# Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study

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## Appendix Q:
## PROGRAMMATIC
## SECTION 404(b)(1) EVALUATION

**Hudson Raritan Estuary Ecosystem Restoration**

**Draft Integrated Feasibility Report &**
**Environmental Assessment**
**February 2017**

**Prepared by the New York District, North Atlantic Division,**
**U.S. Army Corps of Engineers**

***A partnership for the future***

THE PORT AUTHORITY OF NY & NJ

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NYC Parks

NYC Environmental Protection

**PREFACE** This document is a programmatic Section 404(b)(1) Evaluation. As such it addresses, at a general level, the potential environmental effects of the wetland and aquatic ecosystem alterations expected from the construction of the structural components of the recommended comprehensive plan. Subsequent site-specific Section 404(b)(1) Evaluations will be done for individual project components, or groups thereof, in sufficient detail for final decision making and for full compliance with the Section 404(b)(1) Guidelines and National Environmental Policy Act requirements.






# Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study
# Appendix Q: PROGRAMMATIC SECTION 404(b)(1) EVALUATION

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## Chapter 1: Introduction

This document is a programmatic Section 404(b)(1) Evaluation. As such it addresses, at a general level, the potential environmental effects of the wetland and aquatic ecosystem alterations expected from the construction of the structural components of the recommended comprehensive plan. Subsequent site-specific Section 404(b)(1) Evaluations will be done for individual project components, or groups thereof, in sufficient detail for final decision making and for full compliance with the Section 404(b)(1) Guidelines and National Environmental Policy Act requirements.

The Tentatively Selected Plan (TSP) is a suite of ecosystem restoration sites within the HRE that address long-term and large-scale degradation of aquatic habitat. The TSP would realize restoration activities at 33 sites which span five (5) planning regions. This would allow for the restoration of diverse native habitat throughout the estuary that supports the HRE program goal, "to develop a mosaic of habitats that provides society with renewed and increased benefits from the estuary environment" (Figure 1-1).

The TSP would provide for the restoration of up to 360 acres of estuarine wetland habitat, 12 acres of freshwater riverine wetland habitat, 81 acres of coastal and maritime forest habitat, 5.5 acres of riparian forest habitat, and 58 acres of oyster habitat. Two (2) fish ladders would be installed and three (3) weirs would be modified to re-introduce or expand fish passage along the Bronx River.





