# ENVIRONMENTAL ASSESSMENT
# CHANNEL MAINTENANCE &
# BENEFICIAL USE OF DREDGED MATERIAL PROJECTS
# NEW JERSEY INTRACOASTAL WATERWAY
# OCEAN AND CAPE MAY COUNTIES, NEW JERSEY

**PREPARED BY:**
**PHILADELPHIA DISTRICT**
**U.S. ARMY CORPS OF ENGINEERS**
**PHILADELPHIA, PENNSYLVANIA 19107**

**July 2014**

US Army Corps
of Engineers
Philadelphia District

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
CHANNEL MAINTENANCE &
BENEFICIAL USE OF DREDGED MATERIAL PROJECTS
NEW JERSEY INTRACOASTAL WATERWAY
OCEAN AND CAPE MAY COUNTIES, NEW JERSEY

The New Jersey Intracoastal Waterway (NJIWW) provides a safe, reliable, and operational navigation channel for the East Coast's largest and fifth most valuable commercial fishing fleet in the U.S. (Cape May/Wildwood) and nine U.S. Coast Guard Stations including the Cape May training base. Funding for maintenance of the NJIWW has been limited in recent years. However, as a result of Hurricane Sandy impacts, funding to dredge critical shoals in the NJIWW was made available under P.L. 113-2: Disaster Relief Appropriations Act (FY 2013) - Operations and Maintenance (O&M) Emergency Supplemental. A lease-of-plant maintenance dredging contract was awarded to Barnegat Bay Dredging Company to address impacted areas in the waterway and work to restore the channel in sections identified as having critical shoals. Critical shoals have been identified in the vicinity of Mordecai Island, located in Ocean County, NJ, and Avalon and Stone Harbor in Cape May County, NJ. Beneficial use of the NJIWW material to prevent further loss of eroding habitats is an optimum regional sediment management solution for the issues in the NJIWW.

For Mordecai Island, approximately 30,000 cubic yards of material would be dredged from the NJIWW between channel markers 107 and 108. The material would be placed in a breached area of Mordecai Island. Material would be placed to the same elevation as the adjacent existing salt marsh vegetation. Hay bales would be placed on the eastern edge of this zone to confine the material and then the sediment would be hydraulically placed beginning with the hay bale edge working west until the gap between the islands is filled. Hay bales would be used as needed and where feasible to stabilize the western edge of the area after placement. This "plug" of material would bolster the island and stabilize the breach and shoreline as a short-term solution to the severe erosion threatening the remaining portions of the island.

The portion of the NJIWW channel in the vicinity of Avalon that requires maintenance dredging is between channel markers 386 and 397. The channel is critically shoaled to depths of approximately 3 feet MLW creating a significant hazard to navigation and public safety. Approximately 75,000 cubic yards of material are required to be dredged from this portion of the NJIWW channel. The objective at the placement site is to reuse the dredged material in a beneficial way to achieve restoration of degraded marsh habitat and improve coastal resiliency. Two methods will be

employed: thin-layer placement to help salt marshes (accretion) keep pace with sea level rise, and placement of dredged material to restore marsh area and stabilize shoreline lost to and threatened by erosion. A small pontoon holding the end of the discharge pipe would be floated along the marsh edge by a small skiff and approximately 6 to 9 inches of material would be sprayed into the marsh. The Nature Conservancy and the NJDFW will be assisting with further recommendations on the edge restoration techniques to be utilized.

Approximately 7,000 cubic yards of sand would be hydraulically dredged between channel markers 416 and 421 to remove the critical shoal in the vicinity of Stone Harbor. The dredged material placement site was developed in conjunction with the NJDFW and the Nature Conservancy. The selected plan includes thin layer application of dredged material and restoration of marsh that is subsiding on State-owned property. Approximately 6 to 8 acres of land would be restored. For the thin layer application, material would be dredged from the adjacent channel and brought to the marsh via a floating pipeline. A small pontoon holding the end of the discharge pipe would be floated along the marsh edge pulled by a small skiff and approximately 6 to 9 inches of material would be sprayed into the marsh. A small pool would be filled by pumping dredged material directly into the pool for infilling to the surrounding marsh elevation. An approximately 40 ft by 80 ft area of black skimmer habitat would also be created by pumping dredged material onto the degraded marsh to an elevation of approximately 6 ft above high tide. Material would be pumped directly to the area, with hay bales utilized to hold the material if needed.

In compliance with the National Environmental Policy Act of 1969 and Council on Environmental Quality regulations, the Philadelphia District prepared a draft Environmental Assessment (EA) for public comment in 2014. The purpose of the EA is to address the environmental impacts of the selected dredged material placement plans for each of the three shoal locations.

The public has been invited to comment on the draft EA. A 15-day comment period is provided (14 – 28 July 2014). The Corps will review and appropriately considered all comments prior to finalizing the EA.

The projects discussed in the EA have been coordinated with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service regarding issues related to Section 7 of the Endangered Species Act and Essential Fish Habitat pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments). Final comments will be received from these agencies prior to

initiation of construction. The projects have also been coordinated with the New Jersey Department of Environmental Protection, Office of Dredging and Sediment Technology and the State Historic Preservation Office. The projects require State approval pursuant to Section 401 of the Clean Water Act, Section 307 of the Coastal Zone Management Act and Section 106 of the National Historic Preservation Act. These approvals will be obtained prior to initiation of construction.

Because the EA concludes that the proposed NJIWW projects do not constitute a major Federal action significantly affecting the human environment, I have determined that an Environmental Impact Statement is not required.

_____ _____

Date

Michael A. Bliss, P.E.
Lieutenant Colonel, Corps of Engineers
District Commander

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## 1.0 Introduction and Project Authority

The New Jersey Intracoastal Waterway (NJIWW) project was adopted in 1939 (HD 76-133, 1st session). This sea-level inland waterway, extends along the New Jersey Coast from the Atlantic Ocean at Manasquan Inlet, about 26 miles south of Sandy Hook, New Jersey to Delaware Bay about three miles north of Cape May Point. The waterway extends through the inlet and up the Manasquan River about two miles and thence through the Point Pleasant Canal about two miles to the head of Barnegat Bay. It then passes through a series of bays, lagoons and thoroughfares along the New Jersey coast to Cape May Harbor and thence across Cape May County to Delaware Bay (Cape May Canal). This project is normally maintained to a depth of six feet Mean Low Water (MLW), except in the southern portion in the vicinity of the Cape May Canal where it is maintained to a depth of up to 12 feet MLW. The total project length is 117 miles.

The NJIWW provides a safe, reliable, and operational navigation channel for the East Coast's largest and 5th most valuable commercial fishing fleet in the U.S. (Cape May/Wildwood) and nine U.S. Coast Guard Stations including the Cape May training base. The USCG requires a reliable channel to fulfill their Homeland Security requirements and conduct search and rescue operations. Other commercial users include head-boats and tour-boats that operate over various portions of the waterway. The Delaware River and Bay Authority operates a ferry service between Cape May, New Jersey and Lewes, Delaware and the ferries dock in the Cape May Canal. Almost 1.5 million passengers are dependent on maintenance dredging to keep the four vessels operating. The South Jersey economy is heavily dependent on recreational and commercial fishing and tourism, and these industries rely on the maintained channels of the NJIWW.

## 2.0 Purpose and Need for Action

Funding for maintenance of the NJIWW has been limited in recent years. However, as a result of Hurricane Sandy impacts, funding to dredge critical shoals in the NJIWW was made available under P.L. 113-2: Disaster Relief Appropriations Act (FY 2013) - Operations and Maintenance (O&M) Emergency Supplemental. A lease-of-plant maintenance dredging contract was awarded to Barnegat Bay Dredging Company to address impacted areas in the waterway and work to restore the channel in sections identified as having critical shoals. The Mordecai Island, Avalon and Stone Harbor areas have been identified as critical shoal locations with dredged material placement sites that would restore degraded coastal habitats (Figure 1). Beneficial use of the NJIWW material to prevent further loss of eroding habitats is an optimum regional sediment management solution for the issues in the NJIWW.

Saltwater marshes on the New Jersey coastline have been disappearing over the past hundred years due to factors such as sea level rise, lower accretion rates, and higher rates of anthropogenic erosion. In the Avalon project area alone, it is estimated that over 120 acres of coastal marsh has been lost since the 1930's. As sea levels continue to rise and storms become more frequent and intense, salt marshes that cannot keep pace with sea level rise will ultimately be lost along with the ecosystem services they provide to coastal communities and the coastal economy. Furthermore, salt marshes provide habitat for economically and ecologically important fish, crabs, and shellfish; nesting and foraging habitat for migratory and resident birds; and improve water quality through de-nitrification and sediment removal. Beneficial reuse projects like these will create a regional uplift in ecosystem functions, services and resiliency—including increased buffering capacity against storm and flood damage, significant regional uplift in water quality, and the enhancement and creation of fish, shellfish, wading bird, and waterfowl habitat. The uplift in ecosystem services will have a significant, positive impact on dependent local and regional economies including tourism, hunting, fishing, recreation, and avoided storm damage costs.

## 3.0 Project Locations and Objectives

### 3.1 Mordecai Island

Mordecai Island is located near Beach Haven Borough in Barnegat Bay, Ocean County, New Jersey and is adjacent to the NJIWW (Figure 2). Strong tidal currents and waves that develop over a large fetch have contributed to severe shoreline erosion along Mordecai. Over the past 100 years, half the island has been lost through erosion. The western edge, adjacent to the NJIWW, has receded at a rate on the order of 3 to 6 feet per year. Communication with locals indicates that some recreational boaters use the breach that occurred as a cut through, contributing to further erosion of the critical habitat. Additionally, since shoaling exists in the marked NJIWW channel but deeper water exists adjacent to the island, the wakes of vessels are now contributing to increased wave action in the vicinity of the eroding Mordecai Island shoreline.

Mordecai Island has a topography composed of widespread areas of salt marsh and varying degrees of exposed sod or grass-covered slopes. The island's approximately 45 acres also support areas of common reed, bayberry, winged sumac, and eastern red cedar. Continued erosion of Mordecai Island threatens an abundant diversity of natural wildlife habitats including open marsh, salt ponds, exposed mud flats, shrub-dominated areas and shallow water eelgrass beds. These habitats provide breeding, foraging, nesting and resting areas for many species of migratory birds, including shorebirds, wading birds, raptors and waterfowl. Over 20 species of birds have been observed on Mordecai Island. Two of these species, the American bittern (*Botaurus lentiginosus*) and the black skimmer (*Rynchops niger*), are included on the New Jersey Department of Environmental Protection's (NJDEP) state endangered species list and the black-crowned night heron (*Nycticorax nycticorax*) is considered threatened by NJDEP. In addition, Mordecai Island was designated as an Important Bird and Birding Area (IBBA) by the New Jersey Audubon Society in 2005. Furthermore, areas of eelgrass in the

shallow tidal flats provide refuge for many young finfish and crustaceans. The continual erosion along the western edge of Mordecai Island threatens this rich diversity of natural habitats.

The objective of the Mordecai Island beneficial use of dredged material project is to preserve and protect Mordecai Island's diverse natural bird and marine habitats by stabilizing the shoreline and reducing future erosion. Since many of the finfish species found in the eelgrass are recreationally and commercially valuable, protecting their habitats would be both ecologically and economically important. In addition to ecological benefits, the project will also contribute to coastal resilience and provide protection for the Beach Haven community along the bay shoreline.

### 3.2 Avalon Dredging Location

Avalon is a borough in Cape May County, New Jersey, on the northern portion of Seven Mile Island. The portion of the NJIWW channel in the vicinity of Avalon that requires maintenance dredging is between channel markers 386 and 397 (Figure 3). The channel is critically shoaled to depths of approximately 3 feet MLW creating a significant hazard to navigation and public safety. Approximately 75,000 cubic yards of material are required to be dredged from this portion of the NJIWW channel to restore the channel to the authorized depth of 6 feet MLW. The dredged material will be used beneficially and the placement sites are being developed with the New Jersey Division of Fish and Wildlife (NJDFW) and the Nature Conservancy for marsh restoration on land owned by the NJDFW.

### 3.3 Stone Harbor Dredging Location

Stone Harbor is a borough in Cape May County, New Jersey, on the southern portion of Seven Mile Island. The portion of the NJIWW channel in the vicinity of Stone Harbor that requires maintenance dredging is between channel markers 416 and 421 (Figure 4). Navigable depths through the channel are approximately 3 feet MLW creating a significant hazard to boaters in a highly utilized section of the waterway. The critical shoal is composed of approximately 7,000 cubic yards of sand (96 %). The project will hydraulically dredge material from the channel and beneficially use it for restoration of a degraded marsh area on approximately 6 to 8 acres of land owned by the NJDFW. Topographic data and site surveys of the degraded vegetation indicate that a portion of the marsh is stressed due to low elevation causing longer and deeper flooding. This is in contrast to surrounding marsh areas, which have the short form of *S. alterniflora* (characteristic of low marsh) or S. patens mixed with *Distichilis spicata* and *Salicornia* species (high marsh). Visits to the restoration site have identified areas of new mudflat as evidenced by old root structures sticking up through the mud where there hasn't been regrowth.

## 4.0 Alternatives

### 4.1 No Action

No action assumes that there would be no Federal involvement in maintaining portions of the NJIWW project, and the proposed benefits to the environment would not occur. A plan of no action does not meet the current project objectives. The no action alternative is retained in the analysis pursuant to National Environmental Policy Act regulations.

Several dredged material placement alternatives were considered for these shoal locations. Alternatives included other restoration sites, previously used confined disposal facilities, and placement of sand on an ocean beach. Alternatives were eliminated for various reasons including cost, institutional constraints and technical feasibility. The following describes the selected plans.

### 4.2 Mordecai Island

For Mordecai Island, approximately 30,000 cubic yards of material would be dredged from the NJIWW between channel markers 107 and 108. The material would be placed in the breach area of Mordecai Island within the zone identified in Figures 5 and 6. Material would be placed to the same elevation as the adjacent existing salt marsh vegetation. Hay bales would be placed on the eastern edge of this zone to confine the material and then the sediment would be hydraulically placed beginning with the hay bale edge working west until the gap between the islands is filled. Hay bales would be used as needed and where feasible to stabilize the western edge of the area after placement. This “plug” of material would bolster the island and stabilize the breach and shoreline as a short-term solution to the severe erosion threatening the remaining portions of the island. Longer-term solutions are under development by USACE and NJDEP under the Section 1135 Program to further stabilize and restore the island to the 1977 tidelands map limits. The dredging project is expected to take 5 to 6 weeks.

### 4.3 Avalon Dredging Location

Approximately 75,000 cubic yards of material would be dredged from the channel and brought to the marsh restoration site via a floating pipeline. The objective at the placement site is to reuse the dredged material in a beneficial way to achieve restoration of degraded marsh habitat and improve coastal resiliency. Two methods will be employed: thin-layer placement to help salt marshes (accretion) keep pace with sea level rise, and placement of dredged material to restore marsh area and stabilize shoreline lost to and threatened by erosion. The area being considered for restoration on State owned property is shown on Figure 7. A small pontoon holding the end of the discharge pipe would be floated along the marsh edge by a small skiff and approximately 6 to 9 inches of material would be sprayed into the marsh. Marsh buggies, typically used in marsh restoration projects, may be used if material is needed further eastward into the marsh than can be sprayed from the pontoon. Outside of New Jersey, dredged material has been used to restore eroded marsh along the Atlantic and

Gulf Coasts with great success. Thin layer applications of dredged material have shown improved marsh health, function and resiliency with very short recovery times. The Nature Conservancy and the NJDFW will be assisting with further recommendations on the edge restoration techniques to be utilized. The project is expected to take 2 to 3 months.

### 4.4 Stone Harbor Dredging Location

Approximately 7,000 cubic yards of sand would be hydraulically dredged to remove the critical shoal in the vicinity of Stone Harbor. The dredged material placement site is being developed in conjunction with the NJDFW and the Nature Conservancy. The selected plan includes thin layer application of dredged material and restoration of marsh that is subsiding on State owned property (Figure 8). Approximately 6 to 8 acres of land would be restored. For the thin layer application, material would be dredged from the adjacent channel and brought to the marsh via a floating pipeline. A small pontoon holding the end of the discharge pipe would be floated along the marsh edge pulled by a small skiff and approximately 6 to 9 inches of material would be sprayed into the marsh. For restoration of the small pool, material would be piped directly into the pool for infilling to the surrounding marsh elevation. Creation of an approximately 40 ft by 80 ft area of black skimmer habitat would involve pumping dredged material onto the degraded marsh to an elevation of approximately 6 ft above high tide. Material would be pumped directly to the area, with hay bales utilized to hold the material if needed. The project is expected to take 3 weeks.

## 5.0 Existing Environment

### 5.1 Air and Water Quality

#### Air Quality

General Conformity is a process to implement Section 176(c) of the Clean Air Act to ensure actions conducted or sponsored by federal agencies in nonattainment or maintenance areas are consistent with the regulating authority's (New Jersey Department of Environmental Protection) air quality State Implementation Plan (SIP). General Conformity requires that reasonably foreseeable emissions from federal actions will not cause or contribute to new violations of an NAAQS, increase the frequency or severity of existing NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone towards achieving attainment.

Ocean and Cape May Counties, New Jersey within which the Federal actions will take place are classified as marginal nonattainment for 8-hour ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). The project sites are within the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area. A nonattainment area is an area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national ambient air quality standard

(NAAQS) for the pollutant.

The Marginal designation determines the de minimis emission threshold, below which a General Conformity determination is not required, and the project can be approved. The de minimis emission threshold for a marginal ozone nonattainment area is 100 tons/year of NOx or 100 tons/year VOC.

Water Quality

According to New Jersey regulations (N.J.A.C. 7:9B-1.12), the majority of surface waters in the vicinity of the NJIWW have an NJDEP classification of SE-1 (estuarine). Tidal water bodies classified as SE-1 are estuarine waters with the designated uses of:

- Shellfish harvesting in accordance with N.J.A.C. 7:12;
- maintenance, migration and propagation of natural and established biota;
- primary and secondary contact recreation; and any other reasonable uses.

Water quality within the coastal waters of New Jersey is comparable to that of similar coastal water bodies along the New York Bight and is indicative of similar coastal tidal river and estuary complexes along the Mid-Atlantic coast (USFWS, 1997). The quality of water in this coastal region is dependent largely on the influence of the major coastal freshwater rivers that flow into the bays including the Mullica River, Absecon Creek, Patcong Creek and the Great Egg Harbor River. Other factors that influence water quality over time include tides, season, ocean current fluctuations, nutrient enrichment, water depth, biotic communities, and other temporal and spatial variables.

Studies conducted on the bays and estuaries in the vicinity of the NJIWW indicate that water quality has historically been impacted by pollutants such as nutrients, pathogens, heavy metals and fecal coliform bacteria. As a result, habitat for fish and wildlife has been degraded in many areas relative to historical pre-developed conditions. Barnegat Bay-Little Egg Harbor and New Jersey's more southerly inland bays from Great Bay (at the mouth of the Mullica River) south to Cape May are considered by the National Oceanic and Atmospheric Administration (NOAA) to be highly eutrophic – meaning that they are susceptible to nutrient-fueled algae blooms that harm aquatic ecosystems and have the potential to deprive waterways of oxygen. NOAA projects that nutrient related symptoms in the southern coastal bays are likely to worsen in the years to come.

Sediment Testing

Sediment cores were collected from the three project areas in February and March of 2014 (Tetra Tech, 2014). Three sediment cores were collected from the dredging location in the vicinity of Mordecai Island; five cores were collected from the channel in the vicinity of Avalon. For both areas, samples were analyzed for grain size; TOC; Target Compound List (TCL) volatile organics (VOCs) and semi-volatile organics

(SVOCs); TCL pesticides; Target Analyte List (TAL) inorganics, including total cyanide and total mercury; polychlorinated biphenyl (PCB) arochlors and PCB congeners/dioxins and furans.

