive species and improve vegetative diversity. Placement of structural materials will protect marshes and create beneficial habitat for macroinvertebrates. Since the focus of this project is to protect habitat and restore ecological function, the project is consistent with the goals of this policy.

<u>WRP Policy 4.5:</u> *Protect and restore tidal and freshwater wetlands.*

Also Applicable: **<u>State Policy 44:</u>** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

The primary goal for this project is to restore degraded tidal ecosystems, improve environmental quality, and enhance fish and wildlife habitat. Project activities proposed for this site include restoring and creating low and high marshes; therefore, the project is consistent with this policy.

<u>WRP Policy 4.6:</u> *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The proposed restoration activities at Dead Horse Bay include building a tidal channel and restoring 31 acres of low marsh, seven (7) acres of high marsh, creating 27.7 acres of dunes, and restoring 61 acres of maritime forest. The project will also include the removal of 31 acres of landfill in the southern portion. Project positive impacts include increased fish and wildlife habitat, and essential fish habitat, and improved aesthetic viewsheds and opportunities for recreation. The Evaluation of Planned Wetlands assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities, tidal patterns, and human use patterns at the project site were observed, documented, and incorporated into an analysis of the existing site and in the selection for the recommended final design plan. The project is consistent with this policy.

<u>WRP Policy 4.7:</u> *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

Restoration activities will benefit vulnerable plant, fish, and wildlife species and rare ecological communities by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy

WRP Policy 4.8: *Maintain and protect living aquatic resources.*

The project will not only maintain and protect aquatic resources, but create additional habitat for shellfish, finfish, and benthic resources through wetland and stream restoration activities. Salt marshes and estuaries provide essential habitat for fish caught commercially and recreationally. Species such as summer flounder, scup, butterfish, mullet, menhaden, Atlantic croaker, and blue crab all use salt marshes as juvenile or adults for feeding and refuge. Local shellfish, finfish, and benthic macroinvertebrate population will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, sedimentation and turbidity from wetland and upland restoration will be minimized to through the implementation of best management practices (BMPs) such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the restoration measures implemented for the project are consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

One of the project's restoration objectives is to improve water quality. The project includes the preservation, enhancement, and restoration of wetland areas, providing for an increase in wetland water quality functions. Water quality functions of wetlands include erosion control, sediment stabilization, and filtration of dissolved particulate materials. Therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

Also Applicable: **State Policy 34:** *Discharge of waste materials into coastal waters from vessels subject to State jurisdiction will be limited so as to protect significant fish and wildlife habitat, recreational areas and water supply area.*

As stated in Policy 5, the restoration of wetland areas will provide water quality functions such as erosion control, sediment stabilization, filtration of dissolved particulate materials, and improvement of dissolved oxygen, thereby improving the overall water quality of the area; therefore, the project is consistent with this policy.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

<u>WRP Policy 5.3:</u> *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **<u>State Policy 35:</u>** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

The project will carefully evaluate construction to prevent or minimize adverse impacts such as soil erosion and sediment alteration. For example, work can be accomplished during low tidal periods or in areas temporarily disconnected from tidal waters. In addition, all appropriate BMPs for soil erosion and sediment control including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales will be used. The project is consistent with this policy.

<u>WRP Policy 5.4:</u> *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

Also Applicable: **<u>State Policy 38:</u>** *The quality and quantity of surface water and groundwater supplies, will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.*

As stated in Policy 5.2, BMPs for soil erosion and sediment control will be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

<u>WRP Policy 5.5:</u> *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

As stated in Policy 5, the restoration of wetland areas will provide water quality functions such as erosion control, sediment stabilization, filtration of dissolved particulate materials, and improvement of dissolved oxygen, thereby improving the overall water quality of the area; therefore, the project is consistent with this policy.

<u>WRP Policy 6:</u> *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The expansion and restoration of wetland habitat should slightly increase flood storage at the site, but is not expected to make an overall change in flood zones. Therefore, the project is consistent with this policy.

<u>WRP Policy 6.1:</u> *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **<u>State Policy 17:</u>** *Non- Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project includes the protection and restoration of wetland habitat and expansion and restoration of wetland habitat will slightly increase flood storage on the site, but is not expected to make an overall change in flood zone. The project also includes the construction of offshore structures that will aid in the management of shoreline erosion at the site.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with United States Army Corps of Engineers (USACE) guidance, as alternatives are refined and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of four (4) to eight (8) inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed habitat restoration plans Dead Horse Bay. The projects do not include any shoreline infrastructure or enclosed structures.

1a. Portions of the footprint are located within the current, 2050 1%, and 2050 0.2% annual chance floodplain. Similarly, portions of the footprint may also be flooded by all estimates of 2050s High Tide water.

Ground elevations in the Dead Horse Bay North project footprint will be excavated and re graded to appropriate elevations for low and high mash (1.6-3.4 feet) and upland (3.4 feet and above) development. Ground elevations in Dead Horse Bay South's dune will range from 1-17 feet. Base Flood elevation, reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM), for Dead Horse Bay are reported to be in the range of 13 feet NAVD88. FIRMs indicate that the site contain Coastal V, A, and X Zones.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.

2. N/A

3. The Project will advance Policy 6.2 and no further analysis is needed.

Please see Project Location Maps at the end of this document.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and was utilized to consider the impacts of the feasibility level design, however further sampling will be conducted during the next phase of this project before final plans are created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify soils that can be reused on site for landscaping and possible capping of contaminated areas and solid wastes that do not need to be removed. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy.

WRP Policy 7.2: *Prevent and remediate discharge of petroleum products.*

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

The use of construction equipment may present the potential for hydrocarbons to spill while storing or refueling equipment. However, the use of BMPs such as secondary containment for fuel storage areas, and proper maintenance of equipment to prevent leaks will be implemented; therefore, the project is consistent with this policy.

WRP Policy 8: *Provide public access to, form, and along New York City's coastal waters.*

Also Applicable: **State Policy 19:** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

Dead Horse Bay is part of the Gateway National Recreation Area (GNRA). Existing trails provide opportunities for walking and bird watching, along with providing shoreline access for fishing. A bike path system runs along the edge of this site, providing further recreational opportunities. Between the north and south sections of the site are a golf driving range, a tennis court, and a full service marina. Across Flatbush Avenue, the Floyd Bennett Field Complex provides open space, community gardens, sports fields, and other specialized facilities for group activities. The proposed action will have positive impacts to the recreational and educational features of this site by creating a much more diverse landscape with enhanced wildlife habitat and viewing opportunities. Restoration activities will not modify public access and all public access trails will be reestablished after construction. Therefore, the project is consistent with this policy.

WRP Policy 8.1: *Preserve, protect, maintain, and enhance physical, visual, and recreational access to the waterfront.*

See Policy 8 above.

WRP Policy 8.5: *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

See Policy 8 above.

WRP Policy 8.6: *Design waterfront public spaces to encourage the waterfront's identify and encourage stewardship.*

See Policy 8 above.

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

Dead Horse Bay consists of undeveloped parkland located in the GNRA. The site currently does not provide a quality viewshed for the surrounding area. There is a substantial amount of disturbed area within the project site due to past filling activities. Invasive species, including mugwort and common reed, dominate the site and block the line of sight. The eroding landfill litters the beach with broken glass and trash. By restoring the coastal habitat, stabilizing the shoreline, and removing the eroding landfill, the project will be protecting habitats from erosion, improving water quality, removing invasive species, and preserving/enhancing the scenic resources; therefore, the project is consistent with and furthers the goals of this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

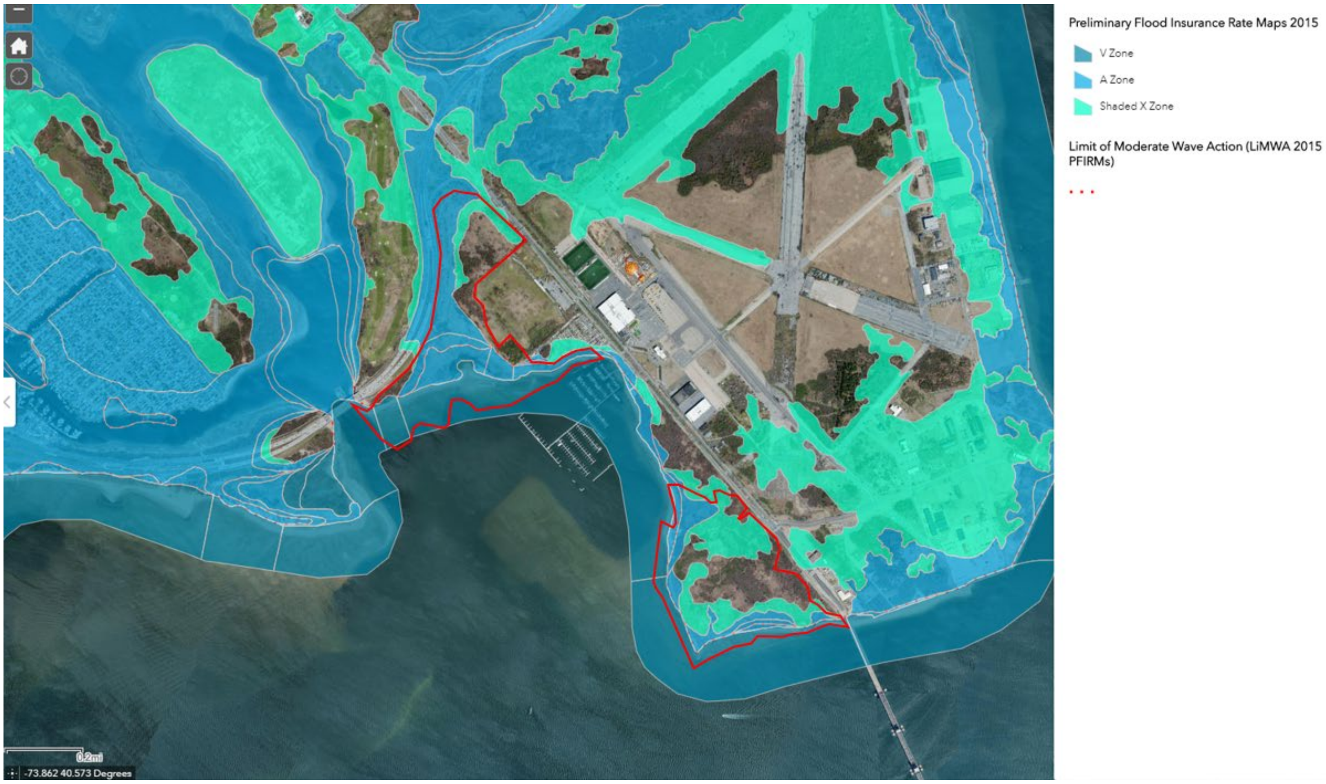
A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The USACE will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP, National Park Service- GNRA. Therefore, the project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.


Preliminary Flood Insurance Rate Maps 2015
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Shaded X Zone
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
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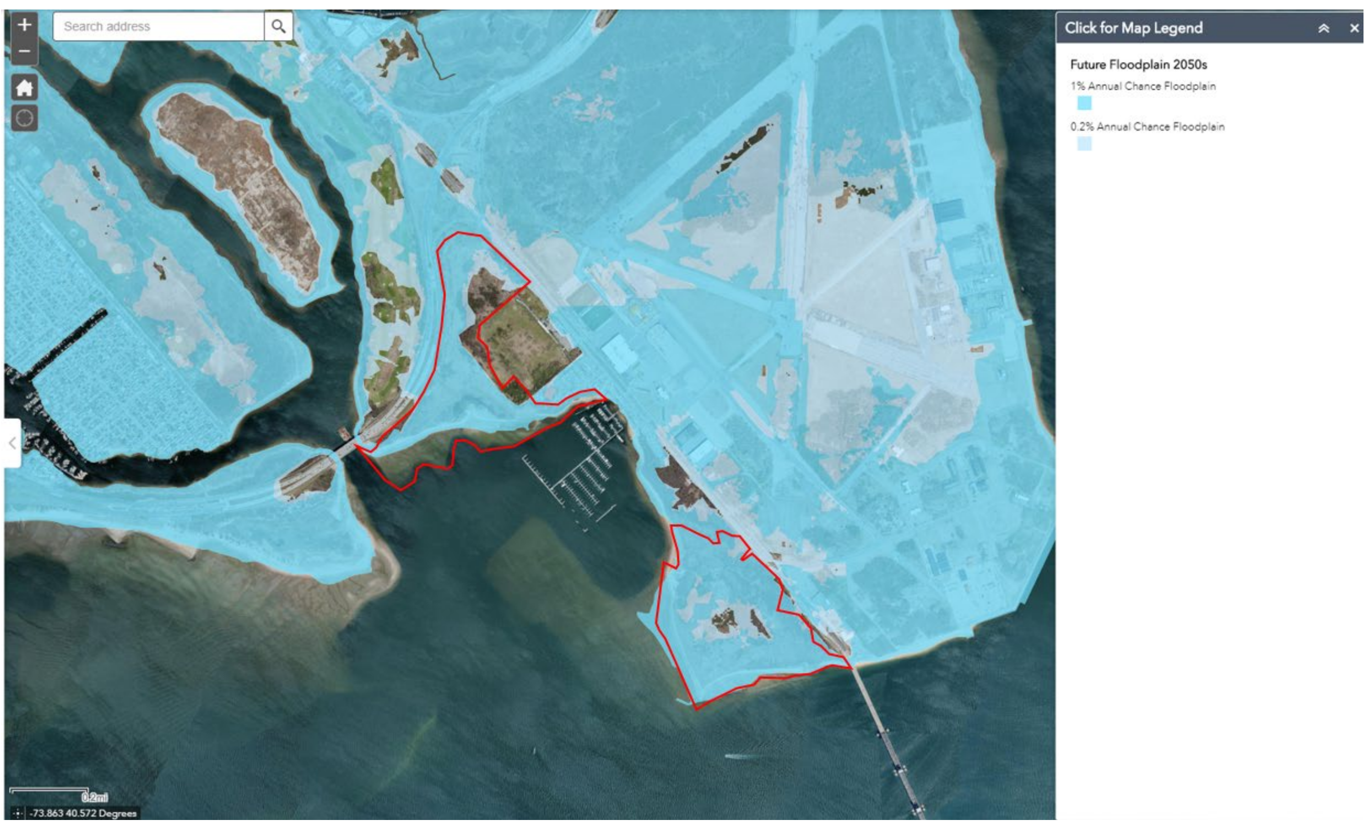
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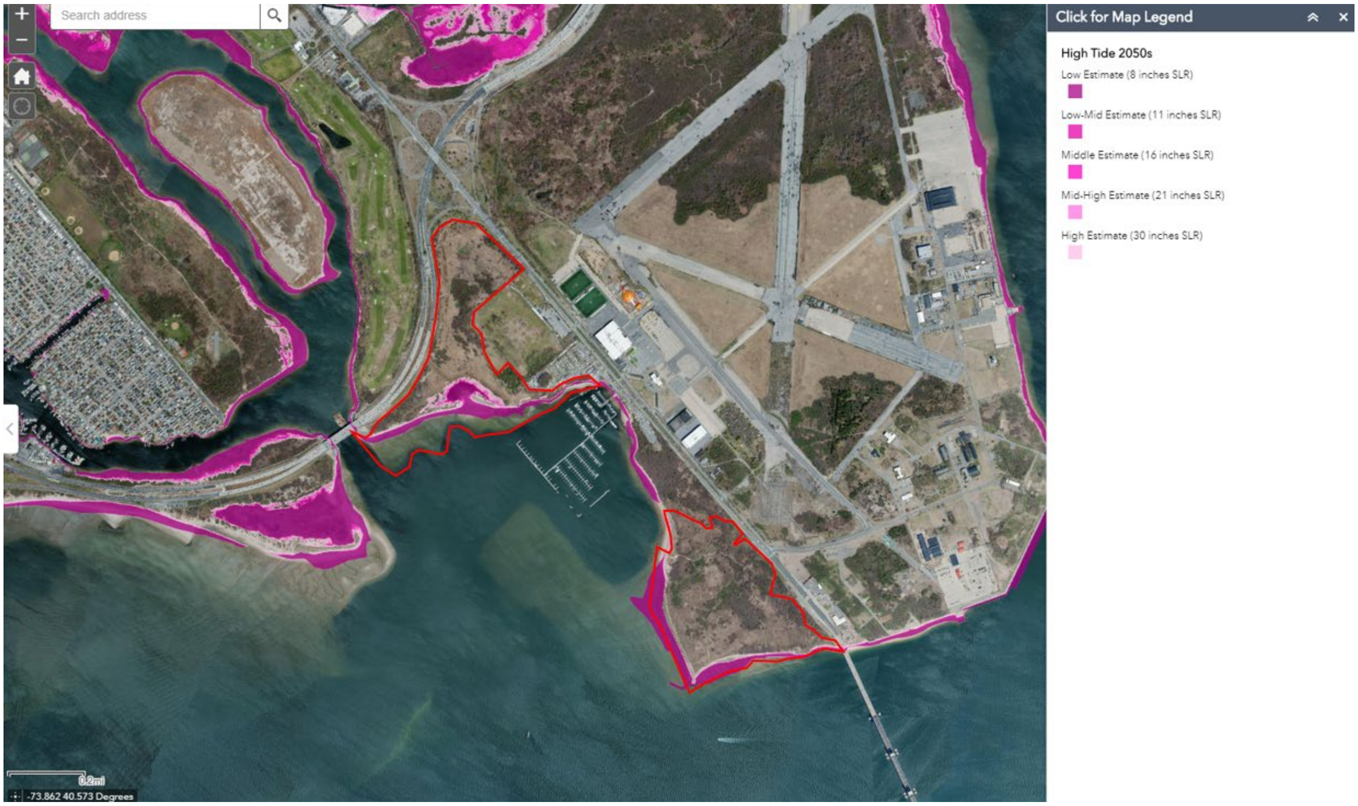
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Low Estimate (8 inches SLR)
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FOR INTERNAL USE ONLY
Date Received: ____________________

WRP No. ____________________
DOS No. ____________________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (*WRP*) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ____________________

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

Dead Horse Bay- The recommended plan maximizes marsh habitat by creating a tidal channel in the northern portion of the site and re-grading the existing upland Phragmites stand to salt marsh elevations to create a 31 acre tidal marsh system. On the southern point, the landfill at the shoreline will be removed and replaced with clean fill and sand from the northern portion of the site. By the removal action, the fringe marsh will be able to support native wetland plant species with high habitat value. This measure will serve as the least cost placement for the approximately 669,000 cubic yards that must be excavated to create the northern marsh. Additionally, the fill and sand will be planted with maritime plants and trees to achieve multiple benefits: 1) to stabilize the excavated fill, which is placed on site over 61 acres as the least cost placement option; 2) to act as a protective buffer for intertidal habitat (37 out of 61 acres, when counting to 300 ft out from the intertidal habitat); and 3) adding additional habitat values associated with maritime forests, a major historical feature within the bay and integral to a fully functioning ecosystem to support species. In total this plan restores 130.7 acres which includes 31 acres of low marsh, 7 acres of high marsh, 4 acres of creek, and 27.7 acres of dunes.

2. Purpose of activity

In the absence of restoration, the north parcel would remain heavily dominated by invasive species and considerably degraded from its past ecological values. In addition, the southern parcel would continue to experience shoreline erosion with continuing exposure of landfill materials.

C. PROJECT LOCATION

Borough: Brooklyn Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Dead Horse Bay, Gerritson Creek

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) *(2.1)*
- ☑ Special Natural Waterfront Area (SNWA) *(4.1)*
- ☐ Priority Martine Activity Zone (PMAZ) *(3.5)*
- ☐ Recognized Ecological Complex (REC) *(4.4)*
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) *(2.2, 4.2)*

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☑	☐	☐
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☑	☐	☐
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☑	☐	☐
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☑	☐	☐
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☐	☐	☑
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☐	☐	☑
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☐	☐	☑
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☐	☐	☑
8	**Provide public access to, from, and along New York City's coastal waters.**	☑	☐	☐
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☑	☐	☐
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☐	☐	☑
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☐	☐	☑

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☑	☐	☐
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza Room 2151 New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=WEPPLER.PETER.M.1228647353 Date: 2016.11.03 12:39:06 -04'00'

Date: ____________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Description: The project area, under the jurisdiction of NYC Parks, is located in and along the tidal wetlands and adjacent upland bordering Fresh Creek, a tributary to Jamaica Bay, in Kings County, NY. The site includes beach, mudflat, salt marsh, coastal scrub/shrub forest, mature woodlands, and invasive plant species; it is surrounded by dense urban development and subject to combined sewer overflow (CSO) and stormwater outfalls.

The recommended plan creates a tidal marsh system continuous around the basin and includes basin filling and re-contouring to improve water quality and low quality benthic habitat resulting from past dredging and fill activities, existing CSOs, and untreated stormwater runoff. Excavation of 193,220 cubic yards of material from the channel intertidal and upland will be redistributed on site and capped with clean fill to create valuable upland scrub shrub and maritime forest habitat. This plan includes restoration of 16.1 acres of low marsh, 4.4 acres of high marsh, 3.6 acres of coastal scrub shrub, 10.7 acres of maritime forest, and restoration to 45.8 acres of tidal channels and pools. Recommended actions will compliment NYC Parks' small-scale restoration efforts and NYC DEP's salt marsh mitigation along the creek.

Schedule and Duration: The expected construction duration for Fresh Creek is 36 months and is expected to begin in 2027.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Fresh Creek, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP POLICY QUESTIONS – RESPONSES

WRP Policy 3: *Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.*

The project is not expected to negatively impact boating within the area. During restoration activities traffic may be restricted to only shallow draft boats. No existing marinas or port will be affected; therefore, the project is consistent with this policy.

WRP Policy 3.4: *Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water use.*

Restoration of a tidal marsh system with protective buffers along Fresh Creek will protect the shoreline from wave action created by recreational and commercial boats; therefore, the project is consistent with this policy.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The goal of the tentatively selected plan design is consistent with the stated goal of this policy. The planned restoration will restore salt marsh and adjacent upland habitat, and improve water quality. The project is consistent with this policy.

WRP Policy 4.1: *Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.*

Fresh Creek is recognized as being within a Special Natural Waterfront Area (SNWA). The New York City Comprehensive Waterfront Plan recognizes SNWAs as large areas with significant open spaces and concentration of natural resources including wetlands, habitats, and buffer areas. The purpose of this project is to restore coastal habitats, which is in direct accord with this policy.

WRP Policy 4.3: *Protect designated Significant Coastal Fish and Wildlife Habitats.*

Also Applicable: **State Policy 7:** *Significant Coastal Fish and Wildlife Habitat will be protected, preserved, and where practical, restored to maintain their viability as habitats.*

Restoration activities at Fresh Creek will improve and increase physical, biological, and chemical parameters including tidal inundation, flushing rates, turbidity, erosion control, vegetative diversity, wildlife habitat, habitat diversity, and water quality. Excavation will be done and will temporarily impact existing habitat; however, all work will be done using best management practices (BMPs) for erosion control. Upland vegetation clearing and excavation will be done only in areas that are currently dominated by introduced invasive species; planting and seeding of the native vegetative species will replace the existing invasive species and improve vegetative diversity. Placement of structural materials will protect marshes and create beneficial habitat for macroinvertebrates. Since the focus of this project is to protect habitat and restore ecological function, the project is consistent with the goals of this policy.

WRP Policy 4.5: *Protect and restore tidal and freshwater wetlands.*

Also Applicable: **State Policy 44:** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

The primary goal for this project is to restore degraded tidal ecosystems, improve environmental quality, and enhance fish and wildlife habitat. Project activities proposed for this site include restoring and creating low and high marshes; therefore, the project is consistent with this policy.

WRP Policy 4.6: *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The proposed restoration activities at Fresh Creek include, protecting and restoring multiple habitat types including 13 acres of low marsh, 2.4 acres of high marsh, 2.1 acres of creek/pool, 4.5 acres of maritime forest, and 11 acres of coastal shrub. 60.1 acres of shallow water through channel re-grading will be restored. The capacity of the existing wetland and the selected plan to perform specific wetland functions and values were assessed using the Evaluation of Planned Wetlands procedure. Current vegetative communities, tidal patterns, and human use patterns at the project site were observed, documented, and incorporated into an analysis of the existing site and in the selection for the recommended design plan. The project is consistent with this policy.

WRP Policy 4.7: *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

Restoration activities will benefit vulnerable plant, fish, and wildlife species and rare ecological communities by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy

WRP Policy 4.8: *Maintain and protect living aquatic resources.*

The project will not only maintain and protect aquatic resources, but will create habitat for shellfish, finfish, and benthic resources through wetland and stream restoration activities. Salt marshes and estuaries provide essential habitat for fish caught commercially and recreationally. Species such as summer flounder, scup, butterfish, mullet, menhaden, Atlantic croaker, and blue crab all use salt marshes as juvenile or adults for feeding and refuge. Additionally, the design plan includes basin bathymetry reconfiguration and re-contouring at the head of the basin, which is expected to improve flushing rates and water quality. Therefore, the restoration measures implemented for the project are consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

One of the project's restoration objectives is to improve water quality. The project includes the preservation, enhancement, and restoration of wetland areas, providing for an increase in wetland water quality functions. Water quality functions of wetlands include erosion control, sediment stabilization, and filtration of dissolved particulate materials. Additionally, basin bathymetry reconfiguration and re-contouring at the head of the basin is expected to improve flushing rates and water quality; therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

Also Applicable: **State Policy 34:** *Discharge of waste materials into coastal waters from vessels subject to State jurisdiction will be limited so as to protect significant fish and wildlife habitat, recreational areas and water supply area.*

As stated in Policy 5, the restoration of wetland areas and stream geomorphology will provide overall improvements in water quality of the area through functions such as erosion control, sediment stabilization, filtration of dissolved particulate materials, and improvement of dissolved oxygen; therefore, the project is consistent with this policy.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

The project will carefully evaluate construction in a manner to prevent or minimize adverse impacts such as soil erosion and sediment alteration. For example, work can be accomplished during low tidal periods or in areas temporarily disconnected from tidal waters. In addition, all appropriate BMPs for soil erosion and sediment control including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

Also Applicable: **State Policy 38:** *The quality and quantity of surface water and groundwater supplies, will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.*

As stated in Policy 5.2, BMPs for soil erosion and sediment control will be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

As stated in Policy 5, the restoration of wetland areas and stream geomorphology will provide overall improvements in water quality of the area through functions such as erosion control, sediment stabilization, filtration of dissolved particulate materials, and improvement of dissolved oxygen; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The expansion and restoration of wetland habitat should slightly increase flood storage at the site, but is not expected to make an overall change in flood zones. Therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non-Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project includes the protection and restoration of wetland habitat and expansion and restoration of wetland habitat will slightly increase flood storage on the site, but is not expected to make an overall change in flood zone. The project also includes the construction of offshore structures, which will aid in the management of shoreline erosion at the site. The project is consistent with this policy.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with United States Army Corps of Engineers (USACE) guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of four (4) to eight (8) inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s. The project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of the USACE has proposed habitat restoration plans for the Spring Creek Park, located along Spring and Ralph's Creels in the Boroughs of

Brooklyn and Queens, New York. The Project does not include any shoreline infrastructure or enclosed structures.

1a. The project is located within the current and 2050 1% annual chance floodplain. A portion of the site may also be flooded by 2050s Mean Higher High Water.

Ground elevations in areas project areas A and B will be reduced to elevations appropriate for wetland development, 1.5 to 3.2 feet. In areas E, F, and G local topography will increase to ranges between 4.0 to 13 feet. Base Flood elevations are between 10-11 feet in Zone A.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.

2. N/A

3. The Project will advance Policy 6.2 and no further analysis is needed.

Please see Project Location Maps at the end of this document.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bioaccumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans are created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify soils that can be reused on site for landscaping and possible capping of contaminated areas and solid wastes that do not need to be removed. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy.

WRP Policy 8: *Provide public access to, form, and along New York City's coastal waters.*

Also Applicable: **<u>State Policy 19:</u>** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

Fresh Creek is owned by the New York City Department of Parks and Recreation (NYC Parks). Trails exist in the southeast portion of the site with platforms for viewing wildlife and bird watching. The waterway also provides access for active recreational activities such as kayaking, canoeing, and sailing. The Fresh Creek Bridge, which connects Canarsie Beach Park to Spring Creek Park, provides additional recreational opportunities for bikers and pedestrians crossing the Fresh Creek Basin. The proposed action will have positive impacts to the recreational and educational features of this site by creating a much more diverse landscape with enhanced wildlife habitat and viewing opportunities. Restoration activities will not modify public access and all public access trails will be reestablished after construction. Therefore, this project is consistent with this policy.

<u>WRP Policy 8.1:</u> *Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.*

See Policy 8 above.

<u>WRP Policy 8.3:</u> *Provide visual access to the waterfront where physically practical.*

See Policy 8 above.

<u>WRP Policy 8.4:</u> *Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.*

See Policy 8 above.

<u>WRP Policy 8.5:</u> *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

See Policy 8 above.

<u>WRP Policy 8.6</u>: *Design waterfront public spaces to encourage the waterfront's identify and encourage stewardship.*

See Policy 8 above.

<u>WRP Policy 9:</u> *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

Fresh Creek consists of parkland owned by NYC Parks. The southeastern section of the site is developed, landscaped park with a walking trail and viewing platform. The site provides a total of 145 acres of open land however, only 74.3 acres has been developed as a public park. A substantial amount of the area is disturbed; however, it also contains a large parcel of native marsh, grass and woodlands. Invasive species dominate the site including mugwort, Japanese knotweed, and common reed, which block the line of sight. By restoring the coastal habitat at Fresh Creek, the project will be protecting habitats from erosion, improving water quality, removing invasive species, and preserving/enhancing the scenic resources; therefore, the project is consistent with and furthers the goals of this policy.