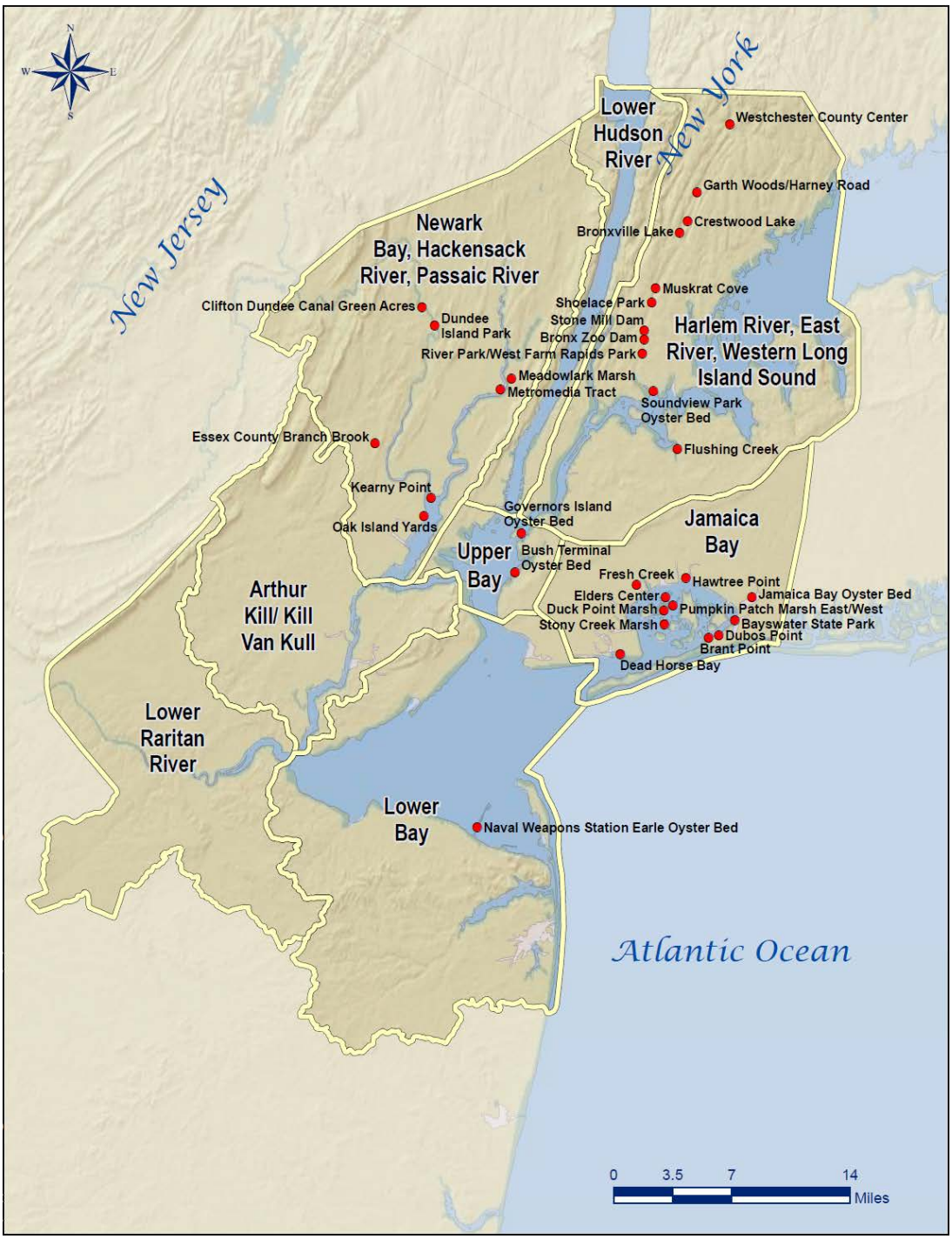
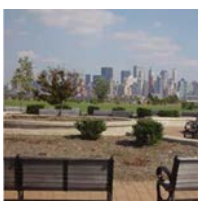
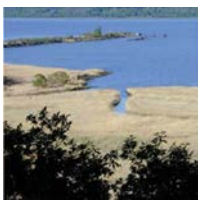




**Figure 1-1: HRE Study Area, with Planning Regions.**







## Chapter 2: 404(b) 1 Evaluation of Proposed Activities

The restoration plans for the TSP to be implemented at the 33 sites analyzed in the *Hudson-Raritan Estuary Ecosystem Restoration Feasibility Study - Draft Integrated Feasibility Report & Environmental Assessment* have only been advanced and analyzed at the conceptual level. Exact qualities of fill and dredging, construction methodologies, lay down areas, etc. will not be developed until later in the project.

Tables 3-1 and 3-2 document the restoration actions that will occur at the estuarine and riverine sites, respectively, per the different planning regions. The restoration measures are of a large enough scale that low impact work (i.e., solely working with hand tools) it not possible and/or practicable. All of the restoration measures will require heavy equipment. It is anticipated that the equipment for these restoration actions would include, but not be limited to, barges, cranes, earth moving vehicles (e.g., back hoes, excavators, etc.), dump trucks, tug boats, and/or other large vehicles.

Due to the proximity of each site to wetlands and open waters, any restoration measure has the potential to either place fill within a wetland or open water and/or indirectly introduce fill (e.g., via sediment erosion, etc.) to a nearby wetland or open water. Within this chapter, a description is provided for potential impacts, based on the level of detail available at the time of publication of this FR/EA. Due to the nature of work associated with environmental restoration, it is anticipated that any fill directly placed in a wetland or open water would be in support of an environmental enhancement and thereby have positive long-term impacts. Also, as the restoration plans are progressed, it is anticipated that all appropriate best management practices (BMPs) would be utilized to restrict, to the greatest extent practicable, the indirect introduction of sediments to wetlands and open waters. Finally, it is anticipated that construction would be staged to occur within each project and amongst the projects during time periods when the least environmental impact would occur.

