DRAFT
ENVIRONMENTAL ASSESSMENT
NJIWW CHANNEL MAINTENANCE AND BENEFICIAL USE OF DREDGED MATERIAL IN THE VICINITY OF STONE HARBOR, CAPE MAY COUNTY NEW JERSEY

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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 (Figure 1). 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 Lower Low Water (MLLW), except in the southern portion from Ottens Harbor south through the Cape May Canal where it is maintained to a depth of up to 12 feet MLLW.

The NJIWW Project is a 117 mile long waterway that provides for a safe channel supporting the life safety mission of eight U.S. Coast Guard (USCG) Stations (four of which are Search and Rescue Stations), a USCG Aids to Navigation Station Cape May, and the nation's only enlisted USCG Training Base. The NJIWW maintained channel also supports the East Coast's largest and the 5th most valuable U.S. Commercial Fishing Fleet and connects the commercial fishing ports utilizing Barnegat, Absecon, Cold Spring and Manasquan Inlets. 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

Maintenance dredging is needed to remove critically shoaled areas along portions of the NJIWW when sedimentation occurs and authorized depths are no longer available. Funding for maintenance of the NJIWW has been limited in recent years, however, as a result of Hurricane Irene and Hurricane Sandy impacts, emergency supplemental funding to dredge critical shoals in the NJIWW was made available. Additional funding was received under the Operations and Maintenance budget in 2018 and dredging to restore the channel continues under a lease-of-plant maintenance dredging contract awarded to Barnegat Bay Dredging Company. Critical shoals remain in the vicinity of Stone Harbor, New Jersey due to the lack of long-term dredged material placement sites (Figure 2). Recent successes in creating and restoring degraded coastal habitats with dredged material in this vicinity along the NJIWW have opened up additional opportunities for addressing these shoals through a systems approach. Beneficial use of the dredged material within a system of habitats over time 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 Stone Harbor 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 or degraded 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 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, coastal 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 Location and Objectives

Stone Harbor is a borough in Cape May County, New Jersey. It occupies the southern portion of Seven Mile Island together with its northern neighbor Avalon. The portion of the NJIWW channel in the vicinity of Stone Harbor that requires maintenance dredging is between channel markers 419 and 421 (Figure 2). The channel is critically shoaled to depths of approximately 3 to 5 feet MLW creating a significant hazard to navigation and public safety. Approximately 12,000 cubic yards of sand are required to be dredged from this portion of the NJIWW channel to restore the channel to the authorized depth of 6 feet MLW plus 1 foot of overdepth dredging. The dredged material will be used beneficially and placement sites are being developed with the New Jersey Division of Fish and Wildlife (NJDFW) and the Wetlands Institute for habitat restoration/creation on land owned by the NJDFW.

The current intent is to create a system of sites (1 to 2 acres each) that provide shorebird nesting habitat and expands on the successful habitat created on Ring Island Site 1. Target species include the State endangered black skimmer (*Rynchops niger*) and least tern (*Sternula antillarum*). These species nest on open sandy beaches, inlets, sandbars, offshore islands, and dredged material disposal sites that are sparsely vegetated and contain shell fragments. Important attributes of suitable sites include the lack of vegetation and sufficient elevation to prevent nests from being flooded during extreme high tides and storm events. These attributes may change at a given site from year to year. As such, periodic placement of additional material may be necessary to maintain habitat suitability. Having a system of sites insures that there will be suitable nesting habitat each year even if some sites require placement of additional material for maintenance. Other species of concern that would benefit from these open sandy sites include the American oystercatcher (*Haematopus palliatus)* and northern diamondback terrapin (*Malaclemys terrapin terrapin*). These species also nest on sandy bay

beaches. All of these species have suffered from various factors including overharvesting, habitat loss from coastal development, human disturbance from recreational activity and elevated predator levels.

4.0 Alternatives

4.1 No Action

No action assumes that there would be no Federal involvement in maintaining this portion of the NJIWW project, and 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.