Sediment samples were also used to prepare unfiltered (total) and filtered (dissolved) modified elutriate samples. In addition, one surface water sample (unfiltered) was collected from the Mordecai Island and Avalon areas. The modified elutriate samples were analyzed for total and dissolved TCL SVOCs; total and dissolved TCL pesticides; total and dissolved TAL inorganics, including total cyanide and total mercury; total and dissolved PCB arochlors and total PCB congeners/dioxins and furans; and total suspended solids (TSS). The surface water samples used to prepare the elutriates were analyzed for total (unfiltered) concentrations of these parameters. TCL VOCs were also evaluated. Dissolved (filtered) concentrations were not evaluated for any parameter.

One sediment core was collected from the NJIWW within Great Channel in Stone Harbor, NJ. This core was only analyzed for grain size. The sediment core was 96% sand. Chapter II-Section C Case 1 of the New Jersey Department of Environmental Protection dredging guidance manual (NJDEP, 1997) indicates that no further testing is required if the material to be dredged is greater than 90% sand. For this reason, there was no analysis of the chemical quality of the Stone Harbor sediment core.

The following conclusions were made with respect to the chemical analysis of samples:

- All New Jersey residential and non-residential soil cleanup criteria were met;

- there were few exceedances of New Jersey ER-L/ER-M ecological screening criteria. Some parameters that exceeded values were also present in laboratory control samples or surface water collected from the sites, which indicates that the sediment was not solely responsible for the exceedances;

- for most parameters exceeding ER-L levels, sample concentrations were only slightly above the ER-L and well below the ER-M. This suggests that the potential for the sediment to have an adverse effect on ecological resources is small;

- the sediment elutriate samples had few exceedances of New Jersey surface water quality criteria. Most parameters exceeding criteria were also detected in laboratory control samples or surface water collected from the sites. Because of the low concentrations, many exceedances were reported by the laboratory as approximate;

- most elutriate sample contaminant concentrations above chronic protection of aquatic life criteria were well below acute criteria;

- and the elutriate data is conservative because it does not consider dilution within a mixing zone as provided by New Jersey surface water quality regulations.

The overall conclusion from the report is that the sediment is considered clean with respect to chemical contamination and can be used for ecologically beneficial purposes.

## 5.2 Biological Resources

### 5.2.1 Terrestrial Habitats

A variety of terrestrial/wildlife habitat types are present within the NJIWW project area. Although some wildlife species may use several different habitats, others may be specialized and use only one or two different types. The terrestrial and wetland habitat types within the peroject area included the following:

- bay and mudflats;
- low saltmarsh;
- high saltmarsh;
- common reed (tidal/upland);
- scrub/shrub upland; and
- dredged material placement sites.

#### Bays and Mudflats

Bay and mudflat habitats support an ecological community adapted to daily tidal fluctuations. At the base of this food chain is detritus and biota washed in from the adjacent tidal marsh and open bay areas, as well as benthic invertebrates that live on microscopic algae, plants and animals within the mud. Shorebirds (e.g., sandpipers) and waterfowl feed on these invertebrates, which include minute crustaceans and mollusks, as do juvenile fish that enter the shallows with the tide. In some areas where tidal flow has been restricted due to dikes and tidal gates, these mudflat habitats exist along creeks and ditches without daily tidal inundation.

#### Low Saltmarsh

Low saltmarsh habitats are dominated by saltmarsh cordgrass (*Spartina alterniflora*), the dominant saltmarsh plant species in the northeastern United States (Mitsch and Gosselink, 1993). This species grows in the intertidal zone between mean water and mean high tide levels, so it is subject to daily tidal inundation. Wildlife species utilizing the low saltmarsh habitats include birds such as clapper rails (*Rallus longirostris*), common moorhen (*Gallinula chloropus*), waterfowl, and other species that feed on insects, crabs and other invertebrates that this community supports. The low marsh and tidal channel complex provides significant habitat for numerous fish species that

depend on estuaries for nursery and spawning grounds, as well as smaller resident fish such as mummichog, killifish and silversides (Mitsch and Gosselink, 1993; Tiner, 1985).

High Saltmarsh

High saltmarsh habitats are generally found near the mean high tide level, and are generally dominated by saltmarsh hay (*Spartina patens*) and seashore saltgrass (*Distichlis spicata*). High saltmarsh provides habitat for many of the same species found in the low tidal marsh areas. However, since high saltmarsh is inundated far less regularly than the low saltmarsh, waterfowl such as black ducks (*Anas rubripes*) and mallards (*Anas platyrhynchos*) may breed within this habitat. White-footed mice (*Peromyscus leucopus*) and meadow voles (*Microtus pennsylvanicus*) may use this habitat, as well as raptors (hawks and owls) that feed on rodents throughout the year.

Common Reed

The invasive common reed (*Phragmites australis*) dominates much of the remaining high tidal marsh areas within the NJIWW project area. Since this species may invade areas and exclude other species, it can reduce the diversity of habitats and species within an area (Roman et. al. 1984). This has happened historically within the project area, especially in areas that have been subject to diking and ditching for mosquito control purposes. Due to the tenacious nature of this species, control efforts are not always successful without repeated herbicide application (Marks et. al. 1993). Common reed (*Phragmites australis*) marshes are common throughout the area but are generally present at higher elevations than other tidal marsh communities. Common reed communities also tend to gradually encroach and fill in or restrict tidal channel flows. As a result, this habitat often provides marginal fish habitat except in mosquito ditches and other channels that are sufficiently inundated to support fish. Common reed provides some habitat benefits for certain species of wildlife. When interspersed with other habitats, such as open water and mudflat areas, the value of common reed habitat may be greater, since this interspersion provides breeding, foraging, and resting habitat for several species. However, if left unmanaged, the species quickly spreads creating a monoculture, which limits habitat diversity and productivity. The root mat and thick biomass of common reed communities also presents an impenetrable barrier to nesting terrapins and competing native vegetation.

Scrub/Shrub

Scrub/shrub habitats are common at the transition from high marsh to uplands. Common vegetation includes switchgrass (*Panicum virgatum*), groundsel tree (*Baccharis halimifolia*), bayberry (*Myrica spp*.), eastern red cedar (*Juniperus virginiana*), hightide bush (*Iva frutescens*), seaside rose (*Rosa rugosa*) and poison ivy (*Toxicodendron radicans*). Common reed competes with these species for dominance in these areas. Scrub/shrub communities are an important component of the open water/tidal marsh/upland transition, providing habitat for numerous species of birds and mammals that utilize these areas.

Dredged Material Placement Sites

Dredged material placement sites may provide a variety of wetland and upland habitats depending on the final elevations and nature of the placed dredged material. Dominance by common reed is common, and scrub/shrub habitat is often a component within the diked areas. Isolated wetlands can be found in the interior of some placement sites due to the formation of depressions when the dredged material settles.

5.2.2 Aquatic Habitats

Aquatic habitats within the NJIWW project area include open water and marsh habitat complexes. Although some wildlife species may use several different habitats, others may be specialized and use only one or two different types. The habitat types described in this section include upper marine, intertidal and dredged holes.

Upper Marine

The upper marine zone supports an ecological community adapted to daily tidal fluctuations. At the base of this food chain are detritus and biota washed in from the ocean in the form of beach wrack, including drying seaweed, tidal marsh plant debris, decaying marine animals, and other material deposited on the beach. Near the base of the food chain are benthic invertebrates that live on microscopic algae, plants and animals within the sand or mud. The beach wrack provides a cooler, moister microhabitat than the beach that is suitable to crustaceans such as beach fleas (*Orchestia spp* and *Tolorchestia spp*) and other amphipods. Shorebirds (e.g., sandpipers) feed on these invertebrates, which include minute crustaceans and mollusks. Beach fleas are also important prey to ghost crabs (*Ocypode quadrata*). Other species of birds and mammals may visit this habitat to scavenge upon the wrack. These include gulls, grackles, and fish crows, and occasionally red fox.

Intertidal

The intertidal zone (or littoral zone) also supports an ecological community adapted to daily tidal fluctuations. Along beach areas, shifting sands and pounding surf affect the available habitat. Fauna inhabiting the beach intertidal zone have evolved special adaptations that allow them to live in this extreme environment. Most are excellent burrowers and as such are capable of resisting long periods of environmental stress. These organisms are also tolerant of wide ranges in salinity. At the base of the intertidal food chain are bacteria and unicellular algae capable of living in the interstitial spaces between sand grains. This habitat also supports several species of benthic algae within the Phyla *Chlorophyta* and *Phaeophyta*. Benthic macroinvertebrates such as marine worms, mollusks and amphipods also live within this zone. They are in turn fed upon by many of the same species that use the upper marine intertidal zone. In addition, they may be fed upon by several species of estuarine and marine fish, because the intertidal zone is periodically inundated with sufficient water to support them. These species include the Atlantic silverside (*Menidia menidia*), juvenile spot

(*Leiostomus xanthurus*), and bluefish (*Pomatomus saltatrix*). Horseshoe crabs (*Limulus polyphenus*) are also common inhabitants of this zone, and may use sandy beaches above this zone for laying their eggs. In back water areas the intertidal zone may be dominated by mudflats, and/or low saltmarsh vegetation such as saltmarsh cordgrass (*Spartina alterniflora*), the dominant saltmarsh plant species in the northeastern United States (Mitsch and Gosselink 1993). This species grows in the intertidal zone between mean water and mean high tide levels, so it is subject to daily tidal inundation. Salinity within this habitat generally ranges between 10 and 15 ppt (Mitsch and Gosselink, 1993). Wildlife species utilizing the low saltmarsh habitats include birds such as clapper rails (*Rallus longirostris*), common moorhen (*Gallinula chloropus*), waterfowl, and other species that feed on insects, crabs and other invertebrates that this community supports. Muskrats (*Ondatra zibethica*) occasionally feed on *Spartina* roots, but generally prefer freshwater marshes. Juvenile fish also use mudflat and low saltmarsh areas within the intertidal zone for foraging and nursery areas. These include striped bass (*Morone saxatilis*), various species of killifish (*Fundulus spp*.), Atlantic croaker and others. Collectively these juvenile foraging fish provide an important food source for piscivorous birds and mammalian carnivores or scavengers that may occasionally visit the marsh. The intertidal mudflat and marsh areas also support different species of crabs and other crustaceans, serve as breeding grounds for shellfish, and support larval stages of shellfish before they disperse to the open ocean.

Open Water

5.2.3 Wildlife

The complex of shallow bays, estuaries, salt marshes, channels, inlets, and barrier island habitats along the Intracoastal Waterway, provide shelter, nesting habitat, and a rich food resource that support regionally significant wildlife populations, especially migratory and wintering waterfowl, nesting wading birds, migratory shorebirds, raptors, reptiles and mammals. Wildlife species that utilize these habitats included federally and state listed threatened and endangered species. The following provides general information on the species within major wildlife groups that utilized the NJIWW project area.

Mammals

Mammals that occur within upland habitats within the NJIWW project area include raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), meadow vole (*Microtus pennsylvanicus*), eastern cottontail (*Sylvilagus floridanus*), Virginia opossum (*Didelphis virginiana*), red bat (*Lasiurus borealis*), little brown bat (*Myotis lucifugus*) and white-tailed deer (*Odocoileus virginianus*). Mammals that would likely inhabit freshwater and brackish wetlands, rivers, and saltmarshes along the back bays of the area include common muskrat (*Ondatra zibethicus*), raccoon, Virginia opossum, white-tailed deer, and river otter (*Lutra canadensis*) (USFWS, 1999). Small mammals that could utilize the upper saltmarsh and marsh transition areas include the meadow vole

(*Microtus pennsylvanicus*), meadow jumping mouse (*Zapus hudsonius*), and whitefooted mouse (*Peromyscus leucopus*) (Daiber, 1982).

Reptiles

Several species of turtles and snakes occur in upland areas of the barrier island complex within the NJIWW project area including the snapping turtle (*Chelydra serpentina*), eastern mud turtle (*Kinosternon subrubrum*), stinkpot (*Sternotherus odoratus*), northern watersnake (*Natrix sipedon*), northern black racer (*Coluber constrictor*), and eastern garter snake (*Thamnophis sirtalis*). The distribution of these species is limited by the availability of fresh water, as they are intolerant of higher salinity. The northern diamondback terrapin (*Malaclemys terrapin terrapin*) inhabits salt marshes, tidal flats, and beaches within the project area. Northern diamondback terrapins occur primarily in emergent wetlands and shallow water habitats and feed on crustaceans, mollusks and other invertebrates (Palmer and Cordes, 1988, as cited in USFWS, 1988). During the winter, terrapins burrow into the mud of tidal creeks and ponds to hibernate either individually or in groups. Terrapin populations have declined recently due to entrapment in crab pots and the reduction of nesting habitat (USFWS, 1999).

Birds

Raptors that occur in the area include the red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*B. jamaicensis*), peregrine falcon (*Falco peregrinus*), osprey (*Pandion haliaetus*), Cooper's hawk (*Accipiter cooperii*), barred owl (*Strix varia*), and short-eared owl (*Asio flammeus*) (New Jersey Division of Fish, Game and Wildlife, 1994, as cited in USFWS 1999). These species utilize tidal marshes for nesting and foraging throughout the year. Ospreys nest on platforms in numerous locations throughout the project area and “feed primarily on fish within the back bays” (USFWS, 1999). The short-eared owl is a temporary resident of high marsh areas, feeding primarily on small mammals and birds (USFWS, 1999). Northern harriers are also known to “nest and feed in the salt and brackish marshes” along the Intracoastal Waterway. The red-shouldered hawk and Cooper’s hawk migrate over the area in spring and fall (USFWS, 1999). Other raptors that could occur in the project area during migration include American kestrel (*Falco sparverius*), merlin (*E. columbarius*), sharp-shinned hawk (*Accipiter striatus*), broad-winged hawk (*Buteo platypterus*), and the bald eagle (*Haliaeetus leucacephalus*).

The New Jersey barrier beach/back barrier lagoon system provides important habitat for shorebirds during spring and fall migrations. Wetlands in the area also provided high quality habitats for a variety of migratory shorebirds. Shorebirds using beach areas and associated estuarine wetlands at the project area include the black rail (*Laterallus jamaicensis*), American oystercatcher (*Haematopus palliates*), semi-palmated plover (*Charadrius semipalmatus*), Wilson's plover (*C. wilsonia*), piping plover (*C. melodus*), lesser golden plover (*Pluvialis dominica*), black-bellied plover (*P. squatarola*), hudsonian godwit (*Limosa haemastica*), marbled godwit (*Limosa fedoa*), whimbrel (*Numenius phaeopus*), sanderling (*Calidris alba*), semi-palmated sandpiper (*C. pusilla*), purple

sandpiper (*C. maritima*), western sandpiper (*C. mauri*), least sandpiper (*C. minutilla*), white-rumped sandpiper (*C. fuscicollis*), Baird's sandpiper (*C. bairdii*), pectoral sandpiper (*C. melanotos*), red knot (*C. canutus*), dunlin (*C. alpina*), greater yellowlegs (*Tringa melanoleuca*), eastern willet (*Catoptrophorus semipalmatus*), curlew sandpiper (*C. ferruginea*), stilt sandpiper (*C. himantopus*), spotted sandpiper (*Actitis macularia*), ruddy turnstone (*Arenaria interpres*), and short-billed dowitcher (*Limnodromus griseus*) (New Jersey Division of Fish, Game and Wildlife 1994, as cited in USFWS, 1999).

Nesting wading birds that occur within the area include the great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), tricolored heron (*E. tricolor*), snowy egret (*E. thula*), black-crowned night heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nyctanassa violaceus*), cattle egret (*Bubulcus ibis*), great egret (*Casmerodius albus*), glossy ibis (*Plegadis falcinellus*), great black-backed gull (*Larus marinus*), herring gull (*L. argentatus*), laughing gull (*L. atricilla*), glossy ibis (*Plegadis falcinellus*), black-legged kittiwake (*Rissa tridactyla*), gull-billed tem (*Gelochelidon nilotica*), Forster's tem (*Sterna forsteri*), common tern (*S. hirundo*), least tern (*S. antillarum*), black skimmer (*Rynchops niger*), common loon (*Gavia immer*), red-throated loon (*G. stellata*), great connorant (*Phalacrocorax carbo*), and doublecrested cormorant (*P. auritus*) (New Jersey Division of Fish, Game and Wildlife, 1994, as cited in USFWS, 1999).

Estuarine marshes, bays, and channels within the area are important resting and feeding areas for migratory waterfowl on the Atlantic flyway. The bays and associated coves within the area provided habitat for tundra swan (*Cygnus columbianus*), mute swan (*Cygnus olor*), Canada goose (*Branta canadensis*), Atlantic brant (*Branta bernicla*), American black duck (*Anas rubripes*), gadwall (*Anas strepera*), American wigeon, northern pintail (*Anas acuta*), bluewinged teal (*A. discors*), green-winged teal (*A. crecca*), northern shoveler (*A. clypeata*), redhead (*A. Americans*), lesser scaup (*Aythya affinis*), common goldeneye (*Bucephala clangula*), mallard, bufflehead, greater scaup, canvasback, oldsquaw (*Clangula hyemalis*), wood duck (*Aix sponsa*), ruddy duck (*Oxyura jamaicensis*), red-breasted merganser (*Mergus serrator*), hooded merganser (*Lophodytes cucullatus*), common merganser (*M. merganser*), and canvasback (*Aythra valisneria*) (New Jersey Division of Fish, Game and Wildlife, 1994, as cited in USFWS 1999).

Dabbling ducks and bufflehead are fairly evenly distributed along the shorelines and tidal creeks of estuaries, while diving ducks occur mostly in more open water areas (USFWS, 1997). Inlet waterways are an important concentration area for many waterfowl species during harsh winters when other area water surfaces freeze. Breeding waterfowl in estuaries include American black duck, gadwall, mallard, and Canada goose. Salt marshes provide an important larval insect food source for newly hatched ducklings (USFWS, 1997).

### 5.2.4 Aquatic Invertebrates

The coastal habitats along the New Jersey coast are home to a wide variety of both benthic and free floating invertebrates. Invertebrate groups found in various coastal

habitats include zooplankton, *Cnidaria* (corals, anemones, jellyfish), *Platyhelminthes* (flatworms), *Nemertinea* (ribbon worms), *Nematoda* (roundworms), *Bryozoa*, *Mollusca* (chitons, bivalves, snails, etc.), *Echinodermata* (sea urchins, sea cucumbers, sand dollars, starfish) and the *Urochordata* (tunicates) (USACE, 1998). Benthic macro invertebrate communities are commonly used as indicators of overall quality of water and benthic habitats. Indices measuring such parameters as abundance and species composition are well developed and often used in describing quality of habitats and also the potential food sources for higher consumers. In particular, benthic invertebrates make up the primary food source for both juvenile and adult fish species in shallow water environments found in estuarine habitats. Benthic invertebrate communities vary spatially and temporally as a result of factors such as sediment type, water quality, depth, temperature, predation, and competition. Thus benthic invertebrate communities differ between habitat types. For example, the community within fine grain sediment found in a deep water, low energy environment is likely to be dominated by a higher percentage of sessile organisms, while a shallow, high energy environment consisting of larger grain sediment may contain a higher percentage of mobile filter feeding invertebrates. Invertebrates common to estuarine and marine habitats along the New Jersey coast include sea stars (*Asterias forbesi*), saltmarsh mosquito, (*Aedes cantator* and *Aedes sollicitans*), bay scallop (*Aequipecten irradians*), horsefly (*Chrysops sp*.), mosquito (*Anopheles sp.* and *Culex sp.*), common rock crab (*Cancer irroratus*), blue crab (*Callinectes sapidus*), snapping shrimp (*Crangon septemspinosa*), oyster (*Crassostrea virginica*), American lobster (*Homerus americanus*), Atlantic long-finned squid (*Loligo peali*), saltmarsh snail (*Melampus bidentatus*), hard clam (*Mercenaria mercenaria*), ribbon mussel (*Modiolus demissus*), common blue mussel (*Mytilus edulis*), roundworms (*Nematoda*), grass shrimp (*Palaemontes spp*.), and fiddler crab (*Uca spp*.) (USACE, 1998).