**Table 3-1: Restoration Measures Applied at Each Estuarine Habitat Restoration Site.**

| Restoration Site | Restoration Measures | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Atoll terrace creation | Beach/dune creation | Coastal scrub/shrub and grassland restoration | Dune creation | High marsh restoration | Low marsh restoration | Scrub/shrub wetland restoration | Wetland protection | Invasive species removal and native plantings | Landfill removal | Maritime forest restoration | Meadow restoration | Public access improvement | Tidal channel/basin/pool restoration | Oyster reef creation |
| **Jamaica Bay Planning Region** | | | | | | | | | | | | | | | |
| Dead Horse Bay | | | | ★ | ★ | ★ | | | | ★ | ★ | | | ★ | |
| Fresh Creek | | | | | ★ | ★ | | | | | ★ | | | ★ | |
| Hawtree Point | | | ★ | | ★ | | | | | | | | | | |
| Bayswater Point State Park | | ★ | | | ★ | ★ | | | | | | | | ★ | |






| Restoration Site | Restoration Measures | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Atoll terrace creation | Beach/dune creation | Coastal scrub/shrub and grassland restoration | Dune creation | High marsh restoration | Low marsh restoration | Scrub/shrub wetland restoration | Wetland protection | Invasive species removal and native plantings | Landfill removal | Maritime forest restoration | Meadow restoration | Public access improvement | Tidal channel/basin/pool restoration | Oyster reef creation |
| Dubos Point | | | | | ★ | ★ | | | | | ★ | | | ★ | |
| Brant Point | | | | | | ★ | | ★ | | | ★ | ★ | | | |
| Stony Creek | | | | | ★ | ★ | ★ | | | | | | | ★ | |
| Duck Point | ★ | | | | ★ | ★ | | | | | | | | ★ | |
| Elders Point Center | | | | | ★ | ★ | | | | | | | | | |
| Pumpkin Patch West | | | | | ★ | ★ | | | | | | | | ★ | |
| Pumpkin Patch East | | | | | ★ | ★ | | | | | | | | ★ | |
| Jamaica Bay | | | | | | | | | | | | | | | ★ |
| **Harlem River, East River, and Western Long Island Sound Planning Region** | | | | | | | | | | | | | | | |
| Flushing Creek | | | | | | ★ | | | | | | | | | |
| Soundview | | | | | | | | | | | | | | | ★ |
| **Newark Bay, Hackensack River, and Passaic River Planning Region** | | | | | | | | | | | | | | | |
| Oak Island Yards, Tier 2 | | | | | | ★ | | | ★ | | | | | ★ | |
| Kearny Point, Tier 2 | | | | | | ★ | | | ★ | | | | ★ | ★ | |
| Metromedia Tract | | | | | ★ | ★ | ★ | | | | ★ | | | | |
| Meadowlark Marsh | | | | | ★ | ★ | | | ★ | | ★ | | | ★ | |
| **Upper Bay** | | | | | | | | | | | | | | | |
| Bush Terminal | | | | | | | | | | | | | | | ★ |
| Governors Island | | | | | | | | | | | | | | | ★ |
| **Lower Bay** | | | | | | | | | | | | | | | |
| Naval Weapons Station Earle | | | | | | | | | | | | | | | ★ |

Legend: ★ Indicates restoration measure applied at site.





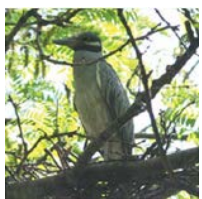



**Table 3-2: Restoration Measures at Freshwater Riverine Habitat Restoration Sites.**

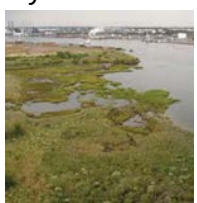
| Restoration Site | Restoration Measures | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bank stabilization | Shoreline softening | Bed restoration | Channel dredging/ modification/realignment | Instream structures | Emergent wetland restoration | Forested and scrub/shrub wetland restoration | Fish ladder installation | Invasive species removal | Native plantings | Riparian forest restoration | Riprap forebay installation | Sediment control BMP installation | Water quality BMP installation | Weir modification for fish passage |
| **Harlem River, East River, and Western Long Island Sound Planning Region** | | | | | | | | | | | | | | | |
| River Park/West Farm Rapids Park | | ★ | ★ | | | ★ | | | ★ | ★ | | | | | |
| Bronx Zoo and Dam | | | | | | ★ | | ★ | ★ | ★ | | | ★ | | |
| Stone Mill Dam | | | | | | | | ★ | | | | | | | |
| Shoelace Park | ★ | | | ★ | ★ | | | | ★ | ★ | | | ★ | ★ | |
| Muskrat Cove | ★ | | | ★ | | | | | ★ | ★ | | | ★ | | |
| Bronxville Lake | | | ★ | ★ | | ★ | ★ | | ★ | ★ | | ★ | ★ | ★ | ★ |
| Crestwood Lake | | | | ★ | ★ | ★ | | | ★ | ★ | | ★ | | | ★ |
| Garth Woods/Harney Road | | ★ | | ★ | | ★ | ★ | | ★ | ★ | | | | ★ | ★ |
| Westchester County Center | ★ | | | ★ | ★ | ★ | | | ★ | ★ | | | | | |
| **Newark Bay, Hackensack River, and Passaic River Planning Region** | | | | | | | | | | | | | | | |
| Essex County Branch Brook Park | ★ | | | ★ | | | | | ★ | ★ | | | | | |
| Dundee Island Park | ★ | ★ | | | | | | | ★ | ★ | | | | | |
| Clifton Dundee Canal Green Acres | | | | | | ★ | | | ★ | ★ | ★ | | ★ | | |

