Draft
ENVIRONMENTAL ASSESSMENT
NATIONAL REGIONAL SEDIMENT MANAGEMENT (RSM) PROGRAM
WRDA 2016 SECTION 1122
BENEFICIAL USE PILOT PROJECT

Barnegat Inlet, NJ

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March 2020

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National Regional Sediment Management (RSM) Program
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1.0 Introduction and Project Authority

Section 1122 of the Water Resources Development Act (WRDA) 2016 authorizes the U.S. Army Corps of Engineers (USACE) to establish a pilot program to carry out 10 projects for the beneficial use of dredged material from federal and non-federal navigation channels consistent with all applicable environmental laws. The ten selected pilot projects must meet the Section 1122 statutory language for the following purposes to produce public economic or environmental benefits:

- reducing storm damage to property and infrastructure;
- promoting public safety;
- protecting, restoring, and creating aquatic ecosystem habitats;
- stabilizing stream systems and enhancing shorelines;
- promoting recreation;
- supporting risk management adaptation strategies; and
- reducing the costs of dredging and dredged material placement or disposal, such as for projects that use dredged material as construction or fill or other civic improvement objectives.

Of 95 proposals evaluated based on Section 1122 criteria, the 10 selected by the USACE Headquarters evaluation board were deemed to have a high likelihood of environmental, economic and social benefits, and exhibiting geographic diversity. One of the 10 pilot projects selected is located in USACE's Philadelphia District and is the subject of this Environmental Assessment: Beneficial Use Pilot Project Barnegat Inlet, New Jersey (the Barnegat Inlet project or project).

Under the Section 1122 program, transportation of the material beyond the Federal Standard will be at a 100% federal cost. Implementation Guidance for Section 1122 was signed by the Acting Assistant Secretary of the Army (Civil Works) on January 3, 2018. Draft Guidance for Major Subordinate Commands (MSC) and District Commands was provided by the USACE Director of Civil Works in January 2019. The New Jersey Department of Environmental Protection's (NJDEP) Bureau of Coastal Engineering will serve as the non-federal sponsor. The NJDEP's Division of Fish and Wildlife and the New Jersey Department of Transportation's Office of Maritime Resources (NJDOT/OMR) also have significant interest in the Barnegat Inlet project and innovative techniques of dredging and dredged material placement.

In fulfillment of the National Environmental Policy Act (NEPA) of 1969, this Environmental Assessment provides a comprehensive alternatives evaluation for decision-makers and the concerned public of the physical, biological, and social effects of human activities on the environment.

2.0 Purpose and Need for Action

The purpose of this project is to maintain the Barnegat Inlet Federal Navigation Channel to authorized depth by dredging sand from the shoaled portions of the channel and to use the material beneficially with a nearshore placement to support the shore protection project along Long Beach Island. This Barnegat Inlet project and the Section 1122 program in the Philadelphia District USACE in general also seek to develop innovative approaches for the beneficial use of dredged material and potential habitat creation/restoration in Barnegat Bay

that will inform and support beneficial use projects in the future and keep sediments in the natural system. There is considerable opportunity within the sediment-rich Barnegat Inlet complex to use dredged sediments from state and federal channels for beneficial use through placement on adjacent beaches, for marsh enhancement, and island creation. Such projects would improve overall coastal system resilience within the Barnegat Inlet region and other regions of New Jersey.

3.0 Project Location and Objectives

3.1 Location

The Section 1122 pilot project will be implemented in two phases located in the region of the Barnegat Inlet Federal Navigation Project, a complex and dynamic coastal system along the New Jersey Atlantic Coast. This Environmental Assessment addresses Phase 1 of the pilot project. The study area extends approximately 3,800 feet within Barnegat Inlet between the north and south jetties and a 1-mile length of Atlantic Ocean beachfront at Harvey Cedars with subsequent year placements along eroded areas from Barnegat Light south to Harvey Cedars on Long Beach Island, Ocean County, New Jersey (Figure 1). Phase 2 of the pilot project will address maintenance dredging needs and potential beneficial use of dredged material for the Oyster Creek portion of the authorized navigation channel in Barnegat Bay and will be evaluated in a separate report, pursuant to the NEPA.