Intertidal Benthos

Shallow water intertidal areas consisting of habitats such as high salt marshes, low salt marshes, mud flats, and common reed dominated estuarine wetlands provide habitat for benthic invertebrate groups that are tolerant of a continuously changing environment such as *oligochaetes*, *polychaetes*, and nematodes. Other groups of benthic invertebrates that inhabit these habitats in lesser abundance include ceratopogonids, chironomids, mites, ostracods, isopods, and gastropods. High marsh habitats that are rarely affected by tidal influence generally contain lower abundances of aquatic invertebrates and a higher proportion of terrestrial taxa as a result. By comparison, habitats such as low saltmarsh and mosquito ditches are inundated most of the time and are home to a higher abundance of aquatic organisms. Similarly, the benthic macro invertebrate community may differ between vegetation types, such as within high marsh habitats dominated by common reed (*Phragmites*) vegetation versus low marsh habitat dominated by *Spartina alterniflora*. For example, low marshes dominated by *Spartina alterniflora* were shown to have greater abundance and species composition than high marshes dominated by *Phragmites* (Able and Hagan, 2000; Angradi et. al., 2001).

Subtidal Benthos

Near shore subtidal estuarine habitats such as marsh creeks, bays, and channels are home to many of the same invertebrate species that are also found in shallower intertidal habitats. The primary difference being that organisms within the subtidal habitats are exclusively aquatic in nature and cannot tolerate extended exposure. Other species that are present in these habitats include barnacles, hydroids, sea anemones, bryozoans, and jellyfish (Lippson and Lippson, 1997). The proportion and abundance of species such as snails, crabs, and bivalves increases in the subtidal habitats as well. The characteristics of near shore subtidal habitats make these areas ideal for high invertebrate production that is in turn important as feeding grounds for both juvenile and adult fish species (Lippson and Lippson, 1997). For example, marsh creek habitat is important habitat for both shrimps and crabs (Rountree and Able, 1992). Within deeper water habitats such as open bays benthic invertebrate species diversity generally decreases with decreasing light penetration, temperature, DO, and food availability (Pinet, 1992). In particular, inshore, deep-water holes have been shown to provide poor benthic habitat as measured by lower diversity and abundance of inshore invertebrate communities (Versar, 2000; 2002). However, due to a larger amount of water column habitat, the holes may favor swimming and free-floating organisms such as jellyfish and zooplankton.

Sediments and Benthos

Open water marine habitats in the subtidal zone include substrates consisting of several sediment types including sand, gravel, mud, and shell remnants and other coarse materials. Species such as surf clams (*Spisula solididdima*), hard clam (*Mercenaria mercenaria*), ribbon mussel (*Modiolus demissus*), common blue mussel (*Mytilus edulis*), and moon snails (*Polinices duplicata*) often dominate these types of offshore habitats (USACE, 1998). Large tracts of these shellfish beds exist off the shore of New Jersey's Atlantic coast, providing significant recreational and commercial shellfisheries (BBEP, 2001). Toxins and bacteria tend to accumulate in these invertebrate communities, which are dominated by filter feeders. As a result the NJDEP Division of Marine Water Quality closely monitors bacteria concentrations throughout coastal areas, restricting harvests when levels exceed acceptable limits. Alterations of temperature, salinity, substrate composition, depth, and wave energy also affect community composition and species abundance (Lippson and Lippson, 1997). Other specialized habitats such as rock piles, jetties, bulkheads, pilings, and sunken debris have invertebrate communities dominated by sponges, hydroids, and barnacles. These invertebrates may act as food sources for both juvenile and adult fish species that also utilize vertical cover and niche habitat provided by the larger substrates that make up these habitats.

5.2.5 Fisheries

The coastal waters of New Jersey are reported to support up to 107 species of fish during part or all of their life cycle (BBEP, 2001; Tatham et. al., 1984). Of these, 61 species have been studied extensively regarding their role and presence in estuarine

habitats (Able and Fahey, 1998). The great diversity of fish fauna found in estuarine habitats includes both resident and transient species. Species habitat use is best understood in terms of life history, as many fish species occupy estuarine habitats only during certain lifestages. Several fish species are continuously present in coastal habitats, while others are present only during certain periods (e.g. during spring many fish species use specific habitats for spawning). Thus the distribution and abundance of important indicator fish species vary both temporally and spatially. Because most of the project area consisted of estuarine waters, the focus of this assessment was on estuarine species that could have been affected by different management alternatives. Estuarine environments are extremely important to wide number of fish species because of the multitude of niche environments available to fish. Certain fish species utilize shallow water vegetated habitats for spawning while others migrate out to open water to distribute their eggs as planktonic forms. Similarly, some larval fish species migrate from open water as they develop and enter highly productive estuarine environments to grow and develop into juvenile stages. In this respect estuaries provide ample amounts of both food and protection for larval and juvenile stages of fish (Able and Fahey, 1998).

Marsh Communities

High marsh and tidal mud flat areas have been shown to provide important year round habitat for many groups of fishes including killifishes (*Fundulidae*), needlefishes (*Belonidae*), and silversides (*Atherinidae*) (Talbot and Able, 1984). In addition, larval and juvenile stages of numerous fish species such as herring (*Clupidae*), white perch (*Morone americana*), striped bass (*Morone saxatilis*), menhaden (*Brevoortia tyrannus*), and winter flounder (*Pseudopleuronectes americanus*) utilize high marsh and tidal mud flat environments during spring, summer, and fall seasons. The variable microhabitats found throughout these environments provide both protection and cover as well as food sources for early life stages of fish found throughout estuarine habitats and are important to the success of these species as nurseries, foraging areas and cover habitat.

Habitats with restricted tidal flows such as marsh potholes and closed ponds often have associated fish assemblages that consist of low diversity and high abundance. For example, killifish are highly tolerant of wide variations in salinity and temperature and are known to dominate these types of habitats. High marsh habitat dominated by common reed (*Phragmites*) has been shown to negatively affect the success and survival of larval and juvenile fish (Able and Hagan, 2000). Common reed habitats offer few niche habitats and associated biomass available as food sources. Conversely, low marsh areas dominated by *Spartina alterniflora* have been shown to provide high quality habitat for many fish species (Able and Hagan, 2000). Other vegetation types present in submerged aquatic vegetation beds such as water celery provide spawning habitats as well as nursery and feeding habitat for juvenile fish.

Connecting expanses of high and low marsh, marsh channels and tidal creeks provide highly utilized habitat for all life stages of fishes such as Atlantic silversides and killifish

as well as important larval and juvenile habitat for fishes such as herring, white perch, weakfish (*Cynoscion regalis*), flounder and bluefish (Able et. al., 2001; Rountree and Able, 1992). Tidal stages strongly influence juvenile fish species such as summer flounder that utilize flood and ebb tides to gain access to habitats for foraging as they move between habitat types.

Impoundments that restrict tidal flow between marshes and estuaries inhibit fish migration and hence nutrient exchange between high and low intertidal habitats (Talbot et. al., 1986). The reduction or elimination of the tidal regime of a marsh due to diking or ditching may lower salinity, reduce DO, and increase temperature fluctuations. These changes in water quality can result in alterations of habitats, vegetation type, or benthic invertebrates and consequently shifts in fish species composition. Marshes altered for mosquito control by open marsh water management techniques have been shown to affect fish assemblages primarily due to resulting changes in salinity and habitat preference (Talbot and Able, 1986).

Certain fish such as striped bass travel through numerous habitat types along with diel tidal fluctuations (Tupper and Able, 2000). They may utilize low and high marsh channels during flood tides to areas where food is available in higher abundance and then move back into deeper water and channels with the ebb tide. Adult migratory fish species exhibit this behavior throughout estuarine habitats and utilize numerous types of intertidal habitat types.

### 5.2.6 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act, (PL 94-265 as amended through October 11, 1996 and 1998) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". Regulations further clarify EFH by defining "waters" to include aquatic areas that are used by fish and may include aquatic areas that were historically used by fish where appropriate. A purpose of the act is to "promote the protection of essential fish habitat in the review of projects conducted under federal permits, licenses, or other authorities that affect, or have the potential to affect such habitat". An EFH assessment is required for a federal action that could potentially adversely impact essential fish habitat.

Managed fish species are those species that are managed under a federal fishery management plan. Managed fish species for New Jersey are listed in the Guide to Essential Fish Habitat Designations in the Northeastern United States Volume IV prepared by the National Oceanographic and Atmospheric Administration (NOAA, 1999). This guide is often used to evaluate the fish species that might be adversely affected by proposed developments within a project area. The coastal estuarine habitats of the project area have been designated as habitat for a number of managed species and their specific life history stages of concern. Some specific species and

| TABLE 1<br>HABITAT REQUIREMENTS OF FEDERALLY MANAGED SPECIES<br>WITHIN THE NJIWW PROJECT AREA | | | | |
|---|---|---|---|---|
| **MANAGED SPECIES** | **EGGS** | **LARVAE** | **JUVENILES** | **ADULTS** |
| Atlantic Cod *(Gadus morhua)* | NA | NA | NA | Bottom (rocks, pebbles, or gravel) winter for Mid- Atlantic |
| Red Hake *(Urophycis chuss)* | Surface waters <10°C, <25‰ salinity | Surface waters <10°C, <25‰ salinity | Bottom habitats shell fragment substrates <16°C, | Bottom habitats <12°C, 33 – 35‰ salinity |
| Winter flounder *(Pleuronectes americanus)* | Bottom habitats Temps <10°C, 10 - 30‰ salinity depths <6m | Pelagic and bottom waters <15°C, 4 - 30‰ salinity depths <6m | Bottom habits Mud, sand Temp <28°C, 0.1-10 m depth 5-33‰ salinity | Bottom habits Mud, sand, gravel Temps <25°C, 1-100 m depth 15-33‰ salinity |
| Windowpane flounder *(Scopthalmus aquosus)* | Surface waters, peaks in May and Oct. | Pelagic waters, peaks in May and Oct. | Bottom (mud or fine sands) | Bottom (mud or fine sands) peak spawning in May |
| Atlantic sea herring *(Clupea harengus)* | NA | NA | Pelagic and bottom waters <10° C and depths of | Pelagic waters and bottom habitats |
| Monkfish *(Lophius americanus)* | Surface waters, in temps of 15°C and depths of 25- | Pelagic waters with temps of 15°C and depths of | NA | NA |
| Bluefish *(Pomatomus saltatrix)* | NA | NA | Pelagic waters | Pelagic waters |
| Whiting *(Merluccius bilnearis)* | Surface waters year round, peaks Jul-Sep Temps below 20°C. Depths of 50- | Surface waters year round Peaks Jul-Sep Temps below 20°C. Depths of 15- | Bottom habitats Temps below 22°C. Depths of 30-325m | Bottom habitats Temps below 13°C. Depths of 30-325m |
| Atlantic Butterfish *(Peprilus tricanthus)* | Pelagic waters | NA | Pelagic waters 10-360 m depth | Pelagic waters |
| Summer flounder *(Paralicthys dentatus)* | NA | Pelagic waters, near shore at depths of 10-70 m from Nov.-May | Dermersal waters (mud and sandy substrates) | Demersal waters (mud and sandy substrates). Shallow coastal areas in warm months, |
| Scup *(Stenotomus* | NA | NA | Dermersal waters | Dermersal waters |

| TABLE 1<br>HABITAT REQUIREMENTS OF FEDERALLY MANAGED SPECIES<br>WITHIN THE NJIWW PROJECT AREA | | | | |
|---|---|---|---|---|
| **MANAGED SPECIES** | **EGGS** | **LARVAE** | **JUVENILES** | **ADULTS** |
| *chrysops)* | | | | offshore from Nov. – April |
| Black sea bass *(Centropristus striata)* | NA | NA | Dermersal waters over rough bottom, shellfish and eelgrass beds, man-made structures | Dermersal waters over structured habitats (natural and man-made), and sand and shell areas. |
| Surfclam *(Spisula solidissima)* | NA | NA | Throughout substrate to 3' in depth | NA |
| King Mackerel *(Scomberomorus cavalla)* | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profiles rocky bottom and barrier island ocean-side waters from the |
| Spanish Mackerel *(Scomberomorus maculatus)* | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters form the surf to the shelf |
| Cobia *(Rachycentron canadum)* | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf | Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf |
| Sand tiger shark *(Odontaspis* | Shallow coastal waters | Shallow coastal waters | Shallow coastal waters to the 25 m | Shallow coastal waters to the 25 m |

| TABLE 1<br>HABITAT REQUIREMENTS OF FEDERALLY MANAGED SPECIES<br>WITHIN THE NJIWW PROJECT AREA | | | | |
|---|---|---|---|---|
| **MANAGED SPECIES** | **EGGS** | **LARVAE** | **JUVENILES** | **ADULTS** |
| *taurus)* | | | isobath | isobath |
| Atlantic angel shark *(Squatina dumerili)* | NA | Off the coast of southern New Jersey and shallow coastal waters to | Off the coast of southern New Jersey and shallow coastal waters to | Off the coast of southern New Jersey and shallow coastal waters to |
| Atlantic sharpnose shark *(Rhizopriodon terraenovae)* | NA | Shallow coastal areas including estuaries north to Cape Hatteras, | Shallow coastal areas including estuaries north to Cape Hatteras, | Shallow coastal areas north of Cape Hatteras, NC to Cape May, NJ |
| Dusky Shark *(Charcharinus obscurus)* | NA | Shallow coastal waters | Coastal and pelagic waters | Coastal and pelagic waters |
| Sandbar Shark *(Cahcharinus plumbeus)* | NA | Shallow coastal waters | Coastal and pelagic waters | Shallow coastal waters |
| Tiger Shark *(Galeocerdo cuvieri)* | NA | Shallow coastal areas to the 200 m isobath | Coastal areas between the 25 and 100 m isobaths | Offshore waters south of Chesapeake Bay, MD |

| TABLE 2<br>DISTRIBUTION OF EARLY LIFE HISTORY STAGES OF FISHES FOUND IN VARIOUS NEW JERSEY COASTAL HABITATS | | | |
|---|---|---|---|
| **SPECIES** | **SOUTH INLAND BAYS** | **GREAT BAY** | **BARNE** |
| Smooth dogfish *(Mustelus canis)* | | J | |
| American eel *(Anguilla rostrata)* | J | J | J |
| Conger eel *(Conger oceanicus)* | J | J | |
| Blueback herring *(Alosa aestivalis)* | J | | E |
| Alewife *(A. pseudoharengus)* | ELJ | | E |
| American shad *(A. sapidissima)* | J | | J |
| Atlantic menhaden *(Brevoortia tyrannus)* | ELJ | ELJ | E |
| Atlantic herring *(Clupea harengus)* | LJ | LJ | L |
| Striped anchovy *(Anchoa hepsetus)* | ELJ | ELJ | |
| Bay anchovy *(A. mitchilli)* | ELJ | ELJ | E |
| Inshore lizardfish *(Synodus foetens)* | J | LJ | J |
| Pollack *(Pollachius virens)* | J | J | J |

| TABLE 2<br>DISTRIBUTION OF EARLY LIFE HISTORY STAGES OF FISHES FOUND IN VARIOUS NEW JERSEY COASTAL HABITATS | | | |
|---|---|---|---|
| **SPECIES** | **SOUTH INLAND BAYS** | **GREAT BAY** | **BARNEGAT BAY** |
| Red hake *(Urophycis chuss)* | J | EJ | J |
| Spotted hake *(U. regia)* | J | J | J |
| White hake *(U. tenuis)* | J | J | |
| Striped cusk-eel *(Ophidion marginatum)* | LJ | J | |
| Oyster toadfish *(Opsanus tau)* | ELJ | ELJ | ELJ |
| Atlantic needlefish *(Strongylura marina)* | J | LJ | J |
| Sheepshead minnow *(Cyprinodon varigatus)* | ELJ | ELJ | ELJ |
| Mummichog *(Fundulus heteroclitus)* | ELJ | ELJ | ELJ |
| Spotfin killifish *(F. luciae)* | ELJ | ELJ | ELJ |
| Striped killifish *(F. majalis)* | ELJ | ELJ | ELJ |
| Rainwater killifish *(Lucania parva)* | ELJ | ELJ | ELJ |
| Rough silverside *(Membras martinica)* | ELJ | ELJ | J |
| Inland silverside *(Menidia beryllina)* | ELJ | ELJ | ELJ |
| Atlantic silverside *(M. menidia)* | ELJ | ELJ | ELJ |
| Fourspine stickleback *(Apeltes quadracus)* | ELJ | ELJ | ELJ |
| Threespine stickleback *(Gasterosteus aculeatus)* | ELJ | ELJ | ELJ |
| Lined seahorse *(Hippocampus erectus)* | J | LJ | LJ |
| Northern pipefish *(Syngnathus fuscus)* | LJ | LJ | LJ |
| Striped searobin *(Prionotus evolans)* | ELJ | LJ | J |
| Northern searobin *(P. carolinus)* | ELJ | LJ | J |
| Grubby *(Myoxocephalus aenaeus)* | J | LJ | ELJ |
| White perch *(Morone americana)* | ELJ | L | ELJ |
| Striped bass *(M. saxatilis)* | J | J | J |
| Black sea bass *(Centropristis striata)* | LJ | LJ | LJ |
| Bluefish *(Pomatomus saltatrix)* | J | LJ | LJ |
| Crevalle jack *(Carnax hippos)* | J | J | J |
| Gray snapper *(Lutjanus griseus)* | J | J | |
| Scup *(Stenotomus chrysops)* | J | LJ | J |
| Silver perch *(Bairdiella chrysoura)* | ELJ | LJ | J |
| Weakfish *(Cynoscion regalis)* | ELJ | LJ | ELJ |
| Spot *(Leiostomus xanthurus)* | J | LJ | LJ |
| Northern kingfish *(Menticirrhus saxatilis)* | LJ | J | ELJ |
| Atlantic croaker *(Micropogonias undulates)* | LJ | LJ | LJ |
| Black drum *(Pogonias cromis)* | J | | J |
| Foureye butterflyfish *(Chaetodon ocellatus)* | J | J | |
| Striped mullet *(Mugil cephalus)* | J | J | J |
| White mullet *(M. curema)* | J | J | J |
| Northern sennet *(Sphyraena borealis)* | J | J | |
| Tautog *(Tautoga onitis)* | ELJ | ELJ | ELJ |

| TABLE 2<br>DISTRIBUTION OF EARLY LIFE HISTORY STAGES OF FISHES FOUND IN VARIOUS NEW JERSEY COASTAL HABITATS | | | |
|---|---|---|---|
| **SPECIES** | **SOUTH INLAND BAYS** | **GREAT BAY** | **BARNEGAT BAY** |
| Cunner *(Tautogolabrus adspersus)* | ELJ | ELJ | ELJ |
| Rock gunnel *(Pholis gunnellus)* | | LJ | |
| Northern stargazer *(Astroscopus guttatus)* | J | LJ | J |
| Feather blenny *(Hypsoblennius hentz)* | | LJ | ELJ |
| American sand lance *(Ammodytes americanus)* | ELJ | ELJ | ELJ |
| Darter goby *(Gobionellus boleosoma)* | | LJ | |
| Naked goby *(Gobiosoma bosc)* | ELJ | ELJ | ELJ |
| Seaboard goby *(G. ginsburgi)* | ELJ | LJ | |
| Butterfish *(Peprilus triacanthus)* | LJ | LJ | LJ |
| Windopane *(Scophthalmus aquosus)* | ELJ | ELJ | ELJ |
| Smallmouth flounder *(Etropus microstomus)* | ELJ | LJ | J |
| Summer flounder *(Paralichtys dentatus)* | LJ | LJ | LJ |
| Winter flounder *(Pseudopleuronectes americanus)* | ELJ | ELJ | ELJ |
| Hogchoker *(Trinectes maculates)* | ELJ | ELJ | ELJ |
| Northern puffer *(Sphoeroides maculates)* | LJ | LJ | ELJ |

**E = eggs; L = larvae; J = juveniles**

**Source: Able, Kenneth W. and Fahay, Michael P. The First Year in the Life of Estuarine Fishes in the Middle Atlantic Bight. 1998.**

life stages that are designated for EFH in the New Jersey Inland Bays include summer flounder (larvae through adult), scup (juvenile), black sea bass (juvenile and adult), bluefish (juvenile and adult), and juvenile butterfish (NOAA, 1999).