<u>WRP Policy 9.1:</u> *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

<u>WRP Policy 9.2</u>: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

<u>WRP Policy 10:</u> *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **<u>State Policy 23:</u>** *Protect, enhance, and restore structures, districts, areas, or sites that are of significance in history, architecture, archaeology, or culture of the State, its communities, or the Nation.*

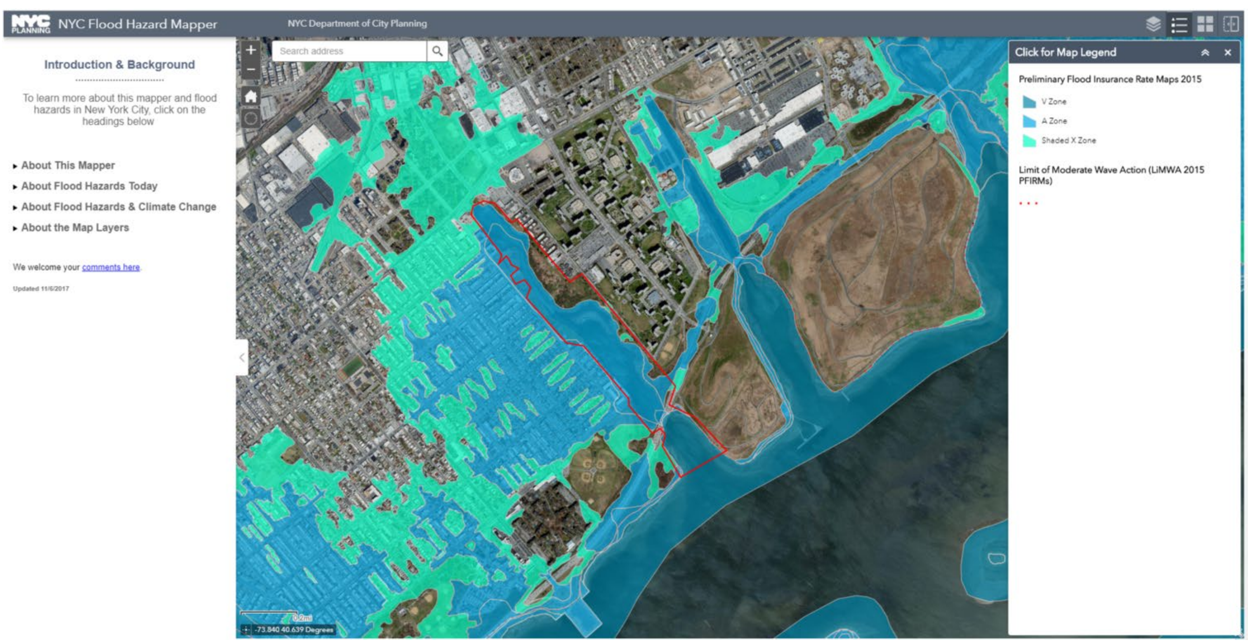
A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The USACE will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP, National Park Service - Gateway National Recreation Area. Therefore, the project is consistent with this policy.

<u>WRP Policy 10.1</u>: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

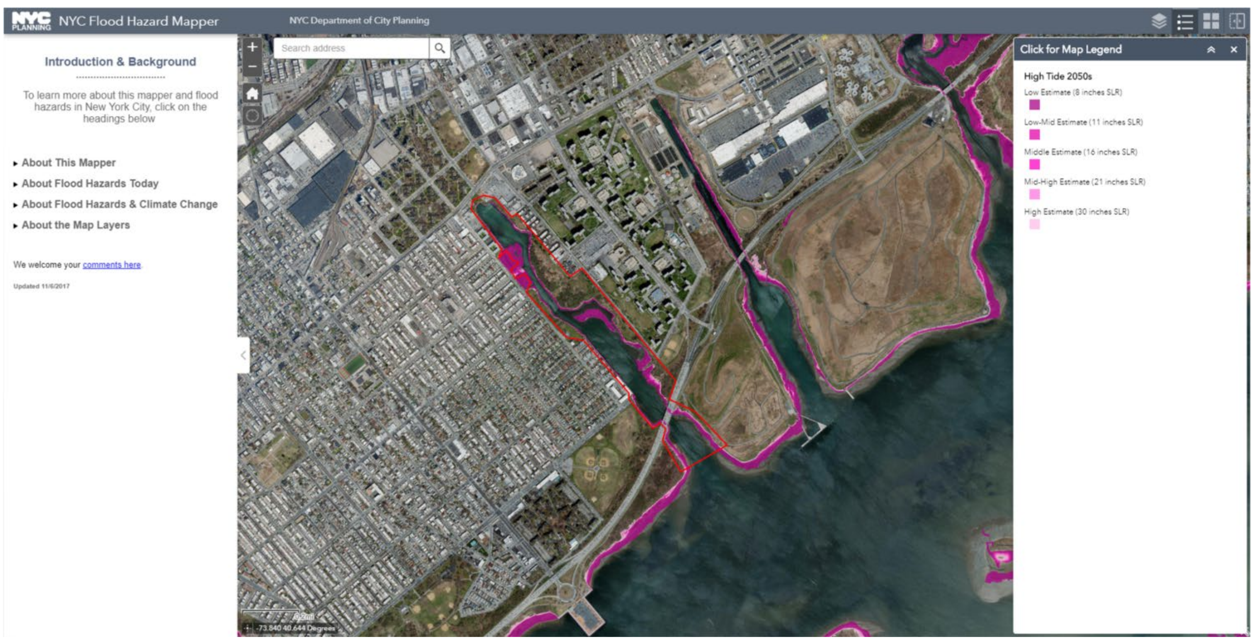
See Policy 10 above.

<u>WRP Policy 10.2:</u> *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.




NYC Flood Hazard Mapper
NYC Department of City Planning
Introduction & Background
To learn more about this mapper and flood hazards in New York City, click on the headings below
About This Mapper
About Flood Hazards Today
About Flood Hazards & Climate Change
About the Map Layers
We welcome your comments here.
Search address
Click for Map Legend
Future Floodplain 2050s
1% Annual Chance Floodplain
0.2% Annual Chance Floodplain


NYC Flood Hazard Mapper
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About This Mapper
About Flood Hazards Today
About Flood Hazards & Climate Change
About the Map Layers
We welcome your comments here.
Search address
Click for Map Legend
High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)

FOR INTERNAL USE ONLY	WRP No. ____________
Date Received: ____________	DOS No. ____________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* *(WRP)* which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: (917) 790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): NYC Department of Parks and Recreation

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

Fresh Creek- The recommended plan creates a tidal marsh system continuous around the basin and includes basin filling and re-contouring to improve water quality and low quality benthic habitat resulting from past dredging and fill activities, existing CSOs, and untreated stormwater runoff. Excavation of 193,220 cubic yards of material from the channel intertidal and upland will be redistributed on site and capped with clean fill to create valuable upland scrub shrub and maritime forest habitat. This plan includes restoration of 16.1 acres of low marsh, 4.4 acres of high marsh, 3.6 acres of coastal scrub shrub, 10.7 acres of maritime forest, and restoration to 45.8 acres of tidal channels and pools. Recommended actions will complement NYC Parks' small-scale restoration efforts and NYCDEP's salt marsh mitigation along the creek.

2. Purpose of activity

It is anticipated that without restoration, the Fresh Creek site would remain a degraded, low quality habitat. The invasive species within the project area could spread into the existing native vegetation. In addition, previously anticipated combined sewage outfall improvements by the City of New York have been delayed indefinitely, and there are currently no known restoration plans for the site.

C. PROJECT LOCATION

Borough: Brooklyn Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Fresh Creek

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☐ Yes	☑ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) (*2.1*)
- ☑ Special Natural Waterfront Area (SNWA) (*4.1*)
- ☐ Priority Martine Activity Zone (PMAZ) (*3.5*)
- ☐ Recognized Ecological Complex (REC) (*4.4*)
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) (*2.2, 4.2*)

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☑	☐	☐
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☑	☐	☐
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☑	☐	☐
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☑	☐	☐
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☐	☐	☑
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☐	☐	☑
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☐	☐	☑
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☐	☐	☑
8	**Provide public access to, from, and along New York City's coastal waters.**	☑	☐	☐
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☑	☐	☐
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☑	☐	☐
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☑	☐	☐

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☑	☐	☐
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151 New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=WEPPLER.PETER.M.1228647353
Date: 2016.11.03 12:32:39 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Descriptions: The recommended National Ecosystem Restoration plan for the Hudson Raritan Estuary Ecosystem Restoration Project - Jamaica Bay Marsh Islands, restores five remnant salt marsh islands that are under the jurisdiction of the National Park Service (within the boundaries of the Gateway National Recreation Area), currently in danger of erosion, sea level rise, continued water quality stressors, and habitat fragmentation. The proposed Jamaica Bay Marsh Island projects are as follows:

1. Stony Creek- The existing condition remnant marsh at Stony Creek is 34 acres, it is well defined and characterized by relatively high elevations compared to the remaining Jamaica Bay marsh islands as whole, however, almost 60 percent of the marsh island has been lost in the past 42 years. The recommended alternative involves delivering 151,360 cubic yards of clean fill to the island and grading the sediment. This would make the total footprint of the island 69.6 acres, 52 acres of which would be marsh. Of the marsh habitat, 26 acres are low marsh, 25.3 acres are high marsh, and 0.7 acres are scrub.

2. Duck Point- The elevations at Duck Point represent approximately 17 acres, more than half of which are at the lower end of the low marsh range. The recommended alternative includes delivering 213,776 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 62.6 acres, 38.6 acres of which would be marsh. Of the marsh habitat, 22.5 acres are low marsh, 13.9 acres are high marsh, and 2.2 acres are scrub.

3. Elders Center- Elders Point Marsh was historically one island but marsh loss in the center of the island created two distinct islands separated by a mud flat. When the restoration of Elders Point East and Elders Point West were planned and implemented, it was infeasible to restore Elders Point Center based on the depth of the substrate in that area. The restoration was limited to an increase in size of 40 acres of new marsh at Elders Point East (2007) and 43 acres of new marsh at Elders Point West (2010). Presently, no marsh island exists above water between the two islands The recommended alternative includes delivering 284,891 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 41.7 acres, 27.5 acres of which would be marsh. Of the marsh habitat, 15.2 acres are low marsh, 10.9 acres are high marsh, and 1.4 acres scrub.

4. Pumpkin Patch West- Currently approximately 4 acres. The recommended alternative includes delivering 327,686 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 32.9 acres, 23.2 acres of which would be marsh. Of the marsh habitat, 13.7 acres are low marsh, 8.6 acres are high marsh, and 0.9 acres are scrub.

5. Pumpkin Patch East- Pumpkin Patch East is currently approximately 8 acres. The recommended alternative includes delivering 351,952 cubic yards of clean fill to the marsh island and grading the sediment. This would make the total footprint of the island 40.5 acres, 28.8 acres of which would be marsh. Of the marsh habitat, 15.6 are low marsh, 10.1 acres are high marsh, and 3.1 acres are scrub.

Construction Methods: There are several construction methods available for the movement of material from the stockpile location to the marsh islands. The likely scenario, which was used in previous marsh island construction, is through the use of a hopper system and a series of booster pumps to re-slurry the material and deposit it on the existing footprint, where it would be re-graded to the desired elevation.

In order to effectively place the material being used for marsh restoration, geotextile tubes, as well as other methods (including hay bales and silt curtains) will be employed to serve as an initial containment of the sediment water slurry. By installing geotextile tubes, the slurry is isolated from the wave and current forces, allowing the construction contractor to pump the sediment in a more efficient manner. In addition to providing a barrier to external forces, the tubes will serve to prevent large portions of the slurry from entering the surrounding water column, which would increase turbidity and pose a threat to the native species.

Schedule and Duration: The expected construction duration for each marsh island is 36 months, start dates are as follows: Stony Creek and Duck Point- 2024, Elders Center 2028, Pumpkin patch West 2032, Pumpkin Patch East 2036.

Applicable Policies: See below**.** Based on a review of the Coastal Management Program policies for New York, 9 state policies, 32 New York City policies were found to be potentially applicable to the proposed project.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to the Marsh Islands restoration proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The goal of the tentatively selected plan designs for these projects is consistent with the stated goal of this policy; to "protect and restore the quality and function of ecology systems within the New York City coastal area." The restoration of the Marsh Islands will improve nesting and feeding habitat for coastal birds in the New York area; therefore, the project is consistent with this policy.

WRP Policy 4.1: *Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.*

The Marsh Islands are recognized as being within a Special Natural Waterfront Area (SNWA). The New York City Comprehensive Waterfront Plan recognizes SNWAs as large areas with significant open spaces and concentration of natural resources including wetlands, habitats, and buffer areas. The purpose of this project is to restore lost tidal marshes and waterbird islands, which is in direct accord with this policy.

WRP Policy 4.3: *Protect designated Significant Coastal Fish and Wildlife Habitats.*

Also Applicable: **State Policy 7:** *Significant Coastal Fish and Wildlife Habitat will be protected, preserved, and where practical, restored to maintain their viability as habitats.*

The Marsh Islands are situated in the heavily urbanized Jamaica Bay and are designated as Siginificant Coastal Fish and Wildlife Habitat. Despite this designation, the intertidal marshes in Jamaica Bay have been undergoing significant and rapid losses, reducing the quality and quantity of available wildlife habitat for birds, shellfish, invertebrates, and fish. The activity is a salt marsh restoration that seeks to restore the marshes to a previous state of functionality. In the long run, the project will improve the coastal fish and wildlife habitat by increasing the functions and benefits of coastal marsh systems. This activity will also satisfy the Target Ecosystem Characteristic goal for providing "Habitat for Waterbirds". The restoration project can improve nesting and feeding habitat for target species as well as reduce fetch distance across Jamaica Bay, thereby potentially reducing damage and habitat loss during catastrophic weather events. Therefore, the project is consistent with this policy.

WRP Policy 4.5: *Protect and restore tidal and freshwater wetlands.*

Also Applicable: **State Policy 44:** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

The primary goal for this project is to restore degraded tidal ecosystems, improve environmental quality, and enhance fish and wildlife habitat. Project activities proposed for this site include restoring and creating low and high marsh islands which have been degraded or lost; therefore, the project is consistent with this policy.

WRP Policy 4.6: *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The purpose of this project is to restore the once prevalent salt marsh islands, which will contribute to the overall restoration of the unique landscape of the Jamaica Bay Wildlife Refuge; therefore, the project is consistent with this policy.

WRP Policy 4.7: *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

Restoration activities will benefit vulnerable plant, fish, wildlife species and rare ecological communities by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy.

WRP Policy 4.8: *Maintain and protect living aquatic resources.*

The project will not only maintain and protect aquatic resources, but will create additional habitat for shellfish, finfish, and benthic resources. Salt marshes and estuaries provide essential habitat for fish caught commercially and recreationally. Species such as summer flounder, scup, butterfish, mullet, menhaden, Atlantic croaker, and blue crab all use salt marshes as juvenile or adults for feeding and refuge. Local shellfish, finfish, and benthic macroinvertebrate population will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, sedimentation and turbidity from wetland and upland restoration will be minimized through the implementation of best management practices (BMPs) such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the restoration measures implemented for this project are consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

To minimize impacts to surface water and water quality during construction, erosion and sediment control measures will be employed. These may include temporary construction of a cofferdam, employing silt curtains, and stabilizing soils. These BMPs for soil and sediment control will be prepared before any construction commences. Therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

See Policy 5 above.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.

- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

Restoration will require in-water work and also the use of BMPs to protect the water quality of the surrounding resources. As stated in Policy 5.2, to protect the water quality of the surrounding area, construction BMPs will be implemented. In addition, all appropriate BMPs for soil erosion and sediment control including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

As stated in Policy 5.2, BMPs for soil erosion and sediment control will be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

The restoration of wetland areas will provide water quality functions such as erosion control, sediment stabilization, and filtration of dissolved particulate materials, and improvement of dissolved oxygen, thereby improving the overall water quality of the area; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The restoration of wetland habitat should slightly increase flood storage at the site, but is not expected to make an overall change in flood zones. Therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non- Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project includes the restoration of wetland habitat. Expansion and restoration of wetland habitat will slightly increase flood storage on the site, but is not expected to make an overall change in flood zone. The project is consistent with this policy.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with United States Army Corps of Engineers (USACE) guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of four (4) to eight (8) inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s. The project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed habitat restoration plans for five Jamaica Bay Marsh Islands. The projects do not include any shoreline infrastructure or enclosed structures.

1a. Portions of the footprint for all projects are located within the current and 2050 1% annual chance floodplain. Similarly, portions of the footprint for all projects may also be flooded by low estimates (8 inches SLR) of 2050s High Tide water.

Ground elevations in the project footprint will be filled to elevations appropriate for low and high mash development, within the range of 1.5 to 3.5 feet. In a small portion of each site, local topography will increase to ranges above 3 feet to accommodate scrub shrub habitat. Base Flood elevation, reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM), for Jamaica Bay are reported to be 13 feet NAVD88. FIRMs indicate that all sites contain Coastal V Zones.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.

2. N/A

3. The Project will advance Policy 6.2 and no further analysis is needed.

Please see Project Location Maps at the end of this document.

WRP Policy 6.4: *Protect and preserve non-renewable sources of sand for beach nourishment.*

Sources of dredged material for this project will be re-used from dredged material resulting from the USACE's ongoing navigation channel maintenance projects; therefore, this project is consistent with this policy.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and was utilized to consider the impacts of the feasibility level design, however further sampling will be conducted during the design phase of this project before final plans are created. It is expected that the marsh islands will not have contaminated soils or solid wastes that would need to be excavated. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will place dredged sand from Rockaway Inlet.

<u>WRP Policy 7.1:</u> *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

Also Applicable: **<u>State Policy 39:</u>** *The transport, storage, treatment and disposal of solid wastes, particularly hazardous wastes, within coastal areas will be conducted in such a manner so as to protect groundwater and surface water supplies, significant fish and wildlife habitats, recreation areas, important agricultural land, and scenic resources.*

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. It is expected that the marsh islands will not have contaminated soils or solid wastes that would need to be excavated. The project is consistent with this policy.

<u>WRP Policy 7.2:</u> *Prevent and remediate discharge of petroleum products.*

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

The use of construction equipment may present the potential for hydrocarbons to spill while storing or refueling equipment. However, the use of BMPs such as secondary containment for fuel storage areas, and proper maintenance of equipment to prevent leaks will be implemented; therefore, the project is consistent with this policy.

<u>WRP Policy 7.3:</u> *Transport solid waste and hazardous materials and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.*

As stated in Policy 7, it is expected that the marsh islands will not have contaminated soils or solid wastes that would need to be excavated; therefore, the project is consistent with this policy.

<u>WRP Policy 8</u>: *Provide public access to, form, and along New York City's coastal waters.*

Also Applicable: **<u>State Policy 19:</u>** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities*

The project will fall within the boundaries of the Gateway National Recreation Area (under the jurisdiction of the National Park Service). The proposed activities will not modify current public access; therefore, the project is consistent with this policy.

<u>WRP Policy 8.1:</u> *Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.*

As stated in Policy 8, the proposed activities will not modify public access; therefore, the project is consistent with this policy.

<u>WRP Policy 8.5:</u> *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

One of the planning goals for this project includes "improving public education opportunities through the watershed to promote public ownership of restoration"; therefore, the project is consistent with this policy.

WRP Policy 8.6: *Design waterfront public spaces to encourage the waterfront's identify and encourage stewardship.*

See Policy 8.5 above.

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

The project will preserve and restore open space in Jamaica Bay, thereby enhancing the scenic resources in New York City's coastal area. The project is consistent with this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The USACE will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resource that may be affected will be developed with input from the NYSOPRHP, National Park Service - Gateway National Recreation Area. Therefore, this project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.


Future Floodplain 2050s
1% Annual Chance Floodplain
0.2% Annual Chance Floodplain
1mi
-73.664 40.554 Degrees


High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)
1mi
-73.664 40.559 Degrees


Preliminary Flood Insurance Rate Maps 2015
V Zone
A Zone
Shaded X Zone
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
-73.766 40.574 Degrees

FOR INTERNAL USE ONLY	WRP No. ______________________
Date Received: ____________________	DOS No. ______________________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* *(WRP)* which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ______________________

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

The Jamaica Bay Marsh Islands comprise five restoration sites: Stony Creek, Duck Point, Elders Center, Pumpkin Patch West, and Pumpkin Parch East. This project will involve the restoration of the Marsh Islands by placing clean fill and planting at a location where an island once existed. Please see see attachment for site specific details.

2. Purpose of activity

From 1994 to 1999, it is estimated that over 220 acres of salt marsh were lost at 47 acres per year in Jamaica Bay. Left alone, the Marsh Islands could vanish by the year 2025, resulting in a significant loss of wildlife habitat and risk of damage from coastal storms. In response to these losses, under the U.S. Army Corps of Engineers Continuing Authorities Program (CAP), the New York City Department of Environmental Protection (NYCDEP) and New York State Department of Environmental Conservation (NYSDEC) requested assistance in implementing this Marsh Island restoration project.

C. PROJECT LOCATION

Borough: Queens Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Jamaica Bay

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) *(2.1)*
- ☑ Special Natural Waterfront Area (SNWA) *(4.1)*
- ☐ Priority Martine Activity Zone (PMAZ) *(3.5)*
- ☐ Recognized Ecological Complex (REC) *(4.4)*
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) *(2.2, 4.2)*

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☐	☐	☑
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☑	☐	☐
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☑	☐	☐
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☐	☐	☑
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☐	☐	☑
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☑	☐	☐
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☑	☐	☐
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☑	☐	☐
8	**Provide public access to, from, and along New York City's coastal waters.**	☑	☐	☐
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☑	☐	☐
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☐	☐	☑
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☐	☐	☑

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☑	☐	☐
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151, New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=WEPPLER.PETER.M.1228647353
Date: 2016.11.03 12:42:27 -04'00'

Date: ____________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Description: The project area is located adjacent to the Bronx Zoo in Bronx County, NY. The site is an over-widened channel that experiences stagnation and constricted flow made worse by the two dams within the channel. Sewage sources and runoff from the Bronx Zoo contribute to the waste infiltration and distinct sewage odor of the water. The wetlands and upland woodlands within the site are relegated to thin strips of land dominated by invasive species.

The recommended plan for the Bronx Zoo and Dam site will improve aquatic habitat and water quality. Approximately 0.28 acres of invasive vegetation along both banks and on the upland island upstream of dams will be removed and 0.28 acres of native vegetation will be planted in these locations and an additional location downstream of the dams. Fish ladder installation will link area upstream of the dams to the river channel below the dams and open Bronx River access to anadromous fish. Creation of 1.14 acres of emergent wetlands along both banks upstream of the dams and along the west bank downstream of the dams will provide habitat for migratory birds and flood control. Creation of 0.48 acres of forested wetlands created along the east bank upstream of the dams may provide potential habitat for endangered bat species, if present. In total, 3,320 CY of material will be excavated during clearing and grubbing activities and to reach grade for the recommended habitats, excavated material will be beneficially reused on site to the extent possible. Additional restoration measures include removal of debris between dams, sediment trap installation to reduce sediment loads reaching the river, installation of 750 linear feet rock wall upstream of the river, and improved public access to the site.

Schedule and Duration: The expected construction duration for Bronx Zoo and Dam is 11 months, with construction currently scheduled for 2024.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Bronx Zoo Dam, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 3: *Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.*

The project will create long-term benefits that will improve the area's aesthetics, recreation, and public access with the creation of new natural habitat and public access points; therefore, the project is consistent with this policy.

WRP Policy 3.1: *Support and encourage in-water recreational activities in suitable locations.*

Also Applicable: **State Policy 22:** *Development when located adjacent to the shore will provide for water-related recreation whenever such use is compatible with reasonably anticipated demand for such activities, and is compatible with the primary purpose of the development.*

Two public access points are proposed along the northeast bank of the river; therefore, the project is consistent with this policy.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The project fulfills the Hudson Raritan Estuary (HRE) mission by promoting Target Ecosystem Characteristics (TECs), which includes improving fish, shellfish and benthic habitat, sediment/nutrient load reduction, and habitat connectivity. Therefore, the project is consistent with this policy.

<u>WRP Policy 4.4:</u> *Identify, remediate, and restore ecological functions within the Recognized Ecological Complexes.*

The Bronx Zoo and Dam fish ladder is a critical component of fish passage projects along the Bronx River that will complement upstream fish ladder projects to expand fish passage and provide additional upstream habitat for anadromous fish and restore ecological function of the river; therefore, the project is consistent with this policy.

<u>WRP Policy 4.5:</u> *Protect and restore tidal and freshwater* wetlands*.*

Also Applicable: **<u>State Policy 44:</u>** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

The project includes the creation of 0.54 acres of emergent wetlands along both banks upstream of the dams, and along the west bank downstream of the dam. Created wetlands will provide beneficial wildlife habitat and increase native biodiversity in the area; therefore, the project is consistent with this policy.

<u>WRP Policy 4.6:</u> *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The Bronx Zoo and Dam site is extremely disturbed by anthropogenic impacts with limited or disturbed natural areas. The site is generally flat and impacted by roadways, parking lots, and other facilities associated with the Bronx Zoo. The river is impeded by a dam system. Upstream of the dam, wetlands are very limited and consist of small discontinuous pockets. Upstream of the dam, the uplands consist of lawns and a thin wooded strip along the shoreline. Overall, the project site has low ecological value and provides limited habitat for fish and wildlife. The proposed restoration measures include invasive species and debris removal, wetland creation, sediment load reduction, fish ladder installation and installation of public access points. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimated the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities, tidal patterns, and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. The project is consistent with this policy.

<u>WRP Policy 4.7:</u> *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

All appropriate federal and state agencies were consulted regarding the documentation of rare, threatened, and endangered species in the project area. Restoration plans have been carefully mapped to avoid areas where listed species were found during previous surveys. A final survey of the restoration site will be performed to ensure that damage to rare plants will be avoided. If protected species are found on site, further protective measures will be considered including but not limited to protection from construction by fencing, or transplanting if the plants are in an unavoidable impact area. Handling of protected species will be coordinated with the New York Natural Heritage Program and New York State Department of Environmental Conservation. Avian species are not expected to be impacted due to their mobile nature. It is expected that listed bird species will fly to another nearby site to forage during construction and planting. Restoration activities in the long term will benefit threatened and endangered species by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy.

<u>WRP Policy 4.8:</u> *Maintain and protect living aquatic resources.*

With the installation of a fish ladder, the project will improve fish connectivity and increase access for anadromous fish species up the Bronx River. Wetland creation, debris removal and native plantings will also provide shade and shallow water habitat for aquatic resources; therefore, the project is consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

To minimize impacts to surface water and water quality during construction, erosion and sediment control measure will be employed. These may include temporary construction of a cofferdam, employing silt curtains, and re-stabilization soils. These best management practices (BMPs) for soil and sediment control will be prepared before any construction commences. With wetland creation and habitat enhancement, restored vegetative communities will provide a reduction in nutrient inputs into surface water bodies. Restoration work proposed would result in fewer low dissolved oxygen events, increased water transparency, and a reduction in frequency and duration of algal blooms. Therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

See Policy 5 above.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

The project will carefully evaluate construction to prevent or minimize adverse impacts such as soil erosion and sediment alteration. For example, work can be accomplished during low tidal periods or in areas temporarily disconnected from tidal waters. In addition, all appropriate BMPs for soil erosion and sediment control, including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales, will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

As stated in Policy 5.2, BMPs for soil erosion and sediment control will be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

Multiple restoration alternatives were proposed for the project site and then evaluated through a Cost Effectiveness Analysis/Incremental Cost Analysis. The alternative selected will include the most cost-effective and ecologically effective restoration option for the site. Restoration measures at the site, including wetland creation, will contribute to the overall resolution of water resource problems within the area; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The creation of wetlands on the project site can function as retention basins acting as flood prevention measures; therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non- Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project includes the creation of wetlands, which function as retention basins and act as flood protection measures; therefore, the project is consistent with this policy.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with Corps guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of 4 to 8 inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s.

Results from implementing the TECs at this site involve the restoration of terrestrial habitat and creation of aquatic plant communities, which will promote primary productivity and increase removal of carbon dioxide from the atmosphere. The project will also result in improved water quality and clarity, which will promote increased photosynthesis and carbon capture from aquatic vascular plants and phytoplankton. The creation and restoration of terrestrial habitat could also lead to minor alterations in microclimates. Biological and physical processes such as transpiration, evaporation, convection, and shading will mediate temperature and humidity within these microhabitats. Therefore, the project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed habitat restoration plans for the Bronx Zoo and Dam project area.

1a. Portions of the project area are within the current and 2050 1% annual chance floodplains. Similarly, portions of the project footprint may also be flooded by low estimates (8 inches of SLR) of 2050s High Tide water.

Ground elevations for the wetlands in the site area are in the range of 88.67 to 89.60 feet NAVD 88. There are no Base Flood elevations reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM) for the Bronx Zoo and Dam. FIRMs indicate that the site contains Coastal A Zones.

1b. The proposed fish passage structure is not considered a vulnerable, critical, or potentially hazardous feature. Although it lies within an area that may be exposed to flooding by the 1% annual 2050 projection, it is an unenclosed, stand-alone environmental feature containing no critical utilities or infrastructure. Further, it will be designed to withstand some impacts of flooding.

2. N/A. Please see Project Location Maps at the end of this document.

3. The Project will advance Policy 6.2 and no further analysis is needed.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans are created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify if soils can be reused on site for landscaping and possible capping of contaminated areas and solid wastes to remain. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution, and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy.

WRP Policy 7.2: *Prevent and remediate discharge of petroleum products.*

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

The use of construction equipment may present the potential for hydrocarbons to spill while storing or refueling equipment. However, the use of BMPs such as secondary containment for fuel storage areas, and proper maintenance of equipment to prevent leaks will be implemented; therefore, the project is consistent with this policy.

WRP Policy 8: *Provide public access to, from, and along New York City's coastal waters.*

Also Applicable: **State Policy 19:** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

Bronx River Park offers recreational opportunities including walking, viewing opportunities, and recreational boating. The park is best known as the home of the Bronx Zoo and New York Botanical Gardens. Bronx Park has many recreational areas including playgrounds, bicycle paths, baseball diamonds, tennis and basketball courts, and football and soccer fields. During construction, viewsheds and recreational access may be temporarily restricted. However, the proposed action will have positive impacts to the recreational and educational features of this site by creating a much more diverse landscape with enhanced wildlife habitat and viewing opportunities and improvement of public access to natural resources. Restoration activities will not modify public access and any trails that were temporarily disturbed will be reestablished after construction. Therefore, the project is consistent with this policy.

WRP Policy 8.1: *Preserve, protect, maintain, and enhance physical, visual, and recreational access to the waterfront.*

See Policy 8 above.

WRP Policy 8.3: *Provide visual access to the waterfront where physically practical.*

Two public access points will be installed on the northeast bank of the river. The location of these public access points will be easily accessible from the parking area to the east. The project is consistent with this policy.

WRP Policy 8.4: *Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.*

See Policy 8 above.

WRP Policy 8.5: *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

One of the planning goals for this project includes "improving public education opportunities through the watershed to promote public ownership of restoration"; therefore, the project is consistent with this policy.

WRP Policy 8.6: *Design waterfront public spaces to encourage the waterfront's identify and encourage stewardship.*

See Policy 8 above.

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

During construction there will be temporary adverse impacts to aesthetics, recreation, and public access. Example of impacts include viewsheds under construction and temporary restrictions to recreational areas. However, in the long-term, beneficial impacts to aesthetics, recreation and public access are anticipated from restoration measures. The project will create new natural habitat or enhance existing habitat, and this will enhance the aesthetic of the project sight. Implementation of public access to natural resources will allow for increased recreational opportunities including fishing, boating, and hiking. Therefore, the project is consistent with and furthers the goals of this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The Army Corps of Engineers (New York District) will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP, National Parks Service (NPS), and Gateway National Recreation Area. Therefore, the project is consistent with this policy.