Currently, the Philadelphia District USACE maintains two authorized projects in the area:

BARNEGAT INLET FEDERAL NAVIGATION CHANNEL. The Federal Navigation Project was adopted in House Document (HD) 73-19 in 1935, modified in HD 74-85 in 1937 and HD 79-358 in 1946 and again as a result of the Supplemental Appropriation Act of 1985. Originally constructed in 1940, the navigation project consists of a dual jetty system with an inlet channel that is 300 feet wide to an authorized depth of 10 feet Mean Low Water (MLW) (Figure 2). The inlet channel extends from the outer bar in the Atlantic Ocean to the north end of the sand dike in Barnegat Bay. The federal project channel then extends in a northwesterly direction from the gorge in the inlet to Oyster Creek channel to provide access to deep water in the bay and a connection to the New Jersey Intracoastal Waterway (NJIWW) federal channel. An additional portion of the project includes a channel which is 8 feet deep and 200 feet wide connecting Barnegat Light Harbor with the main inlet channel. Although originally completed in 1940, the Supplemental Appropriation Act of 1985 contained language stating that the existing project had not worked as projected and, in fact, created a hazard to navigation. As a result, deficiency measures: a new south jetty 4,270 feet in length along an alignment generally the following administratively approved modifications were constructed in 1991 as design navigation channel 300 feet wide to a depth of 10 feet below MLW from the outer bar in the Atlantic Ocean to the north end of existing sand dike in Barnegat Bay, and jetty sport fishing facilities on the new jetty.