EFH assessments also examine the potential effects on prey species for the managed fish species potentially occurring within the area. Prey species are defined as being a forage source for one or more designated fish species. They are normally found at the bottom of the food web in a healthy environment. Prey species found in the project area estuaries include killifish, mummichogs, silversides and herrings.

Federally managed fish species that may be found within the project area are listed in Table 1. Five of these species primarily inhabit marine offshore habitats throughout their lives and are not of major concern since they are largely outside of the project area. The remaining fish species can be found within inshore habitats during at least part of their life cycle (Table 2).

5.3 Endangered Species

Endangered species are those whose prospects for survival are in immediate danger because of a loss or change of habitat, over-exploitation, predation, competition or disease. Threatened

species are those that may become endangered if conditions surrounding the species begin or continue to deteriorate. Species may be classified on a Federal or State basis. There are several listed or notable species of special concern that can be found along the New Jersey coast; most of these are transient in the area.

The Federally-listed seabeach amaranth (*Amaranthus pumilus*) was listed as threatened throughout its range in 1993 (58 FR 18035 18042). Historically, this species occurred on coastal barrier island beaches from Massachusetts to South Carolina. Extant populations are currently known from South Carolina, North Carolina, Virginia, Delaware, Maryland, New Jersey, and New York. The number of plants and populations has increased in all states since it was listed in 1993; however, in North Carolina have generally been increasing since 2002. Primary habitats include overwash flats on the accreting ends of islands, lower foredunes, and the upper strand on non-eroding beaches. Seabeach amaranth is an annual, meaning that the presence of plants in any given year is dependent on seed production and dispersal during previous years. Seeds germinate from April through July. Flowering begins as early as June and seed production begins in July or August. Seeds are dispersed by wind and water. Seabeach amaranth is intolerant of competition; consequently, its survival depends on the continuous creation of newly disturbed habitats. Prolific seed production and dispersal enable the colonization of new habitats as they become available. A continuous supply of newly created habitats is dependent on dynamic and naturally functioning barrier island beaches and inlets (USFWS, 1996).

The piping plover (*Charadrius melodus*) is a Federally-listed endangered small pale shorebird on sandy beaches along the Atlantic and Gulf coasts. The roseate tern (*Sterna dougallii*) is a medium-sized tern and primarily tropical but breeds in scattered coastal localities in the northern Atlantic temperate zone. It is Federally-listed as endangered in the northeast region, including New Jersey.

There are five Federally-listed threatened or endangered sea turtles that can occur off the coast of New Jersey's ocean coast. The endangered Kemp's ridley turtle (*Lepidochelys kempii*), leatherback turtle (*Dermochelys coriacea*) and hawksbill turtle (*Eretmochelys imbricata*), and the threatened green turtle (*Chelonia mydas*) and loggerhead turtle *(Caretta caretta*). With the exception of the loggerhead these species breed further south from Florida through the Caribbean and the Gulf of Mexico. The loggerhead may have historically nested on coastal barrier beaches. No known nesting sites are within the project area. All five species of sea turtles are listed in the State of New Jersey.

There are six Federally-listed species of endangered whales that have been observed along the New Jersey Atlantic coast. The North Atlantic right (*Eubalaena* glacialis) , fin whale (*Balaenoptera physalus*), and humpback whale (*Megapter novaeangliae*) are found seasonally in waters off New Jersey. The sperm whale (*Physeter catodon*), Sei (*Balaenoptera borealis),* and blue whale *(Balaenoptera musculus*) may be present in deeper offshore waters. These are migratory animals that travel north and south along the Atlantic coast. All six species of whales are listed in the State of New Jersey.

The shortnose sturgeon (*Acipenser brevirostrum*) is a Federally-listed endangered species of fish that is also state listed in New Jersey. The shortnose sturgeon is an anadromous species that inhabits marine and estuarine waters, but spawns in freshwater. Shortnose sturgeon occur primarily in the Delaware River but may occur in nearshore marine waters (Brundage and Meadows, 1982).

In April 2012, NMFS added the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) to the Federally endangered list. Atlantic sturgeon has been recommended for endangered status listing in New Jersey. Atlantic sturgeon spawn in the freshwater regions of the Delaware River. By the end of their first summer the majority of young-of-the-year Atlantic sturgeon remain in their natal river while older subadults begin to migrate to the lower Delaware Bay or nearshore Atlantic Ocean. An acoustic tagging study conducted between 2008-2011 (Brundage and O'Herron, in press) found a few subadults, tagged within the Delaware River, in the Hudson River, Potomac River and off Cape Hatteras in the second year of the study. Older subadult Atlantic sturgeon are known to undertake extensive marine migrations, returning to their natal river in the late spring, summer, and early fall months (Dovel and Berggren, 1983).

The bald eagle (*Haliaeetus leucocephalus*) was listed as a Federally endangered species throughout the United States in 1978. Most bald eagle nests are located in large wooded areas associated with marshes and other water bodies. Based on improvements in bald eagle population figures for the contiguous United States, the U.S. Fish and Wildlife Service removed the bald eagle from the Endangered Species list in June 2007. The New Jersey Department of Environmental Protection reported that there were more than 100 pairs of bald eagles within the state in 2011. Although the bald eagle has been removed from the Endangered Species list, the bird is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. These laws prohibit killing, selling or otherwise harming eagles, their nests, or eggs. The bald eagle has remained a state-listed species in New Jersey.

Pergrine falcons (*Falco peregrinus*) were placed on the Endangered Species list as endangered in 1984, however, like the bald eagle, their numbers in the Northeast region have been steadily increasing (Steidl *et al*., 1991). The peregrine falcon was removed from the Endangered Species list in August 1999. The bird continues to be protected by the Migratory Bird Treaty Act, which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except when specifically authorized by the Interior Department. The peregrine falcon remains a state-listed species in New Jersey. The peregrine falcon is known to nest on the Barnegat Division of Edwin B. Forsythe National Wildlife Refuge in Stafford Township, Ocean County, New Jersey.

There are currently 34 bird species state-listed as endangered or threatened species in New Jersey. A few of these, such as the black skimmer (*Rynchops niger*), the least tern (*Sternula antillarum*), and the roseate tern (*Stena dougallii*) occur along Atlantic ocean beaches. The piping plover and roseate tern are state-listed endangered species that have the potential to occur in the area. Several raptors occur in the area includeing the state-listed endangered northern harrier (*Circus cyaneus*), short eared owl (*Asio flammeus*), osprey (*Pandion haliaetus*), and barred owl (*Strix varia*).

Although primarily found within the Delaware Bay shoreline and not the ocean coast, the red knot (*Calidris canutus*) is currently proposed for listing under Endangered Species Act protection by the U.S. Fish and Wildlife Service. The New Jersey Department of Environmental Protection reports that both horseshoe crab and red knot numbers have declined by over 75 percent since the early 1990's. The state listed threatened black rail (*Laterallus* jamaicensis) nests in emergent tidal marshes in the surrounding area.

The harbor porpoise (*Phocoena phocoena*) and the bottlenose dolphin (*Tursiops truncatus*) are New Jersey species of special concern. These species, as are all marine mammals, are protected under the Marine Mammal Protection Act. While mid-Atlantic waters are the southern extreme of their distribution, stranding data indicate a strong presence of harbor porpoise off the coast of New Jersey, predominately during spring. The northern diamondback terrapin (*Malaclemys terrapin terrapin*), considered a "species of special concern", is known to occur in Barnegat Bay. The diamondback terrapin occupies brackish tidal marshes and nests on sandy bay beaches.

## 5.4 Cultural Resources

The New Jersey Intracoastal Waterway (NJIWW) is a 117-mile section of the 3000-mile Intracoastal Waterway (ICW) stretching along the Atlantic and Gulf coasts of the United States. The ICW was conceived in 1808 and constructed in sections during the late 1800s and 1900s, and serves as a protected navigation route for private, commercial and military vessels. The section of the NJIWW within the Area of Potential Effect is not listed on the National Register of Historic Places.

The Mordecai Island, Avalon and Stone Harbor placement sites are uninhabited coastal salt marsh islands within the back-bay New Jersey coastal complex and currently serve as habitat for many state endangered bird species. No cultural resource investigations have been conducted on these islands; however, the marshy habitats make them of moderate to low probability for intact Native American archaeological sites eligible for listing on the National Register of Historic Places.

# 6.0 Environmental Impacts

All three projects entail maintenance dredging activities to remove critical shoals from the authorized NJIWW Federal navigation project. Also, all three projects would utilize dredged material for beneficial purposes. For Mordecai Island, material would be placed in the water to fill a breach that has occurred in the island. This "plug" of material would bolster the island and create a living shoreline as a short-term solution to the severe erosion threatening the remaining portions of the island. For the Avalon and Stone Harbor sites, material would be used for restoration of marsh that is subsiding on State owned property. Environmental impacts considered in this Environmental Assessment are those associated with maintenance dredging, placement of material in open water, and placement of material on existing marsh habitats.

The No Action alternative would allow continuation of the significant public safety hazard to boaters that utilize the shoaled portions of the NJIWW. The existing degraded ecological conditions identified at the restoration sites would also continue and worsen. A summary of the long-term and short-term impacts associated with implementation of the selected alternatives is provided below.

## 6.1 Air and Water Quality

### Air Quality

These projects would result in maintenance of existing regional conditions. There would be some minor, short-term impacts (3 weeks to 3 months) on noise and air quality. The dredging and beneficial use sites are not immediately adjacent to residential areas, and no long-term impacts are anticipated from the selected alternatives. Air emissions for each of the three projects would be below the de minimis threshold for a marginal ozone nonattainment area (100 tons/year of NOx and 100 tons/year VOC). Therefore, a General Conformity determination is not required. The project is not considered regionally significant under 40 CFR 93.153 (i). See Appendix B for the Clean Air Act assessment calculations.

### Water Quality

Significant impacts to water quality are not anticipated from implementation of any of the components to the selected plans. Short-term, temporary and localized impacts to water quality in the form of turbidity are anticipated to occur from maintenance dredging and depositing sand/silt to fill the breach at Mordecai Island. Any potential effects would be short-lived and localized and would be limited to the immediate vicinity of the dredging sites and the area that receives dredged material. Eventually tidal currents and bay circulation would negate any impacts from turbidity. Best Management Practices would be used and may be mandated by conditions contained in State approvals (i.e., 401 Water Quality and Coastal Zone Management Certifications) would minimize water quality impacts during project implementation. Therefore, no long-term adverse impacts are anticipated. Based on the results of recent sediment testing (Tetra Tech, 2014), it is concluded that the sediment to be dredged is clean with respect to chemical contamination and would not adversely affect water quality in the area.

## 6.2 Biological Resources

### 6.2.1 Terrestrial Habitats

The No Action alternative would result in the continued loss of habitat within the region due to erosion and subsidence at the selected restoration sites. There would be temporary adverse impacts to existing terrestrial habitats during construction from construction equipment. Outside of New Jersey, dredged material has been used to restore eroded marsh along the Atlantic and Gulf Coasts with great success. Applications of dredged material have shown improved marsh health, function and resiliency with very short recovery times. Overall the projects would result in positive ecological benefits to the regional salt marsh complex. Marshes along the NJIWW

provide important resting, feeding and nesting habitat to many migratory and resident species of birds. These projects are intended to demonstrate the benefits that can be achieved with dredged material in this back-bay, coastal environment.

### 6.2.2 Aquatic Habitats

Maintenance dredging within the existing NJIWW channel would impact existing benthic habitats. The navigation channel should recover to pre-dredge conditions within 1-2 years after disturbance. There would be a small, long-term loss of bottom habitat at the Mordecai Island breach closure site due to the placement of dredged material. There would also be an impact to benthos due to burial of the benthic community during placement activities in the intertidal and nearshore zone for shoreline edge restoration at the Avalon site.

### 6.2.3 Wildlife

The marshes along the NJIWW provide breeding, foraging, nesting and resting areas for many species of migratory birds, including shorebirds, wading birds, raptors and waterfowl. The proposed projects are intended to improve ecosystem functions, services and resiliency—including improvement in water quality, and the enhancement and creation of fish, shellfish, wading bird, and waterfowl habitat. No long-term adverse impacts to wildlife resources utilizing the selected restoration sites are anticipated as a result of these projects. It is likely that construction activities would result in mortality of some burrowing animals such as crustaceans, mollusks, and some worms. Motile animals would be displaced during the construction period, but would likely repopulate the sites after construction and revegetation is completed.

### 6.2.4 Aquatic Invertebrates

Short-term adverse impacts to benthic organisms would occur as a result of construction activities associated with dredging and placement activities; recolonization is anticipated within one to two years. It is expected that these species, after construction, would repopulate the restored areas from nearby aquatic and marsh habitats. There would be a long-term loss of benthic habitat as a result of Mordecai Island breach closure and Avalon shoreline edge restoration.

### 6.2.5 Fisheries

The projects will have limited and short-term impact on finfish. With the exception of some small finfish, most bottom dwelling and pelagic fishes are highly mobile and should be capable of avoiding turbidity impacts due to dredging and placement operations. The primary impact to fisheries will be felt from the disturbance of benthic and epibenthic communities. The loss of benthos and epibenthos smothered as a result of Mordecai Island breach closure and Avalon shoreline edge restoration, and removal during maintenance dredging activities will temporarily disrupt the food chain in the impacted areas.

6.2.6 Essential Fish Habitat

Table 3 provides an Essential Fish Habitat assessment for the Mordecai Island, Avalon and Stone Harbor projects.

Table 3. EFH ASSESSMENT WORKSHEET FOR FEDERAL AGENCIES

**PROJECT NAME: Channel Maintenance & Beneficial Use of Dredged Material Projects, New Jersey Intracoastal Waterway Ocean and Cape May Counties, New Jersey**

| **1. INITIAL CONSIDERATIONS** | | |
|---|---|---|
| **EFH Designations** | **Yes** | **No** |
| **Is the action located in or adjacent to EFH designated for eggs?** | **x** | |
| **Is the action located in or adjacent to EFH designated for larvae?** | **x** | |
| **Is the action located in or adjacent to EFH designated for juveniles?** | **x** | |
| **Is the action located in or adjacent to EFH designated for adults?** | **x** | |
| **Is the action located in or adjacent to EFH designated for spawning adults?** | | |
| **If you answered no to all questions above, then EFH consultation is not required -go to Section 5. If you answered yes to any of the above questions proceed to Section 2 and complete remainder of the worksheet.** | | |

| **2. SITE CHARACTERISTICS** | |
|---|---|
| **Site Characteristics** | **Description** |
| **Is the site intertidal, sub-tidal, or water column?** | The NJIWW dredging locations are subtidal. Portions of the Mordecai Island placement area and marsh restoration sites are intertidal. |
| **What are the sediment characteristics?** | Mordecai Island: 76-85 % sand; 15-24 % silt and clay.<br>Avalon: 9-61 % sand; 39-91 % silt and clay.<br>Stone Harbor: 96 % sand. |
| **Is Habitat Area of Particular Concern (HAPC) designated at or near the site? If so what type, size, characteristics?** | No |
| **Is there submerged aquatic vegetation (SAV) at or adjacent** | No |

| | |
|---|---|
| **to project site? If so describe the spatial extent.** | |
| **What is typical salinity and temperature regime/range?** | Salinity ranges between 19 and 30 ppt with an average 25 ppt in the center of bays. Water temperatures range from a recorded winter low of 29.5 F to summer highs of 82 F. |
| **What is the normal frequency of site disturbance, both natural and man-made?** | Recreational boating and storm events. |
| **What is the area of proposed impact (work footprint & far afield)?** | See Figures 1-8. |

| **3. DESCRIPTION OF IMPACTS** | | | |
|---|---|---|---|
| **Impacts** | **Y** | **N** | **Description** |
| **Nature and duration of activity(s)** | | | Mordecai Island: Approximately 30,000 cu yards of material would be dredged from the NJIWW between channel markers 107 and 108. The material would be placed in the breach area of Mordecai Island within the zone identified in Figures 5 and 6. Material would be placed to the same elevation as the adjacent existing salt marsh vegetation. Hay bales would be placed on the eastern edge of this zone to confine the material and then the sediment would be hydraulically placed beginning with the hay bale edge working west until the gap between the islands is filled. Hay bales would be used as needed and where feasible to stabilize the western edge of the area after placement. This "plug" of material would bolster the island and create a living shoreline. Construction would last 1 to 2 months.<br>Avalon: Approximately 75,000 cubic yards of material are required to be dredged from this portion of the NJIWW channel to restore the channel to the authorized depth of 6 feet MLW. The restoration site is on State owned property (Figure 7). Material would be dredged from the channel and brought to the marsh via a floating pipeline. Approximately 6 to 9 inches of material would be sprayed into the marsh. The project is expected to take 2-3 months.<br>Stone Harbor: The critical shoal is composed of approximately 7,000 cubic yards of sand. The proposed placement site is shown on Figure 8. Approximately 6 to 8 acres of land would be restored. For the thin layer application, material would be dredged from the adjacent channel and brought to the marsh via a floating pipeline. Approximately 6 to 9 inches of material would |

| | | | |
|---|---|---|---|
| | | | be sprayed into the marsh. For restoration of the small pool, material would be piped directly into the pool for infilling to the surrounding marsh elevation. Creation of an approximately 40 ft by 80 ft area of black skimmer habitat would involve pumping dredged material onto the degraded marsh to an elevation of approximately 6 ft above high tide. Material would be pumped directly to the area, potentially with hay bales utilized to hold the material if needed. The project is expected to take 3 weeks. |
| **Will benthic community be disturbed?** | **Y** | | The benthic community would be disturbed at the dredging locations. No dredging will occur outside of the authorized channel. Open water created by the breach would be filled and returned to salt marsh. The benthic community would be lost at the placement site. |
| **Will SAV be impacted?** | | **N** | |
| **Will sediments be altered and/or sedimentation rates change?** | | **N** | |
| **Will turbidity increase?** | **Y** | | A temporary increase in turbidity would occur during dredging and dredged material placement operations. No significant increase. |
| **Will water depth change?** | **Y** | | Shoaled material will be removed from the NJIWW between channel markers 107 and 108 for the Mordecai Island project, 386 and 397 for the Avalon project, and 416 and 421 for the Stone Harbor project. The channel will be returned to its authorized depth of 6 feet MLW. |
| **Will contaminants be released into sediments or water column?** | | **N** | See the report: Tetra Tech, Inc. 2014. Sediment quality analysis for maintenance dredging and beneficial use of dredged material within the New Jersey intracoastal waterway (Mordecai Island, Avalon and Stone Harbor). Prepared for USACE, Philadelphia District. Contract No. W912BU-12-D-0021 Task Order No. 0021. The report is provided in Appendix A. |
| **Will tidal flow, currents or wave patterns be altered?** | **Y** | | No |
| **Will water quality be altered?** | | **N** | See the Tetra Tech, Inc. 2014. |