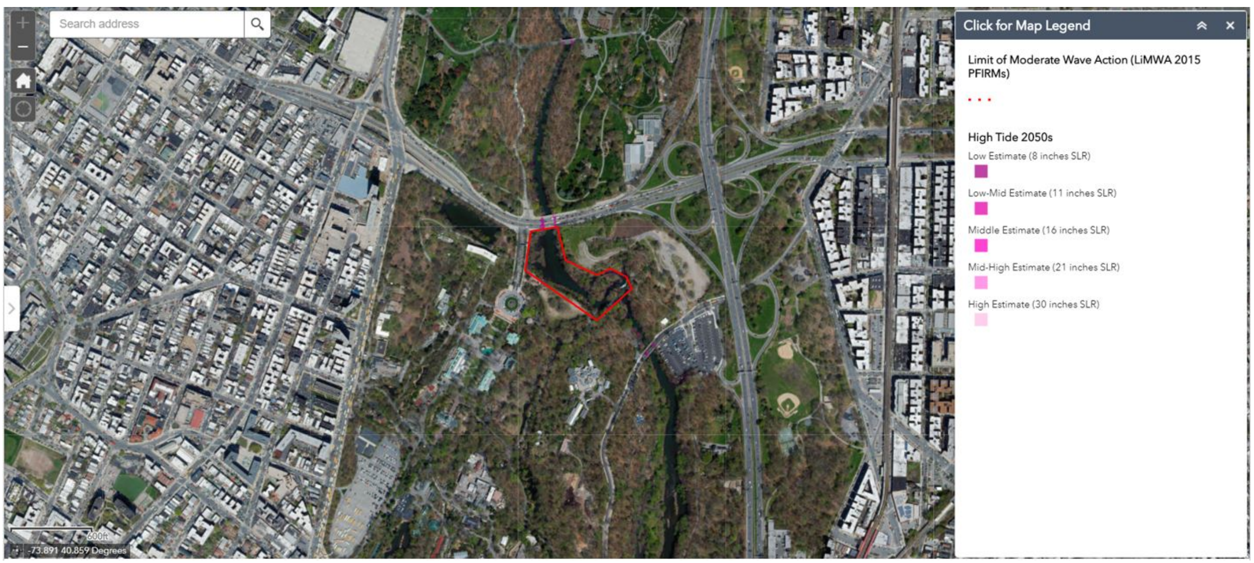
WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.


Search address
Click for Map Legend
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
Future Floodplain 2050s
1% Annual Chance Floodplain
0.2% Annual Chance Floodplain
-73.888 40.859 Degrees


Search address
Click for Map Legend
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)
-73.891 40.859 Degrees


Search address
Click for Map Legend
Preliminary Flood Insurance Rate Maps 2015
V Zone
A Zone
Shaded X Zone
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
-73.890 40.858 Degrees

FOR INTERNAL USE ONLY Date Received: ____________	WRP No. ____________ DOS No. ____________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (*WRP*) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ____________

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

The Bronx Zoo and Dam site is affected by a dam system consisting of two dams abreast of each other, separated by a mid-stream island. Restoration measures proposed for the site will improve aquatic habitat, water quality, flow regime, fish connectivity, biodiversity, and create habitat for migratory birds and endangered bats. The recommended plan for the Bronx Zoo and Dam site will improve aquatic habitat and water quality. Approximately 0.28 acres of invasive vegetation along both banks and on the upland island upstream of dams will be removed and 0.28 acres of native vegetation will be planted in these locations and an additional location downstream of the dams. Fish ladder installation will link area upstream of the dams to the river channel below the dams and open Bronx River access to anadromous fish. Creation of 1.14 acres of emergent wetlands along both banks upstream of the dams and along the west bank downstream of the dams will provide habitat for migratory birds and flood control. Creation of 0.48 acres of forested wetlands created along the east bank upstream of the dams may provide potential habitat for endangered bat species, if present. In total, 3,320 CY of material will be excavated during clearing and grubbing activities and to reach grade for the recommended habitats, excavated material will be beneficially reused on site to the extent possible. Additional restoration measures include removal of debris between dams, sediment trap installation to reduce sediment loads reaching the river, installation of 750 linear feet rock wall upstream of the river, and improved public access to the site.

2. Purpose of activity

Upstream of the dam, the waterbody is broad and shallow with nutrient-laden inputs from the zoo. The dams at the Bronx Zoo constitute a barrier to fish movements. Removal of these stressors would result in immediate improvements to water quality and would allow for fish, especially anadromous and catadromous species to access greater portions of the Bronx River.

C. PROJECT LOCATION

Borough: Bronx Tax Block/Lot(s): ______

Street Address: Between East Fordham Road and Boston Road

Name of water body (if located on the waterfront): Bronx River

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☐ Yes	☑ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☐ Yes	☑ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) (*2.1*)
- ☐ Special Natural Waterfront Area (SNWA) (*4.1*)
- ☐ Priority Martine Activity Zone (PMAZ) (*3.5*)
- ☑ Recognized Ecological Complex (REC) (*4.4*) (Bronx Zoo/Bronx Park)
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) (*2.2, 4.2*)

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder*, provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☑	☐	☐
3.1.	Support and encourage in-water recreational activities in suitable locations.	☑	☐	☐
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☐	☐	☑
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☐	☐	☑
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☑	☐	☐
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☐	☐	☑
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☐	☐	☑
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☐	☐	☑
8	**Provide public access to, from, and along New York City's coastal waters.**	☑	☐	☐
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☑	☐	☐
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☑	☐	☐
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☑	☐	☐

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☑	☐	☐
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151, New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:50:21 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Descriptions: The project area is within a steep valley in the New York Botanical Garden in Bronx County, NY. Wetlands are practically non-existent in the site and consist of few, very small (less than 5 square feet) discontinuous pockets of emergent vegetation. River samples often contain high levels of coliform bacteria and poor water quality due to illegal CSOs. The extreme channel habitats, including sediment laden pond, fast moving rocky channel and dam, impede fish movement and provide low to moderate fish and wildlife habitat.

The recommended plan for Stone Mill Dam increases and improves tributary connections, shoreline and shallows, and habitats for fish, crab, and lobsters. Fish ladder installation at this site is a critical component of the fish passage projects along the Bronx River and links the slow-flowing pool upstream of dam and the faster-flowing channel downstream of the dam. This measure will open additional upstream habitat for anadromous fish. Clay pipe attractors will be placed at both the upstream and downstream ends of the fish ladder to function as refuge habitat for fish. Approximately 0.027 acres of native vegetation will be planted along the east bank of the river, abutting the fish ladder. Invasive vegetation will be removed from 0.005 acres along the west bank, downstream of the dam, and planted with native vegetation.

Schedule and Duration: The expected construction Duration of construction is estimated at 8 months and is expected to begin in 2026.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Stone Mill Dam, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The purpose of this project is to restore the connectivity of the Bronx River to allow for anadromous and diadromous fish passage; therefore, the project is consistent with this policy.

WRP Policy 4.4: *Identify, remediate, and restore ecological functions within the Recognized Ecological Complexes.*

The Stone Mill Dam fish ladder is a critical component of fish passage projects along the Bronx River that will complement downstream fish ladder projects to expand fish passage and provide additional upstream habitat for anadromous fish and restore ecological function of the river; therefore, the project is consistent with this policy.

WRP Policy 4.5: *Protect and restore tidal and freshwater wetlands.*

Also Applicable: **State Policy 44:** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

Due to the steep slopes of the site, there were limited restoration options that could be implemented at the site. Even though wetland restoration is not part of the proposed project activities, the installation of the fish ladder will not impact or create any wetland losses. Native vegetation will also be planted in place of invasive species, which will create natural buffers along the river banks; therefore, the project is consistent with this policy.

<u>WRP Policy 4.6:</u> *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The Stone Mill Dam is a TEC implementation project that is part of the HRE Comprehensive Restoration Plan. The goal of the HRE CRP is to "restore and sustain a mosaic of habitats within the region." Due to the steeply sloped banks, there were limited restoration opportunities at the site. To ensure the most ecologically and economical feasible plan was a selected, a comprehensive tiered evaluation plan was used. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities and human use patterns were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan. The project is consistent with this policy.

<u>WRP Policy 4.7:</u> *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

All appropriate federal and state agencies were consulted regarding the documentation of rare, threatened, and endangered species in the project area. Restoration plans have been carefully mapped to avoid areas where listed species were found during previous surveys. A final survey of the restoration site will be performed to ensure that damage to rare plants will be avoided. If protected species are found on-site, further protective measures will be considered including but not limited to protection from construction by fencing, or transplanting if the plants are in an unavoidable impact area. Handling of protected species will be coordinated with the New York Natural Heritage Program and New York State Department of Environmental Conservation. Avian species are not expected to be impacted due to their mobile nature. It is expected that birds will fly to another nearby site to forage during construction and planting. Restoration activities in the long term will benefit threatened and endangered species by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy.

<u>WRP Policy 4.8:</u> *Maintain and protect living aquatic resources.*

The construction of the fish ladder at the Stone Mill Dam will link the slow-flowing pool upstream of the dam and the faster-flowing channel downstream of the dam. The installation of the fish ladder will allow fish to navigate through existing impoundments and continue their migration runs upstream. This will benefit anadromous fish, which have had their historic spawning runs greatly reduced in the Bronx River. During construction, fish may be displaced due to noise, changes in currents or stream flow, changes in water quality including increased turbidity, and direct mechanical disturbance to habitat. Proper planning and implementation of best management practices (BMPs) will minimize these disturbances, and fish will return to the area shortly after completion of construction activities. Generally, these impacts will be minor for species that are abundant as well as species that may be rare. Construction activities can deter commercially important, rare, or protected fish species from using essential migratory pathways, breeding, foraging, or seeking shelter from predators. However, seasonal work windows will be observed to minimize or avoid disturbances to fish life stages of concern. The project is consistent with this policy.

<u>WRP Policy 5:</u> *Protect and improve water quality in the New York City coastal area.*

To minimize impacts to surface water and water quality during construction, erosion and sediment control measure will be employed. These may include temporary construction of a cofferdam, employing silt curtains, and stabilizing soils. These BMP practices for soil and sediment control will be prepared before any construction commences. Therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

See Policy 5 above.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

The project will carefully evaluate construction to prevent or minimize adverse impacts such as soil erosion and sediment alteration. All appropriate BMPs for soil erosion and sediment control, including use of silt fencing, turbidity curtains, and hay bales, will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

As stated in Policy 5.2, BMPs for soil erosion and sediment control will also be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The only structures proposed for the site include clay-pipe fish attractors and fish ladders. These structures will not cause flooding or erosion, therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **<u>State Policy 17:</u>** *Non- Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As state in Policy 6, the project will not cause flooding, erosion, or increase the flood zone; therefore, the project is consistent with this policy.

<u>WRP Policy 6.2:</u> *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with Corps guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of 4 to 8 inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s. The project is consistent with this policy.

<u>WRP Policy 6.2: General Methodology:</u> The New York District has proposed plans to improve fish movement and habitat quality in the Stone Mill Dam area. The project does not include any shoreline infrastructure or enclosed structures.

1a. Portions of the project footprint are located within the current and 2050 1% annual chance floodplain. Similarly, small portions of the footprint may also be flooded by low estimates (8 inches SLR) of 2050s High Tide water.

Ground elevations in the project area are in the range of 60-80 feet NAVD 88. No base flood elevation was reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM) for Stone Mill Dam. FIRMs indicate that the site contains Coastal A Zones.

1b. The proposed fish passage structure is not considered a vulnerable, critical, or potentially hazardous feature. Although it lies within an area that may be exposed to flooding by the 1% annual 2050 projection, it is an unenclosed, stand-alone environmental feature containing no critical utilities or infrastructure. Further, it will be designed to withstand some impacts of flooding.

2. N/A Please see Project Location Maps at the end of this document.

3. The Project will advance Policy 6.2 and no further analysis is needed.

<u>WRP Policy 6.3:</u> *Direct public funding for flood prevention or erosion control measure to those locations where the investment will yield significant public benefit.*

Also Applicable: **<u>State Policy 16:</u>** *Public funds shall only be used for erosion protective structures where necessary to protect human life, and new development which requires a location within or adjacent to an erosion hazard are to be able to function, or existing development; and only where the public benefits outweigh the long term monetary and other costs including the potential for increasing erosion and adverse effects on natural protective features.*

Based on modeling efforts, the erosion control measures proposed for the site are necessary to protect the existing and constructed habitats at the site. Without installation, it is expected that current rates of erosion will persist. Therefore, it is determined the project is consistent with this policy.

<u>WRP Policy 7:</u> *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **<u>State Policy 8:</u>** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans are created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify if soils can be reused on site for landscaping and possible capping of contaminated areas and solid wastes to remain. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

<u>WRP Policy 7.1:</u> *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy.

Also Applicable: **<u>State Policy 39:</u>** *The transport, storage, treatment and disposal of solid wastes, particularly hazardous wastes, within coastal areas will be conducted in such a manner so as to protect groundwater and surface water supplies, significant fish and wildlife habitats, recreation areas, important agricultural land, and scenic resources.*

<u>WRP Policy 7.2:</u> *Prevent and remediate discharge of petroleum products.*

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

<u>WRP Policy 8:</u> *Provide public access to, form, and along New York City's coastal waters.*

Also Applicable: **<u>State Policy 19:</u>** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

Recreation and water access will be limited during construction but are expected to return to their current levels post-construction. Trails will be maintained or rebuilt to the extent possible as agreed by the local owner; therefore, the project is consistent with this policy.

<u>WRP Policy 8.1:</u> *Preserve, protect, maintain, and enhance physical, visual, and recreational access to the waterfront.*

Physical, visual and recreational access maybe temporarily restricted during the construction, however, will return to their current levels post-construction. As stated above, trails will be maintained or rebuilt to the best extent possible; therefore, the project is consistent with this policy.

<u>WRP Policy 8.3:</u> *Provide visual access to the waterfront where physically practical.*

See Policy 8 and 8.1 above.

<u>WRP Policy 8.4:</u> *Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.*

The project will preserve and restore existing open space by removing invasive species. The project will enhance scenic resources; therefore, the project is consistent with this policy.

<u>WRP Policy 8.5:</u> *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

One of the planning goals for this project includes "improving public education opportunities through the watershed to promote public ownership of restoration"; therefore, the project is consistent with this policy.

<u>WRP Policy 8.6:</u> *Design waterfront public spaces to encourage the waterfront's identify and encourage stewardship.*

See Policy 8.5 above.

<u>WRP Policy 9:</u> *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

The project will preserve and restore existing open space by removing invasive species. The project will enhance scenic resources; therefore, the project is consistent with this policy.

<u>WRP Policy 9.1</u>: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

<u>WRP Policy 9.2:</u> *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

<u>WRP Policy 10:</u> *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **<u>State Policy 23:</u>** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The Army Corps of Engineers (New York District) will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the

NYSOPRHP, National Parks Service (NPS), and Gateway National Recreation Area. Therefore, this project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.


Search address
Click for Map Legend
Preliminary Flood Insurance Rate Maps 2015
V Zone
A Zone
Shaded X Zone
-73.890 40.864 Degrees

FOR INTERNAL USE ONLY	WRP No. ______
Date Received: ______	DOS No. ______

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (WRP) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ______

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

Stone Mill Dam- The recommended plan for Stone Mill Dam increases and improves tributary connections, shoreline and shallows, and habitats for fish, crab, and lobsters. Fish ladder installation at this site is a critical component of the fish passage projects along the Bronx River and links the slow-flowing pool upstream of dam and the faster-flowing channel downstream of the dam. This measure will open (Insert measure), providing additional upstream habitat for anadromous fish. Clay pipe attractors will be placed at both the upstream and downstream ends of the fish ladder to function as refuge habitat for fish. Approximately 0.027 acres of native vegetation will be planted along the east bank of the river, abutting the fish ladder. Invasive vegetation will be removed from 0.005 acres along the west bank, downstream of the dam, and planted with native vegetation.

2. Purpose of activity

Due to the steeply sloped shorelines, there is limited restoration opportunity along the river bank. As such, improvements to water quality and aquatic fauna should receive consideration. Currently, there is a strong movement to restore anadromous and diadromous fish passage to the entire Bronx River. The presence of the dam is an obstacle to this goal, thus the implementation of a fish ladder, especially when combined with fish attractors, will contribute to the goal of improving connectivity along the full length of the river.

C. PROJECT LOCATION

Borough: Bronx Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Bronx River

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

☐ City Map Amendment
☐ Zoning Map Amendment
☐ Zoning Text Amendment
☐ Site Selection – Public Facility
☐ Housing Plan & Project
☐ Special Permit
(if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

☐ Zoning Certification
☐ Zoning Authorizations
☐ Acquisition – Real Property
☐ Disposition – Real Property
☐ Other, explain: ______

☐ Concession
☐ UDAAP
☐ Revocable Consent
☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

☐ Variance (use)
☐ Variance (bulk)
☐ Special Permit
(if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

☐ Legislation
☐ Rulemaking
☐ Construction of Public Facilities
☐ 384 (b) (4) Approval
☐ Other, explain: ______

☐ Funding for Construction, specify: ______
☐ Policy or Plan, specify: ______
☐ Funding of Program, specify: ______
☐ Permits, specify: ______

State Actions/Approvals/Funding

☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
☐ Funding for Construction, specify: ______
☐ Funding of a Program, specify: ______
☐ Other, explain: ______

Federal Actions/Approvals/Funding

☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
☑ Funding for Construction, specify: Section 204 of WRDA 1992
☐ Funding of a Program, specify: ______
☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☐ Yes	☑ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) *(2.1)*
- ☐ Special Natural Waterfront Area (SNWA) *(4.1)*
- ☐ Priority Martine Activity Zone (PMAZ) *(3.5)*
- ☑ Recognized Ecological Complex (REC) *(4.4)* (Bronx Zoo)
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) *(2.2, 4.2)*

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☐	☐	☑
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☐	☐	☑
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☐	☐	☑
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☑	☐	☐
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	✓		
5.1	Manage direct or indirect discharges to waterbodies.	✓		
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	✓		
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	✓		
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	✓		
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.			✓
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	✓		
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	✓		
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	✓		
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	✓		
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.			✓
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	✓		
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	✓		
7.2	Prevent and remediate discharge of petroleum products.			✓
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.			✓
8	**Provide public access to, from, and along New York City's coastal waters.**	✓		
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	✓		
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.			✓
8.3	Provide visual access to the waterfront where physically practical.			✓
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	✓		

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☑	☐	☐
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151, New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:51:09 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Descriptions: The project area is adjacent to the Bronx River Parkway in Bronx County, NY. The site currently provides limited fish and wildlife habitat due to nearby urban development, significant habitat fragmentation, sedimentation issues, and dense growth of invasive species.

The recommended plan increases and improves wetlands, public access, shoreline and shallows, and mudflat habitat. Native upland trees and shrubs will be planted along almost the entire length of the Bronx River Parkway roadway embankment along the west side of the site and on the steep slope along the east bank of the river. Forested and scrub/shrub wetlands totaling 1.1 acres will be created along two segments of the river on both banks. In stream work includes 5.7 acres of channel realignment using instream cross vanes and J-hooks. Between the forested wetland areas near the southern end of the site, 2.09 acres of banks will be stabilized using stacked rock walls with brush layers or crib walls and the river bottom will be excavated, bed material replaced, and cross vanes constructed. Invasive species removal with native plantings along 7.89 acres will provide a wooded riparian corridor along the banks of the entire reach. Riparian woodlands and created forested wetlands would provide habitat resources that are currently very limited in the Bronx urban environment.

Additional restoration measures at Shoelace Park include installation of 2.07 acres of vegetation swales, bioretention basins, raingardens along the east bank to reduce sediment loads reaching the river, and shoreline softening along 0.012 acres of the west bank at the southern end of site using a stacked rock wall with brush layers.

In total 40,430 CY of material will be excavate3,440 CY of material will be excavated during invasive species removal and select native plantings; 1,010 CY will be excavated from the streambed and banks for construction of j-hooks and rock vanes; 8,910 CY will be excavated from the from the channel for in channel modifications and installation of an stone bottom; 18,400 CY will be excavated for sediment load reduction; 8,670 CY will be excavated during installation of the stepped rock wall. To the extent possible, this material will be reused onsite for habitat creation. Duration of construction is estimated at 13.5 months and is expected to begin in 2030.

Schedule and Duration: The expected duration of construction is estimated at 13.5 months and is expected to begin in 2030.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Shoelace Park, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 3: *Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.*

The project will create long-term benefits that will improve the area's aesthetics, recreation, and public access with the creation of new natural habitat and public access points; therefore, the project is consistent with this policy.

WRP Policy 3.1: *Support and encourage in-water recreational activities in suitable locations.*

Also Applicable: **State Policy 22:** *Development when located adjacent to the shore will provide for water-related recreation whenever such use is compatible with reasonably anticipated demand for such activities, and is compatible with the primary purpose of the development.*

Public access to the river will be maintained; therefore, the project is consistent with this policy.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The project fulfills the Hudson Raritan Estuary (HRE) Comprehensive Restoration Plan's (CRP) mission by promoting Target Ecosystem Characteristics (TEC) and to "restore and sustain a mosaic of habitats within the region, in a cost-effective and socially feasible manner"; therefore, the project is consistent with this policy.

WRP Policy 4.4: *Identify, remediate, and restore ecological functions within the Recognized Ecological Complexes.*

The Shoelace Park realigned channel, with instream structures, meanders, and pool and riffle complexes, is a critical component of fish passage projects along the Bronx River that will complement downstream fish ladder projects to expand fish passage and provide additional upstream habitat for anadromous fish and restore ecological function of the river; therefore, the project is consistent with this policy.

WRP Policy 4.5: *Protect and restore tidal and freshwater wetlands.*

Also Applicable: **State Policy 44:** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

The project includes the creation of wetlands that will restore the limited habitat resources available in the Bronx. Additionally, habitat restoration and bank stabilization will provide beneficial wildlife habitat, increased native biodiversity, and prevent soil erosion; therefore, the project is consistent with this policy.

WRP Policy 4.6: *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The purpose of the project is to "restore and sustain a mosaic of habitats within the region". Restoration measure will improve aquatic habitat, water quality, reduce invasive species, and enhance recreational usage; therefore, the project is consistent with this policy.

To ensure the most ecologically and economical feasible plan was a selected, a comprehensive tiered evaluation plan was used. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities, tidal patterns, and human use patterns at the project site were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecological beneficial design plan.

WRP Policy 4.7: *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

All appropriate federal and state agencies were consulted regarding the documentation of rare, threatened, and endangered species in the project area. Restoration plans have been carefully mapped so as to avoid areas where listed species were found during previous surveys. A final survey of the restoration site will be performed to ensure that damage to rare plants will be avoided. If protected species are found on site, further protective measures will be considered including but not limited to protection from construction by fencing, or transplanting if the plants are in an unavoidable impact area. Handling of protected species will be coordinated with the New York Natural Heritage Program and New York State Department of Environmental Conservation. Avian species are not expected to be impacted due to their mobile nature. It is expected that listed bird species will fly to another nearby site to forage during construction and planting. Restoration activities in the long term will benefit threatened and endangered species by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy.

WRP Policy 4.8: *Maintain and protect living aquatic resources.*

Aquatic resources will receive long-term benefits from the implementation of the TECs and restoration measures of this project. Habitats created and restored will enhance the entire ecosystem by increasing primary and secondary production, habitat availability, water quality, and aquatic species diversity and abundance. During construction, fish may be displaced due to noise, changes in currents or stream flow, changes in water quality including increased turbidity, and direct mechanical disturbance to habitat. To prevent these impacts, proper planning and implementation of best management practices (BMPs) will minimize these disturbances, and fish will return to the area shortly after completion of construction activities. Generally, these impacts will be minor for species that are abundant as well as species that may be rare. Construction activities can deter commercially important, rare, or protected fish species from using essential migratory pathways, breeding, foraging, or seeking shelter from predators. However, seasonal work windows will be observed to minimize or avoid disturbances to fish life stage concerns. The project is consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

To minimize impacts to surface water and water quality during construction, erosion and sediment control measures will be employed. These may include temporary construction of a cofferdam, employing silt curtains, and re-stabilization soils. These BMP practices for soil and sediment control will be prepared before any construction commences. With wetland creation and habitat enhancement, restored vegetative communities will provide a reduction in nutrient inputs into surface water bodies. Restoration work proposed in time will result in fewer low dissolved oxygen events, increased water transparency and a reduction in frequency and duration of algal blooms. Therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

See Policy 5 above.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

The project will carefully evaluate construction in a manner to prevent or minimize adverse impacts such as soil erosion and sediment alteration. For example, work can be accomplished during low tidal periods or in areas temporarily disconnected from tidal waters. In addition, all appropriate BMPs for soil erosion and sediment control including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

The proposed project includes restoration measures such as shoreline stabilization and channel modification, which will reduce erosion and help reestablish hydrologic conditions and sediment transport in the system. Additionally, forested wetland creation will retain and bio-transform soil and sediment nutrients. Overtime, a reduction in nutrient inputs, combined with increased nutrient uptake by vegetation should result in improved water quality. Wetland restoration will also establish new areas for aquifer recharge, which will also provide beneficial impacts to water quality. As stated in Policy 5.2, BMPs for soil erosion and sediment control will also be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

Multiple restoration alternatives were proposed for the project site then evaluated through a Cost Effectiveness Analysis/Incremental Cost Analysis. The alternative selected included the most cost-effective and ecologically effective restoration option for the site. Restoration measures at the site, including habitat restoration, shoreline stabilization, channel modification, and the installation of a sediment basin will contribute to the overall resolution of water resource problems within the area; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The creation of forested wetlands on the project site can function as retention basins acting as flood prevention measures. Channel modification and shoreline stabilization will also have beneficial effects to floodplains as they will reestablish natural flood regimes; therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non- Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project includes native planting, channel modification, and shoreline stabilization, which will function as flood protection measures; therefore, the project is consistent with this policy.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with Corps guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of 4 to 8 inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s.

Results from implementing the TECs at this site involve the restoration of terrestrial habitat and creation of aquatic plant communities, which will promote primary productivity and increase removal of carbon dioxide from the atmosphere. The project will also result in improved water quality and clarity, which will promote increased photosynthesis and carbon capture from aquatic vascular plants and phytoplankton. The creation and restoration of terrestrial habitat could also lead to minor alterations in microclimates. Biological and physical processes such as transpiration, evaporation, convection, and shading will mediate temperature and humidity within these microhabitats. Therefore, the project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed plans to improve habitat at Shoelace Park. The project does not include any shoreline infrastructure or enclosed structures.

1a. The entire project footprint is within the current 1% annual chance floodplain and portions of the project are within the 2050 1% annual chance floodplain. Similarly, small portions of the footprint for the project may also be flooded by low and low-mid estimates (8 and 11 inches SLR) of 2050s High Tide water.

Ground elevations of a typical cross section are within the following ranges: forested scrub-shrub 58-62 feet, channel restoration ~55 feet, select native plantings 60-65 feet, sediment load reduction features 60-75 feet NAVD 88. There are no Base Flood elevations reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM) for Shoelace Park. FIRMs indicate that the site contains Coastal A and V Zones.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.

2. N/A. Please see Project Location Maps at the end of this document.

3. The Project will advance Policy 6.2 and no further analysis is needed.

WRP Policy 6.3: *Direct public funding for flood prevention or erosion control measure to those locations where the investment will yield significant public benefit.*

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

Based on modeling efforts, the erosion control measures proposed for the site are necessary to protect the existing and constructed habitat. Without installation, it is expected that current rates of erosion will persist. Therefore, it is determined the project is consistent with this policy.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans; however, further sampling will be conducted during the next phase of this project, before final plans are created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify if soils can be reused on site for landscaping and/or capping of contaminated areas and solid wastes to remain. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy.

WRP Policy 7.2: *Prevent and remediate discharge of petroleum products.*

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

The use of construction equipment may present the potential for hydrocarbons to spill while storing or refueling equipment. However, the use of BMPs such as secondary containment for fuel storage areas, and proper maintenance of equipment to prevent leaks will be implemented; therefore, the project is consistent with this policy.

WRP Policy 8: *Provide public access to, form, and along New York City's coastal waters.*

Also Applicable: **State Policy 19:** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

During construction, viewsheds and recreational access may be temporarily restricted. However, the proposed action will have positive impacts to the recreational and educational features of this site by creating a much more diverse landscape with enhanced wildlife habitat and viewing opportunities and improvement of public access to natural resources. Restoration activities will not modify public access and any trails that were temporarily disturbed will be reestablished after construction. Therefore, the project is consistent with this policy.

WRP Policy 8.1: *Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.*

See Policy 8 above.

WRP Policy 8.3: *Provide visual access to the waterfront where physically practical.*

The project will maintain public access points at the site; therefore, the project is consistent with this policy.

WRP Policy 8.4: *Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.*

See Policy 8 above.

WRP Policy 8.5: *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

One of the planning goals for this project includes "improving public education opportunities through the watershed to promote public ownership of restoration"; therefore, the project is consistent with this policy.

WRP Policy 8.6: *Design waterfront public spaces to encourage the waterfront's identify and encourage stewardship.*

See Policy 8 above.

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

With the implementation of restoration measures the project will protect existing habitats from erosion, and improve water quality; therefore, project is consistent with and furthers the goals of this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

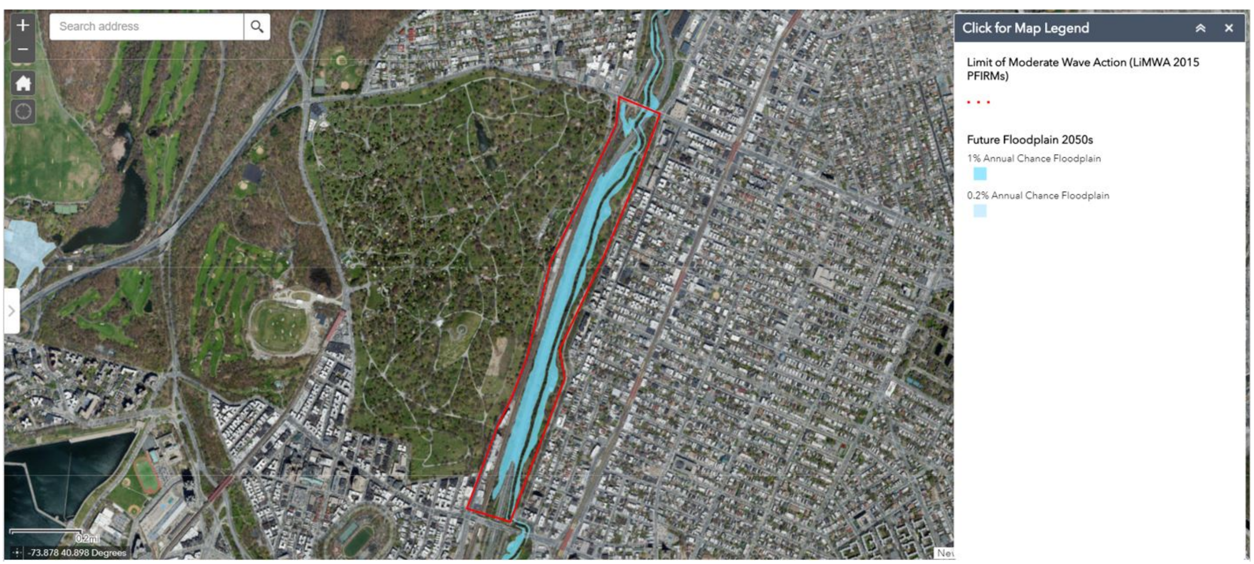
A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The Army Corps of Engineers (New York District) will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP, National Parks Service (NPS), and Gateway National Recreation Area. Therefore, the project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.