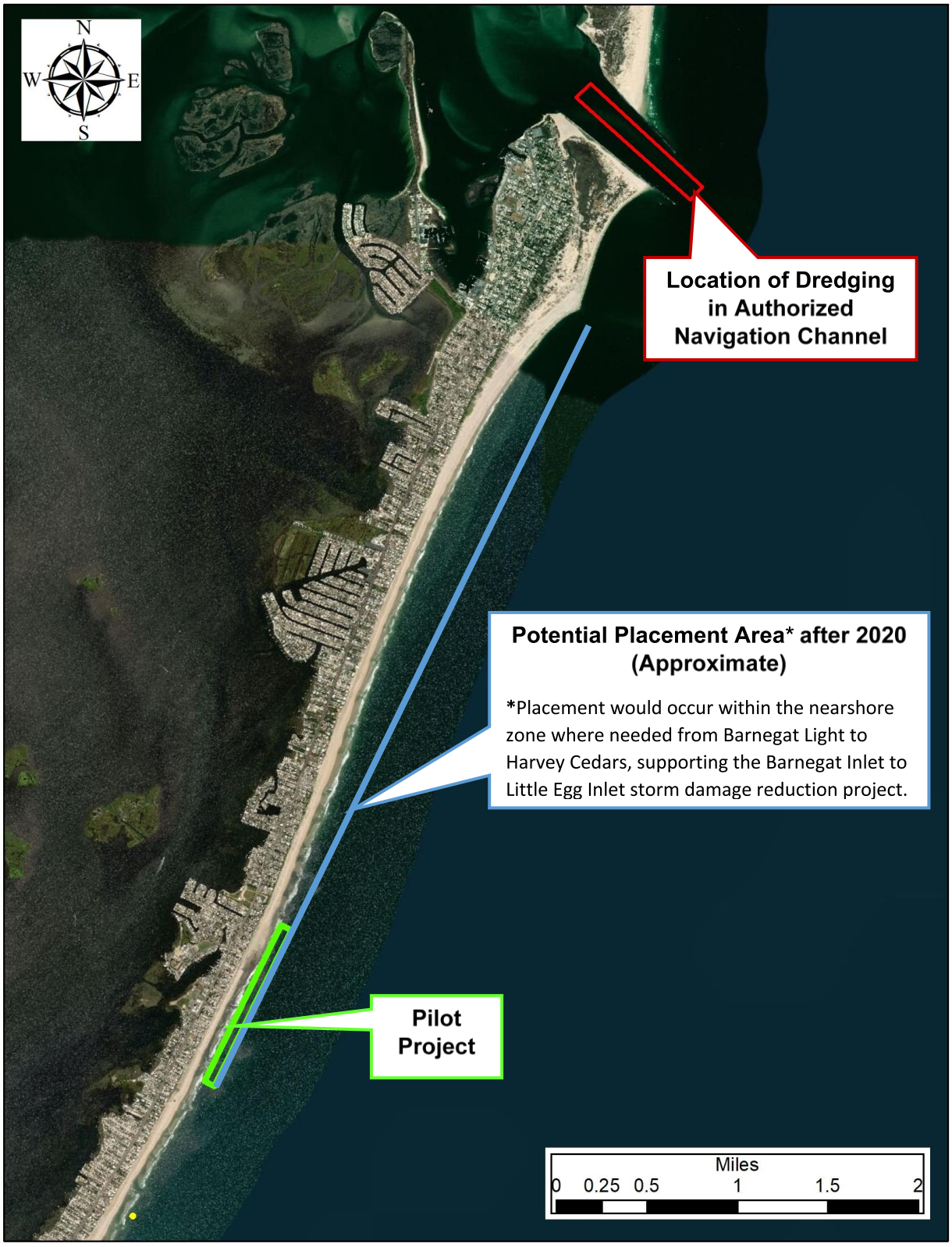

Figure 1. Barnegat Inlet Study Area

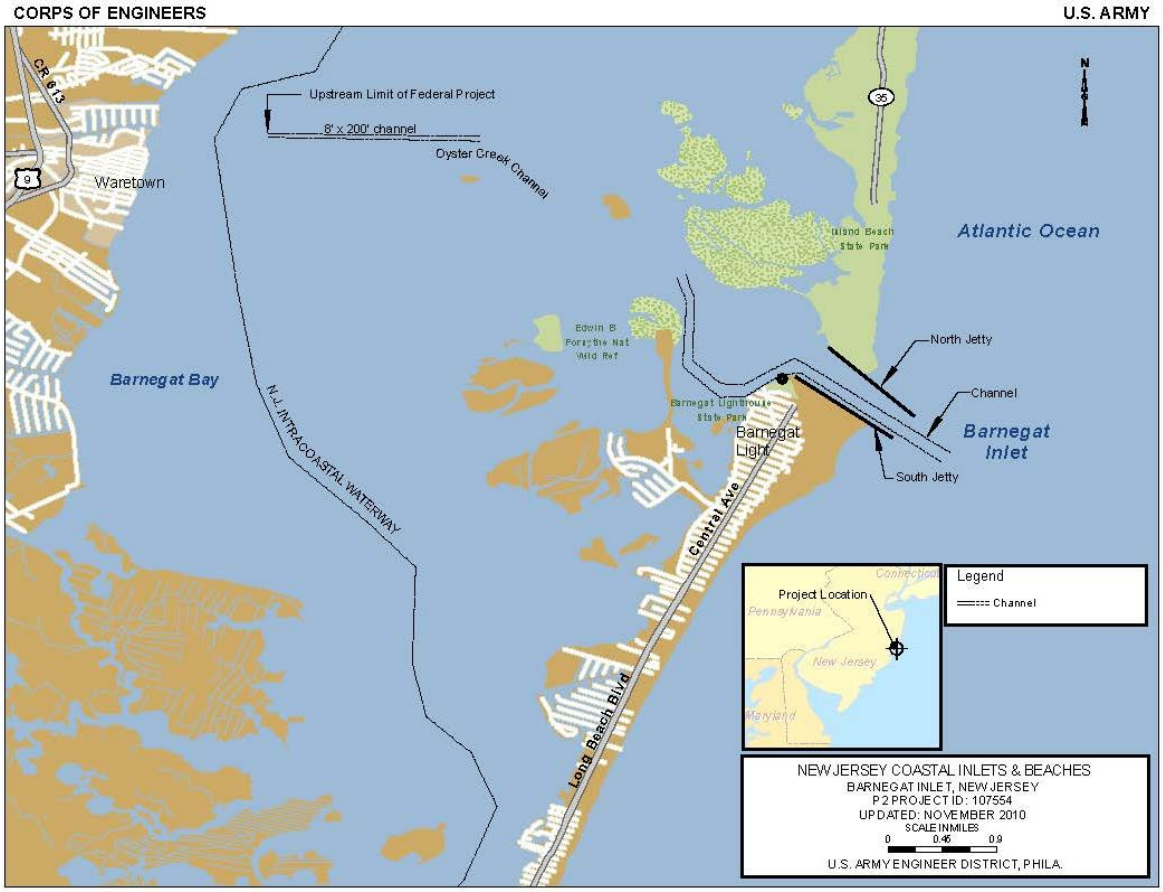

Figure 2. Barnegat Inlet Federal Navigation Project.

BARNEGAT INLET TO LITTLE EGG INLET STORM DAMAGE REDUCTION PROJECT. This New Jersey Shore Protection Study was authorized under resolutions adopted by the Committee on Public Works and Transportation of the U.S. House of Representatives and the Committee on Environment and Public Works of the U.S. Senate in December 1987. The Barneget Inlet to Little Egg Storm Damage Reduction project addresses coastal erosion along the ocean coast fronting 17 miles along Long Beach Island. The project provides for restoration of a protective berm 125 feet wide at an elevation of +8 feet North American Vertical Datum (NAVD) and a 30 foot wide dune with crest elevation of +22 feet NAVD. The dune incorporates grasses and sand fencing along the project length. The project includes periodic nourishment at 7-year intervals for a 50-year project life. The beach nourishment project is evaluated in a 1999 Environmental Impacts Statement (EIS) and 2014 Environmental Assessment (EA):

- *Barnegat Inlet to Little Egg Inlet Final Feasibility Report and Integrated Environmental Impact Statement* (1999 EIS)
- *Final Environmental Assessment Barnegat Inlet to Little Egg Inlet (Long Beach Island), New Jersey, Storm Damage Reduction Project* (USACE 2014)

From 2007 through 2013, USACE constructed 4.5 miles of the Long Beach Island shoreline within the municipalities of Surf City, Harvey Cedars, the Brant Beach section of Long Beach Township, and a small portion of Ship Bottom adjacent to Surf City utilizing sand obtained from an authorized offshore borrow area. Additional emergency repair placements were conducted due to subsequent impacts from severe nor-easter storms. After Superstorm Sandy, the Disaster Control Act of 2013 was passed which authorized and appropriated funding to complete the remaining sections of the Barnegat Inlet to Little Egg Inlet shore protection project. The remaining sections were constructed while previously constructed sections underwent periodic nourishment.

3.2 Objectives