4.2 Ring Island Sites

Ring Island (Figure 3) is a saltmarsh complex located in Middle Township, New Jersey, immediately adjacent to the NJIWW across from the borough of Stone Harbor. Ring Island is owned and managed by the New Jersey Department of Environmental Protection, Division of Fish and Wildlife (NJDFW). Five alternative sites have been identified and considered within the Ring Island complex. Sites were identified based on past disturbance or habitat degradation. The design template for these sites is to place sandy dredged material on 1.0 to 2.0-acre parcels to an elevation of 6.0 feet NAVD 88. The final target elevation for nesting habitat is 5.5 feet NAVD 88. Some subsidence occurs after initial placement due to consolidation and compaction. The entire filled sites will not reach the target 5.5 feet. It is anticipated that a portion of the sites will be lower and establish high marsh habitat, which is an enhancement over existing conditions. The construction technique is to initially pump sand on to a site to create a stable base and build up sand that can be subsequently used for creation of a berm around a portion of the site. Sand would be initially contained by the use of hay bales, coir logs and potential use of temporary geotextiles. Once sufficient sand has been placed on the site, a sand berm would be constructed for containment and a portion of the area would be filled to an elevation of 6.0 feet NAVD 88. After placement, the site can be contoured as necessary to achieve the target elevation of 5.5 feet NAVD 88. Additional material may be placed in subsequent years to maintain and optimize habitat quality. Vegetation would be controlled as needed on the sites to keep an open area for nesting. Sites will be monitored by the Wetlands Institute, a non-profit group located in Stone Harbor.

4.2.1 Ring Island Site 1

Ring Island Site 1 (Figure 3) is a 1.9 to 2.0-acre site located in the northeast corner of Ring Island. Site 1 was initially constructed in 2014 as a beneficial use project to create black skimmer and least tern nesting habitat. Dredged material (greater than 90 percent sand) was placed on Ring Island Site 1 in August 2014 and again in February 2018 to create and enhance an elevated nesting habitat for black skimmer and other coastal nesting species. Weekly surveys in 2015, 2016, 2017, and 2018 documented

nesting activity and outcomes at the site. Seven bird species nested on the constructed nesting habitat over this period, including black skimmer and common tern (*Sterna hirundo*) in 2017-2018, and least tern and American oystercatcher in 2015-2018. Reproductive success tended to be high for most species in most years. Currently, there is approximately 0.6 acres of suitable unvegetated nesting habitat. Additional material can be placed at Site 1 to increase suitable nesting habitat by achieving a more uniform target elevation of 5.5 feet NAVD 88 (consolidation and compaction have reduced the extent of the site at this elevation) and reducing the amount of vegetation.

4.2.2 Ring Island Site 2

Ring Island Site 2 (Figure 3) is located immediately north of Site 1. It is approximately 1.0 acre in size, and is a formerly used dredged material disposal area. The site is vegetated at the center with common reed (*Phragmites australis*) and along the outside with saltmeadow cordgrass (*Spartina patens*) and seashore saltgrass (*Distichlis spicata*). These are high marsh grasses typically found near the elevation of mean high tide. The current elevation outside of the high Phragmites center is 3.8 to 3.9 feet NAVD 88. Placement of sand on this site to an elevation of 6.0 feet NAVD 88 and adding additional material to Site 1 for maintenance would require approximately 7,000 to 10,000 cubic yards of dredged material.

4.2.3 Ring Island Site 3

Ring Island Site 3 (Figure 3) is separated from Ring Island by Dung Thorofare, but is within the same marsh Island complex as Ring Island. It is located immediately southeast of Ring Island, and is listed as Great Flat. The site appears to be a formerly used dredged material disposal area. The site is approximately 2.0 acres in size with exiting elevations in the range of 1.5 to 2.5 NAVD 88. The area is a combination of intertidal and high marsh habitat, with saltmarsh cordgrass (*Spartina alterniflora*) being the predominant species of vegetation.

4.2.4 Ring Island Site 4

Ring Island Site 4 (Figure 3) is located within the marsh complex south of Ring Island Site 1. The site is above elevation 2.4 NAVD 88 and is vegetated with saltmarsh cordgrass (*Spartina alterniflora*) and saltmeadow cordgrass (*Spartina patens*). The site is characterized as low to high marsh habitat.

4.2.5 Ring Island Site 5

Ring Island Site 5 (Figure 3) is located on the western side of Ring Island adjacent to Nichols Channel. The area is a combination of intertidal and high marsh habitat, with saltmarsh cordgrass (*Spartina alterniflora*) being the predominant species of vegetation.