Search address
Click for Map Legend
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)
0.2mi
-73.896 40.899 Degrees


Search address
Click for Map Legend
Preliminary Flood Insurance Rate Maps 2015
V Zone
A Zone
Shaded X Zone
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
0.2mi
-73.896 40.899 Degrees

FOR INTERNAL USE ONLY Date Received: ____________________	WRP No. ______________________ DOS No. ______________________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (*WRP*) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ______________________

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

Shoelace Park- The recommended plan increases and improves wetlands, public access, shoreline and shallows, and mudflat habitat. Native upland trees and shrubs will be planted along almost the entire length of the Bronx River Parkway roadway embankment along the west side of the site and on the steep slope along the east bank of the river. Forested and scrub/shrub wetlands totaling 1.1 acres will be created along two segments of the river on both banks. In stream work includes 5.7 acres of channel realignment using instream cross vanes and J-hooks. Between the forested wetland areas near the southern end of the site, 2.09 acres of banks will be stabilized using stacked rock walls with brush layers or crib walls and the river bottom will be excavated, bed material replaced, and cross vanes constructed. Invasive species removal with native plantings along 7.89 acres will provide a wooded riparian corridor along the banks of the entire reach. Riparian woodlands and created forested wetlands would provide habitat resources that are currently very limited in the Bronx urban environment.

Additional restoration measures at Shoelace Park include installation of 2.07 acres of vegetation swales, bioretention basins, raingardens along the east bank to reduce sediment loads reaching the river, and shoreline softening along 0.012 acres of the west bank at the southern end of site using a stacked rock wall with brush layers.

2. Purpose of activity

Improvements to the park will complement existing recreational uses and substantially reduce erosion, sedimentation, and enviornmental stressors for up to 1.3 miles of shoreline along the Bronx River.

C. PROJECT LOCATION

Borough: Bronx Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Bronx River

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) (*2.1*)
- ☐ Special Natural Waterfront Area (SNWA) (*4.1*)
- ☐ Priority Martine Activity Zone (PMAZ) (*3.5*)
- ☑ Recognized Ecological Complex (REC) (*4.4*) (Shoelace Park/Bronx Park)
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) (*2.2, 4.2*)

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☑	☐	☐
3.1.	Support and encourage in-water recreational activities in suitable locations.	☑	☐	☐
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☐	☐	☑
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☐	☐	☑
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☑	☐	☐
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☑	☐	☐
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☐	☐	☑
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☐	☐	☑
8	**Provide public access to, from, and along New York City's coastal waters.**	☑	☐	☐
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☑	☐	☐
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☑	☐	☐
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☑	☐	☐

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☑	☐	☐
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151, New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:49:42 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

☐ Copy of original signed NYC Consistency Assessment Form

☐ Attachment with consistency assessment statements for all relevant policies

☐ For Joint Applications for Permits, one (1) copy of the complete application package

☐ Environmental Review documents

☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM (WRP) CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Description: The project site is located in a highly urbanized area in Queens, New York. In preparation for the World's Fair in 1939, there was significant stream straightening, filling of wetland areas, and headwater reconfiguration of Flushing Creek. Continued development in the area has led to loss and degradation of tidal wetlands. Remaining wetlands are dominated by invasive species and limited to fringe areas. Currently, the site has low ecological value suffering from bank erosion, profusion of invasive species, low benthic and fish abundance and diversity, and poor water quality.

The recommend design includes re-grading existing common reed-dominated marsh as well as conversion of existing mudflat areas to low marsh. High marsh and scrub shrub area will be established in the transitional zones between low marsh and upland maritime forest. The existing upland forest will be restored to a more diverse and functional maritime forest community. Finally, re-contouring along the mudflat will address issues of water quality and provide the appropriate hydrology necessary for persistence of the created habitat.

In total 39,015 CY of excavation will take place throughout the site with 12,200 CY to be taken off site and 26,815 CY to be beneficially re-used onsite to create upland habitat. Invasives (*Phragmites*) would be removed along with 1ft root mat and would be placed off-site. Other invasive species may be smothered or left on site in riparian area if not part of active restoration actions. Material excavated to create wetlands will be kept on-site and placed in upland and/or adjacent areas as needed. Cover requirements including 2-ft of cover in upland/riparian areas and 1-ft cover in wetland areas.

In total Restoration measures include 8.83 acres of low marsh, 4.01 acres of high marsh, 1.50 acres of scrub/shrub, and 2.43 acres of maritime forest.

Schedule and Duration: Duration of construction is estimated to be 23 months and is expected to begin in 2024.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Flushing Creek, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP POLICY QUESTIONS – RESPONSES

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The project fulfills the Hudson Raritan Estuary (HRE) Comprehensive Restoration Plan's (CRP) mission by promoting Target Ecosystem Characteristics (TECs) and to "restore and sustain a mosaic of habitats within the region, in a cost-effective and socially feasible manner"; therefore, the project is consistent with this policy.

WRP Policy 4.1: *Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.*

The purpose of this project is to restore coastal habitat, which is in direct accord with this policy. While excavation and grading will occur with restoration activities, all work will be done using best management practices (BMPs) for erosion control. The planting/seeding of native vegetation will replace the existing invasive introduced species.

WRP Policy 4.5: *Protect and restore tidal and freshwater wetlands.*

Also Applicable: **State Policy 44:** *Preserve and protect tidal and freshwater wetlands and preserve the benefit derived from these areas.*

The project includes the restoration of 4.01 acres of low marsh, 0.41 acres of high marsh, and the conversion of 1.25 acres of mudflats into low salt marsh. Restored wetlands will provide beneficial wildlife habitat and increase native biodiversity in the area; therefore, the project is consistent with this policy.

WRP Policy 4.6: *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

Flushing Creek is significantly disturbed by anthropogenic impacts. Urban development has artificially straightened the creek, filled wetlands, and reconfigured the headwaters of the creek. Currently, the site has low ecological value suffering from bank erosion, invasive species invasion, low benthic and fish abundance and diversity, and poor water quality. The purpose of the project is to "restore and sustain a mosaic of habitats within the region"; therefore, the project is consistent with this policy.

Additionally, to ensure the most ecologically and economically feasible plan was selected, a comprehensive tiered evaluation plan was used. The Evaluation of Planned Wetlands (EPW) assessment method was used to characterize the functional capacity of the project site. The assessment results estimate the current resource value and the potential increase in resource value for each alternative restoration plan proposed. Current vegetative communities, tidal patterns, and human use patterns at the project site were observed, documented, and incorporated into an analysis of the existing site and in the selection for the most economically and ecologically beneficial design plan.

WRP Policy 4.7: *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

All appropriate federal and state agencies were consulted regarding the documentation of rare, threatened, and endangered species in the project area. Restoration plans have been carefully mapped so as to avoid areas where listed species were found during previous surveys. A final survey of the restoration site will be performed to ensure that damage to rare plants will be avoided. If protected species are found on site, further protective measures will be considered including but not limited to protection from construction by fencing, or transplanting if the plants are in an unavoidable impact area. Handling of protected species will be coordinated with the New York Natural Heritage Program and New York State Department of Environmental Conservation. Avian species are not expected to be impacted due to their mobile nature. It is expected that listed bird species will fly to another nearby site to forage during construction and planting. Restoration activities in the long term will benefit threatened and endangered species by producing localized environmental enhancements, including improving water quality and creating and restoring habitat, which support an increase in local and regional biodiversity; therefore, the project is consistent with this policy.

WRP Policy 4.8: *Maintain and protect living aquatic resources.*

Aquatic resources will receive long-term benefits from the implementation of the TECs and restoration measures of this project. Habitats created and restored will enhance the entire ecosystem by increasing primary and secondary production, habitat availability, water quality, and aquatic species diversity and abundance. During construction, fish may be displaced due to noise, changes in currents or stream flow, changes in water quality, including increased turbidity, and direct mechanical disturbance to habitat. To prevent these impacts, proper planning and implementation of BMPs will minimize these disturbances, and fish will return to the area shortly after completion of construction activities. Generally, these impacts will be minor for species that are abundant as well as species that may be rare. Construction activities can deter commercially important, rare, or protected fish species from using essential migratory pathways, breeding, foraging, or seeking shelter from predators. However, seasonal work windows will be observed to minimize or avoid disturbances to fish life stage. The project is consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

To minimize impacts to surface water and water quality during construction, erosion and sediment control measures will be employed. These may include temporary construction of a cofferdam, employing silt curtains, and stabilizing soils. These BMP practices for soil and sediment control will be prepared before any construction commences. With wetland creation and habitat enhancement, restored vegetative communities will provide a reduction in nutrient inputs into surface water bodies. Restoration work proposed in time will result in fewer low dissolved oxygen events, increased water transparency and a reduction in frequency and duration of algal blooms. Therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

See Policy 5 above.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

The project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

The project will carefully evaluate construction in a manner to prevent or minimize adverse impacts such as soil erosion and sediment alteration. For example, work can be accomplished during low tidal periods or in areas temporarily disconnected from tidal waters. In addition, all appropriate BMPs for soil erosion and sediment control including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

The proposed project includes restoration measures such as shoreline stabilization and channel modification will reduce erosion and help reestablish hydrologic conditions and sediment transport in the system. Additionally, restored vegetative communities associated with wetland and maritime forest restoration will retain and bio-transform soil and sediment nutrients. Over time, a reduction in nutrient inputs, combined with increased nutrient uptake by vegetation should result in improved water quality. Wetland and forest restoration will also establish new areas for aquifer recharge, which will also provide beneficial impacts to water quality. As stated in Policy 5.2, BMPs for soil erosion and sediment control will also be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

Multiple restoration alternatives were proposed for the project site and then evaluated through a Cost Effectiveness Analysis/Incremental Cost Analysis. The alternative selected included the most cost-effective and ecologically effective restoration option for the site. Restoration measures at the site, including wetland creation, shoreline stabilization, and channel modification will contribute to the overall resolution of water resource problems within the area; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The creation of wetlands and maritime forests on the project site can function as retention basins acting as flood prevention measures. Channel modification and shoreline stabilization will also have beneficial effects to flood plains as the project will reestablish natural flood regimes; therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non- Structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project includes the creation of wetlands, channel modification, and shoreline stabilization, which will function as flood protection measures; therefore, the project is consistent with this policy.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with Corps guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of 4 to 8 inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s.

Results from implementing the TECs at this site involve the restoration of terrestrial habitat and creation of aquatic plant communities, which will promote primary productivity and increase removal of carbon dioxide from the atmosphere. The project will also result in improved water quality and clarity, which will promote increased photosynthesis and carbon capture from aquatic vascular plants and phytoplankton. The creation and restoration of terrestrial habitat could also lead to minor alterations in microclimates. Biological and physical processes such as transpiration, evaporation, convection, and shading will mediate temperature and humidity within these microhabitats. Therefore, the project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed plans to improve habitat at Flushing Creek. The project does not include any shoreline infrastructure or enclosed structures.

1a. The project footprint is within the current 1% annual chance floodplain and within the 2050 1% and 0.2% annual chance floodplains. Similarly, portions of the project footprint may also be flooded by low to high estimates (8 to 30 inches SLR) of 2050s High Tide water.

Ground elevations of a typical cross section are between 0 and 20 feet. Base Flood elevations range from 0 to over 12 feet, as reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM) for Flushing Creek. FIRMs indicate that the site contains Coastal A Zones.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.

2. N/A. Please see Project Location Maps at the end of this document.

3. The Project will advance Policy 6.2, and no further analysis is needed.

WRP Policy 6.3: *Direct public funding for flood prevention or erosion control measure to those locations where the investment will yield significant public benefit.*

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

The erosion control measures proposed for the site are necessary, as based off modeling efforts, to protect the existing and constructed habitat at the site. Without installation, it is expected that current rates of erosion will continue. Therefore, it is determined the project is consistent with this policy.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effect on those resources.*

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans are created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify soils that can be reused on site for landscaping and possible capping of contaminated areas and solid wastes that do not need to be removed. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution, and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

By restoring coastal habitat along Flushing Creek, protecting existing habitats from erosion, and improving water quality, the project is consistent with and furthers the goals of this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

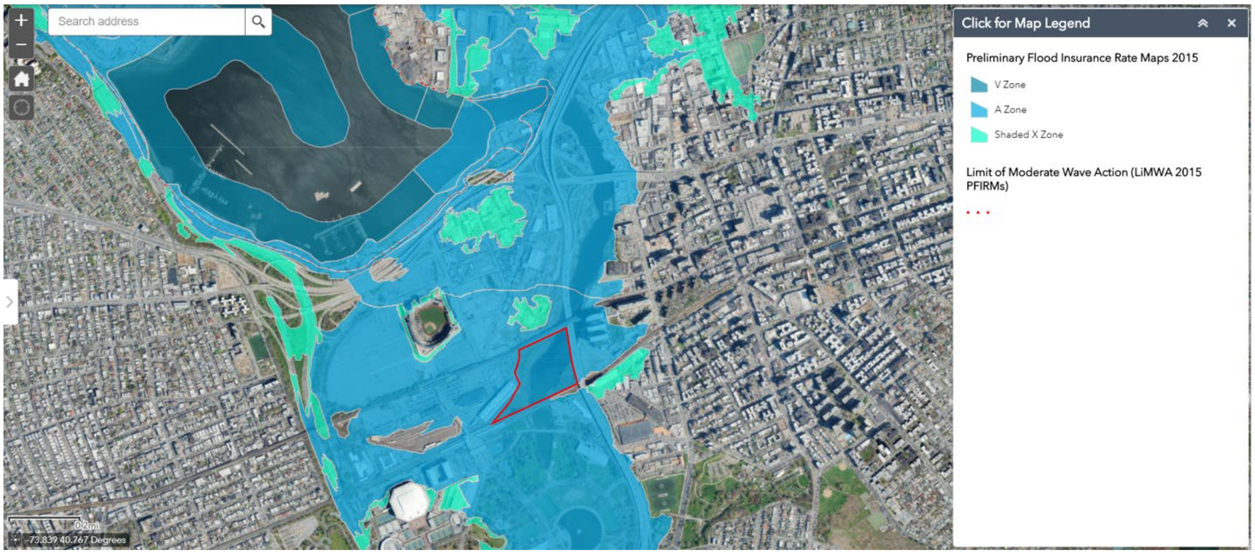
A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The Army Corps of Engineers (New York District) will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP, National Parks Service (NPS), and Gateway National Recreation Area. Therefore, the project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.


Search address
Click for Map Legend
Preliminary Flood Insurance Rate Maps 2015
V Zone
A Zone
Shaded X Zone
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
-73.839 40.767 Degrees


Search address
Click for Map Legend
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)
-73.851 40.749 Degrees


Search address
Click for Map Legend
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
Future Floodplain 2050s
1% Annual Chance Floodplain
0.2% Annual Chance Floodplain
-73.866 40.769 Degrees

FOR INTERNAL USE ONLY	WRP No. ______________
Date Received: ______________	DOS No. ______________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (*WRP*) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ______________

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

Flushing Creek- In the past, Flushing Creek was a sinuous tidal creek that supported an extensive tidal wetland system. Development has caused significant straightening of the stream, filled wetlands, and reconfigured headwaters of Flushing Creek. The project plans to restore the wetland ecosystem and improve water quality at Flushing Creek. The recommend design includes re-grading of existing common reed-dominated marsh as well as conversion of existing mudflat areas to low marsh. High marsh and scrub shrub area will be established in the transitional zones between low marsh and upland maritime forest. The existing upland forest will be restored to a more diverse and functional maritime forest community. Finally, re-contouring along the mudflat will address issues of water quality and provide the appropriate hydrology necessary for persistence of the created habitat. In total Restoration measures include 8.83 acres of low marsh, 4.01 acres of high marsh, 1.50 acres of scrub/shrub, and 2.43 acres of maritime forest.

2. Purpose of activity

The objective for the Flushing Creek project is to develop and recommend the optimal plan to restore the degraded structures, functions, and dynamic processes of the local and regional ecosystems to a less degraded, more natural condition. Achieving this objective will involve consideration of the ecosystem's natural integrity, productivity, stability, and biological diversity.

C. PROJECT LOCATION

Borough: Queens Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Flushing Creek

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

(if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit

(if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☑ Yes	☐ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) (*2.1*)
- ☑ Special Natural Waterfront Area (SNWA) (*4.1*)
- ☑ Priority Martine Activity Zone (PMAZ) (*3.5*)
- ☐ Recognized Ecological Complex (REC) (*4.4*)
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) (*2.2, 4.2*)

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☐	☐	☑
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☑	☐	☐
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☐	☐	☑
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☐	☐	☑
4.5	Protect and restore tidal and freshwater wetlands.	☑	☐	☐
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☑	☐	☐
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☐	☐	☑
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☐	☐	☑
8	**Provide public access to, from, and along New York City's coastal waters.**	☐	☐	☑
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☐	☐	☑
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☐	☐	☑
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☐	☐	☑

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☐	☐	☑
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☐	☐	☑
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151, New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:48:45 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Description: The Bush Terminal site consists of eroding piers south of the Gowanus Canal on the western shore of Brooklyn. The piers were used for shipping during the industrial era. Due to this, as well as known historical dumping and the proximity to the Gowanus Canal, some level of contaminants may be present in the sediment. Water depth at the site varies from shallow to deep, allowing for good habitat diversity.

The recommended plan for Bush Terminal would provide public access, awareness, and opportunities for future studies. Restoration measures for this site include 1,100 oyster gabions and 76,680 CY of spat-on-shell to create an approximately 31.4 acre oyster reef. Duration of construction is estimated at 15.5 months and is expected to start in 2028.

Schedule and Duration: The expected construction duration for Bush Terminal is 15.5 months, with construction currently scheduled for 2024.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Bush Terminal, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The project focuses on important functions attributed to the restoration of oyster reefs including maintenance of water quality, nutrient processing, shoreline stabilization, and improved feeding, breeding, and nursery habitat for fish and benthic communities within the Hudson Raritan Estuary (HRE); therefore, the project is consistent with this policy.

WRP Policy 4.3: *Protect designated Significant Coastal Fish and Wildlife Habitats.*

Also Applicable: **State Policy 7:** *Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.*

See Policy 4 above.

WRP Policy 4.4: *Identify, remediate and restore ecological functions within Recognized Ecological Complexes.*

Restoration of oyster habitat at Bush Terminal will complement other oyster restoration projects throughout the HRE and restore ecological function of the estuary; therefore, the project is consistent with this policy.

WRP Policy 4.6: *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

This project will create structurally complex habitat mosaics that will provide living space for the growth and reproduction of many species, including invertebrates; therefore, the project is consistent with this policy.

WRP Policy 4.7: *Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

This project has been carefully mapped to avoid areas where state-listed species were found during surveys; however, prior to construction, a final survey of the restoration site will be completed to ensure that impacts to rare plants or animals will be avoided. If listed plants are found within the site, best management practices (BMPs) will be utilized. If listed animals are found, plans will be made to avoid disturbances through construction windows and other BMPs. Cumulatively, restoration projects set to occur in the HRE are expected to have positive impacts to sea turtles, marine mammals, fish and invertebrates through improved water quality, benthic environment, and available habitat for species; therefore, the project is consistent with this policy.

WRP Policy 4.8: *Maintain and protect living aquatic resources.*

The project will result in the creation of additional shellfish habitat. Local shellfish, finfish, and benthic macroinvertebrate populations will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, these disturbances will be minimized to the fullest extent possible through the implementation of BMPs such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the project is consistent with this policy.

WRP Policy 5: *Protect and improve water quality in the New York City coastal area.*

This project will result in improved water quality in the HRE through the filtering of nutrients, sediment, and phytoplankton from the water column by restored oyster reefs; therefore, the project is consistent with this policy.

WRP Policy 5.1: *Manage direct or indirect discharges to waterbodies.*

Also Applicable: **State Policy 34:** *Discharge of waste materials into coastal waters from vessels subject to State jurisdiction will be limited so as to protect significant fish and wildlife habitat, recreational areas and water supply area.*

See Policy 5 above.

WRP Policy 5.2: *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Complete in-water work during periods of low tide.

Therefore, the project is consistent with this policy.

WRP Policy 5.3: *Protect water quality when excavating or placing fill in navigable water and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **State Policy 35:** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

Restoration will require in-water work and, therefore, BMPs will be implemented to protect the water quality of the surrounding resources. In addition, all appropriate BMPs for soil erosion and sediment control will be used. Therefore, this project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

Also Applicable: **State Policy 38:** *The quality and quantity of surface water and groundwater supplies, will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.*

See Policy 5.2 above.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

See Policy 5 above.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The restoration of oyster reefs is expected to significantly reduce ongoing erosion problems and protect marsh habitats within the HRE. Additionally, oyster reefs may act as natural wave attenuators, protecting nearby shorelines and other aquatic, tidal, and terrestrial habitats; therefore, the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

See Policy 6 above.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with United States Army Corps of Engineers (USACE) guidance, as alternatives are refined and identified, the selection of the preferred plan will consider sensitivity to varying projections of sea level rise (SLR). Considerations will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of four (4) to eight (8) inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s.

Additionally, oysters can contribute to the reduction of climate change impacts by attenuating storm surges and sequestering carbon. Therefore; the project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed plans to restore oyster reefs at Bush Terminal. The project does not include any shoreline infrastructure or enclosed structures.

1a. The project footprint is within the current and 2050 1% annual chance floodplains. Small portions of the footprint may be flooded by low, low-mid and middle estimates (8, 11, and 16 inches SLR) of 2050s High Tide water.

The project site is completely submerged, water depths near Bush Terminal are generally shallow ranging from intertidal along the shoreline to approximately 16 feet, out to the ends of the remains of the old piers. The site has Base Flood elevations over 12 feet as reported by FEMA Preliminary Flood Insurance Rate Maps (FIRM). FIRMs indicate that the site contains Coastal V Zones.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.

2. N/A. Please see Project Location Maps at the end of this document.

3. The project will advance Policy 6.2 and no further analysis is needed.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effects on those resources.*

Implementation of the TSP is not expected to have any negative impacts from solid waste, toxic pollutants, hazardous materials or industrial materials. Construction activities, vessel movements, and prop wash may cause temporary resuspension of potentially contaminated sediments and a concomitant short-term increase in turbidity in nearby waters but these activities and their effects would be localized and short-term. BMPs will be used to minimize sediment transport and turbidity. In the long term, establishing oyster habitat would improve water quality and provide nutrient removal and denitrification services. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, only short-term, local release or resuspension of sediments and concomitant short-term increase in turbidity is expected to occur during project construction. No materials will be removed from the site as a result of restoration. Therefore, the project is consistent with this policy.

WRP Policy 7.2: *Prevent and remediate discharge of petroleum products.*

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

The use of construction equipment may present the potential for hydrocarbons to spill while storing or refueling equipment. However, the use of BMPs such as secondary containment for fuel storage areas, and proper maintenance of equipment to prevent leaks will be implemented; therefore, the project is consistent with this policy.

WRP Policy 7.3: *Transport solid waste and hazardous materials and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.*

As stated in Policy 7, contaminated soils or solid wastes on site will be excavated, removed, and processed at a disposal facility approved to accept hazardous waste; therefore, the project is consistent with this policy.

WRP Policy 8: *Provide public access to, from, and along New York City's coastal waters.*

Also Applicable: **State Policy 19:** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

The project will reutilize derelict portions of the shoreline and will have a positive synergistic effect with the adjacent park development; therefore, the project is consistent with this policy.

WRP Policy 8.1: *Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.*

See Policy 8 above.

WRP Policy 8.5: *Preserve the public interest in and use of lands and waters held in public trust by the State and City.*

One of the planning goals for this project is "improving public education opportunities through the watershed to promote public ownership of restoration". Implementation of the project and ongoing restoration and monitoring activities will provide local community groups and educational institutions opportunities to participate in the restoration efforts, providing valuable educational experiences that will bolster environmental education. Additionally, as stated in Policy 8, the proposed activities will reutilize derelict portions of the shoreline and will have a positive synergistic effect with the adjacent park development. Therefore, the project is consistent with this policy.

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

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

The project will preserve and restore natural habitat in the HRE, thereby enhancing the scenic resources in New York City's coastal area. Therefore, the project is consistent with this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

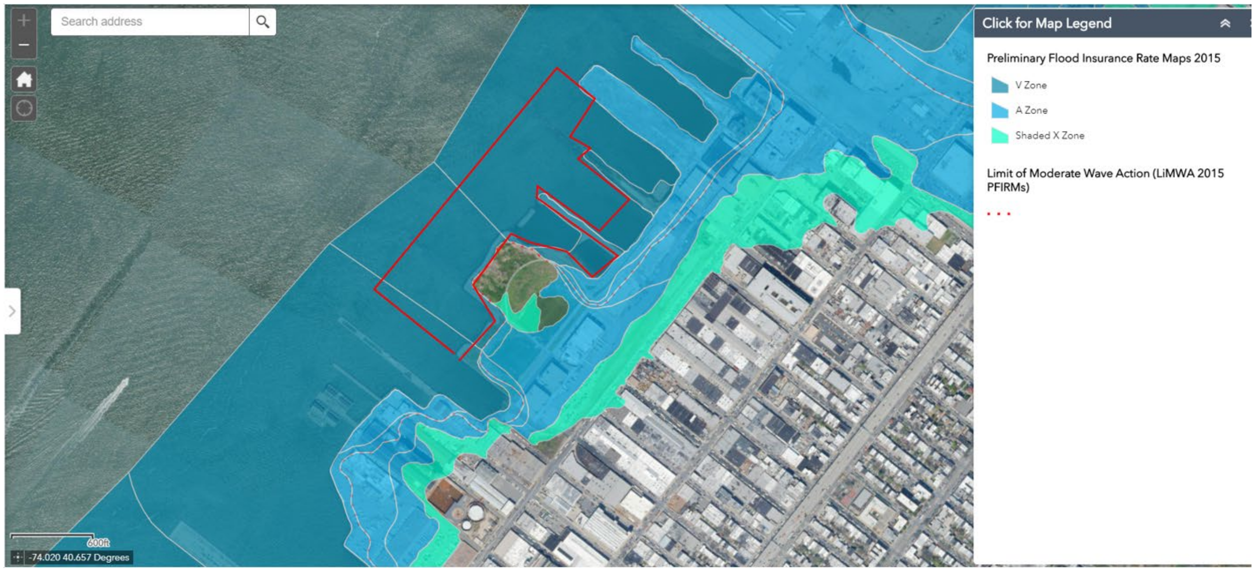
A cultural resources review was completed for the site to identify potentially significant resources within the project area. The restoration area will not affect any known prehistoric sites. Thirteen (13) historic properties or districts and five (5) Automated Wreck and Obstruction Information System database records were documented within one (1) mile of the site. A number of surveys have been conducted around the restoration area, but have not yet been reported. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The USACE will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP and New York City Department of Parks and Recreation. Therefore, the project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.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Preliminary Flood Insurance Rate Maps 2015
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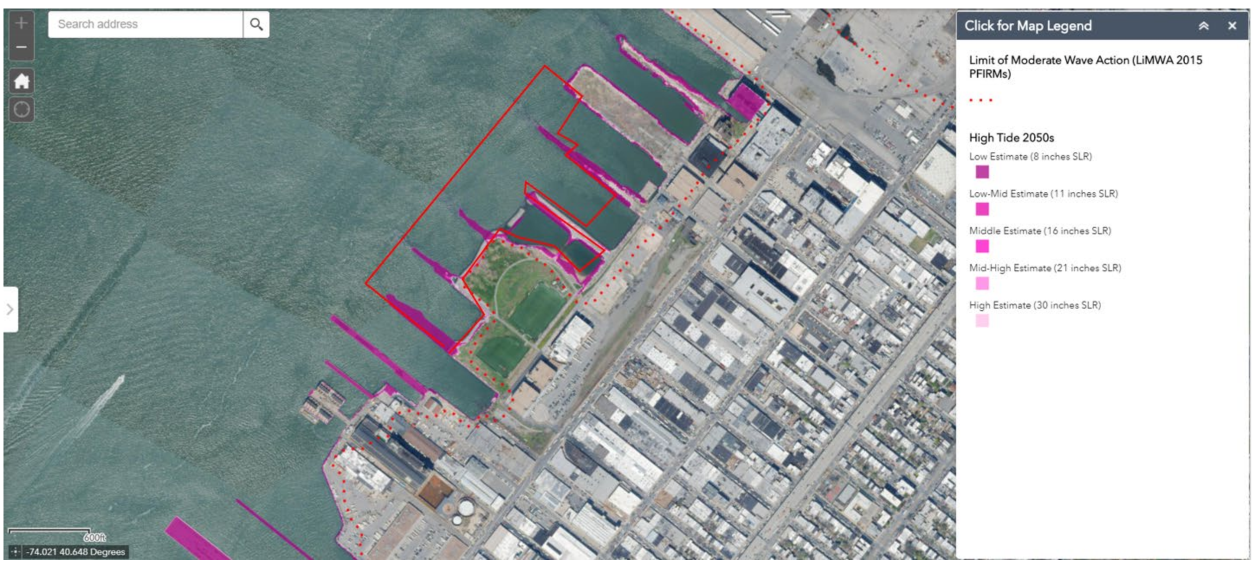
Shaded X Zone
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
600ft
-74.020 40.657 Degrees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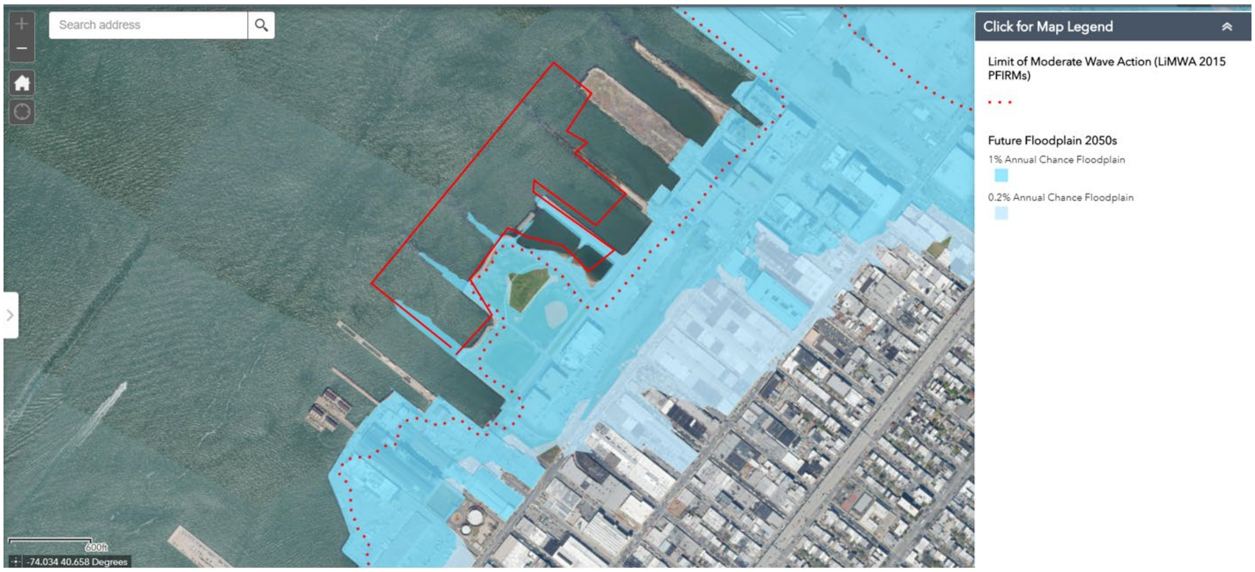
High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)
600ft
-74.021 40.648 Degrees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Click for Map Legend
Limit of Moderate Wave Action (LiMWA 2015 PFIRMs)
Future Floodplain 2050s
1% Annual Chance Floodplain
0.2% Annual Chance Floodplain
600ft
-74.034 40.658 Degrees

FOR INTERNAL USE ONLY	WRP No. ______________
Date Received: ______________	DOS No. ______________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (*WRP*) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: US Army Corps of Engineers- NY District

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza CENAN-PL-EA 21st floor New York, NY 10278-0090

Telephone: 917- 790-8619 Email: Diana.M.Kohtio@usace.army.mil

Project site owner (if different than above): New York City Department of Parks and Recreation

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

The Bush Terminal site consists of eroding piers south of the Gowanus Canal on the western shore of Brooklyn. The piers were used for shipping during the industrial era. Due to this, as well as known historical dumping and the proximity to the Gowanus Canal, some level of contaminants may be present in the sediment. Water depth at the site varies from shallow to deep, allowing for good habitat diversity.