| 4. EFH ASSESSMENT | | | |
|---|---|---|---|
| **Functions and Values** | **Y** | **N** | **Describe habitat type, species and life stages to be adversely impacted (NOAA Website 2010)** |
| **Will functions and values of EFH be impacted for:** | | | |
| **Spawning** | | **N** | |
| **Nursery** | | **N** | |
| **Forage** | **Y** | | Based on the habitat utilization descriptions of the designated EFH species, it appears that most of the species will not be found in the immediate project areas, due to a depth requirement or the fact that they are very migratory in nature (i.e., the sharks). There is the potential for a few species and various life stages to be found in the project areas and these would include: winter flounder, windowpane flounder, summer flounder, black sea bass and scup.<br><br>During the summer and fall months the estuary is typically utilized as a forage area for juveniles. For managed species that are found in the area, the adults and juveniles are mobile so it is expected that they will avoid the areas of disturbance and therefore will not be impacted. |
| **Shelter** | | **N** | . |
| **Will impacts be temporary or permanent?** | | | All impacts will be temporary. |
| **Will compensatory mitigation be used?** | | **N** | |

| 5. DETERMINATION OF IMPACT | | |
|---|---|---|
| | | **Federal Agency EFH Determination** |
| **Overall degree of adverse effects on EFH (not including compensatory mitigation) will be:**<br><br>**(check the appropriate statement)** | | **There is no adverse effect on EFH**<br><br>**EFH Consultation is not required** |
| | **X** | **The adverse effect on EFH is not substantial.**<br><br>**This is a request for an abbreviated EFH consultation. This worksheet is being submitted to NMFS to satisfy the EFH Assessment requirement.** |
| | | **The adverse effect on EFH is substantial.**<br><br>**This is a request for an expanded EFH consultation. A detailed written EFH assessment will be submitted to NMFS expanding upon the impacts revealed in this worksheet.** |

| 6. OTHER NOAA-TRUST RESOURCES IMPACT ASSESSMENT | |
|---|---|
| **Species known to occur at site (list others that may apply)** | **Describe habitat impact type (i.e., physical, chemical, or biological disruption of spawning and/or egg development habitat, juvenile nursery and/or adult feeding or migration habitat).** |
| **alewife** | **N/A** |
| **blueback herring** | **N/A** |
| **rainbow smelt** | **N/A** |
| **Atlantic sturgeon** | **N/A** |
| **Atlantic menhaden** | **N/A** |
| **American shad** | **N/A** |
| **American eel** | **N/A** |
| **American lobster** | **N/A** |
| **blue mussels** | **N/A** |
| **soft-shell clams** | **N/A** |
| **quahog** | **N/A** |

Based on the above listed habitat utilization by the designated EFH species, it appears that most of the species will not be found in the immediate project areas, due to a depth requirement or the fact that they are migratory in nature (i.e., the sharks). There is the potential for a few species to be found in the project area and these include: winter flounder, windowpane flounder, summer flounder, scup, and black sea bass. Most of the above-listed fish species are not estuarine resident species and therefore only utilize this area on a seasonal basis, primarily in the warmer summer months. During the summer months, the estuary is typically utilized as a forage area for juveniles and adults and as a nursery area for larvae and juveniles. Since adults and juveniles of the

above-listed species are mobile, it is expected that they will avoid the areas of disturbance regardless of season and therefore will not be impacted. In addition, the actual footprint of the in-water construction work is relatively small, so any impacts to demersal eggs and larvae of various species will be minor.

Cumulative effects associated with these projects on EFH and managed species are not anticipated. The projects would have temporary minor impacts to the bottom habitat and demersal eggs/larvae of some species. However, once the construction is completed it is likely that the bottom areas would quickly recolonize. There would be a small loss of bottom habitat at the Mordecai Island breach closure site. It is concluded that the projects would have a minimal direct effect on EFH and not result in cumulative impacts to EFH. This conclusion is being coordinated with the National Marine Fisheries Service.

## 6.3 Threatened and Endangered Species

Due to the location of the proposed projects along the NJIWW, the Federally listed Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus), shortnose sturgeon (Acipenser *brevirostrum*), piping plover (Charadrius melodus), roseate tern (Sterna dougallii dougallii) and seabeach amaranth (Amaranthus pumilus) have been considered. Additionally, potential effects to the candidate species red knot (Calidris canutus rufa) have been considered. Based on the available information, it has been determined that the proposed projects are not likely to adversely affect the above listed threatened and endangered species. This determination is being coordinated with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

In addition, the projects would have no adverse impact on State-listed species of birds. The projects are intended to restore important resting, feeding and nesting habitat for these species.

## 6.4 Cultural Resources

Since the NJIWW will only be dredged to its previously authorized depth, and since the placement of dredged material will serve to stabilize Mordecai Island and restore marshes in the vicinity of Avalon and Stone Harbor, it has been determined that the proposed action will have *No Effect* on historic properties eligible for or listed on the National Register of Historic Places pursuant to 36CFR800.4(d)(1). The New Jersey State Historic Preservation Office (SHPO) has been requested to review the proposed projects and provide their concurrence with the *No Effect* determination. A SHPO concurrence letter for the Mordecai Island project is provided in Appendix C.

## 7.0 Environmental Justice

None expected; no affected populations. These NJIWW Projects are expected to comply with Executive Order 12898, which requires that "each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations."

## 8.0 Relationship of Selected Plan to Environmental Requirements, Protection Statutes, and Other Requirements

Compliance with environmental quality protection statutes and other environmental review requirements is ongoing. Table 4 provides a listing of compliance with environmental statutes. The Corps has apply for the necessary state approvals, including a Coastal Zone Management Plan consistency determination and a water quality certification from the New Jersey Department of Environmental Protection.

**TABLE 4**
**COMPLIANCE OF THE PROPOSED ACTIONS WITH ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS**

| STATUTES | COMPLIANCE STATUS [1] |
|---|---|
| Clean Air Act | Full |
| Clean Water Act | Ongoing |
| Coastal Zone Management Act | Ongoing |
| Endangered Species Act | Ongoing |
| Fish and Wildlife Coordination Act | Ongoing |
| National Historic Preservation Act | Ongoing |
| National Environmental Policy Act | Full |
| Environmental Justice (E.O. 12898) | Full |

## 9.0 Section 404(b)(1) Analysis

A review of the impacts associated with discharges to waters of the United States for Channel Maintenance & Beneficial Use of Dredged Material Projects New Jersey Intracoastal Waterway Ocean and Cape May Counties, New Jersey is required by Section 404(b)(1) of the Clean Water Act, as amended (Public Law 92-500).

### I. PROJECT DESCRIPTION

A. Location. The project areas are located in Ocean and Cape May Counties, New Jersey.

B. General Description. Project descriptions and objectives are provided in Sections 3.0 and 4.0 of this EA.

C. Purpose. The purpose of the projects is to remove critical shoals from the NJIWW that pose a hazard to navigation and public safety. A secondary purpose is to utilize the dredged material for restoration of degraded and eroding coastal habitats.

D. General Description of Dredged or Fill Material.

1. General Characteristics of Material: sand/silt

2. Quantity of Discharge: The estimated quantities of dredged material are 30,000 cubic yards for the Mordecai Island project; 75,000 cubic yards for the Avalon project; and 7,000 cubic yards for the Stone Harbor project.

3. Source of Material: All material would be obtained from the existing NJIWW Federal navigation project. For the Mordecai Island project material would be removed between channel markers 107 and 108. For the Avalon project material would be removed between channel markers 386 and 397. For the Stone Harbor project material would be removed between channel markers 416 and 421.

E. Description of Discharge Sites.

1. Location: See Figures 1 through 8 in the EA for Mordecai Island, Avalon and Stone Harbor project locations.

2. Size (acres): Mordecai Island 5.5 acres; Avalon approximately 60 acres; Stone Harbor 6-8 acres.

3. Type of Sites: Mordecai Island entails placement of material in open water to fill a breach that has occurred in the island. The Avalon and Stone Harbor projects would place material on open marsh.

4. Type of Habitat: estuarine.

5. Timing and Duration of Discharge: 1-3 months for each project. The first project would begin in early August 2014.

F. Description of Discharge Method. Hydraulic pipeline dredging.

## II. FACTUAL DETERMINATIONS

### A. Physical Substrate Determinations.

1. Substrate Elevation and Slope: varies.

2. Sediment Type: sand/silt.

3. Fill Material Movement: For Mordecai Island material would be subject to normal erosive processes for that area. No sediment movement is anticipated at the Avalon and Stone Harbor sites.

4. Physical Effects on Benthos: Temporary, loss of existing benthos during dredging and placement actions. The areas should reach a stabilized equilibrium subsequent to construction. A permanent loss of open water habitat would occur at the Mordecai Island breach site.

5. Actions taken to Minimize Impacts: Construction best management practices will be used during construction of all three projects.

### B. Water Circulation, Fluctuation and Salinity Determinations.

1. Water:

   a. Salinity – No effect

   b. Water Chemistry – Temporary, minor effect.

   c. Clarity – Temporary, minor effect.

   d. Color - No effect.

   e. Odor – Temporary, minor effect.

   f. Taste - No effect.

   g. Dissolved Gas Levels – No effect.

   h. Nutrients – No effect.

   i. Eutrophication - No effect.

   j. Temperature- No effect.

2. Current Patterns and Circulation:

a. Current Patterns and Flow – No significant effect.

b. Velocity – No significant effect on tidal velocity and longshore current velocity regimes.

c. Stratification – Normal stratification patterns would continue.

d. Hydrologic Regime – The regime is estuarine and would remain that way subsequent to construction of the projects.

3. Normal Water Level Fluctuations – No effect on tidal regime.

4. Salinity Gradients – No effect on existing salinity gradients.

5. Actions That Will Be Taken To Minimize Impacts: N/A

C. Suspended Particulate/Turbidity Determinations.

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Fill Site: Temporary effects when the dredged material is being placed. The areas should reach a stabilized equilibrium in a relatively short time period.

2. Effects on Chemical and Physical Properties of the Water Column:

a. Light Penetration: Short-term, limited reductions during dredging and placement activities. No long-term effects.

b. Dissolved Oxygen: There is a potential for decreased dissolved oxygen levels during dredging and placement activities. No long- term effects.

c. Toxic Metals and Organics: No effect.

d. Pathogens: No effect.

e. Aesthetics: Minor, temporary effects limited to the construction period.

f. Temperature: No effect.

3. Effects on Biota:

a. Primary Production, Photosynthesis: Temporary, minor effect during dredging and placement activities. The areas should reach a stabilized equilibrium in a relatively short time period.

b. Suspension/Filter Feeders: Temporary, minor effect on suspension feeders during dredging and placement activities. The area should reach a stabilized equilibrium in a relatively short time period.

c. Sight feeders: Temporary, minor effect on sight feeders during dredging and placement activities. The area should reach a stabilized equilibrium in a relatively short time period.

4. Actions Taken to Minimize Impacts: Best management practices will be used to minimize turbidity.

D. Contaminant Determinations:

No significant contaminants were found at the project sites that would impact the project areas. See Appendix A of the EA for recent sediment data (Tetra Tech, 2014).

E. Aquatic Ecosystem and Organism Determinations:

1. Effects on Plankton: Temporary, minor effect on plankton during dredging and placement activities. The area should reach a stabilized equilibrium in a relatively short time period.

2. Effects on Benthos: Temporary, minor effect on benthos during dredging and placement activities. The area should reach a stabilized equilibrium in a relatively short time period.

3. Effects on Nekton: No effect.

4. Effects on Aquatic Food Web: Temporary, minor effect on the aquatic food web during dredging and placement activities. The area should reach a stabilized equilibrium in a relatively short time period.

5. Effects on Special Aquatic Sites:

(a) Sanctuaries and Refuges: None.

(b) Wetlands: Restoration of eroding and subsiding habitats.

(c) Tidal flats: None.

(d) Vegetated Shallows: None.

6. Threatened and Endangered Species: No effect.

7. Other Wildlife: Temporary, minor effects during construction.

8. Actions to Minimize Impacts: Best management construction practices will be used to minimize any disturbance.

F. Proposed Disposal Site Determinations.

1. Mixing Zone Determinations: The following factors have been considered in evaluating the placement sites.

   a. Depth of water.
   b. Current velocity.
   c. Degree of turbulence.
   d. Stratification.
   e. Discharge vessel speed and direction.
   f. Rate of discharge.
   g. Dredged material characteristics.

2. Determination of Compliance with Applicable Water Quality Standards: A section 401 Water Quality Certificate will be obtained from the NJDEP prior to construction of each project.

3. Potential Effects on Human Use Characteristics:

   a. Municipal and Private Water Supply: No anticipated effect.

   b. Recreational and Commercial Fisheries: Temporary, minor effect during construction.

   c. Water Related Recreation: Temporary, minor effect.

   d. Aesthetics: Temporary, minor effect.

   e. Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves: N/A.

G. Determination of Cumulative Effects on the Aquatic Ecosystem. No significant adverse effects are anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem. No significant secondary effects are anticipated.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adaptation of the Section 404(b)(1) Guidelines to this evaluation - No significant adaptation of the guidelines were made relative to this evaluation.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem - The selected plan was determined to be the best alternatives for restoring the habitats at the placement sites.

C. Compliance With Applicable State Water Quality Standards - The selected plan is not expected to violate any applicable state water quality standards in New Jersey.

D. Compliance With Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act - The proposed discharge is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. Compliance With Endangered Species Act of 1973 -The selected plan will comply with the Endangered Species Act of 1973. Informal Section 7 consultation will be completed with the U.S. Fish and Wildlife Service and National Marine Fisheries Service prior to initiation of construction.

F. Compliance With Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 - No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are located within the project area.

G. Evaluation of Extent of Degradation of Waters of the United States - The proposed project will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, and recreational and commercial fishing, plankton, fish and shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and wildlife will not be adversely affected. Significant adverse impacts on aquatic ecosystem diversity, productivity and stability, and recreation, aesthetics and economic values will not occur as a result of the project.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem – Best management construction methods will be employed to minimize potential adverse impacts of discharging material in the aquatic ecosystem.

## 10.0 References


Able, K.W. and M.P. Fahay. 1998. The first year in the life of estuarine fishes in the middle Atlantic bight. Rutgers University Press, New Brunswick, NJ.

Able, K. W. and S. M. Hagan. 2000. Effects of common reed (*Phragmites australis*) invasion on marsh surface macrofauna: Response of fishes and decapod crustaceans. Estuaries 23:633–646.

Able, K. W., P. Light, D. Nemerson, and R. Bush. 2001. Spatial variation in Delaware Bay (U.S.A.) marsh creek fish assemblages. Estuaries 24:441–452.

Angradi, T.R., S. M. Hagan and K.W. Able. 2001. Vegetation type and the intertidal macroinvertebrate fauna of a brackish marsh: *Phragmites* vs. *Spartina. Wetlands* 21:75–92.

Barnegat Bay Estuary Program (BBEP). 2001. The scientific characterization of the Barnegat Bay - Little Egg Harbor estuary and watershed. M.J. Kennish ed.

Brundage, H. M., III and R. E. Meadows. 1982. The Atlantic sturgeon, *Acipenser oxyrhynchus*, in the Delaware River estuary. Fisheries Bulletin 80:337-343.

Daiber, F.C. 1982. Animals of the tidal marsh. John Wiley & Sons, Inc., Hoboken, NJ.

Dovel W. L. and T. J. Berggren. 1983. Atlantic sturgeon of the Hudson Estuary, New York. New York Fish and Game Journal 30:140-172.

Lippson, R.L. and A.J. Lippson. 1997. Life in the Chesapeake Bay. Johns Hopkins University Press, Baltimore, MD.

Marks, M., B. Lapin and J. Randall. 1993. Element stewardship abstract for *Phragmites australis*. The Nature Conservancy, Arlington, VA.

Mitsch, W.J. and J.G. Gosselink. 1993. Wetlands, 2nd ed. John Wiley & Sons, Inc., Hoboken, N.J.

National Oceanographic and Atmospheric Administration (NOAA). 1999. Guide to essential fish habitat designations in the northeastern United States Volume IV: New Jersey and Delaware. National Marine Fisheries Service. Gloucester, MA. 108 pp.

New Jersey Department of Environmental Protection (NJDEP). 1997. The management and regulation of dredging activities and dredged material in New Jersey's tidal waters.

Palmer, W.M. and C.L. Cordes. 1988. Habitat suitability index models: diamondback terrapin (nesting) - Atlantic coast. U.S. Department of the Interior, Fish and Wildlife Service, Biological Report Number 82 (10.151). 18 pp.

Pinet, P.R. 1992. Oceanography : Introduction to planet oceanus. Jones & Bartlett Learning, LLC, Burlington, MA.

Roman, C.T., W.A. Niering, and S. Warren. 1984. Salt marsh vegetation change in response to tidal restriction. Environmental Management 8:141-150.

Roundtree, R.A. and K.W. Able. 1992. Fauna of polyhaline subtidal marsh creeks in southern New Jersey: composition, abundance and biomass. Estuaries 15:171-185.

Steidl, R.J., C.R. Griffin and L.J. Niles. 1991. Contaminant levels of osprey eggs and prey reflect regional differences in reproductive success. Journal of Wildlife Management 55(4): 601-608.

Talbot, C.W. and K.W. Able. 1984. Composition and distribution of larval fishes in New Jersey high marshes. Estuaries 7 (4A), 434–443.

Talbot, C.W., K.W. Able and J.K. Shisler. 1986. Fish species composition in New Jersey salt marshes: effects of marsh alterations for mosquito control. Transactions of the American Fisheries Society 115:269-278.

Tatham, R.R., D.L. Thomas and D.J. Danila. 1984. Fishes of Barnegat Bay. In M.J. Kennish and R.A. Lutz eds. Ecology of Barnegat Bay, New Jersey. pp 241-280. Lecture Notes on Coastal and Estuarine Studies No. 6. Springer-Verlag, New York, NY.

Tetra Tech, Inc. 2014. Sediment quality analysis for maintenance dredging and beneficial use of dredged material within the New Jersey intracoastal waterway (Mordecai Island, Avalon and Stone Harbor). Prepared for USACE, Philadelphia District. Contract No. W912BU-12-D-0021 Task Order No. 0021.

Tiner, R.W. 1985. Wetlands of New Jersey. 1985. U.S. Fish and Wildlife Service, Region 5, National Wetlands Inventory Project, Newton Corner, MA. 117 pp.

Tupper, M. and K.W. Able. 2000. Movements and food habits of striped bass (*Morone saxatilis*) in Delaware Bay (USA) salt marshes: comparison of a restored and a reference marsh. Mar. Biol. 137(5/6), 1049–1058.

U.S. Army Corps of Engineers (USACE). 1998. Final Environmental Impact Statement Delaware Coast from Cape Henlopen to Fenwick Island feasibility study: Bethany Beach and South Bethany interim feasibility study Sussex County, Delaware.

U.S. Fish and Wildlife Service (USFWS). 1996. Recovery plan for seabeach amaranth (*Amaranth pumilus*) Rafinesque. Atlanta, Georgia. 70 pp.