Legend: ★ Indicates restoration measure applied at site.

## 2.1 Description of Conceptual Stage Construction Actions and Potential Environmental Effects

- Dredging, filling, and sediment turbidity: During restoration construction under the TSP, grading and earthmoving activities, dredging, and sediment resuspension from vessel movements and prop wash could result in temporary disturbances to sediment transport. However, these activities and their effects would be short-term and localized. On land, silt fences and other BMPs would be employed to reduce erosion and sedimentation. As appropriate, silt curtains or cofferdams may be used to minimize sediment transport in open water areas, precluding resuspended sediments being transported by currents and forming new shoals or sandbars.



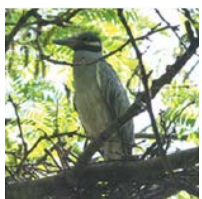
- Wetlands and subtidal communities: Restored and established under the TSP wetlands and subtidal communities would provide long-term regulation of water flow, and storm surge and flood buffering, wave attenuation, and protection of shorelines. Creating or restoring tidal channels and basins would improve tidal flushing, restore salinity regimes, and reduce water residency times. In the Jamaica Bay Planning Region, under the TSP, restoration would contribute to more natural hydrology and hydraulics by creating more resilient shorelines, channel banks, and wetlands that can better withstand flooding and strong storms associated with climate change. During construction, negligible, short-term disruption of local wave and current regimes, hydrology, and stormwater runoff from in-water nearshore, shoreline, and onshore earthmoving activities and temporary structures. BMPs employed to minimize erosion and sedimentation, and control stormwater runoff.

- Threatened and endangered species: All appropriate federal and state agencies were consulted regarding the documentation of rare, threatened, and endangered species, and species of special concern within the HRE project sites and their vicinities. The National Marine Fisheries Service was contacted regarding federally listed threatened and endangered species under the Endangered Species Act , while the New York State Department of Environmental Conservation Division of Fish, Wildlife, and Marine Resources was contacted regarding state listed species in the New York Natural Heritage Program and the New Jersey Department of Environmental Protection Division of Parks and Forestry was contacted regarding state listed species in the New Jersey Natural Heritage Program. Prior to restoration activities, onsite surveys will be conducted at each restoration site to fully assess any potential impacts on biological resources and confirm whether any documented species may be impacted by any restoration activities. If rare, threatened, and endangered species are confirmed at the sites that could be adversely impacted by restoration activities, precautions will be taken to avoid, minimize, or mitigate the impacts as determined by the appropriate agency.

- Hazardous waste: At all sites, soils to be removed are typically fill soils that have been placed along the shorelines in the past, burying salt marsh, mudflat and shallow water communities that occupied the areas before. Hazardous, toxic, and radioactive waste reports for these areas (if available) show minimal contamination, typical of ambient levels found in urban contexts, with most fill comprising sands dredged from the bay. Recontouring the land would not likely place contaminated soils onto clean soils, rather it is expected that similar soils and contaminant levels exist throughout the sites. Further testing will be conducted during the Preconstruction Engineering and Design (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. Removal of portions of the solid waste landfill at the Dead Horse Bay restoration site will require investigation which would be coordinated with the National Park Service (NPS). NPS is already planning to conduct investigations on site to identify levels of contamination and if additional activities are needed at the site prior to restoration.