The recommended plan for Bush Terminal would provide public access, awareness, and opportunities for future studies. Restoration measures for this site include 1,100 oyster gabions and 76,680 CY of spat-on-shell to create an approximately 31.4 acre oyster reef. Duration of construction is estimated at 15.5 months and is expected to start in 2028.

2. Purpose of activity

The project contributes to the overall HRE Regional Goal of establishing 20 acres of reef habitat across several sites by 2020 and advances the Billion Oyster Program (BOP) to restore one billion live oysters to New York Harbor over the next twenty years. The project will contribute to the ecological uplift of Upper New York Bay which includes improving water quality, habitat, ecosystem function, carbon sequestering, shoreline stabilization, and wave attenuation.

C. PROJECT LOCATION

Borough: Brooklyn Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Gowanus Canal

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑	☐
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑	☐
3.	Is the project located on publicly owned land or receiving public assistance?	☑	☐
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☑	☐
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☐	☑
6.	Is the project located adjacent to or within a special area designation? *See* *Maps – Part III* *of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑	☐

☐ Significant Maritime and Industrial Area (SMIA) *(2.1)*

☐ Special Natural Waterfront Area (SNWA) *(4.1)*

☐ Priority Martine Activity Zone (PMAZ) *(3.5)*

☑ Recognized Ecological Complex (REC) *(4.4)*

☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) *(2.2, 4.2)*

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the* *NYC Waterfront Revitalization Program*. *When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☐	☐	☑
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☐	☐	☑
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☑	☐	☐
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☑	☐	☐
4.5	Protect and restore tidal and freshwater wetlands.	☐	☐	☑
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☐	☐	☑
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☐	☐	☑
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☐	☐	☑
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☐	☐	☑
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☐	☐	☑
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☑	☐	☐
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☑	☐	☐
8	**Provide public access to, from, and along New York City's coastal waters.**	☑	☐	☐
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☑	☐	☐
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☐	☐	☑
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☐	☐	☑

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☑	☐	☐
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☐	☐	☑
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: 26 Federal Plaza CENAN-PL-EA 21st floor New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:53:14 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

- ☐ Copy of original signed NYC Consistency Assessment Form
- ☐ Attachment with consistency assessment statements for all relevant policies
- ☐ For Joint Applications for Permits, one (1) copy of the complete application package
- ☐ Environmental Review documents
- ☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM CONSISTENCY DETERMINATION AND NEW YORK STATE COASTAL ZONE MANAGEMENT PROGRAM

Applicant: U.S. Army Corps of Engineers, New York District

Project Description: Head of Jamaica Bay is located in the northeast section of Jamaica Bay, adjacent to JFK Airport. Salt marsh habitat fringes much of the shoreline area. The bottom is steeply sloped close to the shoreline, with depths of up to 33 feet. Substrate in the area is primarily mud. Based on the nearest tidal current station in Jamaica Bay (Grass Hassock Channel), the current speeds in the eastern portion of the bay rarely exceed one (1) knot, making Head of Bay well suited for larval settlement and oyster restoration. The recommended plan will create nearly 10 acres of oyster reef through the placement of 9.85 acres of spat on shell placed on a substrate composed of shell and crushed porcelain. Structural complexity is created through placement of 337 gabions, 150 oyster castles and 470 super trays throughout the project area. The layer of substrate and spat on shell will be 12 inches thick and have a volume of 16, 840 cubic yards.

Schedule and Duration: The expected construction duration for Bush Terminal is 1.5 months, with construction currently scheduled for 2027.

Summary of CZM Analysis: The discussion below addresses the policies that are relevant to restoration of Head of Jamaica Bay, proposed in the recommended plan for the Hudson Raritan Estuary Ecosystem Restoration Feasibility Report.

WRP Policy 4: *Protect and restore the quality and function of ecological systems within the New York coastal area.*

The goal of the tentatively selected plan (TSP) design for this project is consistent with the stated goal of this policy. The important functions attributed to the restoration oyster reefs includes maintenance of water quality, nutrient processing, shoreline stabilization, and provision of nursery habitat for finfish and shellfish in Jamaica Bay; therefore, the project is consistent with this policy.

WRP Policy 4.1: *Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.*

The project will restore the structure and function of the estuary's benthic ecosystem and create significant habitat for estuarine macro fauna; therefore, the project is consistent with this policy.

WRP Policy 4.3: *Protect designated Significant Coastal Fish and Wildlife Habitats.*

Also Applicable: **State Policy 7:** *Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.*

As stated in Policy 4, above, restoration of oyster beds will create nursery habitat for estuarine-dependent finfish and shellfish; therefore, the project is consistent with the goals of this policy.

WRP Policy 4.6: *In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.*

The implementation of the Hudson Raritan Estuary (HRE) Comprehensive Restoration Plan (CRP) Target Ecosystem Characteristics (TECs) will create structurally complex habitat mosaics that will provide living space for the growth and reproduction of many species including invertebrates; therefore, the project is consistent with this policy.

<u>WRP Policy 4.7:</u> *Protect vulnerable plant, fish, and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.*

Restoration plans have been carefully mapped so as to avoid areas where state-listed species were found during surveys; however, prior to construction, a final survey of the restoration site will be completed to ensure that impacts to rare plants or animals will be avoided. If plants are found within the restoration site, best management practices (BMPs) will be utilized. If listed animals are found, plans will be made to avoid disturbances through construction windows and other BMPs. Cumulatively, the restoration projects set the occur in Jamaica Bay are expected to have positive impacts to sea turtles, marine mammals, fish and invertebrates by improving water quality, benthic environment, and improve habitat for forage species; therefore, the project is consistent with this policy.

<u>WRP Policy 4.8</u>: *Maintain and protect living aquatic resources.*

Local shellfish, finfish, and benthic macroinvertebrate population will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, sedimentation and turbidity from wetland and upland restoration will be minimized through the implementation of BMPs such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the project is consistent with this policy.

<u>WRP Policy 5:</u> *Protect and improve water quality in the New York City coastal area.*

To minimize impacts to water quality during construction, erosion and sediment control measures will be employed. These may include temporary construction of a cofferdam, employing silt curtains, and stabilizing soils. These BMP practices for soil and sediment control will be prepared before any construction commences. Therefore, the project is consistent with this policy.

<u>WRP Policy 5.1:</u> *Manage direct or indirect discharges to waterbodies.*

Also Applicable: **<u>State Policy 34:</u>** *Discharge of waste materials into coastal waters from vessels subject to State jurisdiction will be limited so as to protect significant fish and wildlife habitat, recreational areas and water supply area.*

See Policy 5 above.

<u>WRP Policy 5.2:</u> *Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.*

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Complete in-water work during periods of low tide.

The project is consistent with this policy.

<u>WRP Policy 5.3:</u> *Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.*

Also Applicable: **<u>State Policy 35:</u>** *Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural features, important agricultural lands, and wetlands.*

As stated in Policy 5.2, restoration will require in-water work; therefore, BMPs will be implemented to protect the water quality of the surrounding resources. In addition, all appropriate BMPs for soil erosion and sediment control including use of an environmental bucket to perform mechanical dredging, silt fencing, turbidity curtains, and hay bales will be used. The project is consistent with this policy.

WRP Policy 5.4: *Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.*

Also Applicable: **State Policy 38:** The quality and quantity of surface water and groundwater supplies, will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.

As stated in Policy 5.2, BMPs for soil erosion and sediment control will be implemented at the site to protect water quality; therefore, the project is consistent with this policy.

WRP Policy 5.5: *Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.*

The restoration of oyster reefs will result in improved water quality in Jamaica Bay by filtering nutrients, sediments, and phytoplankton from the water column; therefore, the project is consistent with this policy.

WRP Policy 6: *Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.*

The creation of oyster beds is expected to prevent ongoing erosion problems and protect marsh habitat in Jamaica Bay. Additionally, none of the structures proposed for oyster bed restoration is expected to cause flooding; therefore the project is consistent with this policy.

WRP Policy 6.1: *Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.*

Also Applicable: **State Policy 17:** *Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

As stated in Policy 6, the project is not expected to cause flooding; therefore, the project is consistent with this policy.

WRP Policy 6.2: *Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms) into the planning and design of projects in the city's Coastal Zone.*

Consistent with Corps guidance, as alternatives are refined, and a particular alternative is identified, the selection of the preferred plan will consider the sensitivity of the alternative plan to varying projections of sea level rise (SLR). Consideration will also be given to alternatives that perform well and are adaptable to a range of SLR projections. The 2015 report prepared by the New York City Panel on Climate Change presents SLR projections that take into account the predicted ranges of both global climate change and local land subsidence. The central ranges of these projections are sea level increases in New York City of 4 to 8 inches by the 2020s, 11 to 21 inches by the 2050s, and 18 to 39 inches by the 2080s. The project is consistent with this policy.

WRP Policy 6.2 General Methodology: The New York District of USACE has proposed plans to restore oyster reefs at Head of Jamaica Bay. The project does not include any shoreline infrastructure or enclosed structures.
1a. The project footprint is not within the current and 2050 1% annual chance floodplains.

The project sites is completely submerged, the bottom is steeply sloped close to the shoreline, with depths of up to 33 feet.

1b. The project does not include any vulnerable, critical, or potentially hazardous features.
2. N/A.
3. The project will advance Policy 6.2 and no further analysis is needed.

WRP Policy 7: *Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to environment and public health and safety.*

Also Applicable: **State Policy 8:** *Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sublethal or lethal effects on those resources.*

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans area created. It is expected that this further testing will define areas that may include contaminated soils or solid wastes that would need to be excavated and transported to an existing upland facility for processing. It will also verify soils that can be reused on site for landscaping and possible capping of contaminated areas and solid wastes that do not need to be removed. Preliminary testing has showed contaminant types and levels as would be expected in urban areas. Overall, the proposed project is expected to result in a positive impact, in that it will effectively remove or cap contaminated soils. It is therefore determined that the project is consistent with this policy.

WRP Policy 7.1: *Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.*

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

As stated in Policy 7, preliminary testing showed contaminants common in urban areas present on site. Further testing will be utilized to define these areas. Based on these findings and the nature of the soil/sediment, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site. If the nature of the excavated material is found to be hazardous, the material will be treated and disposed of at a facility approved to accept hazardous material. The project is consistent with this policy.

WRP Policy 7.2: *Prevent and remediate discharge of petroleum products.*

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

The use of construction equipment may present the potential for hydrocarbons to spill while storing or refueling equipment. However, the use of BMPs such as secondary containment for fuel storage areas, and proper maintenance of equipment to prevent leaks will be implemented; therefore, the project is consistent with this policy.

WRP Policy 7.3: *Transport solid waste and hazardous materials and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.*

As stated in Policy 7, contaminated soils or solid wastes on site will be excavated, removed, and processed at a disposal facility approved to accept hazardous waste; therefore the project is consistent with this policy.

WRP Policy 8: *Provide public access to, from, and along New York City's coastal waters.*

Also Applicable: **State Policy 19:** *Protect, maintain, and increase the level and type of access to public water related recreation resources and facilities.*

The proposed activities will not modify public access to the Jamaica Bay Wildlife Refuge; therefore, the project is consistent with this policy.

WRP Policy 8.1: *Preserve, protect, maintain, and enhance physical, visual, and recreational access to the waterfront.*

As stated in Policy 8, the proposed activities will not modify public access; therefore, the project is consistent with this policy.

WRP Policy 8.5: *Preserve public interest in and use of lands and waters held in public trust by the State and City.*

One of the planning goals for this project includes "improving public education opportunities through the watershed to promote public ownership of restoration"; therefore, the project is consistent with this policy.

WRP Policy 9: *Protect scenic resources that contribute to the visual quality of the New York City coastal area.*

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

The project will preserve and restore natural habitat in Jamaica Bay, thereby enhancing the scenic resources in New York City's coastal area. The project is consistent with this policy.

WRP Policy 9.1: *Protect and improve visual quality associated with the New York City's urban context and the historic and working waterfront.*

See Policy 9 above.

WRP Policy 9.2: *Protect and enhance scenic values associated with natural resources.*

See Policy 9 above.

WRP Policy 10: *Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.*

Also Applicable: **State Policy 23:** *Protect, enhance and restore structures, districts, areas or sites that are of significance in the history, architecture, archaeology or culture of the State, its communities, or the Nation.*

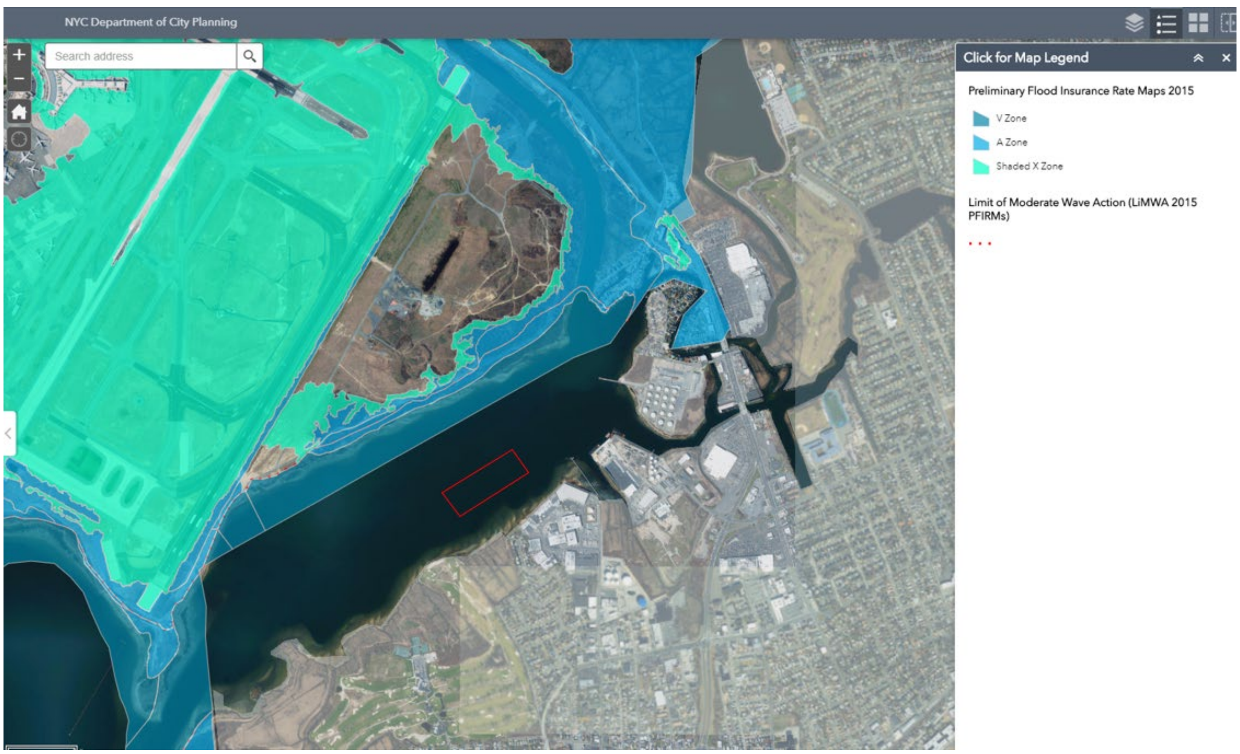
A Phase 1A Cultural Resources survey has been completed for the site to identify potentially significant cultural resources in the project area. The restoration area will not affect any known prehistoric sites. Further testing will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The Army Corps of Engineers (New York District) will consult with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to develop plans to complete identification and evaluation of historic resources found within the project area. Appropriate treatment plans for historic resources that may be affected will be developed with input from the NYSOPRHP, National Parks Service (NPS), and Gateway National Recreation Area. Therefore, the project is consistent with this policy.

WRP Policy 10.1: *Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.*

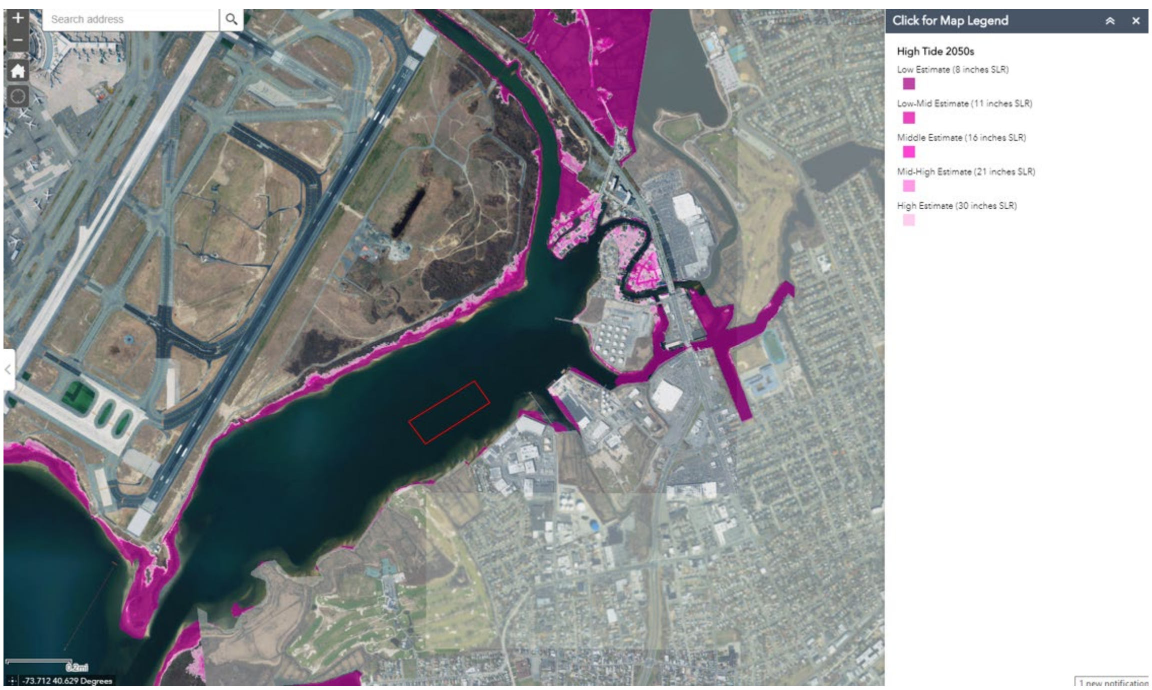
See Policy 10 above.

WRP Policy 10.2: *Protect and preserve archaeological resources and artifacts.*

See Policy 10 above.




Search address
Click for Map Legend
Future Floodplain 2050s
1% Annual Chance Floodplain
0.2% Annual Chance Floodplain


Search address
Click for Map Legend
High Tide 2050s
Low Estimate (8 inches SLR)
Low-Mid Estimate (11 inches SLR)
Middle Estimate (16 inches SLR)
Mid-High Estimate (21 inches SLR)
High Estimate (30 inches SLR)

FOR INTERNAL USE ONLY
Date Received: ____________________

WRP No. ______________________
DOS No. ______________________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's Coastal Zone, must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program* (*WRP*) which has been approved as part of the State's Coastal Management Program.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, the New York City Department of City Planning, or other city or state agencies in their review of the applicant's certification of consistency.

A. APPLICANT INFORMATION

Name of Applicant: United States Army Corps of Engineers

Name of Applicant Representative: Diana Kohtio

Address: 26 Federal Plaza, New York, NY 10278-0090

Telephone: 917-790-8619 Email: diana.m.kohtio@usace.army.mil

Project site owner (if different than above): ____________________

B. PROPOSED ACTIVITY

If more space is needed, include as an attachment.

1. Brief description of activity

Head of Jamaica Bay- The recommended plan for Head of Jamaica Bay will create nearly 10 acres of oyster reef through the placement of 9.85 acres of spat on shell placed on a substrate composed of shell and crushed porcelain. Structural complexity is created through placement of 337 gabions, 150 oyster castles and 470 super trays throughout the project area. The layer of substrate and spat on shell will be 12 inches thick and have a volume of 16, 840 cubic yards.

2. Purpose of activity

The project contributes to the overall HRE Regional Goal of establishing 20 acres of reef habitat across several sites by 2020 and advances the Billion Oyster Program (BOP) to restore one billion live oysters to New York Harbor over the next twenty years. The project will contribute to the ecological uplift of Jamaica Bay which includes improving water quality, habitat, ecosystem function, carbon sequestration, shoreline stabilization, and wave attenutation.

C. PROJECT LOCATION

Borough: Queens Tax Block/Lot(s): ______

Street Address: ______

Name of water body (if located on the waterfront): Jamaica Bay

D. REQUIRED ACTIONS OR APPROVALS

Check all that apply.

City Actions/Approvals/Funding

City Planning Commission ☐ Yes ☑ No

- ☐ City Map Amendment
- ☐ Zoning Map Amendment
- ☐ Zoning Text Amendment
- ☐ Site Selection – Public Facility
- ☐ Housing Plan & Project
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______
- ☐ Zoning Certification
- ☐ Zoning Authorizations
- ☐ Acquisition – Real Property
- ☐ Disposition – Real Property
- ☐ Other, explain: ______
- ☐ Concession
- ☐ UDAAP
- ☐ Revocable Consent
- ☐ Franchise

Board of Standards and Appeals ☐ Yes ☑ No

- ☐ Variance (use)
- ☐ Variance (bulk)
- ☐ Special Permit
  (if appropriate, specify type: ☐ Modification ☐ Renewal ☐ other) Expiration Date: ______

Other City Approvals

- ☐ Legislation
- ☐ Rulemaking
- ☐ Construction of Public Facilities
- ☐ 384 (b) (4) Approval
- ☐ Other, explain: ______
- ☐ Funding for Construction, specify: ______
- ☐ Policy or Plan, specify: ______
- ☐ Funding of Program, specify: ______
- ☐ Permits, specify: ______

State Actions/Approvals/Funding

- ☑ State permit or license, specify Agency: NYSDEC Permit type and number: SEQR
- ☐ Funding for Construction, specify: ______
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Federal Actions/Approvals/Funding

- ☑ Federal permit or license, specify Agency: ______ Permit type and number: USACE Nation Wide Permit 27
- ☑ Funding for Construction, specify: Section 204 of WRDA 1992
- ☐ Funding of a Program, specify: ______
- ☐ Other, explain: ______

Is this being reviewed in conjunction with a Joint Application for Permits? ☑ Yes ☐ No

E. LOCATION QUESTIONS

		Yes	No
1.	Does the project require a waterfront site?	☑ Yes	☐ No
2.	Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land under water or coastal waters?	☑ Yes	☐ No
3.	Is the project located on publicly owned land or receiving public assistance?	☑ Yes	☐ No
4.	Is the project located within a FEMA 1% annual chance floodplain? *(6.2)*	☐ Yes	☑ No
5.	Is the project located within a FEMA 0.2% annual chance floodplain? *(6.2)*	☐ Yes	☑ No
6.	Is the project located adjacent to or within a special area designation? *See Maps – Part III of the NYC WRP. If so, check appropriate boxes below and evaluate policies noted in parentheses as part of WRP Policy Assessment (Section F).*	☑ Yes	☐ No

- ☐ Significant Maritime and Industrial Area (SMIA) *(2.1)*
- ☑ Special Natural Waterfront Area (SNWA) *(4.1)*
- ☐ Priority Martine Activity Zone (PMAZ) *(3.5)*
- ☐ Recognized Ecological Complex (REC) *(4.4)*
- ☐ West Shore Ecologically Sensitive Maritime and Industrial Area (ESMIA) *(2.2, 4.2)*

F. WRP POLICY ASSESSMENT

Review the project or action for consistency with the WRP policies. For each policy, check Promote, Hinder *or* Not Applicable (N/A). *For more information about consistency review process and determination, see* ***Part I*** *of the NYC Waterfront Revitalization Program. When assessing each policy, review the full policy language, including all sub-policies, contained within* ***Part II*** *of the WRP. The relevance of each applicable policy may vary depending upon the project type and where it is located (i.e. if it is located within one of the special area designations).*

For those policies checked Promote *or* Hinder, *provide a written statement on a separate page that assesses the effects of the proposed activity on the relevant policies or standards. If the project or action promotes a policy, explain how the action would be consistent with the goals of the policy. If it hinders a policy, consideration should be given toward any practical means of altering or modifying the project to eliminate the hindrance. Policies that would be advanced by the project should be balanced against those that would be hindered by the project. If reasonable modifications to eliminate the hindrance are not possible, consideration should be given as to whether the hindrance is of such a degree as to be substantial, and if so, those adverse effects should be mitigated to the extent practicable.*

		Promote	Hinder	N/A
1	**Support and facilitate commercial and residential redevelopment in areas well-suited to such development.**	☐	☐	☑
1.1	Encourage commercial and residential redevelopment in appropriate Coastal Zone areas.	☐	☐	☑
1.2	Encourage non-industrial development with uses and design features that enliven the waterfront and attract the public.	☐	☐	☑
1.3	Encourage redevelopment in the Coastal Zone where public facilities and infrastructure are adequate or will be developed.	☐	☐	☑
1.4	In areas adjacent to SMIAs, ensure new residential development maximizes compatibility with existing adjacent maritime and industrial uses.	☐	☐	☑
1.5	Integrate consideration of climate change and sea level rise into the planning and design of waterfront residential and commercial development, pursuant to WRP Policy 6.2.	☐	☐	☑

		Promote	Hinder	N/A
2	**Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operation.**	☐	☐	☑
2.1	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.	☐	☐	☑
2.2	Encourage a compatible relationship between working waterfront uses, upland development and natural resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
2.3	Encourage working waterfront uses at appropriate sites outside the Significant Maritime and Industrial Areas or Ecologically Sensitive Maritime Industrial Area.	☐	☐	☑
2.4	Provide infrastructure improvements necessary to support working waterfront uses.	☐	☐	☑
2.5	Incorporate consideration of climate change and sea level rise into the planning and design of waterfront industrial development and infrastructure, pursuant to WRP Policy 6.2.	☐	☐	☑
3	**Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.**	☐	☐	☑
3.1.	Support and encourage in-water recreational activities in suitable locations.	☐	☐	☑
3.2	Support and encourage recreational, educational and commercial boating in New York City's maritime centers.	☐	☐	☑
3.3	Minimize conflicts between recreational boating and commercial ship operations.	☐	☐	☑
3.4	Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.	☐	☐	☑
3.5	In Priority Marine Activity Zones, support the ongoing maintenance of maritime infrastructure for water-dependent uses.	☐	☐	☑
4	**Protect and restore the quality and function of ecological systems within the New York City coastal area.**	☑	☐	☐
4.1	Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas.	☑	☐	☐
4.2	Protect and restore the ecological quality and component habitats and resources within the Ecologically Sensitive Maritime and Industrial Area.	☐	☐	☑
4.3	Protect designated Significant Coastal Fish and Wildlife Habitats.	☑	☐	☐
4.4	Identify, remediate and restore ecological functions within Recognized Ecological Complexes.	☐	☐	☑
4.5	Protect and restore tidal and freshwater wetlands.	☐	☐	☑
4.6	In addition to wetlands, seek opportunities to create a mosaic of habitats with high ecological value and function that provide environmental and societal benefits. Restoration should strive to incorporate multiple habitat characteristics to achieve the greatest ecological benefit at a single location.	☑	☐	☐
4.7	Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.	☑	☐	☐
4.8	Maintain and protect living aquatic resources.	☑	☐	☐

		Promote	Hinder	N/A
5	**Protect and improve water quality in the New York City coastal area.**	☑	☐	☐
5.1	Manage direct or indirect discharges to waterbodies.	☑	☐	☐
5.2	Protect the quality of New York City's waters by managing activities that generate nonpoint source pollution.	☑	☐	☐
5.3	Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.	☑	☐	☐
5.4	Protect the quality and quantity of groundwater, streams, and the sources of water for wetlands.	☑	☐	☐
5.5	Protect and improve water quality through cost-effective grey-infrastructure and in-water ecological strategies.	☑	☐	☐
6	**Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.**	☑	☐	☐
6.1	Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the site, the use of the property to be protected, and the surrounding area.	☑	☐	☐
6.2	Integrate consideration of the latest New York City projections of climate change and sea level rise (as published in *New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms*) into the planning and design of projects in the city's Coastal Zone.	☑	☐	☐
6.3	Direct public funding for flood prevention or erosion control measures to those locations where the investment will yield significant public benefit.	☐	☐	☑
6.4	Protect and preserve non-renewable sources of sand for beach nourishment.	☐	☐	☑
7	**Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.**	☑	☐	☐
7.1	Manage solid waste material, hazardous wastes, toxic pollutants, substances hazardous to the environment, and the unenclosed storage of industrial materials to protect public health, control pollution and prevent degradation of coastal ecosystems.	☑	☐	☐
7.2	Prevent and remediate discharge of petroleum products.	☑	☐	☐
7.3	Transport solid waste and hazardous materials and site solid and hazardous waste facilities in a manner that minimizes potential degradation of coastal resources.	☑	☐	☐
8	**Provide public access to, from, and along New York City's coastal waters.**	☐	☐	☑
8.1	Preserve, protect, maintain, and enhance physical, visual and recreational access to the waterfront.	☐	☐	☑
8.2	Incorporate public access into new public and private development where compatible with proposed land use and coastal location.	☐	☐	☑
8.3	Provide visual access to the waterfront where physically practical.	☐	☐	☑
8.4	Preserve and develop waterfront open space and recreation on publicly owned land at suitable locations.	☐	☐	☑

		Promote	Hinder	N/A
8.5	Preserve the public interest in and use of lands and waters held in public trust by the State and City.	☐	☐	☑
8.6	Design waterfront public spaces to encourage the waterfront's identity and encourage stewardship.	☐	☐	☑
9	**Protect scenic resources that contribute to the visual quality of the New York City coastal area.**	☑	☐	☐
9.1	Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.	☑	☐	☐
9.2	Protect and enhance scenic values associated with natural resources.	☑	☐	☐
10	**Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.**	☑	☐	☐
10.1	Retain and preserve historic resources, and enhance resources significant to the coastal culture of New York City.	☑	☐	☐
10.2	Protect and preserve archaeological resources and artifacts.	☑	☐	☐

G. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Peter Weppler, Chief, Environmental Analysis Branch

Address: USACE 26 Federal Plaza - Room 2151, New York, NY 10278-0090

Telephone: 917-790-8634 Email: peter.m.weppler@usace.army.mil

Applicant/Agent's Signature: WEPPLER.PETER.M.1228647353 Digitally signed by WEPPLER.PETER.M.1228647353 Date: 2019.10.09 14:52:24 -04'00'

Date: ______________________

Submission Requirements

For all actions requiring City Planning Commission approval, materials should be submitted to the Department of City Planning.