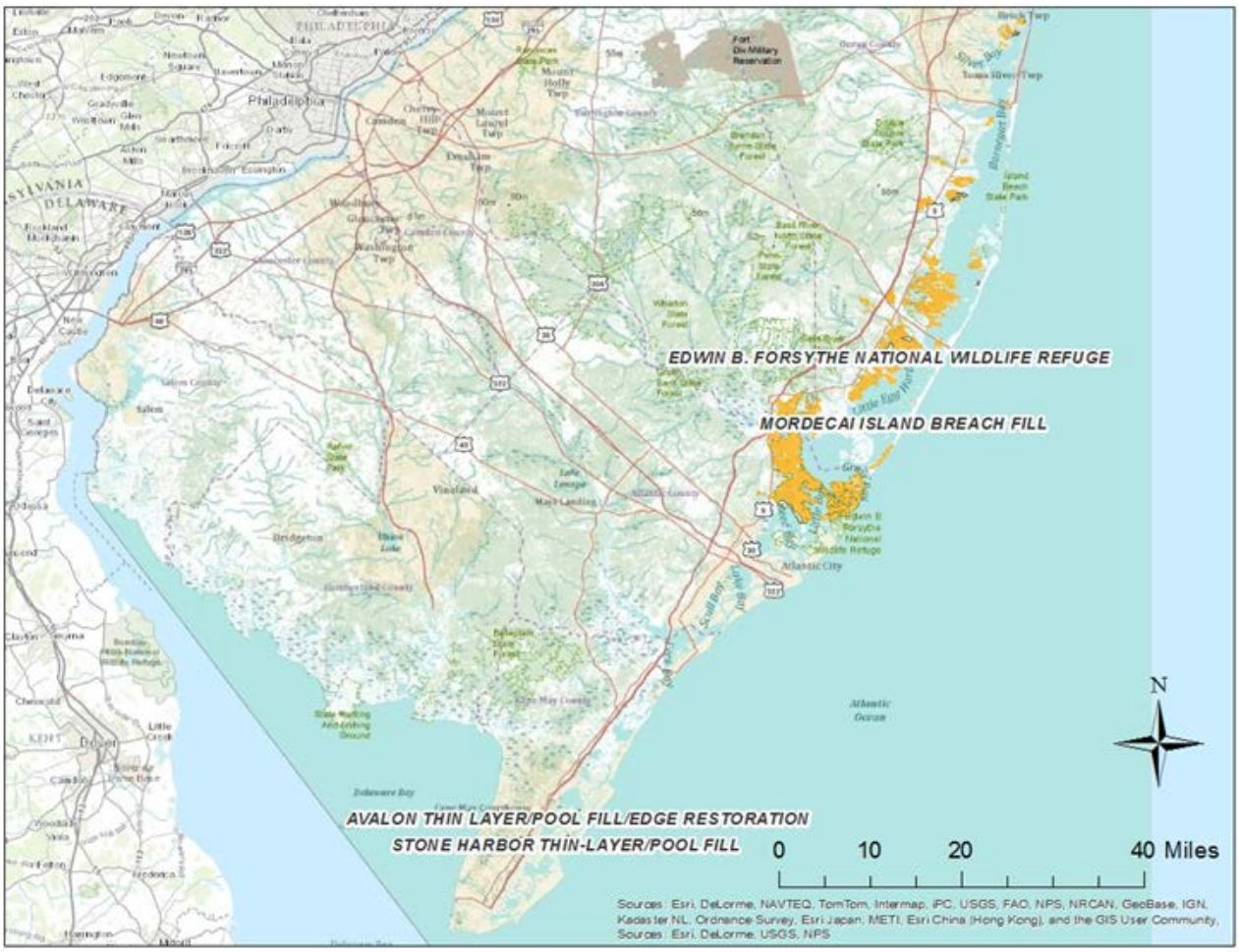
Versar, Inc. 2000. Winter fish and blue crab survey for dredged holes number 5 and 6 in Barnegat Bay and holes 34 and 35 near Atlantic City, New Jersey. Prepared by Versar, Inc. for USACE, Philadelphia District under Contract No. DACW61-00-D-0009.

Versar, Inc. 2002. Water, sediment, and biological monitoring for an ongoing feasibility study of the New Jersey Intracoastal Waterway, New Jersey. Prepared by Versar, Inc. for USACE, Philadelphia District under Contract No. DACW61-00-D-0009 Task Order No. 0038.

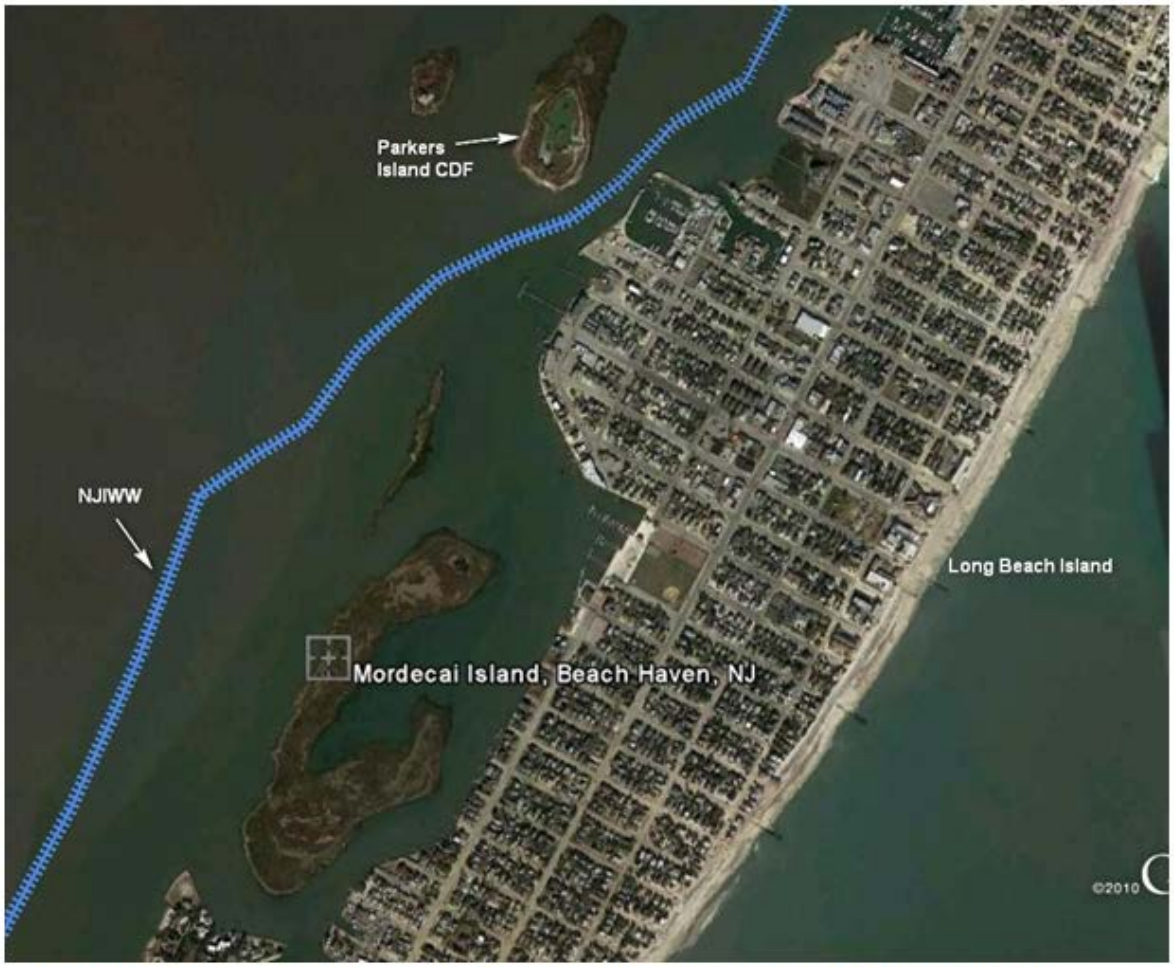
**CHANNEL MAINTENANCE &**
**BENEFICIAL USE OF DREDGED MATERIAL PROJECTS**
**NEW JERSEY INTRACOASTAL WATERWAY**
**OCEAN AND CAPE MAY COUNTIES, NEW JERSEY**
**ENVIRONMENTAL ASSESSMENT**

# FIGURES

# Figure 1. New Jersey Intracoastal Waterway Project Location Map

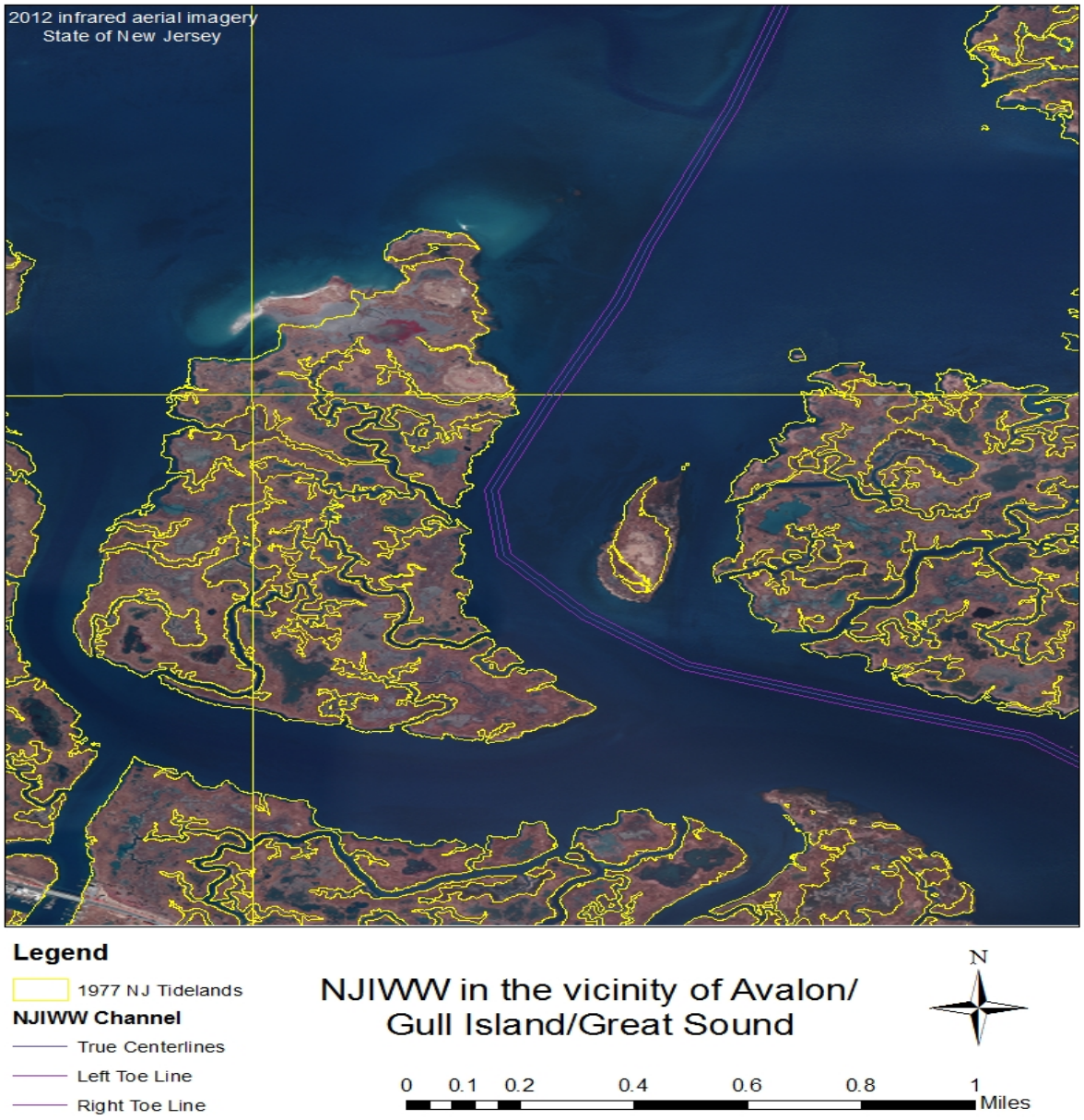


# Figure 2. Mordecai Island NJIWW Dredging Location.




Approximately 30,000 cubic yards of material would be dredged from the NJIWW between channel markers 107 and 108.

# Figure 3. Avalon NJIWW Dredging Location.



# Figure 4. Stone Harbor NJIWW Dredging Location.

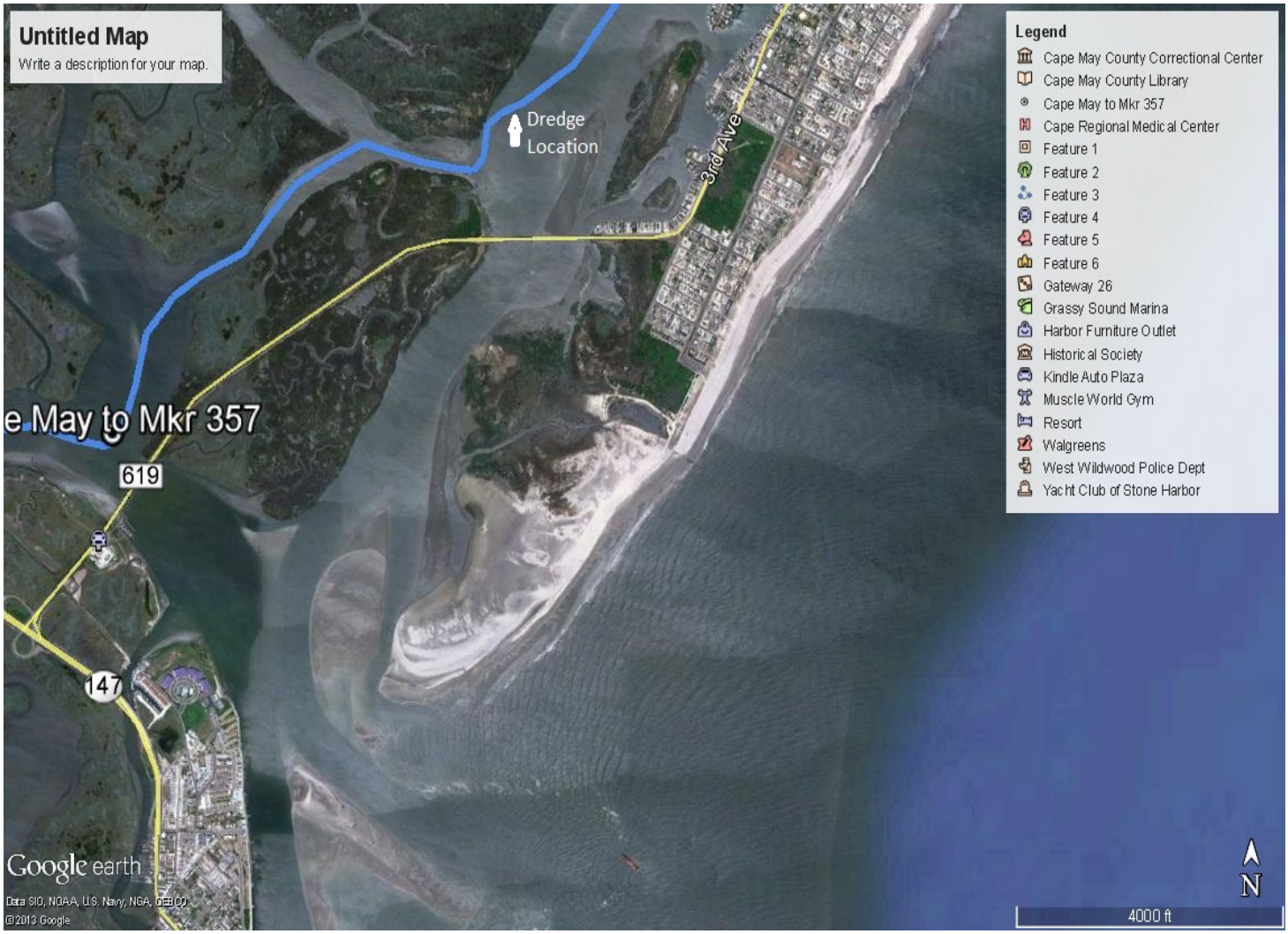
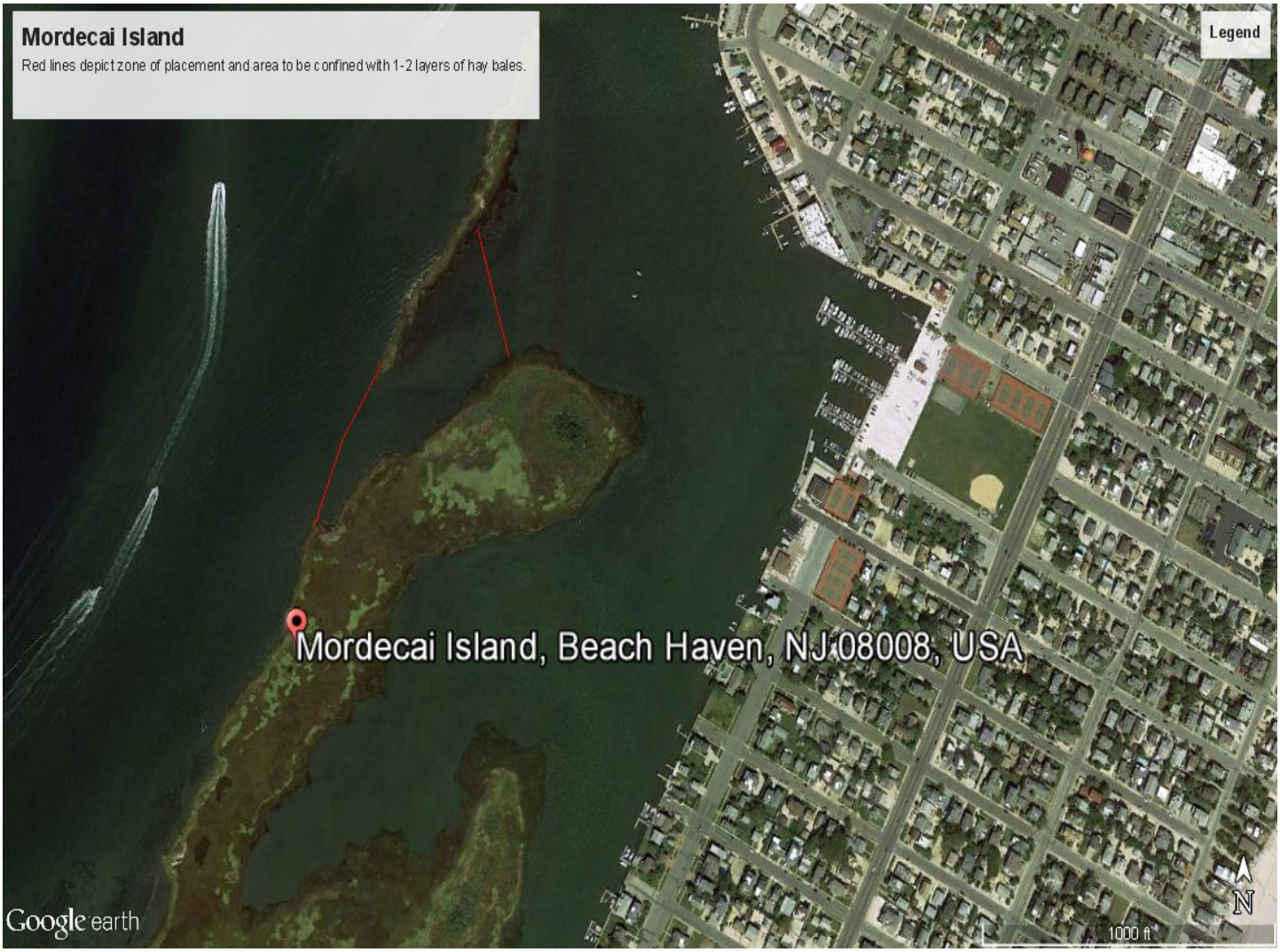
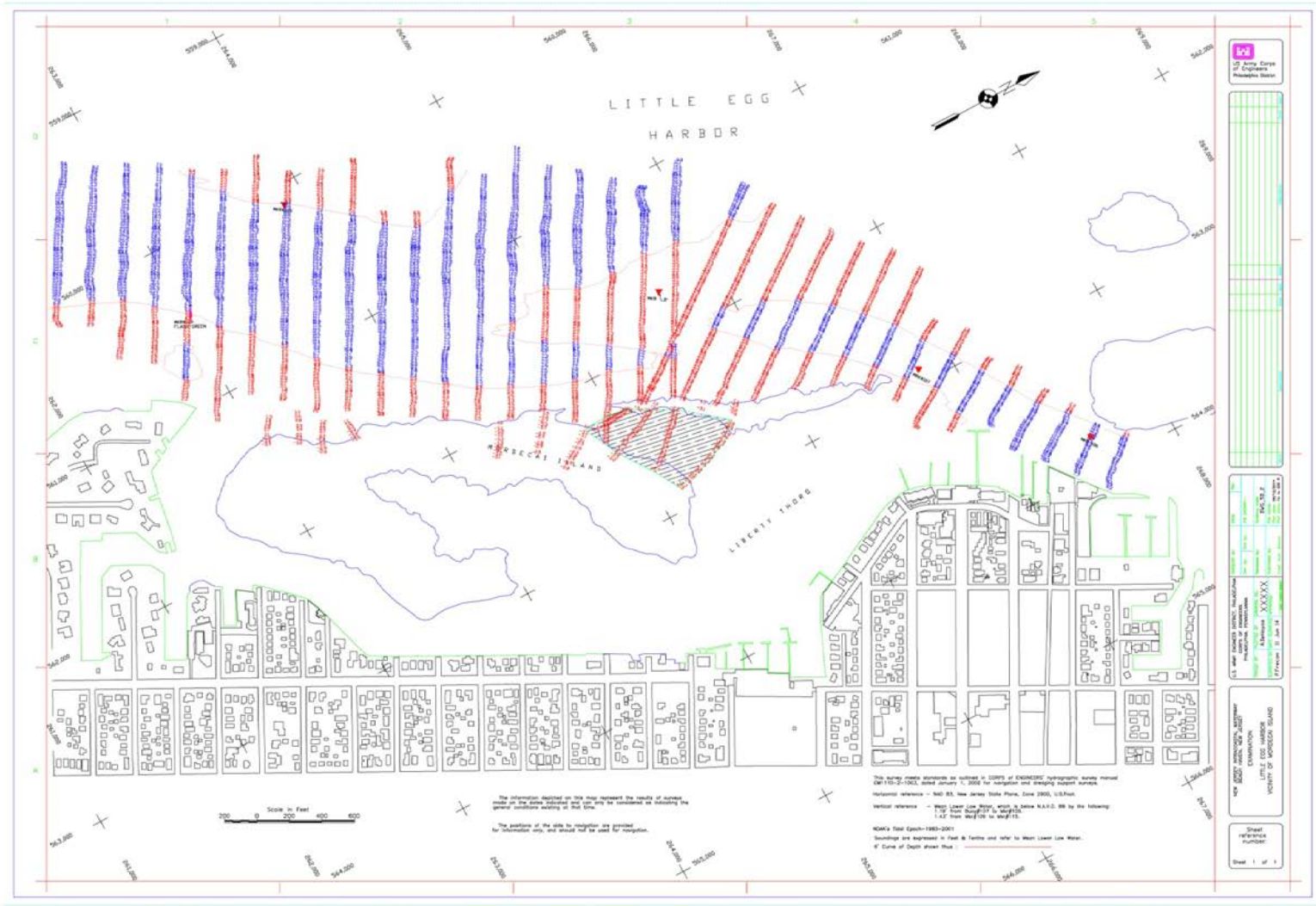