A combination of these sites will receive sandy material dredged from the NJIWW. The final determination will be dependent on the quantity of material available. The most

likely scenario for the fall of 2018 is placement of additional material at Site 1 for habitat maintenance and creation of Site 2. These sites are adjacent to each other, which is desirable from both habitat value and constructability perspectives. The sites are accessible for construction equipment and because the sites are adjacent, there would be minimal mobilization required to switch from placing material on one site to the other. It is likely that Site 3 would also be created in the fall of 2018. This site also has construction access and is close to the NJIWW shoal location. Sites 4 and 5 are less likely for the fall of 2018, but could be constructed as part of a regional habitat system in the future as more is learned through post-construction monitoring. Site 5 is more difficult to access with construction equipment and the furthest from the NJIWW shoal. Site 4 is close to the NJIWW channel and would be most disturbed by recreational boats using the channel, as well as boaters looking for a place to access the marsh. All created sites could receive additional material in the future for maintenance of habitat value.

4.3 Stone Harbor Dredging Location

Approximately 12,000 cubic yards of sand would be dredged from the NJIWW channel between channel markers 419 and 421 (Figure 2). Grain size analysis indicates the material is greater than 96 percent sand (Tetra Tech, 2014). This was verified during dredging operations in August 2014 and February 2018. Chapter II-Section C Case 1 of the New Jersey Department of Environmental Protection dredging guidance manual (NJDEP, 1997) indicates that no testing is required if the material to be dredged is greater than 90 percent sand. For this reason, there was no analysis of the chemical quality of the Stone Harbor shoaled sediment. The overall conclusion from the Tetra Tech report is that the sediment is considered clean with respect to chemical contamination and can be used for ecologically beneficial purposes. Dredged material would be pumped to the beneficial use sites via a floating pipeline. The objective at the placement sites is to reuse the dredged material in a beneficial way to create shorebird nesting habitat and improve coastal resiliency. The areas being considered for habitat creation is on State owned property as shown on Figure 3.

5.0 Existing Environment

5.1 Air and Water Quality

<u>Air Quality</u>

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.

Cape May County, 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]). The project is 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

The sediment to be removed in the vicinity of Stone Harbor is greater than 96 percent sand (Tetra Tech, 2014). Chapter II-Section C Case 1 of the New Jersey Department of Environmental Protection dredging guidance manual (NJDEP, 1997) indicates that no 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 shoaled sediment. The overall conclusion from the Tetra Tech 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 project 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 duck (*Anas rubripes*) and mallard (*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 these areas. Isolated wetlands can be found in the interior of some placement sites due to the formation of depressions within the dredged material.

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 shoreline. Near the base of the food chain are benthic invertebrates that live on microscopic algae, plants and animals within the sand or mud. The 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.

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).

<u>Intertidal Benthos</u>

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

TABLE 1 HABITAT REQUIREMENTS OF FEDERALLY MANAGED SPECIES 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 HABITAT REQUIREMENTS OF FEDERALLY MANAGED SPECIES 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 HABITAT REQUIREMENTS OF FEDERALLY MANAGED SPECIES 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 *(Rhizoprionodon 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 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 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 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.

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 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 Threatened and 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.

Although primarily found within the Delaware Bay shoreline and not the ocean coast, the red knot (*Calidris canutus*) is listed as threatened under Endangered Species Act. 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.

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*).

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 alternative 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

The project entails maintenance dredging activities to remove shoaling from the authorized NJIWW Federal navigation project. The dredged material would be utilized for beneficial purposes. The material would be used for creation of black skimmer and least tern nesting habitat on State owned property. Environmental impacts considered in this Environmental Assessment are those associated with maintenance dredging 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 portion of the NJIWW. A summary of the long-term and short-term ecological impacts associated with implementation of the alternative sites under consideration is provided below.

6.1 Air and Water Quality

Air Quality

The project would result in maintenance of existing regional conditions. There would be some minor, short-term impacts (approximately 2 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 alternative. Air emissions resulting from the project 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).

Water Quality

Significant impacts to water quality are not anticipated from implementation of the selected plan. Short-term, temporary and localized impacts to water quality in the form of turbidity are anticipated to occur from maintenance dredging and deposition of sand at the marsh placement sites. Any potential effects would be short-lived and localized and would be limited to the immediate vicinity of the dredging site and the areas that receive 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 (96 percent sand) and would not adversely affect water quality in the area.