## 2.2 Factual Determinations

### 2.2.1 General Description of Dredged or Fill Material

Many of the project components are expected to involve the discharge of dredged or fill material into wetlands or other aquatic resources. However, specific information is unknown at this time. The general characteristics, quantities, and sources of dredged or fill material will be determined during planning and design activities for each component. Accordingly, this information will be addressed in subsequent Section 404(b)(1) Evaluations. However, it is anticipated all fill will be clean and free of fouling materials.

### 2.2.2 Description of Disposal Method

Specific details of the contaminant concentrations in upland soils are unknown at this time. The disposal method(s) for dredged or fill material will be determined during planning and design activities for each component. Accordingly, this information will be addressed in subsequent Section 404(b)(1) Evaluations. However, it is anticipated that excavated materials will be disposed of in a suitable upland location in accordance with federal state, and local regulations.

### 2.2.3 Physical Substrate Determination

As identified in Section 2.2.1, specific information regarding the composition of the dredged or source of fill materials is unknown at this time. Information regarding the substrates at a particular site is often based on resource agency mapping and site visits. Based on available information, the benthic substrate for almost all the site consists of sediments ranging from fine-grained silts that occur in quiescent waterbodies to coarser sands that occur in areas with stronger water currents.

Placement of fill for the restoration efforts will bury existing substrates. For open water areas that are converted to wetlands above the high tide line or ordinary high water mark, the sediments in the open water area would undergo a change in species composition (see Section 2.2.6). Generally, the placement of fill would be to support restoration actions that would result in long-term positive impacts to the HRE. Moreover, many of the restoration actions are designed to reduce sediment loading. Accordingly, this information will be addressed in subsequent Section 404(b)(1) Evaluations during the PED phase.

### 2.2.4 Water Circulation, Fluctuation and Salinity Determination

The water column effects, current patterns and circulation, and normal water level fluctuations and salinity gradients at the disposal sites for dredged or fill material will be determined during the PED phase for each component. At the feasibility level, it is anticipated that some short-term, localized changes in fluctuation and circulation due to the placement of cofferdams, vessels, and/or other in water structures may occur. During the construction periods, it is anticipated that water flows, especially riverine waterbodies, would be modified so that flow is maintained. However, given the small-scale nature of the work at each site, it is anticipated that there would be little to no change in regional water circulation, fluctuation and/or salinity. Accordingly, this information will be addressed in subsequent Section 404(b)(1) Evaluations.






### 2.2.5 Suspended Particulate/Turbidity Determinations

Although site-specific information is unknown at this time, temporary increases in suspended particulates and turbidity levels can be expected during the construction of some of the components. Due to the geometries of each site, it is anticipated that some work would need to occur outside of cofferdams, the displacement of materials, vessel movements and prop wash may displace and increase turbidity for a short-term on a local level. All appropriate measures to reduce and contain turbidity will be employed so state water quality standards will not be violated. Effects on light penetration, dissolved oxygen, toxic metals, organics, and pathogens, and aesthetics of the water column will be determined during the PED phase of the project for each component. Accordingly, this information will be addressed in subsequent Section 404(b)(1) Evaluations.

### 2.2.6 Fish and Benthic Invertebrates

Construction associated with the various restoration efforts would result in short-term, negative impacts to fish. Fish may be displaced due to noise, changes in currents or stream flow, changes in water quality, including increases in turbidity from onshore construction activities and dredging. 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, given the nature of the restoration efforts and their relatively small footprint size, when compared to the wetlands and open waters of the HRE, construction effects are anticipated to have only short-term, localized influence and fish 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.

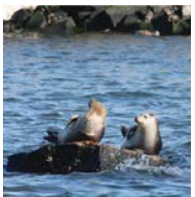
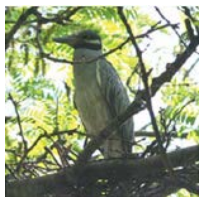
In the long term, restored wetland habitats, would directly benefit multiple life stages of resident, transient, and migratory fish species by providing forage, spawning, nursery, refuge habitat, and/or serving as location that increases water quality and sediment loading.

It is anticipated that any fill associated with in-water and onshore restoration would result in short-term, negative impacts on benthic invertebrates, especially in aquatic areas designated for habitat conversion. Slow-moving or sessile organisms would experience some degree of mortality or removal during construction in intertidal waters and subtidal shallows. Larger more motile organisms would be displaced. It is anticipated that impacts to interstitial dwelling benthic organisms would be limited and short-term due to limited existing species diversity and pollution tolerant composition. Mortality of sessile and less motile species is expected on shellfish beds and habitats targeted for dredging, shoreline stabilization, regrading, and removal of remnant shoreline structures and debris.