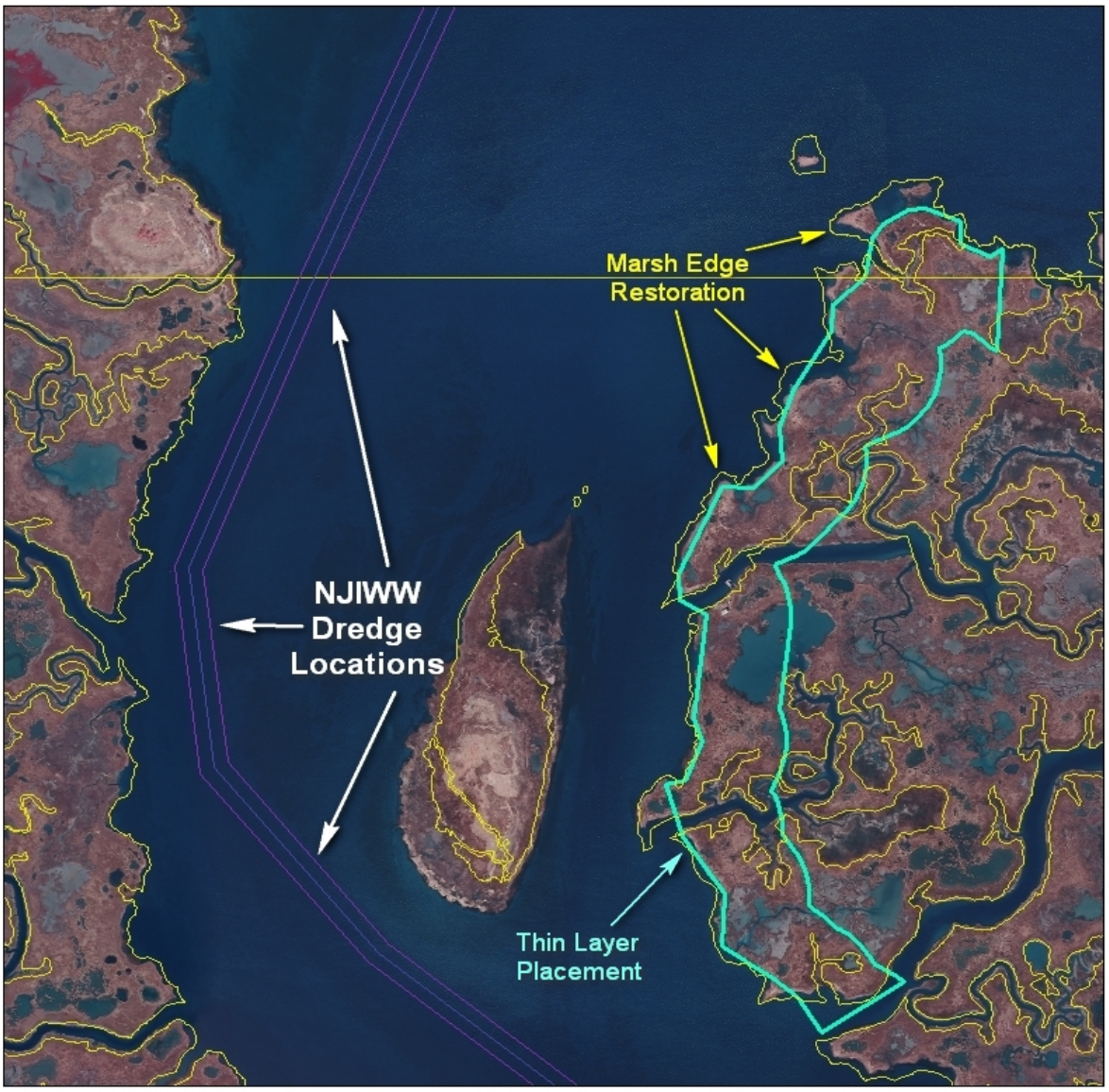
Figure 5. Mordecai Island Dredged Material Placement Site.



# Figure 6. Mordecai Island Placement Location



# Figure 7. Dredge and Placement Area for Avalon




**Potential thin-layer placement area on Avalon back-barrier wetlands within 2000 ft from NJIWW**

**Legend**

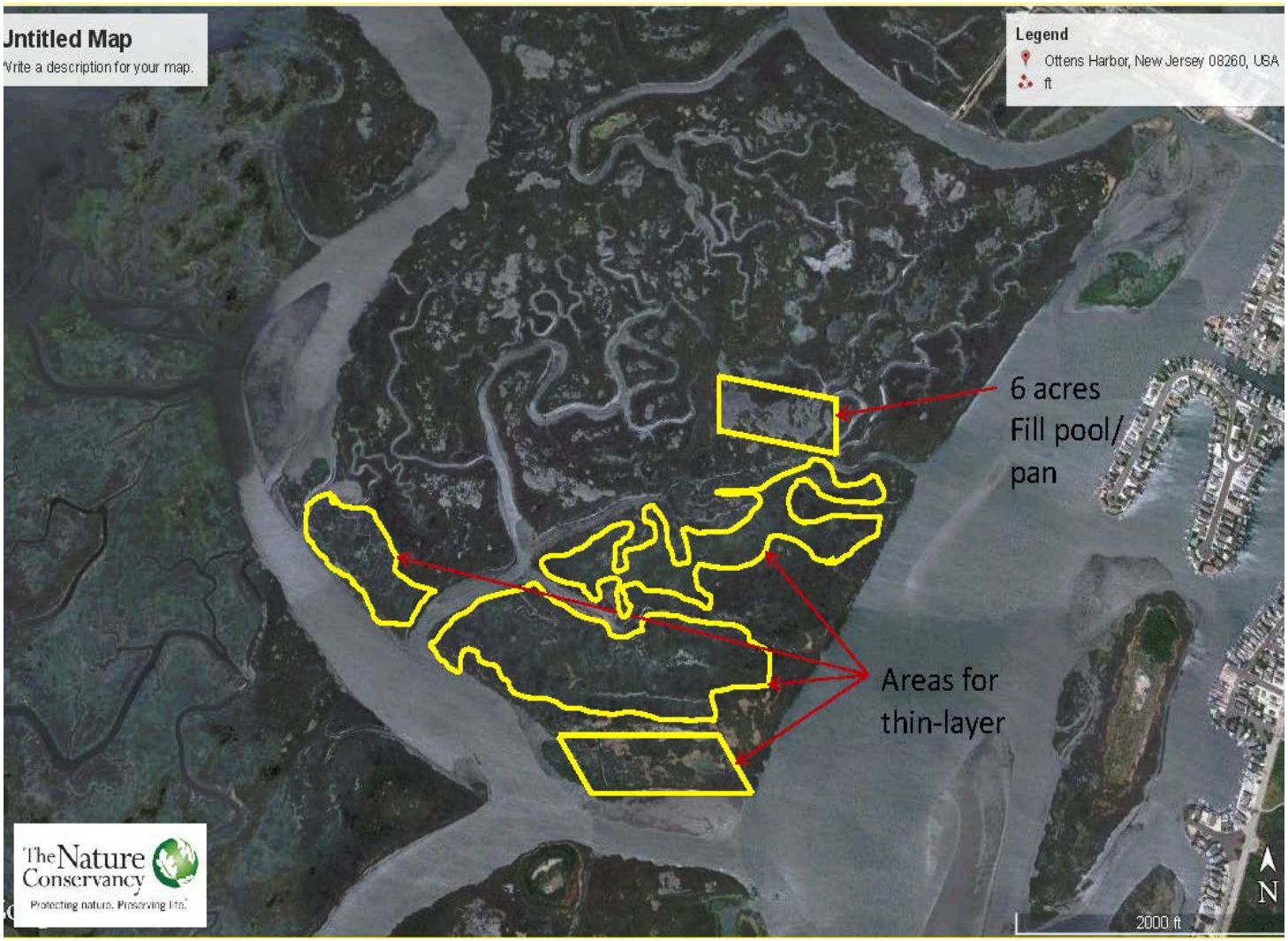
**NJIWW Channel**
True Centerlines
Left Toe Line
Right Toe Line

1977 NJ Tidelands
Avalon back barrier TLP area

N

0 0.1 0.2 0.4 Miles

# Figure 8. Stone Harbor Marsh Restoration Site



11.0 Clean Air Act Statement of Conformity

**CLEAN AIR ACT STATEMENT OF CONFORMITY**
**CHANNEL MAINTENANCE &**
**BENEFICIAL USE OF DREDGED MATERIAL PROJECTS**
**NEW JERSEY INTRACOASTAL WATERWAY**
**OCEAN AND CAPE MAY COUNTIES, NEW JERSEY**

Based on the conformity analysis in the environmental assessment, I have determined that the selected plan conforms to the applicable State Implementation Plan (SIP). The selected plan would comply with Section 176 (c)(1) of the Clean Air Act Amendments of 1990.

Date

Michael A. Bliss, P.E.
Lieutenant Colonel, Corps of Engineers
District Commander

# Appendix A
# Sediment Quality Analysis for Maintenance Dredging and Beneficial Use of Dredged Material within the New Jersey Intracoastal Waterway (Mordecai, Avalon and Stone Harbor)

# Appendix B
# Clean Air Act Assessment

General Conformity Review and Emission Inventory
Channel Maintenance &
Beneficial Use of Dredged Material Projects
New Jersey Intracoastal Waterway
Ocean and Cape May Counties, New Jersey
July 2014

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the New Jersey Intracoastal Waterway (NJIWW) Projects, the Federal Action is to dredge critical NJIWW shoal areas and place the dredged material for beneficial habitat restoration. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction. Ocean and Cape May Counties, New Jersey within which the Federal Action will take place is classified as marginal nonattainment for 8-hour ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). Ocean and Cape May Counties, New Jersey are within the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area.

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system. GC however is applicable. Therefore, the total direct and indirect emissions associated with the NJIWW Projects must be compared to the GC trigger levels presented below.

| **Pollutant** | **General Conformity Trigger Levels (tons per year)** |
|---|---|
| NOx | 100 |
| VOCs | 100 |

To conduct a general conformity review and emission inventory for the NJIWW Projects, a list of equipment necessary for construction was identified. Pertinent pieces of equipment include: a 12 to 14-inch cutter-suction dredge, two work tugs and two work boats. Table 1 lists these pieces of equipment along with the number of engines, engine size (hp), and duration of operation. A Load Factor (LF) was also selected for each engine, which represents the average percentage of rated horsepower used during a source's operational profile.

Table 1 shows the estimated hp-hr required for each equipment/engine category. Hp-hr was calculated using the following equation:

**hp-hr = # of engines*hp*LF*hrs/day*days of operation**

The second calculation is to derive the total amount of emissions generated from each equipment/engine category by multiplying the power demand (hp-hr) by an emission factor (g/hp-hr). The following equations were used:

emissions (g) = power demand (hp-hr) * emission factor (g/hp-hr)

emissions (tons) = emissions (g) * (1 ton/907200 g)

Table 2 provides the NOx and VOC emission factors selected for each equipment/engine category. Tables 3 and 4 present the emission estimates for NOx and VOCs, respectively. The tables present the emissions from each individual equipment/engine category and the combined total.

The total estimated emissions that would result from construction of the NJIWW Projects are Mordecai Island: 10.28 tons of NOx and 0.31 tons of VOCs; Avalon: 22.76 tons of NOx and 0.68 tons of VOCs; and Stone Harbor: 5.14 tons of NOx and 0.15 tons of VOCs. These emissions are below the General Conformity trigger levels of 100 tons per year for each pollutant. General Conformity under the Clean Air Act, Section 176 has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total direct and indirect emissions from the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and VOCs) in a Marginal Nonattainment Area (100 tons of each pollutant per year). The project is not considered regionally significant under 40 CFR 93.153 (i).

General Conformity Review and Emission Inventory for the Mordecai Island Project

Table 1. Project Emission Sources and Estimated Power

hp-hr = # of engines*hp*LF*hrs/day*days of operation

Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile.

| Equipment/Engine Category | # of engines | hp | LF | hrs/day | days of operation | hp-hr |
|---|---|---|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 1 | 1500 | 0.40 | 24 | 42 | 604800 |
| Hydraulic Pipeline Dredge - Electric Generator | 1 | 100 | 0.40 | 24 | 42 | 40320 |
| Tugboat - Prime Engine | 2 | 150 | 0.40 | 24 | 42 | 120960 |
| Tugboat - Auxiliary Engine | 2 | 25 | 0.20 | 24 | 42 | 10080 |
| Crew/Survey Workboat - Prime Engine | 2 | 300 | 0.40 | 24 | 42 | 241920 |
| Crew/Survey Workboat - Auxiliary Engine | 2 | 275 | 0.20 | 24 | 42 | 110880 |

General Conformity Review and Emission Inventory for the Mordecai Island Project

Table 2. Emission Factors

| Equipment/Engine Category | NOx Emission Factors (g/hp-hr) | VOC Emission Factors (g/hp-hr) |
|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 8.162 | 0.197 |
| Hydraulic Pipeline Dredge - Electric Generator | 8.839 | 0.556 |
| Tugboat - Prime Engine | 8.162 | 0.197 |
| Tugboat - Auxiliary Engine | 8.839 | 0.556 |
| Crew/Survey Workboat - Prime Engine | 8.162 | 0.197 |
| Crew/Survey Workboat - Auxiliary Engine | 8.839 | 0.556 |

General Conformity Review and Emission Inventory for the Mordecai Island Project

Table 3. Emission Estmates (NOx)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

| **Equipment/Engine Category** | **hp-hr** | **EF (g/hp-hr)** | **Emissions (tons)** |
|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 604800 | 8.162 | 5.44 |
| Hydraulic Pipeline Dredge - Electric Generator | 40320 | 8.839 | 0.39 |
| Tugboat - Prime Engine | 120960 | 8.162 | 1.09 |
| Tugboat - Auxiliary Engine | 10080 | 8.839 | 0.10 |
| Crew/Survey Workboat - Prime Engine | 241920 | 8.162 | 2.18 |
| Crew/Survey Workboat - Auxiliary Engine | 110880 | 8.839 | 1.08 |
| | | **Total NOx Project Emissions (tons) =** | **10.28** |

General Conformity Review and Emission Inventory for the Mordecai Island Project

Table 4. Emission Estmates (VOCs)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

| **Equipment/Engine Category** | **hp-hr** | **EF (g/hp-hr)** | **Emissions (tons)** |
|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 604800 | 0.197 | 0.13 |
| Hydraulic Pipeline Dredge - Electric Generator | 40320 | 0.556 | 0.025 |
| Tugboat - Prime Engine | 120960 | 0.197 | 0.03 |
| Tugboat - Auxiliary Engine | 10080 | 0.556 | 0.01 |
| Crew/Survey Workboat - Prime Engine | 241920 | 0.197 | 0.05 |
| Crew/Survey Workboat - Auxiliary Engine | 110880 | 0.556 | 0.07 |
| | | **Total VOCs Project Emissions (tons) =** | **0.31** |

General Conformity Review and Emission Inventory for the Avalon Project

Table 1. Project Emission Sources and Estimated Power

hp-hr = # of engines*hp*LF*hrs/day*days of operation

Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile.

| Equipment/Engine Category | # of engines | hp | LF | hrs/day | days of operation | hp-hr |
|---|---|---|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 1 | 1500 | 0.40 | 24 | 93 | 1339200 |
| Hydraulic Pipeline Dredge - Electric Generator | 1 | 100 | 0.40 | 24 | 93 | 89280 |
| Tugboat - Prime Engine | 2 | 150 | 0.40 | 24 | 93 | 267840 |
| Tugboat - Auxiliary Engine | 2 | 25 | 0.20 | 24 | 93 | 22320 |
| Crew/Survey Workboat - Prime Engine | 2 | 300 | 0.40 | 24 | 93 | 535680 |
| Crew/Survey Workboat - Auxiliary Engine | 2 | 275 | 0.20 | 24 | 93 | 245520 |