For local actions not requiring City Planning Commission review, the applicant or agent shall submit materials to the Lead Agency responsible for environmental review. A copy should also be sent to the Department of City Planning.

For State actions or funding, the Lead Agency responsible for environmental review should transmit its WRP consistency assessment to the Department of City Planning.

For Federal direct actions, funding, or permits applications, including Joint Applicants for Permits, the applicant or agent shall also submit a copy of this completed form along with his/her application to the NYS Department of State Office of Planning and Development and other relevant state and federal agencies. A copy of the application should be provided to the NYC Department of City Planning.

The Department of City Planning is also available for consultation and advisement regarding WRP consistency procedural matters.

New York City Department of City Planning
Waterfront and Open Space Division
120 Broadway, 31st Floor
New York, New York 10271
212-720-3525
wrp@planning.nyc.gov
www.nyc.gov/wrp

New York State Department of State
Office of Planning and Development
Suite 1010
One Commerce Place, 99 Washington Avenue
Albany, New York 12231-0001
(518) 474-6000
www.dos.ny.gov/opd/programs/consistency

Applicant Checklist

☐ Copy of original signed NYC Consistency Assessment Form

☐ Attachment with consistency assessment statements for all relevant policies

☐ For Joint Applications for Permits, one (1) copy of the complete application package

☐ Environmental Review documents

☐ Drawings (plans, sections, elevations), surveys, photographs, maps, or other information or materials which would support the certification of consistency and are not included in other documents submitted. All drawings should be clearly labeled and at a scale that is legible.

New Jersey
Coastal Zone Management

State of New Jersey

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

CATHERINE R. McCABE
Commissioner

DEC 09 2019

Peter Weppler
Chief, Environmental Analysis Branch
Department of the Army
New York District, Corps of Engineers
Jacob K. Javits Federal Building
26 Federal Plaza
New York, NY 10278

RE: Federal Consistency Determination and Water Quality Certificate
File No.: 0000-19-0024.1 CDT 190001
Hudson Raritan Estuary Ecosystem Restoration Project

Dear Mr. Weppler:

You are hereby notified that Federal Consistency Determination, File No. 0000-19-0024.1 CDT 190001 is withdrawn effective the date of this letter, as requested in an email dated December 9, 2019.

If you have any questions concerning this matter, please do not hesitate to contact Kara Turner at (609) 633-2289 or in writing at the above address.

Sincerely,

Colleen Keller
Assistant Director
Division of Land Use Regulation

Cc: Kim Springer, Office of Policy Implementation

State of New Jersey

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
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Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

CATHERINE R. McCABE
Commissioner

Peter Weppler
Chief, Environmental Analysis Branch
Department of the Army
New York District, Corps of Engineers
Jacob K. Javits Federal Building
26 Federal Plaza
New York, NY 10278

DEC 09 2019

RE: Army Corps of Engineers (ACOE) Hudson Raritan Estuary Ecosystem Restoration Project

Dear Mr. Weppler:

The Division does not have any concerns with the issuance of a Federal Consistency Determination decision and Water Quality Certificate (WQC), provided that the ACOE submits a Federal Consistency and WQC request for the final selected project design and the Division can confirm that the proposed project is consistent with its Coastal Zone Management rules.

If you have any questions concerning this matter, please do not hesitate to contact Kara Turner at (609) 633-2289 or in writing at the above address.

Sincerely,

Colleen Keller
Assistant Director
Division of Land Use Regulation

Cc: Kim Springer, Office of Policy Implementation

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF
Environmental Analysis Branch

October 16, 2019

Diane Dow
Director
New Jersey Department of Environmental Protection
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625

Subject: Consistency Determination for the Hudson Raritan Estuary Ecosystem Restoration Project

Dear Ms. Dow:

The U.S. Army Corps of Engineers, New York District (District) has determined that the Hudson Raritan Estuary Ecosystem Restoration Project complies with the New Jersey Coastal Management Program Federal Consistency Policies and project implementation will be conducted in a manner consistent with these policies. This letter provides the State of New Jersey Coastal Management Program with information to support the District's consistency determination under the Coastal Zone Management Act, Section 307 (c) (1) and (2), and 15 CFR 930.35(d). The recommended National Ecosystem Restoration plan restores degraded ecosystem structure, function, and dynamic processes to a less degraded and more natural condition at the following proposed restoration sites within the State of New Jersey coastal area boundary (Metromedia Marsh, Meadowlark Marsh, and Naval Weapons Station Earle).

The District requests that your office review the recommended sites in the Hudson Raritan Estuary Ecosystem Restoration Project, for consistency with the State's CZM Policies.

The District will continue to coordinate with your office. Should any questions arise during your review, or if additional information is required, please contact the project biologist, Diana Kohtio, by phone (917) 790-8619, or by email at Diana.M.Kohtio@usace.army.mil.

Sincerely,

WEPPLER.PETER.
M.1228647353

Digitally signed by
WEPPLER.PETER.M.1228647353
Date: 2019.10.16 16:20:16 -04'00'

Peter Weppler, Chief
Environmental Analysis Branch

Attachments

Bean, NJDEP-ONRR

HUDSON RARITAN ESTUARY ECOSYSTEM RESTORATION REPORT

COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

US ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT

OCTOBER 2019

TABLE OF CONTENTS

Applicant: U.S. Army Corps of Engineers, New York District

Project Desctiption: The Metromedia Marsh is located in Carlstadt, Bergen County, New Jersey. The site is bordered by the Hackensack River to the east and south and by the Marsh Resources Meadowlands Mitigation Bank to the north. The site is underdeveloped and dominated by common reed. The property also likely contains fill from unknown sources during construction of nearby radio towers.

The recommended plan will increase diversity and improve fish and wildlife habitat as well as improving flood storage and water quality. 38,000 CY of material will be excavated and replaced with 41,000 CY of clean fill. Restoration measures include enhancement of 26.5 acres of low marsh, creation of 9.4 acres of high marsh, 14.8 acres of scrub-shrub wetland, and 4.1 acres of maritime upland habitat.

Schedule and Duration: The expected construction duration for Metro Media is estimated at 33.5 months and is expected to begin in 2028.

Coastal Zone Management Compliance Summary Table:

Coastal Zone Management Rules (N.J.A.C.7:7)		**Compliance/ Section**
Subchapter 9	**Special Areas**	
7:7-9.1	Purpose and scope	
7:7-9.2	Shellfish habitat	NA
7:7-9.3	Surf clam areas	NA
7:7-9.4	Prime fishing areas	NA
7:7-9.5	Finfish migratory pathways	A1
7:7-9.6	Submerged vegetation habitat	NA
7:7-9.7	Navigation channels	A2
7:7-9.8	Canals	NA
7:7-9.9	Inlets	NA
7:7-9.10	Marina moorings	NA
7:7-9.11	Ports	NA
7:7-9.12	Submerged infrastructure routes	NA
7:7-9.13	Shipwreck and artificial reef habitats	NA
7:7-9.14	Wet borrow pits	NA
7:7-9.15	Intertidal and subtidal shallows	A3
7:7-9.16	Dunes	NA
7:7-9.17	Overwash areas	NA
7:7-9.18	Coastal high hazard areas	NA
7:7-9.19	Erosion hazard areas	NA
7:7-9.20	Barrier island corridor	NA
7:7-9.21	Bay islands	NA
7:7-9.22	Beaches	NA
7:7-9.23	Filled water’s edge	A4
7:7-9.24	Existing lagoon edges	NA
7:7-9.25	Flood hazard areas	A5

7:7-9.26	Riparian zones	A6
7:7-9.27	Wetlands	A7
7:7-9.28	Wetland buffers	A8
7:7-9.29	Coastal bluffs	NA
7:7-9.30	Intermittent stream corridors	A9
7:7-9.31	Farmland conservation areas	NA
7:7-9.32	Steep slopes	NA
7:7-9.33	Dry borrow pits	NA
7:7-9.34	Historic and archeological resources	A10
7:7-9.35	Specimen trees	NA
7:7-9.36	Endangered or threatened wildlife or plant species habitats	A11
7:7-9.37	Critical wildlife habitats	A12
7:7-9.38	Public open space	A13
7:7-9.39	Special hazard areas	NA
7:7-9.40	Excluded Federal lands	NA
7:7-9.41	Special urban areas	A14
7:7-9.42	Pinelands National Reserve and Pinelands Protection Area	NA
7:7-9.43	Hackensack Meadowlands District	A15
7:7-9.44	Wild and scenic river corridors	NA
7:7-9.45	Geodetic control reference marks	NA
7:7-9.46	Hudson River Waterfront Area	NA
7:7-9.47	Atlantic City	NA
7:7-9.48	Lands and waters subject to public trust rights	NA
7:7-9.49	Dredge material management areas	NA
Subchapter 10	**Standards for Beach and Dune Activities**	
7:7-10.1	Purpose and scope	NA
7:7-10.2	Standards applicable to routine beach maintenance	NA
7:7-10.3	Standards applicable to emergency post-storm beach restoration	NA
7:7-10.4	Standards applicable to dune creation and maintenance	NA
7:7-10.5	Standards applicable to the construction of boardwalks	NA
Subchapter 11	**Standards for Conducting and Reporting the Results of an Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment and/or Endangered or Threatened Wildlife Species Habitat Evaluation**	
7:7-11.1	Purpose and scope	
7:7-11.2	Standards for conducting Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessments	B1
7:7-11.3	Standards for conducting Endangered or Threatened Wildlife or Plant Species Habitat Evaluations	B1
7:7-11.4	Standards for reporting the results of impact assessments and habitat evaluations	B1
Subchapter 12	**General Waters Areas**	
7:7-12.1	Purpose and scope	
7:7-12.2	Shellfish aquaculture	NA

7:7-12.3	Boat Ramps	NA
7:7-12.4	Docks and piers for cargo and commercial fisheries	NA
7:7-12.5	Recreational docks and piers	NA
7:7-12.6	Maintenance dredging	NA
7:7-12.7	New dredging	NA
7:7-12.8	Environmental dredging	NA
7:7-12.9	Dredged material disposal	NA
7:7-12.10	Solid waste or sludge dumping	NA
7:7-12.11	Filling	NA
7:7-12.12	Mooring	NA
7:7-12.13	Sand and gravel mining	NA
7:7-12.14	Bridges	NA
7:7-12.15	Submerged pipelines	NA
7:7-12.16	Overhead transmission lines	NA
7:7-12.17	Dams and impoundments	NA
7:7-12.18	Outfalls and intakes	NA
7:7-12.19	Realignment of water areas	NA
7:7-12.20	Vertical wake or wave attenuation structures	NA
7:7-12.21	Submerged cables	NA
7:7-12.22	Artificial reefs	NA
7:7-12.23	Living shorelines	C1
7:7-12.24	Miscellaneous uses	NA
Subchapter 13	**Requirements for Impervious cover and vegetative cover for general land areas and certain special areas**	
7:7-13.1	Purpose and scope	
7:7-13.2	Definitions	
7:7-13.3	Impervious cover requirements that apply to sites in the upland waterfront development and CAFRA areas	D
7:7-13.4	Vegetative cover requirements that apply to sites in the upland waterfront development areas	D
7:7-13.5	Determining if a site is forested or unforested	D
7:7-13.6	Upland waterfront development area regions and growth ratings	D
7:7-13.7	Determining the environmental sensitivity of a site in the upland waterfront development area	D
7:7-13.8	Determining the developmental potential for a site in the upland waterfront development area	D
7:7-13.9	Determining the developmental potential for a residential or minor commercial development site in the upland waterfront development area	D
7:7-13.10	Determining the development potential for a major commercial or industrial development site in the upland waterfront development area	D
7:7-13.11	Determining the development potential for a campground development site in the upland waterfront development area	D

7:7-13.12	Determining the development intensity of a site in the upland waterfront development area	D
7:7-13.13	Impervious cover limits for a site in the upland waterfront development area	D
7:7-13.14	Vegetative cover percentages for a site in the upland waterfront development area	D
7:7-13.15	Coastal Planning Areas in the CAFRA area	D
7:7-13.16	Boundaries for Coastal Planning Areas, CAFRA centers, CAFRA cores, and CAFRA nodes; Non-mainland coastal centers	D
7:7-13.17	Impervious cover limits for a site in the CAFRA area	D
7:7-13.18	Vegetative cover percentages for a site in the CAFRA area	D
7:7-13.19	Mainland coastal centers	D
Subchapter 14	**General Location Rules**	
7:7-14.1	Rule on location of linear development	NA
7:7-14.2	Basic location rule	E1
7:7-14.3	Secondary impacts	NA
Subchapter 15	**Use Rules**	
7:7-15.1	Purpose and scope	
7:7-15.2	Housing use rules	NA
7:7-15.3	Resort/recreational use	NA
7:7-15.4	Energy facility use rule	NA
7:7-15.5	Transportation use rule	NA
7:7-15.6	Public facility use rule	NA
7:7-15.7	Industry use rule	NA
7:7-15.8	Mining use rule	NA
7:7-15.9	Port use rule	NA
7:7-15.10	Commercial facility use rule	NA
7:7-15.11	Coastal engineering	NA
7:7-15.12	Dredged material placement on land	NA
7:7-15.13	National defense facilities use rule	NA
7:7-15.14	High-rise structures	NA
Subchapter 16	**Resource Rules**	
7:7-16.1	Purpose and scope	
7:7-16.2	Marine fish and fisheries	F1
7:7-16.3	Water quality	F2
7:7-16.4	Surface water use	F3
7:7-16.5	Groundwater use	NA
7:7-16.6	Stormwater management	F4
7:7-16.7	Vegetation	F5
7:7-16.8	Air quality	F6
7:7-16.9	Public access	F7
7:7-16.10	Scenic resources and design	F8
7:7-16.11	Buffers and compatibility of uses	F9

7:7-16.12	Traffic	F10
7:7-16.13	Subsurface sewage disposal systems	NA
7:7-16.14	Solid and hazardous waste	F11
NA: Policy not applicable to project.		

Compliance with Coastal Zone Management Rules N.J.A.C. 7:7

A. Subchapter 9. Special Areas

1. Finfish Migratory Pathways (N.J.A.C 7:7–9.5)

Finfish migratory pathways are waterways (rivers, streams, creeks, bays and inlets) which can be determined to serve as passageways for diadromous fish to or from seasonal spawning areas, including juvenile anadromous fish which migrate in autumn and those listed by H.E. Zich (1977) "New Jersey Anadromous Fish Inventory" New Jersey Department of Environmental Protection (NJDEP) Miscellaneous Report No.41, and including those portions of the Hudson and Delaware Rivers within the coastal zone boundary. Species of concern include: alewife or river herring (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), striped bass (*Monrone saxatilis*), Atlantic sturgeon (*Acipenser oxyrhynchus*), shortnose sturgeon (*Acipenser brevirostrum*) and American eel (*Anguilla rostrata*).

According to the NJDEP's guidance document "Locations of Anadromous American Shad and River Herring during their Spawning Period in New Jersey's Freshwaters including Known Migratory Impediments and Fish Ladders" (March 2005), American shad and river herring are confirmed to use the Hackensack River up to the Oradell Reservoir Dam (Jersey City) for spawning runs.

Daily or seasonal migratory patterns of fish could be impacted by construction, however impacts will be temporary. During construction it is expected that local shellfish, finfish, and benthic macroinvertebrates will be temporarily impacted with increased sedimentation and turbidity. However, sedimentation and turbidity will be minimized to the fullest extent possible through the implementation of best management practices (BMPs) such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the project is consistent with this rule.

2. Navigation Channels (N.J.A.C. 7:7-9.7)

Navigation channels are tidal water areas including the Atlantic Ocean, inlets, bays, rivers and tidal guts with sufficient depth to provide safe navigation. Navigation channels include all areas between the top of the channel slopes on either side. These navigation channels are often marked with buoys or stakes. Major navigation channels are shown on NOAA/National Ocean Service Charts.

According to this rule, development that will cause terrestrial soil and shoreline erosion and siltation in navigation channels shall utilize appropriate mitigation measures. Development that will result in loss of navigability is prohibited. Any construction which will extend into a navigation channel is prohibited. The placement of structures within 50 feet of any authorized navigation channel is discouraged, unless it can be demonstrated that the proposed structure will not hinder navigation.

According to NOAA Chart 12337, the project is adjacent to a navigable portion of the Hackensack River. Restoration measures are to take place onshore and will not interfere with any recreational or commercial boat traffic. Therefore, the project is in compliance with this rule.

3. Intertidal and Subtidal Shallows (N.J.A.C. 7:7-9.15)

Intertidal and subtidal shallows are those are that are permanently or twice daily submerged from the spring high tide to a depth of four feet below mean low water.

The project involves the restoration of 50.6 acres of low marsh, 4.1 acres of high marsh, 3.5 acres of scrub-shrub and 1.1 acres of maritime upland forest. To reconnect fragmented areas, new tidal channels will be introduced within wetlands and improvements will be made on existing channels. Removal of approximately 74,000 cubic yards (CY) of the 0.6 top inches of invasive root mass will be disposed of at an approved waste disposal facility. The soil will be replaced with a clean growing medium at high marsh elevation to prevent the re-colonization of invasive plants. As stated in N.J.A.C. 7:7-12.23, the project is defined as a living shore to protect, restore, or enhance the habitat in the areas. As such, living shorelines in intertidal and subtidal shallows are conditionally acceptable; therefore, this project is in compliance with this rule. All restoration work will also comply with N.J.A.C. 7:7-12.23.

4. Filled Water's Edge (N.J.A.C. 7:7- 9.23)

Filled water's edge areas are existing filled water, wetland, or upland areas lying between wetlands or water areas, and either the upland limit of fill or the first paved public road or railroad landward of the adjacent water area, whichever is closer to the water.

The purpose of the project is to restore habitat along the water's edge. The project will restore wetlands and tidal channels within the Metromedia Tract. In combination with adjacent previously restore tracts, the project will create a contiguous connected expanse of natural habitat along the Hackensack River. The goals of this project are in direct accordance with this rule in preserving the water's edge along New Jersey's shore, bays and rivers; therefore, the project is consistent with this policy.

5. Flood Hazard Area (N.J.A.C. 7:7 9.25)

Flood hazard areas are areas subject to flooding from the flood hazard area design flood, as defined by NJDEP under the Flood Hazard Area Control Act rules at N.J.A.C. 7:13. Flood hazard areas include those areas mapped as such by the NJDEP, areas defined or delineated as an A or a V zone by the Federal Emergency Management Agency (FEMA), and any unmapped areas subject to flooding by the flood hazard area design flood.

Per the FEMA Flood Insurance Rate Map for the Borough of Carlstadt (34003C0266G), the project is located in Flood Zone AE. According to this rule, dedication of flood hazard areas for purpose of public open space is encouraged. The project will restore wetlands and tidal channels within the Metromedia Tract. With the combination with adjacent previously restore tracts, the project will create a contiguous connected expanse of natural habitat and open space along the Hackensack River. Therefore, the project is in direct accordance with this policy.

6. Riparian Zones (N.J.A.C. 7:7 9.26)

A riparian zone exists along every regulated water body, except there is no riparian zone along the Atlantic Ocean or along any manmade lagoon, stormwater management basin, or oceanfront barrier island, spit, or peninsula.

Within the vicinity of the project, riparian zones exist within 150-foot offset from the Hackensack River and its associated tributaries. The project will comply with the general permit-by certification at N.J.A.C. 7:13-8.4 "enhancement of a riparian zone through the planting of native, non-invasive plant species". Therefore, the project is consistent with this policy.

7. Wetlands (N.J.A.C. 7:7 - 9.27)

Wetlands or wetland means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Within the project limits, tidal wetlands were identified. This rule states that the establishment of a living shoreline in wetlands to address the loss of vegetated shorelines and habitat in the littoral zone is conditionally acceptable. In accordance with this rule, the project constitutes a living shoreline and will comply with N.J.A.C. 7:7-12.23. Therefore, the project is consistent with this rule.

8. Wetland Buffers (N.J.A.C. 7:7 – 9:28)

Wetland buffers or transition area means an area of land adjacent to a wetland which minimizes adverse impacts on the wetlands or serves as an integral component of the wetland ecosystem.

The project will not cause significant adverse impacts to wetland transition areas. Instead, the project will restore wetland transition areas by creating maritime forest habitat through native plantings; therefore, this project is in compliance with this rule.

9. Intermittent Stream Corridors (N.J.A.C. 7:7-9.30)

Intermittent stream corridors are areas including and surrounding surface water drainage channels in which there is not a permanent flow of water and which contain an area or areas with a seasonal high water table equal to or less than one foot. The inland extent of these corridors is either the inland limit of soils with a seasonal high water table depth equal to, or less than one foot, or a disturbance of 25 feet measured from the top of the channel banks, whichever is greater.

The purpose of this project is to restore coastal wetlands and wildlife habitat, which is directly aligned with the intentions of this rule. During construction of restoration measures, BMPs will be implemented to limit surface water runoff and erosion in accordance with "The Standards for Soil Erosion and Sediment Control in New Jersey". Therefore, the project is consistent with this policy.

10. Historical and archeological resources (N.J.A.C. 7:7- 9.34)

Historic and archeological resources include objects, structures, shipwrecks, buildings and other items that either are on or are eligible for inclusion on the New Jersey or National Register of Historic Places.

Phase 1A Cultural Resource surveys will be completed for the site to identify potentially significant cultural resources in the project area. Further testing and surveys will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The United States Army Corps of Engineers will consult with the New Jersey Historic Preservation Office (NJHPO). Ongoing work will be coordinated with the NJHPO, Advisory Council on Historic Preservation, the Delaware Nation, the Delaware Tribe of Indians, and the Shawnee Tribe of Oklahoma.

11. Endangered or threatened wildlife or plant species habitats (N.J.A.C. 7:7 – 9.36)

Endangered or threatened wildlife or plant species habitats are terrestrial and aquatic (marine, estuarine, or freshwater) areas known to be inhabited on a seasonal or permanent basis by or to be critical at any stage in the life cycle of any wildlife or plant identified as "endangered" or "threatened" species on official federal or state lists of endangered or threatened species, or under active consideration for state or federal listing. The definition of endangered or threatened wildlife or plant species habitats includes a sufficient buffer area to ensure continued survival of the population of the species as well as areas that serve an essential role as corridors for movement of endangered or threatened wildlife. Absence of such a buffer area does not preclude an area from being endangered or threatened wildlife or plant species habitat.

The project's restoration plans have been carefully mapped so as to avoid areas where state-listed species were found during surveys, however prior to construction; a final survey of the restoration site will be completed to ensure that impacts to rare plants or animals will be avoided. If plants are found within the restoration site, BMPs will be utilized. If listed animals are found, plans will be made to avoid disturbances through construction windows and other BMPs.

12. Critical Wildlife Habitat (N.J.A.C. 7:7 – 9.37)

Critical wildlife habitats are specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating. Definitions and maps of critical wildlife habitats are currently available only for colonial waterbird habitat in the 1979 Aerial Colony Nesting Waterbird Survey for New Jersey. Other sites are considered on a case-by-case basis by the New Jersey Division of Fish and Wildlife.

The purpose of this project is to restore the Meadowlands, located within the Atlantic Flyway, a significant coastal pathway for migratory birds. Therefore, this project is in direct accordance with the policy goals.

13. Public Open Space (N.J.A.C 7:7 – 9.38)

Public open space refers to lands owned or maintained by federal, state, or local agencies and which are dedicated to the conservation of public recreation, natural resources, visual, or physical public access, and/or the protection of management of wildlife.

The project will not adversely affect existing open space, but will instead enhance open space through restoration measures. The project restoration measures will restore natural habitat enhancing scenic resources within the area; therefore, the project is in compliance with this rule.

14. Special Urban Areas (N.J.A.C. 7:7-9.41)

Special urban areas are those municipalities defined in urban aid legislation (N.J.S.A.52:27D178) qualified to receive state aid to enable them to maintain and upgrade municipal services and offset local property taxes.

The project site is located within a special urban area. The project is not a development and will not adversely impact the economic and social viability of the special urban area; therefore, the project is in compliance with this rule.

15. Hackensack Meadowlands District (N.J.A.C. 7:7 – 9.43)

The Hackensack Meadowlands District is a 19,485-acre area of water, coastal wetlands and associated uplands within the boundaries described in the Hackensack Meadowlands Reclamation and Development Act (N.J.S.A. 13:17-1 et seq.).

The project is within the boundaries of the Hackensack Meadowlands boundaries and will be consistent with the New Jersey Meadowlands Master Plan and acquire any necessary authorizations; therefore, the project is consistent with this rule.

B. Subchapter 11. Standards for conducting and reporting the results of an endangered or threatened wildlife or plant species habitat impact assessment and/or endangered or threatened wildlife species habitat evaluation.

See Section A, item 8.

C. Subchapter 12. General Water Areas

1. Living Shorelines (N.J.A.C. 7:7-12.23)

Living shorelines are shoreline management practices that address the loss of vegetated shorelines and habitat in the littoral zone by providing for the protection, restoration, or enhancement of these habitats. This is accomplished through the strategic placement of vegetation, sand or other structural and organic material.

According to this rule, the project is defined as a living shoreline and is conditionally acceptable as part of a plan for restoration, creation and enhancement of habitat and water quality functions and values of wetlands, wetland buffers, and open water areas. The project will comply with the requirements of the Wetlands Act of 1970, the Waterfront Development Law, Coastal Area Facility Review Act, and the rules of this chapter; therefore, the project is in compliance.

D. Subchapter 13. Requirements for impervious cover and vegetative cover for general land areas and certain special areas

This subchapter sets forth requirements applicable in general land areas and certain special areas for impervious cover and vegetative cover on sites in the upland waterfront development area and in the CAFRA area.

These requirements will be addressed in subsequent phases of the project.

E. Subchapter 14. General Location Rules

1. Basic Location Rule (N.J.A.C. 7:7 – 14.2)

a. A location may be acceptable for development under N.J.A.C. 7:7-9, 12, 13, and 14, but the NJDEP may reject or conditionally approve the proposed development of the location as reasonably necessary to:

i. Promote the public health, safety, and welfare;
ii. Protect public and private property, wildlife, and marine fisheries; and
iii. Preserve, protect, and enhance the natural environment.

The project is intended to protect, preserve and restore wildlife and the natural environment and is therefore in compliance with this policy.

F. Subchapter 16. Resource Rules

1. Marine Fish and Fisheries (N.J.A.C. 7:7-16.2)

Coastal actions that result in minimal feasible interference of the natural functioning of marine fish and fisheries, including the reproductive and migratory patterns of estuarine and marine estuarine dependent species of finfish and shellfish, are conditionally acceptable. The finfish and shellfish resources of New Jersey provide valuable recreational experiences for residents and interstate visitors. The recreational and commercial landings of these species also contribute substantially to the state’s economy.

Local shellfish, finfish, and benthic macroinvertebrate population will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, sedimentation and turbidity from wetland and upland restoration would be minimized to the fullest extent possible through the implementation of BMPs such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the project is consistent with this policy.

2. Water Quality (N.J.A.C. 7:7-16.3)

As required by Section 307(f) of the Federal Coastal Zone Management Act, 16 U.S.C.§§ 1451 et seq., federal, state, and local water quality requirements established under the Federal Clean Water Act, 33 U.S.C. §§ 1251 et seq., shall be the water resource standards of the coastal management program. These requirements include not only the minimum requirements imposed under the Clean Water Act, but also the additional requirements adopted by states, localities, and interstate agencies pursuant to Section 510 of the Clean Water Act and such statutes as the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

3. Surface Water Use (N.J.A.C. 7:7 – 16.4)

Surface water is the water in lakes, ponds, streams, rivers, bogs, wetlands, bays, and ocean that is visible on land. Coastal development shall conform to all applicable NJDEP requirements for surface water diversion.

The project will not cause adverse impacts to surface waters and will not cause drawdown, bottom scour, or alteration of flow patterns. The project will instead enhance water quality in the area. Wetland restoration will contribute to water quality by reducing nutrient inputs and increasing nutrient uptake through native plantings, which in turn will result in fewer low dissolved oxygen events, increased water transparency, and reduction in the frequency and duration of algal blooms. Therefore, the project is in compliance with this policy.

4. Stormwater Management (N.J.A.C. 7:7-16.6)

If the project or activity meets the definitely of "major development" at N.J.A.C 7:8-1.2, then the project or activity shall comply with the Stormwater Management rules at N.J.A.C. 7:8.

The project is defined as a major development will comply with the Stormwater Management rules at N.J.A.C. 7:8.

5. Vegetation (N.J.A.C. 7:7 – 16.7)

Vegetation is the plant life or total plant cover that is found on a specific area, whether indigenous or introduced by humans. Coastal development shall preserve, to the maximum extent practicable, existing vegetation within a development site. Coastal development shall plant new vegetation, particularly appropriate coastal species, native to New Jersey to the maximum extent practicable.

The project will include the removal of invasive species and will plant native herbs, shrubs, and trees to restore and create natural habitat; therefore, the project is in direct compliance with this policy.

6. Air Quality (N.J.A.C. 7:7 – 16.8)

The protection of air resources refers to protection from air contaminants that injure human health, welfare or property, and to attainment and maintenance of state and federal air quality goals and the prevention of degradation of current levels of air quality. Coastal development shall conform to all applicable state and federal regulations, standards, and guidelines and be consistent with the strategies of New Jersey's State Implementation Plan.

The proposed development will not result in any airborne emissions that will violate state or federal regulations. Emissions will be limited to exhaust from automobiles traveling to and from the site during construction and from construction equipment. The federal government regulates automobile emissions, while technological improvements in heating and cooling units have resulted in decreased emissions and increased efficiency. Minimal impacts to air quality resulting from construction equipment and airborne dust will result from construction activities, but these are considered short-term impacts and will not be present post construction. Therefore, the project complies with this rule.