One of the USACE missions is to ensure safe navigation in federally-authorized channels. The present and future objective is to continue to seek opportunities to utilize high quality dredged material as a resource to provide social, economic, and environmental benefits. The Section 1122 pilot project team will utilize and build on lessons learned, partnerships, and monitoring data for recently constructed projects in coastal New Jersey. Ongoing collaborative efforts with the Engineering with Nature and Regional Sediment Management (RSM) Programs will also contribute to developing and constructing innovative natural and nature-based features using Barnegat Inlet channel sediments. Specific project objectives include:

- Promote public safety by dredging the full inlet channel to the authorized depth plus overdepth (an additional 2 feet allowed for inaccuracies in the dredging process to achieve the required grade), providing approximately 200,000 cubic yards (cy) of sand for beneficial use and to support safe navigation for commercial and recreational boating use.
- Reduce dredging and dredging costs by clearing the entire inlet channel in this dredging and placement operation. This action is expected to reduce future maintenance dredging quantities on an annual basis as opposed to continuing the practice of dredging smaller quantities twice annually to obtain minimal navigable channel depths.
- Use an RSM approach in order to keep dredged sediment in the natural system most effectively and optimized in support of the federal shore protection project.
- Reduce storm damage at erosion hotspots between Barnegat Light and Harvey Cedars through the beneficial use placement of dredged material.
- Improve coastal resiliency by placing sediment in the nearshore to support beaches.
- Improve recreational opportunities by protecting shorelines, protecting habitat for wildlife viewing, and promoting safe and reliable navigation channels.
- Reduce dredging and dredged material placement costs by combining dredge mobilizations, leveraging funds and objectives across business lines and promoting beneficial use to build natural infrastructure.
- Monitor and evaluate the potential to reduce hot spot vulnerability and increase the beach nourishment interval.
- Establish trust with stakeholder groups/natural resource agencies.
- Use monitoring results to understand design and processes associated with sand movement along the New Jersey Atlantic coast for application to future shoreline protection projects.