6.2 Biological Resources

6.2.1 Terrestrial Habitats

The No Action alternative would not meet the objective of creating nesting habitat for the State endangered black skimmer and least tern populations. There would be minimal temporary adverse impacts to existing terrestrial habitats during construction from construction equipment. Previous projects along the NJIWW (Mordecai Island, Ring Island, Avalon) have utilized dredged material to restore eroded marsh and create habitat with great success. Applications of dredged material have shown improved marsh health, function and resiliency with very short recovery times. Overall the project 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. This project is 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 minimal impact to benthos due to burial of the benthic community during placement activities in the intertidal and nearshore zones in the vicinity of the beneficial use sites. The impact would result from deposition of suspended sediment associated with dewatering the sites on benthic habitats. Best management practices would be employed to minimize this turbidity. The amount of deposition would be minimal.

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 project is intended to provide nesting habitat for the State endangered black skimmer and least tern. No long-term adverse impacts to wildlife resources utilizing the selected restoration sites are anticipated as a result of the project. Some species may leave the sites during construction, but are expected to return. Overall there would be a net benefit to wildlife in the area.

6.2.4 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 or removal during maintenance dredging activities will temporarily disrupt the food chain in the impacted areas.

6.2.5 Essential Fish Habitat

Table 3 provides an Essential Fish Habitat assessment for the project.

Table 3. EFH ASSESSMENT WORKSHEET FOR FEDERAL AGENCIES

PROJECT NAME: NJIWW Channel Maintenance Dredging and Beneficial Use of Dredged Material in the Vicinity of Stone Harbor, Cape May County, 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?	**x**	
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 marsh restoration sites are intertidal.
What are the sediment characteristics?	The material to be dredged is approximately 96 percent 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 to project site? If so describe	No

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?	Regular disturbance from recreational boating and storm events.
What is the area of proposed impact (work footprint & far afield)?	See Figures 1, 2 and 3. The restoration sites are 1 to 2 acres in size.

3. DESCRIPTION OF IMPACTS			
Impacts	**Y**	**N**	**Description**
Nature and duration of activity(s)			Approximately 12,000 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 sites are on State owned property (Figure 3). Material would be dredged from the channel and brought to the marsh via a floating pipeline. The project is expected to take 2 months.
Will benthic community be disturbed?	**Y**		The benthic community would be disturbed at the dredging location. No dredging will occur outside of the authorized channel. The benthic community would be temporarily disturbed at the placement sites.
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 419 and 421 for the project. The channel will be returned to its authorized depth of 6 feet MLW plus 1 foot overdepth dredging.

Will contaminants be released into sediments or water column?		**N**	With respect to chemical contamination, the material to be dredged and placed for beneficial use is greater than 96 percent sand) and would not adversely affect water quality in the area.
Will tidal flow, currents or wave patterns be altered?	**Y**		No
Will water quality be altered?		**N**	The material to be dredged is approximately 96 percent sand and would not affect water quality.

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 area, 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 area and these would include: winter flounder, windowpane flounder, summer flounder, black sea bass and scup. 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: **(check the appropriate statement)**		**There is no adverse effect on EFH** **EFH Consultation is not required**
	X	**The adverse effect on EFH is not substantial.** **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. **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 area, 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 the project on EFH and managed species are not anticipated. The project 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. It is concluded that the project 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 project along the NJIWW, the Federally listed Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus), shortnose sturgeon (Acipenser *brevirostrum*), piping plover (Charadrius melodus), red knot (Calidris canutus rufa), roseate tern (Sterna dougallii dougallii) and seabeach amaranth (Amaranthus pumilus) have been considered. Based on the available information, it has been determined that the proposed project is 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. These agencies concurred with this determination in 2014 for the NJIWW beneficial use projects at Stone Harbor, Avalon and Mordecai Island. In addition, the project would have no adverse impact on State-listed species of birds. The project is 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 restore marshes in the vicinity of 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 project and provide their concurrence with the *No Effect* determination. SHPO concurrence will be received prior to initiation of construction.

7.0 Environmental Justice

None expected; no affected populations. The project is 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 project requires 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. The Corps has applied for these approvals. All approvals will be obtained prior to initiation of construction.

Compliance with NJDEP Coastal General Permit 24 (N.J.A.C. 7:7-6.24). (Please note that the N.J.A.C. 7:7 rule language is shown in italics)

(a) This general permit authorizes habitat creation, restoration, enhancement, and living shoreline activities necessary to implement a plan for the restoration, creation, enhancement, or protection of the habitat, water quality functions, and values of wetlands, wetland buffers, and open water areas, which is sponsored by a Federal or State agency or other entity described in (b) below.