7. Public Access (N.J.A.C. 7:7 – 16.9)

Public access to the waterfront is the ability of the public to pass physically and visually to, from, and along tidal waterways and their shores and to use such shores, waterfronts and waters for activities such as navigation, fishing, and recreational activities including, but not limited to, swimming, sunbathing, surfing, sport diving, bird watching, walking, and boating.

The project will not modify public access and any interior walking trails will be re-established after construction; therefore, the project is in compliance with this rule.

8. Scenic Resources and Design (N.J.A.C. 7:7 – 16.10)

Scenic resources include the views of the natural and/or built landscape. Large-scale elements of building and site design are defined as the elements that compose the developed landscape such as size, geometry, massing, height, and bulk structures.

The project will preserve and restore existing open space by removing invasive and re-establishing native wetlands. The project will enhance scenic resources within the HRE; therefore, the project is consistent with this policy.

9. Buffers and compatibility of uses (N.J.A.C. 7:7 – 16.11)

Buffers are natural or man-made areas, structures, or objects that serve to separate distinct uses or areas. Compatibility of uses is the ability for uses to exist together without aesthetic or functional conflicts. Development shall be compatible with adjacent land and water uses to the maximum extent practicable.

The project will restore wetland buffers along the Hackensack River and will comply with the standards found at N.J.A.C. 7:7-9.28. Therefore, the project is in compliance with this policy.

10. Traffic (N.J.A.C. 7:7 – 16.12)

Traffic is the movement of vehicles, pedestrians, or ships along a route. Coastal development shall be designed, located, and operated in a manner to cause the least possible disturbance to traffic systems.

The project will not adversely impact traffic in the surrounding street network. The safe orderly flow of traffic will be ensured at all times and all appropriate safety procedures, uniformed traffic directors, personnel, and devices will be implemented as necessary during construction. Traffic control measures, based on local and state requirements, have been incorporated into the contract specifications.

11. Solid and Hazardous Waste (N.J.A.C. 7:7 – 16.14)

Solid waste means any garbage, refuse, sludge or other waste material, including solid, liquid, semi-solid or contained gaseous material. A material is a solid waste if it is "disposed of" by being discharged, deposited, injected, dumped, spilled, leaked, or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into ground or surface waters.

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans are created. Preliminary testing has showed contaminant types and levels as would be expected in urban, industrialized areas. Based on the findings and the nature of the sediment and soil, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site, graded to appropriate elevations to support upland coastal habitat. If the nature of the excavated material is hazardous, the material will be treated and disposed of at facilities approved to accept hazardous materials. Any solid waste materials resulting from the construction of the project will be disposed of according to all NJ solid waste regulations, and any recyclable materials shall be disposed of at a qualified recycling facility. Overall, the proposed project is expected to result in a positive impact, in that it would effectively remove or cap contaminated soils. No adverse impacts or threats to the environmental or public health and safety are anticipated.

Applicant: U.S. Army Corps of Engineers, New York District

Project Desction: Meadowlark Marsh is bounded to the south by Bellmans Creek, to the north and west by the New Jersey Turnpike – Eastern Spur, and to the east by 83rd street and active railroad tracks in Ridgefield, Bergen County, NJ. The upland area of the site is currently used as a dirt track for off-road vehicles, limiting the habitat available in upland areas. Pesticide overspray into a portion of the site from the utility right-of-way has been observed.

Restoration efforts at the site will improve fish and wildlife habitat as well as flood storage and nutrient and toxicant filtration for runoff from the surrounding developed areas. The entire site (71.5 acres) will be graded, with 64,400 CY of excavated material taken off site. High marsh and upland areas will be brought up to grade with 29,200 CY of fill and capped with clean material. Additional restoration measures include creation of 56.2 acres of low marsh, 6.5 acres of high marsh, 4.2 acres of forested/scrub shrub habitat, and culvert installation.

Schedule and Duration: The expected construction duration for Meadowlark Marsh is estimated at 33.5 months and is expected to begin in 2032.

Coastal Zone Management Compliance Summary Table:

Coastal Zone Management Rules (N.J.A.C.7:7)		**Compliance/ Section**
Subchapter 9	**Special Areas**	
7:7-9.1	Purpose and scope	
7:7-9.2	Shellfish habitat	NA
7:7-9.3	Surf clam areas	NA
7:7-9.4	Prime fishing areas	NA
7:7-9.5	Finfish migratory pathways	NA
7:7-9.6	Submerged vegetation habitat	NA
7:7-9.7	Navigation channels	NA
7:7-9.8	Canals	NA
7:7-9.9	Inlets	NA
7:7-9.10	Marina moorings	NA
7:7-9.11	Ports	NA
7:7-9.12	Submerged infrastructure routes	NA
7:7-9.13	Shipwreck and artificial reef habitats	NA
7:7-9.14	Wet borrow pits	NA
7:7-9.15	Intertidal and subtidal shallows	A1
7:7-9.16	Dunes	NA
7:7-9.17	Overwash areas	NA
7:7-9.18	Coastal high hazard areas	NA
7:7-9.19	Erosion hazard areas	NA
7:7-9.20	Barrier island corridor	NA
7:7-9.21	Bay islands	NA
7:7-9.22	Beaches	NA

7:7-9.23	Filled water's edge	A2
7:7-9.24	Existing lagoon edges	NA
7:7-9.25	Flood hazard areas	A3
7:7-9.26	Riparian zones	A4
7:7-9.27	Wetlands	A5
7:7-9.28	Wetland buffers	A6
7:7-9.29	Coastal bluffs	NA
7:7-9.30	Intermittent stream corridors	NA
7:7-9.31	Farmland conservation areas	NA
7:7-9.32	Steep slopes	NA
7:7-9.33	Dry borrow pits	NA
7:7-9.34	Historic and archeological resources	A7
7:7-9.35	Specimen trees	NA
7:7-9.36	Endangered or threatened wildlife or plant species habitats	A8
7:7-9.37	Critical wildlife habitats	A9
7:7-9.38	Public open space	A10
7:7-9.39	Special hazard areas	NA
7:7-9.40	Excluded Federal lands	NA
7:7-9.41	Special urban areas	A11
7:7-9.42	Pinelands National Reserve and Pinelands Protection Area	NA
7:7-9.43	Hackensack Meadowlands District	A12
7:7-9.44	Wild and scenic river corridors	NA
7:7-9.45	Geodetic control reference marks	NA
7:7-9.46	Hudson River Waterfront Area	NA
7:7-9.47	Atlantic City	NA
7:7-9.48	Lands and waters subject to public trust rights	NA
7:7-9.49	Dredge material management areas	NA
Subchapter 10	**Standards for Beach and Dune Activities**	
7:7-10.1	Purpose and scope	NA
7:7-10.2	Standards applicable to routine beach maintenance	NA
7:7-10.3	Standards applicable to emergency post-storm beach restoration	NA
7:7-10.4	Standards applicable to dune creation and maintenance	NA
7:7-10.5	Standards applicable to the construction of boardwalks	NA
Subchapter 11	**Standards for Conducting and Reporting the Results of an Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment and/or Endangered or Threatened Wildlife Species Habitat Evaluation**	
7:7-11.1	Purpose and scope	
7:7-11.2	Standards for conducting Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessments	B1
7:7-11.3	Standards for conducting Endangered or Threatened Wildlife or Plant Species Habitat Evaluations	B1
7:7-11.4	Standards for reporting the results of impact assessments and habitat evaluations	B1

Subchapter 12	**General Waters Areas**	
7:7-12.1	Purpose and scope	
7:7-12.2	Shellfish aquaculture	NA
7:7-12.3	Boat Ramps	NA
7:7-12.4	Docks and piers for cargo and commercial fisheries	NA
7:7-12.5	Recreational docks and piers	NA
7:7-12.6	Maintenance dredging	NA
7:7-12.7	New dredging	NA
7:7-12.8	Environmental dredging	NA
7:7-12.9	Dredged material disposal	NA
7:7-12.10	Solid waste or sludge dumping	NA
7:7-12.11	Filling	NA
7:7-12.12	Mooring	NA
7:7-12.13	Sand and gravel mining	NA
7:7-12.14	Bridges	NA
7:7-12.15	Submerged pipelines	NA
7:7-12.16	Overhead transmission lines	NA
7:7-12.17	Dams and impoundments	NA
7:7-12.18	Outfalls and intakes	NA
7:7-12.19	Realignment of water areas	NA
7:7-12.20	Vertical wake or wave attenuation structures	NA
7:7-12.21	Submerged cables	NA
7:7-12.22	Artificial reefs	NA
7:7-12.23	Living shorelines	C1
7:7-12.24	Miscellaneous uses	NA
Subchapter 13	**Requirements for Impervious cover and vegetative cover for general land areas and certain special areas**	
7:7-13.1	Purpose and scope	
7:7-13.2	Definitions	
7:7-13.3	Impervious cover requirements that apply to sites in the upland waterfront development and CAFRA areas	D
7:7-13.4	Vegetative cover requirements that apply to sites in the upland waterfront development areas	D
7:7-13.5	Determining if a site is forested or unforested	D
7:7-13.6	Upland waterfront development area regions and growth ratings	D
7:7-13.7	Determining the environmental sensitivity of a site in the upland waterfront development area	D
7:7-13.8	Determining the developmental potential for a site in the upland waterfront development area	D
7:7-13.9	Determining the developmental potential for a residential or minor commercial development site in the upland waterfront development area	D
7:7-13.10	Determining the development potential for a major commercial or industrial development site in the upland waterfront development	D

	area	
7:7-13.11	Determining the development potential for a campground development site in the upland waterfront development area	D
7:7-13.12	Determining the development intensity of a site in the upland waterfront development area	D
7:7-13.13	Impervious cover limits for a site in the upland waterfront development area	D
7:7-13.14	Vegetative cover percentages for a site in the upland waterfront development area	D
7:7-13.15	Coastal Planning Areas in the CAFRA area	D
7:7-13.16	Boundaries for Coastal Planning Areas, CAFRA centers, CAFRA cores, and CAFRA nodes; Non-mainland coastal centers	D
7:7-13.17	Impervious cover limits for a site in the CAFRA area	D
7:7-13.18	Vegetative cover percentages for a site in the CAFRA area	D
7:7-13.19	Mainland coastal centers	D
Subchapter 14	**General Location Rules**	
7:7-14.1	Rule on location of linear development	NA
7:7-14.2	Basic location rule	E1
7:7-14.3	Secondary impacts	NA
Subchapter 15	**Use Rules**	
7:7-15.1	Purpose and scope	
7:7-15.2	Housing use rules	NA
7:7-15.3	Resort/recreational use	NA
7:7-15.4	Energy facility use rule	NA
7:7-15.5	Transportation use rule	NA
7:7-15.6	Public facility use rule	NA
7:7-15.7	Industry use rule	NA
7:7-15.8	Mining use rule	NA
7:7-15.9	Port use rule	NA
7:7-15.10	Commercial facility use rule	NA
7:7-15.11	Coastal engineering	NA
7:7-15.12	Dredged material placement on land	NA
7:7-15.13	National defense facilities use rule	NA
7:7-15.14	High-rise structures	NA
Subchapter 16	**Resource Rules**	
7:7-16.1	Purpose and scope	
7:7-16.2	Marine fish and fisheries	F1
7:7-16.3	Water quality	F2
7:7-16.4	Surface water use	F3
7:7-16.5	Groundwater use	NA
7:7-16.6	Stormwater management	F4
7:7-16.7	Vegetation	F5
7:7-16.8	Air quality	F6

7:7-16.9	Public access	F7
7:7-16.10	Scenic resources and design	F8
7:7-16.11	Buffers and compatibility of uses	F9
7:7-16.12	Traffic	F10
7:7-16.13	Subsurface sewage disposal systems	NA
7:7-16.14	Solid and hazardous waste	F11
NA: Policy not applicable to project.		

Compliance with Coastal Zone Management Rules N.J.A.C. 7:7

A. Subchapter 9. Special Areas

1. Intertidal and Subtidal Shallows (N.J.A.C. 7:7-9.15)

Intertidal and subtidal shallows are those are that are permanently or twice daily submerged from the spring high tide to a depth of four feet below mean low water.

The project involves the re-establishment of degraded wetlands and restoration and creation of maritime forests. No sediment is proposed to be removed. Based on this rule, living shorelines in intertidal and subtidal shallows are conditionally acceptable; therefore, this project is in direct compliance. All restoration work will also comply with N.J.A.C. 7:7-12.23.

2. Filled Water's Edge (N.J.A.C. 7:7- 9.23)

Filled water's edge areas are existing filled water, wetland, or upland areas lying between wetlands or water areas, and either the upland limit of fill or the first paved public road or railroad landward of the adjacent water area, whichever is closer to the water.

The purpose of the project is to restore habitat along the water's edge. Proposed activities include removing debris and historic fill and to plant native vegetation to restore and create a maritime forest. The goals of this project are in direct accordance with this rule in preserving the water's edge along New Jersey's shore, bays and rivers; therefore, the project is consistent with this policy.

3. Flood Hazard Area (N.J.A.C. 7:7 9.25)

Flood hazard areas are areas subject to flooding from the flood hazard area design flood, as defined by New Jersey Department of Environmental Protection (NJDEP) under the Flood Hazard Area Control Act rules at N.J.A.C. 7:13. Flood hazard areas include those areas mapped as such by the NJDEP, areas defined or delineated as an A or a V zone by the Federal Emergency Management Agency (FEMA), and any unmapped areas subject to flooding by the flood hazard area design flood.

Per the FEMA Flood Insurance Rate Map for the Borough of Ridgefield (34003C0259G), the project is located in flood zones AE and X. According to this rule, dedication of flood hazard areas for purpose of public open space is encouraged. The purpose of the project is to restore Meadowlark Marsh. With the combination of restoration activities at nearby Bellman's Creek Marsh, restoration work will create a contiguous expanse of approximately 100 acres of reestablished wetlands. Therefore, the project is in direct accordance with this policy.

4. Riparian Zones (N.J.A.C. 7:7 9.26)

A riparian zone exists along every regulated water body, except there is no riparian zone along the Atlantic Ocean or along any manmade lagoon, stormwater management basin, or oceanfront barrier island, spit, or peninsula.

Within the vicinity of the project, riparian zones exist within 150-foot offset from the flood hazard area regulated waterbody, Bellman's Creek. The project will comply with the general permit-by certification at N.J.A.C. 7:13-8.4 "enhancement of a riparian zone through the planting of native, non-invasive plant species". Therefore, the project is consistent with this policy.

5. Wetlands (N.J.A.C. 7:7 - 9.27)

Wetlands or wetland means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Within the project limits, tidal and freshwater wetlands were identified. This rule states that the establishment of a living shoreline in wetlands to address the loss of vegetated shorelines and habitat in the littoral zone is conditionally acceptable. In accordance with this rule, the project constitutes a living shoreline and will comply with N.J.A.C. 7:7-12.23. Therefore, the project is consistent with this rule.

6. Wetland Buffers (N.J.A.C. 7:7 – 9:28)

Wetland buffers or transition area means an area of land adjacent to a wetland which minimizes adverse impacts on the wetlands or serves as an integral component of the wetland ecosystem.

The project will not cause significant adverse impacts to wetland transition areas. Instead, the project will restore wetland transition area by creating maritime forest habitat through debris removal and native plantings; therefore, the project is in compliance with this rule.

7. Historical and archeological resources (N.J.A.C. 7:7- 9.34)

Historic and archeological resources include objects, structures, shipwrecks, buildings, and other items that either are on or are eligible for inclusion on the New Jersey or National Register of Historic Places.

Phase 1A Cultural Resource surveys will be completed for the site to identify potentially significant cultural resources in the project area. Further testing and surveys will be conducted in the Plans and Specifications Phase of the project and will be completed prior to construction. The United States Army Corps of Engineers will consult with the New Jersey Historic Preservation Office (NJHPO). Ongoing work will be coordinated with the NJHPO, Advisory Council on Historic Preservation, the Delaware Nation, the Delaware Tribe of Indians, and the Shawnee Tribe of Oklahoma.

8. Endangered or threatened wildlife or plant species habitats (N.J.A.C. 7:7 – 9.36)

Endangered or threatened wildlife or plant species habitats are terrestrial and aquatic (marine, estuarine, or freshwater) areas known to be inhabited on a seasonal or permanent basis by or to be critical at any stage in the life cycle of any wildlife or plant identified as "endangered" or "threatened" species on official federal or state lists of endangered or threatened species, or under active consideration for state or federal listing. The definition of endangered or threatened wildlife or plant species habitats includes a sufficient buffer area to ensure continued survival of the population of the species as well as areas that serve an essential role as corridors for movement of endangered or threatened wildlife. Absence of such a buffer area does not preclude an area from being endangered or threatened wildlife or plant species habitat.

The project's restoration plans have been carefully mapped so as to avoid areas where state-listed species were found during surveys, however prior to construction; a final survey of the restoration site will be completed to ensure that impacts to rare plants or animals will be avoided. If plants are found within the restoration site, best management practices (BMPs) will be utilized. If listed animals are found, plans will be made to avoid disturbances through construction windows and other BMPs.

9. Critical Wildlife Habitat (N.J.A.C. 7:7 – 9.37)

Critical wildlife habitats are specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating. Definitions and maps of critical wildlife habitats are currently available only for colonial waterbird habitat in the 1979 Aerial Colony Nesting Waterbird Survey for New Jersey. Other sites are considered on a case-by-case basis by the New Jersey Division of Fish and Wildlife.

The purpose of this project is to restore the Meadowlark Marsh, located within the Atlantic Flyway, a significant coastal pathway for migratory birds. Therefore, the project is in direct accordance with the policy goals.

10. Public Open Space (N.J.A.C 7:7 – 9.38)

Public open space refers to lands owned or maintained by federal, state, or local agencies and which are dedicated to the conservation of public recreation, natural resources, visual, or physical public access, and/or the protection of management of wildlife.

The project will not adversely affect existing open space, but will instead enhance open space through restoration measures. The project restoration measures will restore natural habitat enhancing scenic resources within the area; therefore, the project is in compliance with this rule.

11. Special Urban Areas (N.J.A.C. 7:7-9.41)

Special urban areas are those municipalities defined in urban aid legislation (N.J.S.A.52:27D178) qualified to receive state aid to enable them to maintain and upgrade municipal services and offset local property taxes.

The project site is located in an Urban Enterprise Zone, Urban Aid Community, Urban Coordinating Council Qualified Municipality, and NJ Redevelopment Authority Eligible Municipality. The project is not a development project and will not adversely impact the economic and social viability of the special urban area; therefore, the project is in compliance with this rule.

12. Hackensack Meadowlands District (N.J.A.C. 7:7 – 9.43)

The Hackensack Meadowlands District is a 19,485-acre area of water, coastal wetlands and associated uplands within the boundaries described in the Hackensack Meadowlands Reclamation and Development Act (N.J.S.A. 13:17-1 et seq.).

The project is within the boundaries of the Hackensack Meadowlands boundaries and will be consistent with the New Jersey Meadowlands Master Plan and acquire any necessary authorizations.

B. Subchapter 11. Standards for conducting and reporting the results of an endangered or threatened wildlife or plant species habitat impact assessment and/or endangered or threatened wildlife species habitat evaluation.

See Section A, item 8.

C. Subchapter 12. General Water Areas

1. Living Shorelines (N.J.A.C. 7:7-12.23)

Living shorelines are shoreline management practices that address the loss of vegetated shorelines and habitat in the littoral zone by providing for the protection, restoration, or enhancement of these habitats. This is accomplished through the strategic placement of vegetation, sand or other structural and organic material.

This project is a restoration project and is defined as a living shoreline. Based on this rule, the project is conditional acceptable and will comply with the requirements of the Wetlands Act of 1970, the Waterfront Development Law, Coastal Area Facility Review Act, and the rules of this chapter.

D. Subchapter 13. Requirements for impervious cover and vegetative cover for general land areas and certain special areas

This subchapter sets forth requirements applicable in general land areas and certain special areas for impervious cover and vegetative cover on sites in the upland waterfront development area and in the CAFRA area.

These requirements will be addressed in subsequent phases of the project.

E. Subchapter 14. General Location Rules

1. Basic Location Rule (N.J.A.C. 7:7 – 14.2)

a. A location may be acceptable for development under N.J.A.C. 7:7-9, 12, 13, and 14, but the NJDEP may reject or conditionally approve the proposed development of the location as reasonably necessary to:
   i. Promote the public health, safety, and welfare;
   ii. Protect public and private property, wildlife, and marine fisheries; and
   iii. Preserve, protect, and enhance the natural environment.

The project is intended to protect, preserve and restore wildlife and the natural environment; therefore, the project is in compliance with this policy.

F. Subchapter 16. Resource Rules

1. Marine Fish and Fisheries (N.J.A.C. 7:7-16.2)

Coastal actions that result in minimal feasible interference of the natural functioning of marine fish and fisheries, including the reproductive and migratory patterns of estuarine and marine estuarine dependent species of finfish and shellfish, are conditionally acceptable. The finfish and shellfish resources of New Jersey provide valuable recreational experiences for residents and interstate visitors. The recreational and commercial landings of these species also contribute substantially to the state's economy.

Local shellfish, finfish, and benthic macroinvertebrate population will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, sedimentation and turbidity from wetland and upland restoration would be minimized to the fullest extent possible through the implementation of BMPs such as staked straw bales, reinforced silt fencing, filtered sediment traps, and other approved methods. Therefore, the project is consistent with this policy.

2. Water Quality (N.J.A.C. 7:7-16.3)

As required by Section 307(f) of the Federal Coastal Zone Management Act, 16 U.S.C.§§ 1451 et seq., federal, state, and local water quality requirements established under the Federal Clean Water Act, 33 U.S.C. §§ 1251 et seq., shall be the water resource standards of the coastal management program. These requirements include not only the minimum requirements imposed under the Clean Water Act, but also the additional requirements adopted by states, localities, and interstate agencies pursuant to Section 510 of the Clean Water Act and such statutes as the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. The following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.

- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

3. Surface Water Use (N.J.A.C. 7:7 – 16.4)

Surface water is the water in lakes, ponds, streams, rivers, bogs, wetlands, bays, and ocean that is visible on land. Coastal development shall conform to all applicable NJDEP requirements for surface water diversion.

The project will not cause adverse impacts to surface waters and will not cause drawdown, bottom scour, or alteration of flow patterns. The project will instead enhance water quality in the area. Wetland restoration will contribute to water quality by reducing nutrient inputs and increasing nutrient uptake through native plantings, which in turn will result in fewer low dissolved oxygen events, increased water transparency, and reduction in the frequency and duration of algal blooms. Therefore, the project is in compliance with this policy.

4. Stormwater Management (N.J.A.C. 7:7-16.6)

If the project or activity meets the definitely of "major development" at N.J.A.C 7:8-1.2, then the project or activity shall comply with the Stormwater Management rules at N.J.A.C. 7:8.

The project is defined as a major development will comply with the Stormwater Management rules at N.J.A.C. 7:8.

5. Vegetation (N.J.A.C. 7:7 – 16.7)

Vegetation is the plant life or total plant cover that is found on a specific area, whether indigenous or introduced by humans. Coastal development shall preserve, to the maximum extent practicable, existing vegetation within a development site. Coastal development shall plant new vegetation, particularly appropriate coastal species, native to New Jersey to the maximum extent practicable.

The project will include the removal of invasive species and will plant native herbs, shrubs, and trees to restore and create natural habitat; therefore, the project is in direct compliance with this policy.

6. Air Quality (N.J.A.C. 7:7 – 16.8)

The protection of air resources refers to protection from air contaminants that injure human health, welfare or property, and to attainment and maintenance of state and federal air quality goals and the prevention of degradation of current levels of air quality. Coastal development shall conform to all applicable state and federal regulations, standards, and guidelines and be consistent with the strategies of New Jersey's State Implementation Plan.

The proposed development will not result in any airborne emissions that will violate state or federal regulations. Emissions will be limited to exhaust from automobiles traveling to and from the site during construction and from construction equipment. The federal government regulates automobile emissions, while technological improvements in heating and cooling units have resulted in decreased emissions and increased efficiency. Minimal impacts to air quality resulting from construction equipment and airborne dust will result from construction activities, but these are considered short-term impacts and will not be present post-construction. Therefore, the project complies with this rule.

7. Public Access (N.J.A.C. 7:7 – 16.9)
Public access to the waterfront is the ability of the public to pass physically and visually to, from, and along tidal waterways and their shores and to use such shores, waterfronts and waters for activities such as navigation, fishing, and recreational activities including, but not limited to, swimming, sunbathing, surfing, sport diving, bird watching, walking, and boating.

The project will not modify public access and any interior walking trails will be re-established after construction; therefore, the project is in compliance with this rule.

8. Scenic Resources and Design (N.J.A.C. 7:7 – 16.10)

Scenic resources include the views of the natural and/or built landscape. Large-scale elements of building and site design are defined as the elements that compose the developed landscape such as size, geometry, massing, height, and bulk structures.

The project will preserve and restore existing open space by removing invasive and re-establishing native wetlands. The project will enhance scenic resources within the HRE; therefore, the project is consistent with this policy.

9. Buffers and compatibility of uses (N.J.A.C. 7:7 – 16.11)

Buffers are natural or man-made areas, structures, or objects that serve to separate distinct uses or areas. Compatibility of uses is the ability for uses to exist together without aesthetic or functional conflicts. Development shall be compatible with adjacent land and water uses to the maximum extent practicable.

The project will restore wetland buffers along Bellman's Creek and will comply with the standards found at N.J.A.C. 7:7-9.28. Therefore, the project is in compliance with this policy.

10. Traffic (N.J.A.C. 7:7 – 16.12)

Traffic is the movement of vehicles, pedestrians, or ships along a route. Coastal development shall be designed, located, and operated in a manner to cause the least possible disturbance to traffic systems.

The project will not adversely impact traffic in the surrounding street network. The safe orderly flow of traffic will be ensured at all times and all appropriate safety procedures, uniformed traffic directors, personnel, and devices will be implemented as necessary during construction. Traffic control measures, based on local and state requirements, have been incorporated into the contract specifications.

11. Solid and Hazardous Waste (N.J.A.C. 7:7 – 16.14)

Solid waste means any garbage, refuse, sludge or other waste material, including solid, liquid, semi-solid or contained gaseous material. A material is a solid waste if it is "disposed of" by being discharged, deposited, injected, dumped, spilled, leaked, or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into ground or surface waters.

Preliminary sampling has been completed at the site and will be utilized to consider the impacts of the conceptual plans, however further sampling will be conducted during the next phase of this project before final plans are created. Preliminary testing has showed contaminant types and levels as would be expected in urban, industrialized areas. Based on the findings and the nature of the sediment and soil, removal and placement can be undertaken. If the nature of the removed material is non-hazardous, it can be retained on site, graded to appropriate elevations to support upland coastal habitat. If the nature of the excavated material is hazardous, the material will be treated and disposed of at facilities approved to accept hazardous materials. Any solid waste materials resulting from the construction of the project will be disposed of according to all NJ solid waste regulations, and any recyclable materials shall be disposed of at a qualified recycling facility. Overall, the proposed project is expected to result in a positive impact, in that it would effectively remove or cap contaminated soils. No adverse impacts or threats to the environmental or public health and safety are anticipated.

Applicant: U.S. Army Corps of Engineers, New York District

Project Desctiption: The Naval Weapons Station (NWS) Earle is located in Sandy Hook Bay, New Jersey. Water depths at this site from the pier out into the channel vary from 12 to 40 feet. Previous oyster restoration studies by NY/NJ Baykeeper have been conducted at NWS Earle. There are no risks of oyster poaching at this site due to the proximity of the naval base.

The recommended plan includes installation of 1,010 oyster pyramids with 30 oyster castle blocks per pyramid and creation of 350 CY of spat-on-shell. Duration of construction is estimated at 12 months and is expected to start in 2024.

Schedule and Duration: The expected construction duration for Naval Station Earle is estimated at 12 months and is expected to begin in 2024.