### 2.2.7 Endangered and Threatened Species

It is anticipated that the restoration efforts of the HRE will benefit and not adversely affect, the continued existence of any endangered and/or threatened species which occur in the project area. It is anticipated that during construction, all appropriate BMPs will be adhered to in order to not impact threatened and endangered species, if present. Prior to restoration activities, onsite surveys will be conducted at each restoration site to fully assess any potential impacts on biological resources and confirm whether any documented species may be impacted by any restoration activities. If rare, threatened, and endangered species are confirmed at the sites that could be adversely impacted by restoration activities, avoidance measures will be taken to avoid, minimize, or mitigate the impacts as determined by the appropriate agency. Depending on the species that may be impacted, avoidance




measures may include, but not be limited to, moratoriums on disturbance during certain times of the years, lighting restrictions, noise abatement devices, etc.

### 2.2.8 Existing Wetlands and Subtidal habitats

It is anticipated that if vegetated wetlands are impacted, the impacts would be limited to disturbed wetlands that are often dominated by invasive species. Thus, the disturbance would be an enhancement further increasing the value of the habitat. Subtidal habitats that may be affected during construction activities overwhelmingly consist of soft bottom sediment dominated habitats which are common throughout the HRE. Restoration efforts would convert portions of these habitats to oyster reefs or vegetated wetlands that would substantially increase their ecological value.

### 2.2.9 Determination of Compliance with Applicable Water Quality

Although specific information is unknown at this time, the construction and operation of the project components will comply with state water quality standards. It is anticipated that BMPs (e.g., silt fences, cofferdams, etc.) would be used, as appropriate, to reduce potential environmental impacts to the greatest extent practicable.

### 2.2.10 Parks, National and Historic Monuments, National Seashores

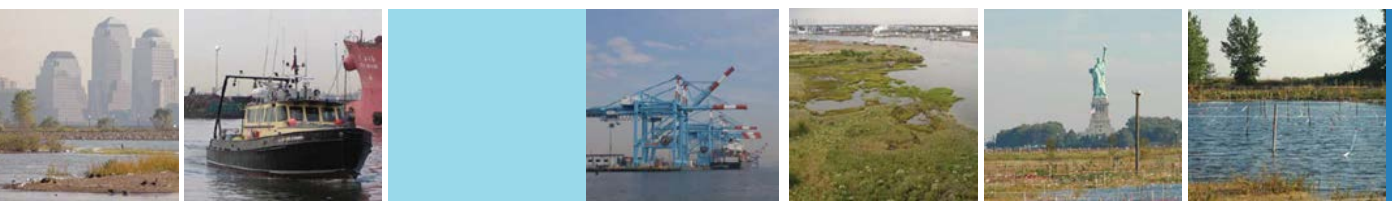
The project will enhance environmental conditions at these types of sites within the project area.

### 2.2.11 Determination of Cumulative Effects on the Aquatic Ecosystem

The restoration of the 33 sites in the HRE and the increase in the extent of protected wetland acreage, tributary connections, sub-tidal habitats and other restoration actions will produce extensive cumulative beneficial effects. These beneficial effects are anticipated to substantially outweigh the cumulative adverse effects produced by the aquatic ecosystem alterations that may be necessary to construct some of the project components. As stated previously in Section 2.1, any adverse effects during restoration are anticipated to be short term and negligible.

## Chapter 3: Findings of Compliance or Non-Compliance with the Restrictions on Discharge

- No significant adaptations of the guidelines were made relative to this evaluation.
- It is anticipated that no practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.
- It is anticipated that the discharges of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, violations of any applicable state water quality standards for Class III waters. The discharge operations will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
- It is anticipated that the placement of fill materials in the project area will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood



of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973.

- It is anticipated that the placement of fill materials will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur. Subsequent application of the Section 404(b) (1) Guidelines during planning and design activities for each component of the recommended TSP will ensure that the proposed disposal sites for the discharge of dredged material will comply with the requirements of these guidelines.

- It is anticipated that subsequent application of the Section 404(b) (1) Guidelines during the PED phase for each component of the recommended TSP will ensure that the proposed disposal sites for the discharge of dredged material will comply with the requirements of these guidelines.