(b) *The following habitat creation, restoration, enhancement, and living shoreline plans are acceptable provided that demonstrate compliance with (c) through (g) below;*

The project is in compliance with (b) above as it is a wildlife management plan approved by the NJDEP Division of Fish and Wildlife (NJDFW). The placement sites for creation of black skimmer and least tern nesting habitats are owned by the NJDFW.

(c) *Habitat creation, restoration, enhancement, and living shoreline activities that are authorized by the general permit include, but are not limited to the following:*

Nesting islands are specifically noted in this rule. The project is in compliance with c above as it includes the construction of nesting island habitats for beach nesting birds and diamond back terrapins.

(d*) To be eligible for authorization under this general permit, an applicant shall demonstrate that the proposed project:*

The plan, which has been developed in conjunction with the NJDEP and the Wetlands Institute, is being implemented to create a system of nesting sites for the State endangered black skimmer and least tern within the Ring Island marsh complex. Ring Island site 1 was initially constructed in 2014 and weekly surveys in 2015, 2016, 2017 and 2018 documented nesting activity by seven bird species including black skimmer and least tern. Reproductive success tended to be high for most species in most years. To maintain productivity, periodic sand nourishment may be required to achieve and hold the target elevation of 5.5 feet NAVD 88, and vegetation needs to be controlled to keep the site open for nesting. As such, a system of multiple sites is desirable so that there is always adequate nesting habitat available each year. With a series of sites, some will be optimal for nesting in a given year while others are being maintained through adaptive management. The documented success at Ring Island site 1 demonstrates that there is a high likelihood of plan success as a system of islands will increase the size and number of valuable nesting habitats. Establishment of nesting islands will improve the values and functions of the Ring Island marsh ecosystem.

(e) *Activities under this general permit, except for living shoreline activities, which are subject to the requirements of (f) below, shall comply with the following:*

The objective of the habitat creation plan is to develop a system of nesting bird islands on the Ring Island marsh complex. Sites have generally been selected based on degraded or previously disturbed areas. As the entire Ring Island marsh complex is considered one type of special area or another pursuant to the N.J.A.C. 7:7, there are no alternatives that would avoid special areas. The constructed sites would be one to two acres in size, which is considered the minimum and optimal from both engineering practicability and habitat suitability perspectives. While there will be a net reduction in wetlands habitat because of this project, the islands will provide nesting habitat to at least two state endangered species. Threatened and Endangered species habitat is also considered a special area pursuant to N.J.A.C. 7:7-9.36. As a result, there will be no net loss of special areas. Furthermore, due to the lack of suitable nesting habitat for the State endangered black skimmer and least tern in the immediate area of Ring Island, the small conversion of marsh habitat to bird nesting islands is environmentally beneficial and outweighs the loss of wetland habitat.

(f) Not applicable

(g*) Public access shall be provided in accordance with the lands and waters subject to public trust rights rule, N.J.A.C. 7:7-9.48, and the public access rule, N.J.A.C. 7:7-16.9.*

This project is in compliance with g above. Public access will only be restricted to this Wildlife Management Area during the period of time that the birds are actively nesting, which is consistent with other beach nesting bird plans that the NJDFW implements.

Based on the information presented above, it is concluded that the project is in compliance with N.J.A.C. 7:7-6.24.

The project discussed in this EA is being 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 of 1977 (16 U.S. C. 1531 et seq.). The project is also being coordinated with NMFS regarding Essential Fish Habitat pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments). Essential fish habitat conservation recommendations will be provided by NMFS prior to the start of construction.

This EA concludes that the proposed beneficial use of dredged material project in the vicinity of Stone Harbor, NJ is not major Federal actions significantly affecting the human environment. Therefore, it has been determined that preparation of an Environmental Impact Statement is not warranted for the project as identified herein, and a Finding of No Significant Impact (FONSI) for the proposed project is appropriate.

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

STATUTES	COMPLIANCE STATUS
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	Ongoing
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 a Channel Maintenance & Beneficial Use of Dredged Material Project in the Vicinity of Stone Harbor, New Jersey, Intracoastal Waterway, Cape May County 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 area is located in Cape May County, New Jersey. See Figure 1.

B. General Description. A project description and objectives are provided in Sections 3.0 and 4.0 of this EA.

C. Purpose. The purpose of the project is to remove a critical shoal from the NJIWW that poses 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 quantity of dredged material is 12,000 cubic yards.