General Conformity Review and Emission Inventory for the Avalon Project

Table 2. Emission Factors

| Equipment/Engine Category | NOx Emission Factors (g/hp-hr) | VOC Emission Factors (g/hp-hr) |
|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 8.162 | 0.197 |
| Hydraulic Pipeline Dredge - Electric Generator | 8.839 | 0.556 |
| Tugboat - Prime Engine | 8.162 | 0.197 |
| Tugboat - Auxiliary Engine | 8.839 | 0.556 |
| Crew/Survey Workboat - Prime Engine | 8.162 | 0.197 |
| Crew/Survey Workboat - Auxiliary Engine | 8.839 | 0.556 |

General Conformity Review and Emission Inventory for the Avalon Project

Table 3. Emission Estmates (NOx)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

| **Equipment/Engine Category** | **hp-hr** | **EF (g/hp-hr)** | **Emissions (tons)** |
|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 1339200 | 8.162 | 12.05 |
| Hydraulic Pipeline Dredge - Electric Generator | 89280 | 8.839 | 0.87 |
| Tugboat - Prime Engine | 267840 | 8.162 | 2.41 |
| Tugboat - Auxiliary Engine | 22320 | 8.839 | 0.22 |
| Crew/Survey Workboat - Prime Engine | 535680 | 8.162 | 4.82 |
| Crew/Survey Workboat - Auxiliary Engine | 245520 | 8.839 | 2.39 |

**Total NOx Project Emissions (tons) = 22.76**

General Conformity Review and Emission Inventory for the Avalon Project

Table 4. Emission Estmates (VOCs)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

| Equipment/Engine Category | hp-hr | EF (g/hp-hr) | Emissions (tons) |
|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 1339200 | 0.197 | 0.29 |
| Hydraulic Pipeline Dredge - Electric Generator | 89280 | 0.556 | 0.05 |
| Tugboat - Prime Engine | 267840 | 0.197 | 0.06 |
| Tugboat - Auxiliary Engine | 22320 | 0.556 | 0.01 |
| Crew/Survey Workboat - Prime Engine | 535680 | 0.197 | 0.12 |
| Crew/Survey Workboat - Auxiliary Engine | 245520 | 0.556 | 0.15 |

**Total VOCs Project Emissions (tons) = 0.68**

General Conformity Review and Emission Inventory for the Stone Harbor Project

Table 1. Project Emission Sources and Estimated Power

hp-hr = # of engines*hp*LF*hrs/day*days of operation

Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile.

| Equipment/Engine Category | # of engines | hp | LF | hrs/day | days of operation | hp-hr |
|---|---|---|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 1 | 1500 | 0.40 | 24 | 21 | 302400 |
| Hydraulic Pipeline Dredge - Electric Generator | 1 | 100 | 0.40 | 24 | 21 | 20160 |
| Tugboat - Prime Engine | 2 | 150 | 0.40 | 24 | 21 | 60480 |
| Tugboat - Auxiliary Engine | 2 | 25 | 0.20 | 24 | 21 | 5040 |
| Crew/Survey Workboat - Prime Engine | 2 | 300 | 0.40 | 24 | 21 | 120960 |
| Crew/Survey Workboat - Auxiliary Engine | 2 | 275 | 0.20 | 24 | 21 | 55440 |

General Conformity Review and Emission Inventory for the Stone Harbor Project

Table 2. Emission Factors

| Equipment/Engine Category | NOx Emission Factors (g/hp-hr) | VOC Emission Factors (g/hp-hr) |
|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 8.162 | 0.197 |
| Hydraulic Pipeline Dredge - Electric Generator | 8.839 | 0.556 |
| Tugboat - Prime Engine | 8.162 | 0.197 |
| Tugboat - Auxiliary Engine | 8.839 | 0.556 |
| Crew/Survey Workboat - Prime Engine | 8.162 | 0.197 |
| Crew/Survey Workboat - Auxiliary Engine | 8.839 | 0.556 |

General Conformity Review and Emission Inventory for the Stone Harbor Project

Table 3. Emission Estmates (NOx)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

| **Equipment/Engine Category** | **hp-hr** | **EF (g/hp-hr)** | **Emissions (tons)** |
|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 302400 | 8.162 | 2.72 |
| Hydraulic Pipeline Dredge - Electric Generator | 20160 | 8.839 | 0.20 |
| Tugboat - Prime Engine | 60480 | 8.162 | 0.54 |
| Tugboat - Auxiliary Engine | 5040 | 8.839 | 0.05 |
| Crew/Survey Workboat - Prime Engine | 120960 | 8.162 | 1.09 |
| Crew/Survey Workboat - Auxiliary Engine | 55440 | 8.839 | 0.54 |

**Total NOx Project Emissions (tons) = 5.14**

General Conformity Review and Emission Inventory for the Stone Harbor Project

Table 4. Emission Estmates (VOCs)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

| **Equipment/Engine Category** | **hp-hr** | **EF (g/hp-hr)** | **Emissions (tons)** |
|---|---|---|---|
| Hydraulic Pipeline Dredge - Total Power | 302400 | 0.197 | 0.07 |
| Hydraulic Pipeline Dredge - Electric Generator | 20160 | 0.556 | 0.01 |
| Tugboat - Prime Engine | 60480 | 0.197 | 0.01 |
| Tugboat - Auxiliary Engine | 5040 | 0.556 | 0.003 |
| Crew/Survey Workboat - Prime Engine | 120960 | 0.197 | 0.03 |
| Crew/Survey Workboat - Auxiliary Engine | 55440 | 0.556 | 0.03 |

**Total VOCs Project Emissions (tons) = 0.15**

# Appendix C
# Pertinent Correspondence

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

14-3108-1 JWR.
HPO-F2014-464

MAY 28 2014

Environmental Resources Branch

Daniel Saunders
Deputy State Historic Preservation Officer
Mail Code 501-04B
State of New Jersey
Department of Environmental Protection
Historic Preservation Office
PO Box 420
Trenton, NJ 08625-0420

RECEIVED
JUN 3 2014
HISTORIC PRESERVATION OFFICE

Dear Mr. Saunders:

The US Army Corps of Engineers, Philadelphia District (USACE) are proposing to maintenance dredge a section of the New Jersey Intracoastal Waterway (NJIWW) and to use the material to fill a breach that has occurred on Mordecai Island. Mordecai Island is located near Beach Haven Borough in Barnegat Bay, Ocean County, New Jersey. Strong tidal currents and waves that develop over a large fetch have contributed to severe shoreline erosion along Mordecai. Over the past 100 years, half the island has been lost through erosion. The western edge, adjacent to the NJIWW, has receded at a rate on the order of 3 to 6 feet per year. Communication with locals indicates that some recreational boaters use the breach that occurred as a cut through, contributing to further erosion of the critical habitat. Additionally, since shoaling exists in the marked NJIWW channel but deeper water exists adjacent to the island, the wakes of vessels are now contributing to increased wave action in the vicinity of the eroding Mordecai Island shoreline.

Funding for maintenance of the NJIWW has been limited in recent years. However, as a result of Hurricane Sandy impacts, funding to dredge critical shoals in the NJIWW was made available under P.L. 113-2: Disaster Relief Appropriations Act (FY 2013) - Operations and Maintenance (O&M) Emergency Supplemental. A lease-of-plant maintenance dredging contract was awarded to Barnegat Bay Dredging Company to address impacted areas in the waterway and work to restore the channel near Mordecai Island has been identified as a critical shoal to be addressed. Beneficial use of the NJIWW material to prevent further loss and help re-establish the critically eroding island is an optimum regional sediment management solution for the issues in this area.

Approximately 30,000 cu yards of material would be dredged from the NJIWW between channel markers 107 and 108. The material would be placed in the breach area of Mordecai Island within the zone identified on the enclosed figure. Material would be placed to the same elevation as the adjacent existing salt marsh vegetation. This "plug" of material will bolster the island and create a living shoreline as a short-term solution to the severe erosion threatening the remaining portions of the island. The longer-term solutions under investigation by USACE and NJDEP are seeking to continue work to further stabilize and restore the island to the 1977 tidelands map limits.

Since the NJIWW will only be dredged to its previously authorized depth, and since the placement of dredged material will serve to stabilize Mordecai Island, the USACE has determined that the proposed action will have *No Effect* on historic properties eligible for or listed on the National Register of Historic Places pursuant to 36CFR800.4(d)(1). We request your review of the proposed project and your concurrence with our *No Effect* determination. If you have any questions or comments please contact our District Cultural Resource Specialist, Nikki Minnichbach via email at Nicole.c.minnichbach@usace.army.mil or by phone at 215-656-6556. Thank you for your participation in the Section 106 review process.

Sincerely,

for C. MacIntosh
Peter R. Blum, P.E.
Chief, Planning Division

Enclosures

CONCUR

Daniel D. Saunders 6/27/14
DEPUTY STATE HISTORIC PRESERVATION OFFICER — DATE

# United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Jersey Field Office
Ecological Services
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609/646 9310
Fax: 609/646 0352
http://www.fws.gov/northeast/njfieldoffice

In Reply Refer To:
14-CPA-0172

Peter R. Blum, Chief
Planning Division, Philadelphia District
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

JUL 0 7 2014

Dear Mr. Blum:

The U.S. Fish and Wildlife Service (Service) has reviewed your office's determination with regard to the effect on federally listed threatened and endangered species and species proposed for listing for three proposed projects located along the New Jersey Intracoastal Waterway (NJIWW). The three projects involve dredging portions of the NJIWW in the vicinity of Mordecai Island, Ocean County, and Avalon and Stone Harbor, Cape May County. Beneficial use of dredged material is proposed within these three areas.

For Mordecai Island, the U.S. Army Corps of Engineers, Philadelphia District, Planning Division (Corps) proposes to place 300,000 cubic yards of dredged material to close a breach area of the island and restore the island to the 1977 New Jersey Tidelands map limits. The Service views this project as beneficial in protecting shellfish and submerged aquatic vegetation beds, and in restoring habitat for nesting black skimmers (*Rhyncops niger*) that are listed as State-endangered.

For Avalon and Stone Harbor, the Corps proposes to dredge approximately 75,000 and 7,000 cubic yards of material, respectively, and place it in partnership with the New Jersey Division of Fish and Wildlife (NJDFW) and The Nature Conservancy (TNC) as thin layer application for the restoration of nearby marsh areas owned by the State of New Jersey. The Stone Harbor project includes a proposal to place some of the dredged material at the terminal jetty near Stone Harbor Point.

## AUTHORITY

The following comments on the proposed activity have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*), the Endangered Species

Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA), and the Migratory Bird Treaty Act (MBTA) (40 Stat. 755 as amended; 16 U.S.C. 703-712).

## FEDERALLY LISTED SPECIES AND SPECIES PROPOSED FOR LISTING

### Piping Plover

The federally listed (threatened) piping plover (*Charadrius melodus*) nests at Stone Harbor Point. The Service has received insufficient information on the proposed placement of dredged material at the terminal jetty near Stone Harbor Point to concur with the Corps' not likely to adversely affect determination. The Service requests specific information on this portion of the project (*i.e.*, percentage of sand in the dredged material, mode of delivery, duration of project activity, and time of the year). Further consultation pursuant to Section 7 of the ESA is required by the Service.

### Roseate Tern

The federally listed (endangered) roseate tern (*Sterna dougallii*) is considered a transient species in New Jersey. The Service concurs that the Corps-sponsored projects are not likely to adversely affect the roseate tern.

### Seabeach Amaranth

The federally listed (threatened) plant seabeach amaranth (*Amaranthus pumilus*) is an annual plant endemic to Atlantic Coast beaches and barrier islands. There are no records of seabeach amaranth occurring within the Corps-proposed project areas. Therefore, the Service concurs that project activities are not likely to adversely affect seabeach amaranth.

### Red Knot

Sedge Island near Stone Harbor provides known roosting and foraging habitat for the red knot (*Calidris canutus rufa*) (proposed for listing under the ESA and protected under the MBTA) during fall migration. The red knot may also utilize other marshes within the project area for roosting. Red knots may occur in small to large numbers between July 15 and November 15. If project activities will be conducted within this time frame, the Service recommends that the NJDFW and TNC monitor red knot activity near Avalon and Stone Harbor, collect data on both timing and numbers of migrating red knots in the general area, and record any reaction of the birds to disturbance from project activities. Any monitoring information collected should be provided to the Service. These data will help the Service prepare a "best practices" guidance document for minimizing disturbance to roosting and foraging red knots during fall migration.

**CONTAMINANTS**

The Service reviewed the chemical data for the material to be dredged within the NJIWW, a comprehensive data set with regard to quantification of polychlorinated biphenyls by the Environmental Protection Agency (EPA) Methods 8082 and 1668, as well as EPA Method 1613 for chlorinated dioxins and furans. The data indicate some low level enrichment of mercury relative to the State of New Jersey's most stringent mercury marine sediment quality standards (ER-L), but mercury does not exceed the level at which half of the studies reported harmful effects (ER-M). Generally, the chemical data do not reveal overt cause for rejection of the material to be dredged for beneficial uses.

Thank you for the opportunity to comment on the subject project. Our office will support the recommendations to be provided by the National Marine Fisheries Service. Should you have any questions, please contact Carlo Popolizio at (609) 383-3938 extension 32.

Sincerely,

Eric Schrading
Field Supervisor

cc: Karen.Greene@noaa.gov
Dave.Jenkins@dep.state.nj.us
David.Golden@comcast.net
Monica.A.Chasten@usace.army.mil

ES:NJFO:cpopoliz:RP:ES:cap: 7/2/14
P:\Shared\Carlo\14-CPA0172 [CORPS letter]

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Resources Branch

JUN 19 2014

Mr. Eric Schrading, Supervisor
U.S. Fish and Wildlife Service
New Jersey Field Office
927 North Main Street, Building D
Pleasantville, New Jersey 08232

Dear Mr. Schrading:

The purpose of this letter is to provide this office's determination with regard to the effect on Federally listed threatened and endangered species under U.S. Fish and wildlife Service (USFWS) jurisdiction, as required under Section 7 of the Endangered Species Act, for three proposed projects located along the New Jersey Intracoastal Waterway (NJIWW). Funding for maintenance of the NJIWW has been limited in recent years. However, as a result of Hurricane Sandy impacts, funding to dredge critical shoals in the NJIWW was made available under P.L. 113-2: Disaster Relief Appropriations Act (FY 2013) - Operations and Maintenance (O&M) Emergency Supplemental. A lease-of-plant maintenance dredging contract was awarded to Barnegat Bay Dredging Company to address impacted areas in the waterway, and critical shoals in the vicinity of Mordecai Island, Avalon and Stone Harbor have been identified as areas to be addressed. Beneficial use of the NJIWW material to prevent further loss and help re-establish critically eroding habitats is an optimum regional sediment management solution for the issues in this area.

Mordecai Island

Mordecai Island is located near Beach Haven Borough in Barnegat Bay, Ocean County, New Jersey and is adjacent to the NJIWW (Figure 1). Strong tidal currents and waves that develop over a large fetch have contributed to severe shoreline erosion along Mordecai. Over the past 100 years, half the island has been lost through erosion. The western edge, adjacent to the NJIWW, has receded at a rate on the order of 3 to 6 feet per year. Communication with locals indicates that some recreational boaters use the breach that occurred as a cut through, contributing to further erosion of the critical habitat. Additionally, since shoaling exists in the

marked NJIWW channel but deeper water exists adjacent to the island, the wakes of vessels are now contributing to increased wave action in the vicinity of the eroding Mordecai Island shoreline.

Continued erosion of Mordecai Island threatens an abundant diversity of natural wildlife habitats including open marsh, salt ponds, exposed mud flats, shrub-dominated areas and shallow water eelgrass beds. These habitats provide breeding, foraging, nesting and resting areas for many species of migratory birds, including shorebirds, wading birds, raptors and waterfowl. The objective of the Mordecai Island beneficial use of dredged material project is to preserve and protect Mordecai Island's diverse natural bird and marine habitats by stabilizing the shoreline and reducing future erosion. Since many of the finfish species found in the eelgrass are recreationally and commercially valuable, protecting their habitats would be both ecologically and economically important.

For Mordecai Island, approximately 30,000 cubic yards of material would be dredged from the NJIWW between channel markers 107 and 108. The material would be placed in the breach area of Mordecai Island within the zone identified in Figure 2. Material would be placed to the same elevation as the adjacent existing salt marsh vegetation. Hay bales would be placed on the eastern edge of this zone to confine the material and then the sediment would be hydraulically placed beginning with the hay bale edge working west until the gap between the islands is filled. Hay bales would be used as needed and where feasible to stabilize the western edge of the area after placement. This "plug" of material would bolster the island and create a living shoreline as a short-term solution to the severe erosion threatening the remaining portions of the island. Longer-term solutions are under investigation by the Corps and the New Jersey Department of Environmental Protection to further stabilize and restore the island to the 1977 New Jersey tidelands map limits (Figure 3).

Avalon Dredging Location

Avalon is a borough in Cape May County, New Jersey, on the northern portion of Seven Mile Island. The portion of the NJIWW channel in the vicinity of Avalon that requires maintenance dredging is between channel markers 386 and 397 (Figure 4). The channel is critically shoaled to depths of approximately 3 feet MLW creating a significant hazard to navigation and public safety. Approximately 75,000 cubic yards of material are required to be dredged from this portion of the NJIWW channel to restore the channel to authorized depth. The dredged material placement sites are being developed with the NJ Division of Fish and Wildlife and the Nature Conservancy and it is anticipated that the material will be used beneficially for marsh restoration. Areas being considered for restoration on State owned property are shown on Figure 4.

Stone Harbor Dredging Location

Stone Harbor is a borough in Cape May County, New Jersey, on the southern portion of Seven Mile Island. The portion of the NJIWW channel in the vicinity of Stone Harbor that requires maintenance dredging is between channel markers 416 and 421 (Figure 5). Navigable depths through the channel are approximately 3 feet MLW creating a significant hazard to boaters in a highly utilized section of the waterway. The critical shoal is composed of approximately 7,000 cubic yards of sand. The dredged material placement sites are also being developed in conjunction with the NJ Division of Fish and Wildlife and the Nature Conservancy. Proposed areas for placement are shown on Figure 6 and most probable actions include thin layer application of dredge material and restoration of marsh that is subsiding on State owned property (Figure 7).

Due to the location of the proposed projects along the NJIWW, the Federally listed piping plover (Charadrius melodus), roseate tern (Sterna dougallii dougallii) and seabeach amaranth (Amaranthus pumilus) have been considered by the Corps. Additionally, potential effects to the candidate species red knot (Calidris canutus rufa) have been considered.

Based on the available information, it is the determination of this office that the proposed projects are not likely to adversely affect the above listed threatened and endangered species. The Corps is also coordinating with the National Marine Fisheries Service with regard to Federally threatened and endangered species under their jurisdiction,

In order to conclude the informal Section 7 consultation process, we request your concurrence with the determination stated above. We request that your concurrence or any comments you may have be supplied to this office within 30 days of the date of this letter. If you have any questions or need additional information, please contact Jerry Pasquale of my staff at 215-656-6560 or at Jerry.J.Pasquale@usace.army.mil. Thank you for your attention to this matter.

Sincerely,

for C. MacIntosh

Peter R. Blum, P.E.
Chief, Planning Division

Enclosures