Coastal Zone Management Compliance Summary Table:

Coastal Zone Management Rules (N.J.A.C.7:7)		**Compliance/ Section**
Subchapter 9	**Special Areas**	
7:7-9.1	Purpose and scope	
7:7-9.2	Shellfish habitat	A1
7:7-9.3	Surf clam areas	NA
7:7-9.4	Prime fishing areas	NA
7:7-9.5	Finfish migratory pathways	A2
7:7-9.6	Submerged vegetation habitat	NA
7:7-9.7	Navigation channels	A3
7:7-9.8	Canals	NA
7:7-9.9	Inlets	NA
7:7-9.10	Marina moorings	NA
7:7-9.11	Ports	NA
7:7-9.12	Submerged infrastructure routes	NA
7:7-9.13	Shipwreck and artificial reef habitats	A4
7:7-9.14	Wet borrow pits	NA
7:7-9.15	Intertidal and subtidal shallows	A5
7:7-9.16	Dunes	NA
7:7-9.17	Overwash areas	NA
7:7-9.18	Coastal high hazard areas	NA
7:7-9.19	Erosion hazard areas	NA
7:7-9.20	Barrier island corridor	NA
7:7-9.21	Bay islands	NA
7:7-9.22	Beaches	NA
7:7-9.23	Filled water’s edge	NA
7:7-9.24	Existing lagoon edges	NA
7:7-9.25	Flood hazard areas	NA
7:7-9.26	Riparian zones	NA

7:7-9.27	Wetlands	NA
7:7-9.28	Wetland buffers	NA
7:7-9.29	Coastal bluffs	NA
7:7-9.30	Intermittent stream corridors	NA
7:7-9.31	Farmland conservation areas	NA
7:7-9.32	Steep slopes	NA
7:7-9.33	Dry borrow pits	NA
7:7-9.34	Historic and archeological resources	A6
7:7-9.35	Specimen trees	NA
7:7-9.36	Endangered or threatened wildlife or plant species habitats	A7
7:7-9.37	Critical wildlife habitats	NA
7:7-9.38	Public open space	NA
7:7-9.39	Special hazard areas	A8
7:7-9.40	Excluded Federal lands	A9
7:7-9.41	Special urban areas	NA
7:7-9.42	Pinelands National Reserve and Pinelands Protection Area	NA
7:7-9.43	Hackensack Meadowlands District	NA
7:7-9.44	Wild and scenic river corridors	NA
7:7-9.45	Geodetic control reference marks	NA
7:7-9.46	Hudson River Waterfront Area	NA
7:7-9.47	Atlantic City	NA
7:7-9.48	Lands and waters subject to public trust rights	A10
7:7-9.49	Dredge material management areas	NA
Subchapter 10	**Standards for Beach and Dune Activities**	
7:7-10.1	Purpose and scope	NA
7:7-10.2	Standards applicable to routine beach maintenance	NA
7:7-10.3	Standards applicable to emergency post-storm beach restoration	NA
7:7-10.4	Standards applicable to dune creation and maintenance	NA
7:7-10.5	Standards applicable to the construction of boardwalks	NA
Subchapter 11	**Standards for Conducting and Reporting the Results of an Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment and/or Endangered or Threatened Wildlife Species Habitat Evaluation**	
7:7-11.1	Purpose and scope	
7:7-11.2	Standards for conducting Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessments	B1
7:7-11.3	Standards for conducting Endangered or Threatened Wildlife or Plant Species Habitat Evaluations	B1
7:7-11.4	Standards for reporting the results of impact assessments and habitat evaluations	B1
Subchapter 12	**General Waters Areas**	
7:7-12.1	Purpose and scope	
7:7-12.2	Shellfish aquaculture	NA
7:7-12.3	Boat Ramps	NA

7:7-12.4	Docks and piers for cargo and commercial fisheries	NA
7:7-12.5	Recreational docks and piers	NA
7:7-12.6	Maintenance dredging	NA
7:7-12.7	New dredging	NA
7:7-12.8	Environmental dredging	NA
7:7-12.9	Dredged material disposal	NA
7:7-12.10	Solid waste or sludge dumping	NA
7:7-12.11	Filling	NA
7:7-12.12	Mooring	NA
7:7-12.13	Sand and gravel mining	NA
7:7-12.14	Bridges	NA
7:7-12.15	Submerged pipelines	NA
7:7-12.16	Overhead transmission lines	NA
7:7-12.17	Dams and impoundments	NA
7:7-12.18	Outfalls and intakes	NA
7:7-12.19	Realignment of water areas	NA
7:7-12.20	Vertical wake or wave attenuation structures	NA
7:7-12.21	Submerged cables	NA
7:7-12.22	Artificial reefs	NA
7:7-12.23	Living shorelines	C1
7:7-12.24	Miscellaneous uses	NA
Subchapter 13	**Requirements for Impervious cover and vegetative cover for general land areas and certain special areas**	
7:7-13.1	Purpose and scope	
7:7-13.2	Definitions	
7:7-13.3	Impervious cover requirements that apply to sites in the upland waterfront development and CAFRA areas	NA
7:7-13.4	Vegetative cover requirements that apply to sites in the upland waterfront development areas	NA
7:7-13.5	Determining if a site is forested or unforested	NA
7:7-13.6	Upland waterfront development area regions and growth ratings	NA
7:7-13.7	Determining the environmental sensitivity of a site in the upland waterfront development area	NA
7:7-13.8	Determining the developmental potential for a site in the upland waterfront development area	NA
7:7-13.9	Determining the developmental potential for a residential or minor commercial development site in the upland waterfront development area	NA
7:7-13.10	Determining the development potential for a major commercial or industrial development site in the upland waterfront development area	NA
7:7-13.11	Determining the development potential for a campground development site in the upland waterfront development area	NA
7:7-13.12	Determining the development intensity of a site in the upland	NA

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7:7-15.4	Energy facility use rule	NA
7:7-15.5	Transportation use rule	NA
7:7-15.6	Public facility use rule	NA
7:7-15.7	Industry use rule	NA
7:7-15.8	Mining use rule	NA
7:7-15.9	Port use rule	NA
7:7-15.10	Commercial facility use rule	NA
7:7-15.11	Coastal engineering	NA
7:7-15.12	Dredged material placement on land	NA
7:7-15.13	National defense facilities use rule	NA
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7:7-16.3	Water quality	E2
7:7-16.4	Surface water use	E3
7:7-16.5	Groundwater use	NA
7:7-16.6	Stormwater management	NA
7:7-16.7	Vegetation	E4
7:7-16.8	Air quality	E5
7:7-16.9	Public access	E6
7:7-16.10	Scenic resources and design	E7
7:7-16.11	Buffers and compatibility of uses	E8
7:7-16.12	Traffic	E9

7:7-16.13	Subsurface sewage disposal systems	NA
7:7-16.14	Solid and hazardous waste	E10
NA: Policy not applicable to project.		

Compliance with Coastal Zone Management Rules N.J.A.C. 7:7

A. Subchapter 9. Special Areas

1. Shellfish Habitat (N.J.A.C. 7:7-9.2)

Shellfish habitat is defined as an estuarine bay or river bottom which has a history of production for hard clams (*Mercenaria mercenaria*), soft clams (*Mya arenaria*), eastern oysters (*Crassostrea virginica*), bay scallops (*Argopecten irradians*), or blue mussels (*Mytilus edulis*), or otherwise listed in the section of the regulation.

According to Chart 2 of the 2015 Shellfish Growing Water Classification Charts prepared by the NJDEP, areas off the coast of Naval Weapons Station Earle are identified as restricted waters. Restricted waters are waters where the harvest of shellfish is not allowed except as authorized by an issued permit in accordance with N.J.A.C. 7:12-9. The "Distribution of Shellfish Resources" mapping identifies soft clam areas as well as hard clams in the vicinity of the proposed restoration site.

The disturbance to shellfish habitat will be minimized to the greatest extent possible. It is expected that during construction, local shellfish will be temporarily impacted with increased sedimentation and turbidity. However, sedimentation and turbidity will be minimized through the implementation of best management practices (BMPs) such as turbidity curtains, and other approved methods. Therefore, the project is consistent with this rule.

2. Finfish Migratory Pathways (N.J.A.C 7:7–9.5)

Finfish migratory pathways are waterways (rivers, streams, creeks, bays and inlets) which can be determined to serve as passageways for diadromous fish to or from seasonal spawning areas, including juvenile anadromous fish which migrate in autumn and those listed by H.E. Zich (1977) "New Jersey Anadromous Fish Inventory" NJDEP Miscellaneous Report No.41, and including those portions of the Hudson and Delaware Rivers within the coastal zone boundary. Species of concern include: alewife or river herring (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), striped bass (*Monrone saxatilis*), Atlantic sturgeon (*Acipenser oxyrhynchus*), shortnose sturgeon (*Acipenser brevirostrum*) and American eel (*Anguilla rostrata*).

It is expected that during construction, local shellfish, finfish, and benthic macroinvertebrates will be temporarily impacted with increased sedimentation and turbidity. However, sedimentation and turbidity will be minimized through the implementation of BMPs such as time-of-year restrictions, turbidity curtains, and other approved methods. Therefore, the project is consistent with this rule.

3. Navigation Channels (N.J.A.C. 7:7-9.7)

Navigation channels are tidal water areas including the Atlantic Ocean, inlets, bays, rivers and tidal guts with sufficient depth to provide safe navigation. Navigation channels include all areas between the top of the channel slopes on either side. These navigation channels are often marked with buoys or stakes. Major navigation channels are shown on NOAA/National Ocean Service Charts.

According to this rule, development that will cause terrestrial soil and shoreline erosion and siltation in navigation channels shall utilize appropriate mitigation measures. Development that will result in loss of navigability is prohibited. Any construction which will extend into a navigation channel is prohibited. The placement of structures within 50 feet of any authorized navigation channel is discouraged, unless it can be demonstrated that the proposed structure will not hinder navigation.

The Naval Weapons Station Earle restoration site is located along the south shore of Sandy Hood Bay and features a 2.9-mile-long pier. Restoration activities would occur under the pier at a location closer to land, away from naval ship activity, and will not interfere with any recreational or commercial boat traffic. Therefore, the project is in compliance with this rule.

4. Shipwreck and Artificial Reef Habitats (N.J.A.C. 7:7-9.13)

The shipwreck and artificial reef special area includes all permanently submerged or abandoned remains of vessels and other structures, including, but not limited to, artificial reefs, anchors, quarry rocks or lost cargo, which serve as a special marine habitat or are fragile historic and cultural resources. An artificial reef is a man-made imitation of a natural reef created by placing hard structures on the sea floor for the purpose of enhancing fish habitat and fish stock. In time, an artificial reef will attain many of the biological and ecological attributes of a natural reef. Artificial reefs do not include shore protection structures, pipelines and other structures not constructed for the sole purpose of fish habitat.

There are no known shipwrecks or artificial reefs within the project area, and there is a low probability of unknown, submerged archeological resources in the vicinity of the Naval Weapons Station Earle pier, based on likely prior bottom disturbance. The project will restore oysters and oyster habitat by placing spat on shell, and installing reef balls and wire cages/gabions. The project is expected to improve feeding, breeding, and nursery grounds for fish and benthic communities, provide secondary coastal storm risk management benefits, and improve water quality through filtration. Therefore, the project is in direct compliance with this rule.

5. Intertidal and Subtidal Shallows (N.J.A.C. 7:7-9.15)

Intertidal and subtidal shallows are permanently or temporarily submerged areas from the spring high tide to a depth of four feet below mean low water.

The project is defined as a living shore as stated in N.J.A.C. 7:7-12.23. Based on this rule, the project is considered conditionally acceptable and will comply with N.J.A.C. 7:7-12.23; therefore, the project is consistent with this rule.

6. Historical and Archeological Resources (N.J.A.C. 7:7- 9.34)

Historic and archeological resources include objects, structures, shipwrecks, buildings and other items that either are on or are eligible for inclusion on the New Jersey or National Register of Historic Places.

A 2014 survey of cultural resources within the Hudson-Raritan Estuary (HRE) identified no cultural resources within 0.5 miles of the proposed restoration project, and there is a low probability of unknown, submerged archeological resources in the vicinity of the Naval Weapons Station Earle pier, based on likely prior bottom disturbance. However, the eastern portion of the proposed oyster restoration site is within the Naval Weapons Station Earle Transshipment Historic District and one of the adjoining piers is a contributing feature of the historic district. Construction activities on the oyster restoration site may adversely affect cultural resources. However, the restoration project will undergo a review with the New Jersey State Historic Preservation Officer in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 United States Code 470). If the project has potential impacts to listed resources, it would be designed and constructed with agency coordination to ensure that both short- and long-term impacts are mitigated. Therefore, the project is consistent with this rule.

7. Endangered or Threatened Wildlife or Plant Species Habitats (N.J.A.C. 7:7 – 9.36)

Endangered or threatened wildlife or plant species habitats are terrestrial and aquatic (marine, estuarine, or freshwater) areas known to be inhabited on a seasonal or permanent basis by or to be critical at any stage in the life cycle of any wildlife or plant identified as "endangered" or "threatened" species on official federal or state lists of endangered or threatened species, or under active consideration for state or federal listing. The definition of endangered or threatened wildlife or plant species habitats includes a sufficient buffer area to ensure continued survival of the population of the species as well as areas that serve an essential role as corridors for movement of endangered or threatened wildlife. Absence of such a buffer area does not preclude an area from being endangered or threatened wildlife or plant species habitat.

The project's restoration plans have been carefully mapped so as to avoid areas where state-listed species were found during surveys, however prior to construction; a final survey of the restoration site will be completed to ensure that impacts to rare plants or animals will be avoided. If plants are found within the restoration site, BMPs will be utilized. If listed animals are found, plans will be made to avoid disturbances through time-of-year restrictions and other BMPs.

8. Special Hazard Areas (N.J.A.C 7:7 – 9.39)

Special hazard areas include areas with a known actual or potential hazard to public health, safety, and welfare, or to public or private property, such as the navigable air space around airports and seaplane landing areas, potential evacuation zones, and areas where hazardous substances as defined at N.J.S.A. 58:10-23.11b are used or disposed, including adjacent areas and areas of hazardous material contamination.

Naval Weapons Station Earle operates a receipts, storage, segregation and issue ordinance facility to support the Atlantic Fleet. Restoration activities would occur under the pier closer to land, away from naval ship activity and away from pier sections where ammunition is loaded and unloaded from warships at a safe distance from heavily populated areas. The station is considered an ideal restoration area and the presence of naval security forces and exclusion areas would likely result in a low disturbance of the restoration site. Therefore, the project is in compliance with this rule.

9. Excluded Federal Lands (N.J.A.C. 7:7-9.40)

Excluded federal lands are those lands, the use of which is, by law, subject solely to the discretion of or held in trust by the federal government, its officers or agents. These lands are excluded from the coastal zone as required by Section 304 of the Federal Coastal Zone Management Act.

Based on the findings of the analyses of how the project would affect each of the enforceable policies of the state’s federally approved coastal management program, presented in this Coastal Zone Management Compliance Statement, and other findings of the HRE Ecosystem Restoration Feasibility Study integrated feasibility report and environmental assessment, the United States Army Corps of Engineers (USACE) finds that the project would result in no or minimal adverse impacts to the coastal zone resources of New Jersey. The project is fully consistent to the maximum extent practicable with the enforceable policies of the New Jersey Coastal Zone Management Program. Therefore, the project is in compliance with this rule.

10. Lands and Waters Subject to Public Trust Rights (N.J.A.C. 7:7-9.48)

Lands and waters subject to public trust rights are tidal waterways and their shores, including both lands now or formerly below the mean high water line, and shores above the mean high water line. Tidal waterways and their shores are subject to the Public Trust Doctrine and are held in trust by the State for the benefit of all the people, allowing the public to fully enjoy these lands and waters for a variety of public uses. Public trust rights include public access which is the ability of the public to pass physically and visually to, from, and along the ocean shore and other waterfronts subject to public trust rights and to use these lands and waters for activities such as navigation, fishing and recreation activities including, but not limited to, swimming, sunbathing, surfing, sport diving, bird watching, walking, and boating. Public trust rights also include the right to perpendicular and linear access.

On June 26, 2003, the USACE amended its regulations to establish a restricted area in waters adjacent to Naval Weapons Station Earle. Under the 2003 rule (68 Federal Register 37970), no persons, unauthorized vessels, or other unauthorized craft may enter the restricted area at any time. The regulations are necessary to safeguard Navy vessels and United States government facilities from sabotage and other subversive acts, accidents, or incidents of similar nature, and to protect the public from potentially hazardous conditions which may exist as a result of Navy use of the area. The project will not affect public access to lands and waters subject to public trust rights; therefore, the project is in compliance with this rule.

B. Subchapter 11. Standards for conducting and reporting the results of an endangered or threatened wildlife or plant species habitat impact assessment and/or endangered or threatened wildlife species habitat evaluation.

See Section A, item 6.

C. Subchapter 12. General Water Areas

1. Living Shorelines (N.J.A.C. 7:7-12.23)

Living shorelines are shoreline management practices that address the loss of vegetated shorelines and habitat in the littoral zone by providing for the protection, restoration, or enhancement of these habitats. This is accomplished through the strategic placement of vegetation, sand, or other structural and organic material.

According to this rule, the project is defined as a living shoreline and is conditionally acceptable as part of a plan for restoration, creation, and enhancement of habitat and water quality functions and values of wetlands, wetland buffers, and open water areas. The project will comply with the requirements of the Wetlands Act of 1970, the Waterfront Development Law, Coastal Area Facility Review Act, and the rules of this chapter. The project will improve or maintain the values and functions of the ecosystem and will have a reasonable likelihood of success. Therefore, the project is in compliance with this rule.

D. Subchapter 14. General Location Rules

1. Basic Location Rule (N.J.A.C. 7:7 – 14.2)
   a. A location may be acceptable for development under N.J.A.C. 7:7-9, 12, 13, and 14, but the NJDEP may reject or conditionally approve the proposed development of the location as reasonably necessary to:
      i. Promote the public health, safety, and welfare;
      ii. Protect public and private property, wildlife, and marine fisheries; and
      iii. Preserve, protect, and enhance the natural environment.

The project is intended to protect, preserve, and restore wildlife habitat and the natural environment and is therefore in compliance with this rule.

E. Subchapter 16. Resource Rules

1. Marine Fish and Fisheries (N.J.A.C. 7:7-16.2)

Coastal actions that result in minimal feasible interference of the natural functioning of marine fish and fisheries, including the reproductive and migratory patterns of estuarine and marine estuarine dependent species of finfish and shellfish, are conditionally acceptable. The finfish and shellfish resources of New Jersey provide valuable recreational experiences for residents and interstate visitors. The recreational and commercial landings of these species also contribute substantially to the state's economy.

Local shellfish, finfish, and benthic macroinvertebrate population will be temporarily impacted during construction, principally through increase in sedimentation and turbidity. However, sedimentation, turbidity, and impacts to marine fish and fisheries from in-water restoration will be minimized to the fullest extent possible through the implementation of BMPs such as time-of-year restrictions, turbidity curtains, and other approved methods. Therefore, the project is consistent with this rule.

2. Water Quality (N.J.A.C. 7:7-16.3)

As required by Section 307(f) of the Federal Coastal Zone Management Act, 16 U.S.C.§§ 1451 et seq., federal, state, and local water quality requirements established under the Federal Clean Water Act, 33 U.S.C. §§ 1251 et seq., shall be the water resource standards of the coastal management program. These requirements include not only the minimum requirements imposed under the Clean Water Act, but also the additional requirements adopted by states, localities, and interstate agencies pursuant to Section 510 of the Clean Water Act and such statutes as the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.

Standard construction stormwater BMPs will be implemented to protect water quality of surrounding water resources. As applicable, the following BMPs will be used:

- Minimize area of ground disturbance and vegetation clearing.
- Use the site's natural contours to minimize run-off and erosion.
- Do not expose the entire site at one time; avoid bare soils during rainy months.
- Stabilize erodible surfaces with mulch, compost, seeding, or sod.
- Use features such as silt fences, gravel filter berms, silt dikes, check dams, and gravel bags for interception and dissipation of turbid runoff water.
- Use silt or turbidity curtains during in-water construction to contain and control dissolved sediments.
- Use wetland mats for construction access within wetland areas to prevent soil compaction.
- Use vehicles with high flotation tires within wetland areas to prevent rutting and soil compaction.
- Complete in-water work during periods of low tide.
- Install cofferdams or stream diversions to isolate in-water construction areas.
- Use stabilized construction entrances for all ingress and egress points.

Therefore, the project is in compliance with this rule.

3. Surface Water Use (N.J.A.C. 7:7 – 16.4)

Surface water is the water in lakes, ponds, streams, rivers, bogs, wetlands, bays, and ocean that is visible on land. Coastal development shall conform to all applicable NJDEP requirements for surface water diversion.

The project will not cause adverse impacts to surface waters and will comply with all applicable Department requirements for surface water diversion. The oyster restoration measures proposed will contribute to water quality by mitigating shoreline erosion and filtering suspended solids and phytoplankton, which in turn will reduce turbidity. The project is aligned with the intentions and policies of this rule and is therefore in compliance.

4. Vegetation (N.J.A.C. 7:7 – 16.7)

Vegetation is the plant life or total plant cover that is found on a specific area, whether indigenous or introduced by humans. Coastal development shall preserve, to the maximum extent practicable, existing vegetation within a development site. Coastal development shall plant new vegetation, particularly appropriate coastal species, native to New Jersey to the maximum extent practicable.

The project will eliminate any submerged aquatic macrophytes, if present, in bay bottom areas targeted for oyster restoration. Conversely, establishment of oyster reefs will provide water filtration and an attendant reduction in turbidity, which would provide long-term benefits to aquatic macrophytes. Therefore, the project is in compliance with this rule.

5. Air Quality (N.J.A.C. 7:7 – 16.8)

The protection of air resources refers to protection from air contaminants that injure human health, welfare, or property, and to attainment and maintenance of state and federal air quality goals and the prevention of degradation of current levels of air quality. Coastal development shall conform to all applicable state and federal regulations, standards, and guidelines and be consistent with the strategies of New Jersey's State Implementation Plan.

The proposed development will not result in any airborne emissions that will violate state or federal regulations. Emissions will be limited to exhaust from automobiles traveling to and from the site during construction and from construction equipment. The federal government regulates automobile emissions, while technological improvements in heating and cooling units have resulted in decreased emissions and increased efficiency. Minimal impacts to air quality resulting from construction equipment and airborne dust will result from construction activities, but these are considered short-term impacts and will not be present post construction. Therefore, the project complies with this rule.

6. Public Access (N.J.A.C. 7:7 – 16.9)

Public access to the waterfront is the ability of the public to pass physically and visually to, from, and along tidal waterways and their shores and to use such shores, waterfronts and waters for activities such as navigation, fishing, and recreational activities including, but not limited to, swimming, sunbathing, surfing, sport diving, bird watching, walking, and boating.

See Section A, item 9.

7. Scenic Resources and Design (N.J.A.C. 7:7 – 16.10)

Scenic resources include the views of the natural and/or built landscape. Large-scale elements of building and site design are defined as the elements that compose the developed landscape such as size, geometry, massing, height, and bulk structures.

The project will restore oysters and oyster habitat by placing spat on shell, and installing reef balls and wire cages/gabions below the water surface. The project will not affect scenic resources within the HRE; therefore, the project is consistent with this rule.

8. Buffers and compatibility of uses (N.J.A.C. 7:7 – 16.11)

Buffers are natural or man-made areas, structures, or objects that serve to separate distinct uses or areas. Compatibility of uses is the ability for uses to exist together without aesthetic or functional conflicts. Development shall be compatible with adjacent land and water uses to the maximum extent practicable.

The project will be compatible with adjacent land uses; therefore, the project is in compliance with this rule.

9. Traffic (N.J.A.C. 7:7 – 16.12)

Traffic is the movement of vehicles, pedestrians, or ships along a route. Coastal development shall be designed, located, and operated in a manner to cause the least possible disturbance to traffic systems.

The project will not adversely impact traffic in the surrounding street network. The safe orderly flow of traffic will be ensured at all times and all appropriate safety procedures, uniformed traffic directors, personnel, and devices will be implemented as necessary during construction. Traffic control measures, based on local and state requirements, will be incorporated into the contract specifications.

10. Solid and Hazardous Waste (N.J.A.C. 7:7 – 16.14)

Solid waste means any garbage, refuse, sludge or other waste material, including solid, liquid, semi-solid or contained gaseous material. A material is a solid waste if it is "disposed of" by being discharged, deposited, injected, dumped, spilled, leaked, or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into ground or surface waters.

Oyster restoration is not expected to have any negative impacts from solid waste, toxic pollutants, hazardous materials or industrial materials. No materials will be removed from the site as a result of restoration. Construction activities, vessel movements, and prop wash may cause temporary resuspension of potentially contaminated sediments and a concomitant short-term increase in turbidity in nearby waters but these activities and their effects would be localized and short-term. BMPs will be used to minimize sediment transport and turbidity. In the long term, establishing oyster habitat would improve water quality and provide nutrient removal and denitrification services. No adverse impacts or threats to the environment or public health and safety are anticipated. Therefore, the project complies with this rule.

Appendix F7:
Clean Air Act

Environmental Analysis Branch January 21, 2020
(CENAN-PL-E)

RECORD OF NON-APPLICABILITY (RONA)

Project Name: Hudson Raritan Estuary

Reference: Data files Construction Scheduule_HRE.pdf and related equipment and site description documents received 10 December 2019, 7 January 2020, and 17 January 2020 and email discussions 10 December 2019 and 7 January 2020

Project/Action Point of Contact: Lisa Baron

Begin Date: Q1 2025

End Date: Q1 2038

1. The project described above has been evaluated for Section 176 of the Clean Air Act. Project related emissions associated with the federal action were estimated to evaluate the applicability of General Conformity regulations (40CFR§93 Subpart B).

2. The requirements of this rule do not apply because the total direct and indirect emissions from this project are less than the 50 tons trigger levels for NO_x, and VOCs, and less than 100 tons of $PM_{2.5}$, CO, and SO_2 for each project year (40CFR§93.153(b)(1) & (2)). The highest estimated total annual NO_x emissions for the project are 24.0 tons. Emissions of VOC, $PM_{2.5}$, CO, and SO_2 are also all well below the applicable trigger levels (see attached estimates).

3. The project is presumed to conform with the General Conformity requirements and is exempted from Subpart B under 40CFR§93.153(c)(1).

Encl

Emissions have been estimated using project planning information developed by the New York District, consisting of anticipated dredging volumes, equipment types and estimates of the horsepower and operating hours of the diesel engines powering the equipment. In addition to this planning information, conservative factors have been used to represent the average level of engine load of operating engines (load factors) and the average emissions of typical engines used to power the equipment (emission factors). The basic emission estimating equation is the following:

$$\mathbf{E = hrs \times LF \times EF}$$

Where:

E = Emissions per period of time such as a year or the entire project.
hrs = Number of operating hours in the period of time (e.g., hours per year, hours per project).
LF = Load factor, an estimate of the average percentage of full load an engine is run at in its usual operating mode.
EF = Emission factor, an estimate of the amount of a pollutant (such as NO_x) that an engine emits while performing a defined amount of work.

In these estimates, the emission factors are in units of grams of pollutant per horsepower hour (g/hphr). For each piece of equipment, the number of horsepower hours (hphr) is calculated by multiplying the engine's horsepower by the load factor assigned to the type of equipment and the number of hours that piece of equipment is anticipated to work during the year or during the project. For example, a crane with a 250-horsepower engine would have a load factor of 0.43 (meaning on average the crane's engine operates at 43% of its maximum rated power output). If the crane were anticipated to operate 1,000 hours during the course of the project, the horsepower hours would be calculated by:

$$\textbf{250 horsepower} \times \textbf{0.43} \times \textbf{1,000 hours} = \textbf{107,500 hphr}$$

The emissions from diesel engines vary with the age of an engine and, most importantly, with when it was built. Newer engines of a given size and function typically emit lower levels of most pollutants than older engines. The emission factors used in these calculations assume that the equipment pre-dates most emission control requirements (known as Tier 0 engines in most cases), to provide a reasonable "upper bound" to the emission estimates. If newer engines are actually used in the work, then emissions will be lower than estimated for the same amount of work. In the example of the crane engine, a NO_x emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{\textbf{107,500 hphr} \times \textbf{9.5 g } \mathbf{NO_x}\textbf{/hphr}}{\textbf{453.59 g/lb} \times \textbf{2,000 lbs/ton}} = \textbf{1.1 tons of } \mathbf{NO_x}$$

As noted above, information on the equipment types, horsepower, and hours of operation associated with the project have been obtained from the project's plans and represent current best estimates of the equipment and work that will be required. Load factors have been obtained from various sources depending on the type of equipment. Land-side nonroad equipment load factors are from the documentation for EPA's NONROAD emission estimating model, "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005, April 2004."

Emission factors have also been sourced from a variety of documents and other sources depending on engine type and pollutant. Nonroad equipment NOx and other emission factors have been derived from EPA emission standards and documentation. As noted above, the emission factors have been chosen to be moderately conservative so as not to underestimate project emissions. Equipment turnover by the time the project is undertaken will likely result in newer equipment performing the work than assumed in this analysis, meaning the emissions presented in this analysis are likely higher than will actually occur.

The following pages summarize the estimated emissions in sum for the project including the anticipated equipment and engine information developed by the New York District, the load factors and emission factors as discussed above, and the estimated emissions for the project.

USACE - New York District
Hudson Raritan Estuary Draft EA
Detailed Equipment Emission Estimates
20 January 2020
DRAFT

Project Emission Summary

Pollutant	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	Project Total
		tons per year													
NO_x	9.5	4.4	13.5	3.7	14.7	2.4	24.0	10.1	35.7	1.6	8.8	2.5	18.6	2.3	151.7
VOC	0.29	0.13	0.42	0.11	0.45	0.07	0.74	0.31	1.10	0.05	0.27	0.08	0.57	0.07	4.7
$PM_{2.5}$	0.31	0.14	0.44	0.12	0.48	0.08	0.78	0.33	1.17	0.05	0.29	0.08	0.61	0.08	5.0
SO_x	0.06	0.03	0.08	0.02	0.09	0.01	0.15	0.06	0.22	0.01	0.05	0.02	0.11	0.01	0.93
CO	1.12	0.51	1.60	0.44	1.73	0.28	2.83	1.20	4.20	0.19	1.03	0.30	2.19	0.27	17.9

Emission source	Category	Horsepower (approx.)	Load Factor	Hours	hphrs	grams per hphr NO_x	VOC	$PM_{2.5}$	SO_x	CO	tons NO_x	VOC	$PM_{2.5}$	SO_x	CO
Marsh Islands															
23-ft outboard boat	Boat main	150	0.68	1,010	103,020	7.3	0.2	0.29	0.005	1.27	0.8	0.0	0.0	0.00	0.1
	Boat aux	40	0.40		16,160	7.3	0.2	0.29	0.005	1.27	0.1	0.0	0.0	0.00	0.0
60-ft, 80-ton tug	Tug main	1,000	0.68	9,976	6,783,680	9.7	0.37	0.51	0.005	1.06	72.5	2.8	3.8	0.04	7.9
	Tug aux	50	0.40		199,520	7.3	0.2	0.29	0.005	1.27	1.6	0.0	0.1	0.00	0.3
Pontoon crawler excavator, 55k lbs	Excavator	250	0.59	4,467	658,883	9.5	0.19	0.16	0.005	1.21	6.9	0.1	0.1	0.00	0.9
Jamaica Bay															
100-ft push boat	Tug main	500	0.68	3,369	1,145,460	9.7	0.37	0.51	0.005	1.06	12.2	0.5	0.6	0.01	1.3
	Tug aux	50	0.40		67,380	7.3	0.2	0.29	0.005	1.27	0.5	0.0	0.0	0.00	0.1
Oyster Bay															
400-hp tug boat	Tug main	400	0.68	169	45,968	9.7	0.37	0.51	0.005	1.06	0.5	0.0	0.0	0.00	0.1
	Tug aux	50	0.40		3,380	7.3	0.2	0.29	0.005	1.27	0.0	0.0	0.0	0.00	0.0
25-ft inboard workboat	Boat main	150	0.68	509	51,918	7.3	0.2	0.29	0.005	1.27	0.4	0.0	0.0	0.00	0.1
	Boat aux	40	0.40		8,144	7.3	0.2	0.29	0.005	1.27	0.1	0.0	0.0	0.00	0.0
Lower Passaic River															
100-ft push boat	Tug main	500	0.68	548	186,320	9.7	0.37	0.51	0.005	1.06	2.0	0.1	0.1	0.00	0.2
	Tug aux	50	0.40		10,960	7.3	0.2	0.29	0.005	1.27	0.1	0.0	0.0	0.00	0.0
Bronx River															
100-ft push boat	Tug main	500	0.68	461	156,740	9.7	0.37	0.51	0.005	1.06	1.7	0.1	0.1	0.00	0.2
	Tug aux	50	0.40		9,220	7.3	0.2	0.29	0.005	1.27	0.1	0.0	0.0	0.00	0.0
Land-based work in NJ															
Oyster Bay		total hp	avg LF	total hrs	total hphrs										
Naval Weapons Station Earle		800	0.45	2,104	316,490	9.5	0.19	0.0050	0.16	1.21	3.3	0.1	0.0	0.06	0.4
Lower Passaic River															
Essex County Branch Brook Park		1,883	0.59	8,155	1,324,721	9.5	0.19	0.0050	0.16	1.21	13.9	0.3	0.0	0.2	1.8
Oak Island Yards		2,464	0.58	2,663	471,990	9.5	0.19	0.0050	0.16	1.21	4.9	0.1	0.0	0.1	0.6
Hackensack River															
Metromedia		1,465	0.59	10,674	1,583,708	9.5	0.19	0.0050	0.16	1.21	16.6	0.3	0.0	0.3	2.1
Meadowlark		1,473	0.59	8,752	1,280,552	9.5	0.19	0.0050	0.16	1.21	13.4	0.3	0.0	0.2	1.7
				52,857	**14,424,212**						**151.7**	**4.7**	**5.0**	**0.9**	**17.9**