3. Source of Material: All material would be obtained from the existing NJIWW Federal navigation project. Material would be removed between channel markers 419 and 421.

E. Description of Discharge Sites.

1. Location: See Figures 3 in the EA for the project location.

2. Size (acres): Approximately 5-10 acres.

3. Type of Sites: The project entails placement of material on open marsh.

4. Type of Habitat: estuarine.

5. Timing and Duration of Discharge: 2 months. Construction is anticipated during the Fall of 2018.

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: Minor sediment movement is anticipated at the marsh placement 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.

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

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 project.

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 area 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:

The area to be dredged is approximately 96 percent sand and considered clean relative to contaminants.

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 project construction.

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 alternative for restoring habitat 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 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.

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NJIWW CHANNEL MAINTENANCE AND BENEFICIAL USE OF DREDGED MATERIAL IN THE VICINITY OF STONE HARBOR, CAPE MAY COUNTY NEW JERSEY

ENVIRONMENTAL ASSESSMENT

FIGURES

Figure 1. Study Area

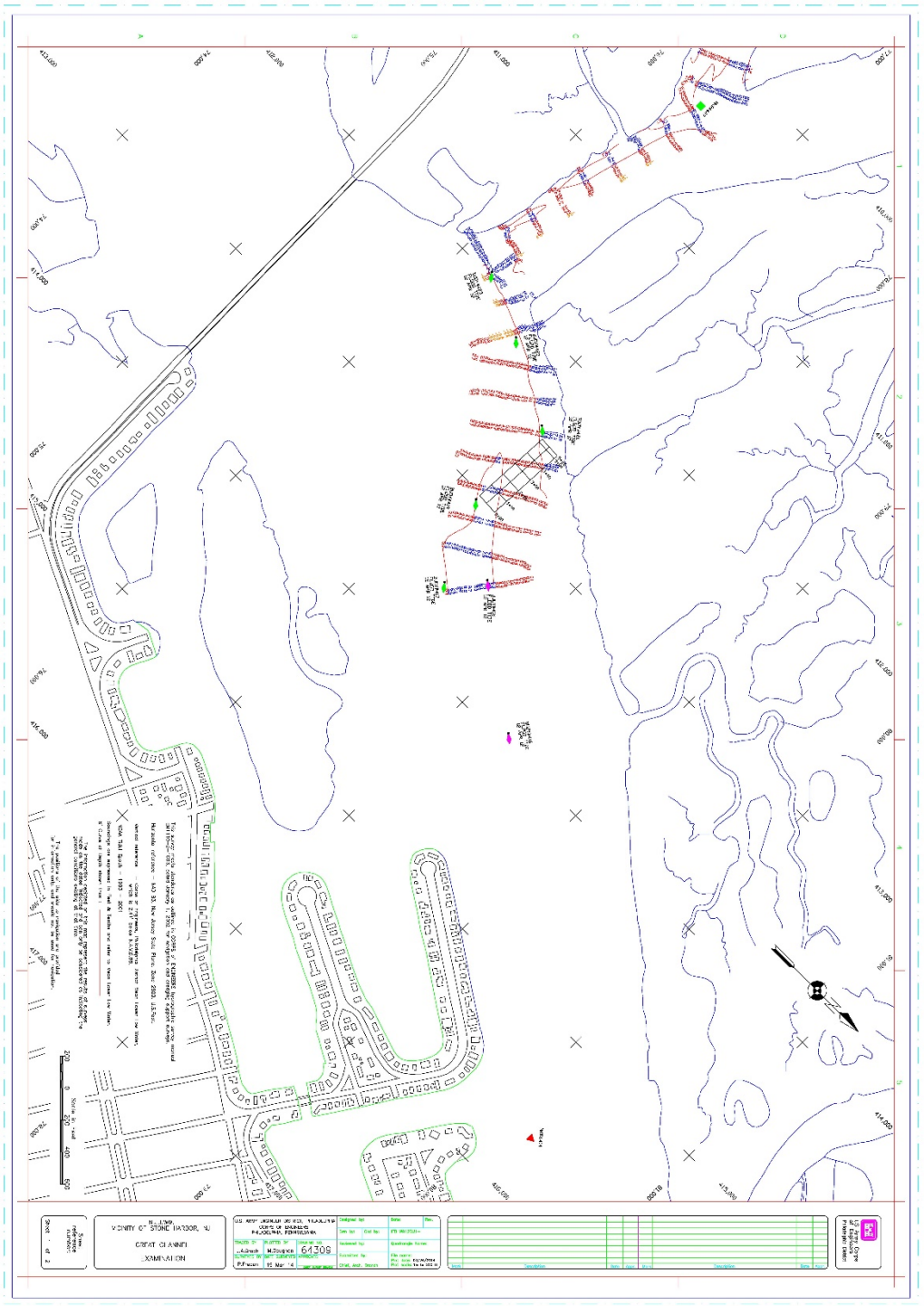

Figure 2. Location of Dredging in the NJIWW

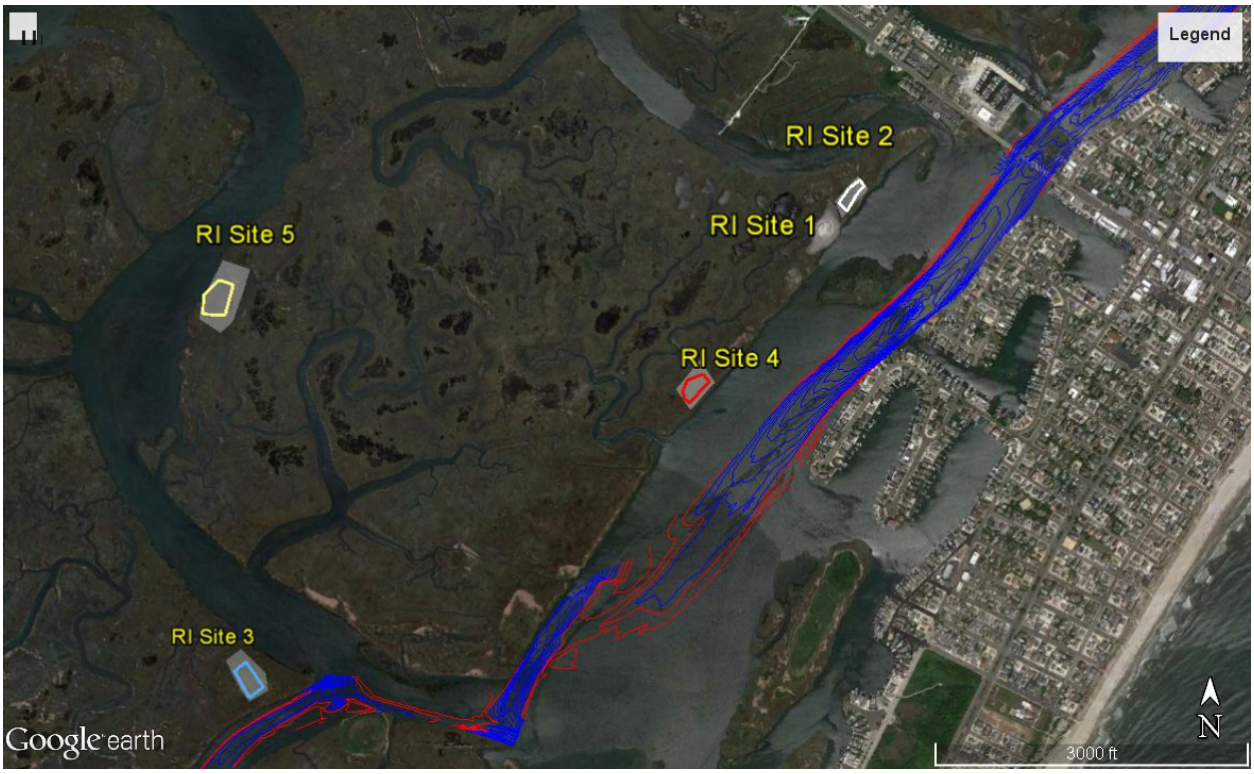

Figure 3. Ring Island Site Locations Including Habitat Constructed in 2014 and 2018 (Site 1). Colored polygons are approximately 1 acre sites.

11.0 Clean Air Act Statement of Conformity

CLEAN AIR ACT STATEMENT OF CONFORMITY
NJIWW CHANNEL MAINTENANCE AND
BENEFICIAL USE OF DREDGED MATERIAL
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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

Kristen N. Dahle
Lieutenant Colonel, Corps of Engineers
District Commander