The initial objective of this project under the Section 1122 program is to beneficially use high quality sand obtained by dredging the Barnegat Inlet federal navigation entrance channel to

authorized depth and placing the material in the nearshore depth of closure zone fronting the community of Harvey Cedars, Long Beach Island as a supplemental sand source for the authorized Barnegat Inlet to Little Egg Inlet Storm Damage Risk Reduction Project. The beach fronting Harvey Cedars is an erosional hotspot that has undergone several emergency beachfills to restore damages to the berm and dune from wave attack and storm inundation. The project will be monitored post-construction to provide valuable scientific information in support of potential future beneficial uses of high quality dredged material.

4.0 Alternatives

4.1 No Action – No Dredging

Under the No Action Alternative maintenance dredging within the Barnegat Inlet navigation channel would not occur. The No Action Alternative would allow the sedimentation of Barnegat Inlet to progress and the channel would eventually become unnavigable. Barnegat Inlet is critical to a large fishing fleet consisting of full-time commercial, charter, and recreational vessels. The US Coast Guard designates this site as a “Surf Station” due to the hazardous inlet and requires a safe channel to fulfill their Homeland Security mission and critical life safety, search and rescue operations. The Barnegat Inlet project requires dredging to provide a safe, reliable navigation channel for one of the most dangerous inlets on the east coast. No material would be placed in the nearshore zone fronting the community of Harvey Cedars. Natural processes would continue to bypass sand around the south jetty to the ocean beach of Barnegat Light. The selection of the No Action Alternative would not meet the purpose and need of the proposed action, but is included as required by NEPA regulations.

4.2 Current Practice

The portion of the Federal Navigation Channel through Barnegat Inlet is currently dredged twice each year for approximately 20 days per year (i.e., approximately 10 days per event), as funding permits, using the USACE-owned, shallow-draft, split-hull hopper dredges, the Currituck or Murden. The dredges remove critical shoaling from the navigation channel to maintain navigable depths, although not necessarily to the full authorized navigation depth. When fully loaded, the Murden requires 9-10 feet of draft and the Currituck requires 8 feet of draft for placement in the nearshore littoral system. The current practice is to place the sediments downdrift of the ebb shoal of the inlet on the south side adjacent to Barnegat Light, thereby keeping the material in the system and supporting downdrift shorelines (Figure 3 and Figure 4).

Current maintenance dredging keeps the channel minimally navigable. Critical limiting depths of 3 to 4 feet MLW are still present in portions of the federal channel, creating life safety concerns for vessel operators and the US Coast Guard. Significant shoaling typically requires dredging to be conducted two times per year, and as funding allows, but current dredging operations are not sufficient to clear the 300-foot wide channel to authorized depth.

Figure 3. Current placement areas for dredging of Barnegat Inlet for routine maintenance dredging conducted twice per year. Red box is preferred, just outside of ebb shoal/nodal point and should be utilized as much as possible. Yellow box is used when placement operations are limited during higher sea conditions.

Figure 4. The Currituck placing sand in the nearshore zone of Barnegat Light during maintenance dredging operations (July 2015). This photo depicts the typical placement operation within the red box shown in Figure 3.

4.3 Beneficial Use of Inlet Sediments (Proposed Action)

Under this alternative, the project will utilize the shallow draft split-hull hopper dredge Murden to dredge the Barnegat Inlet channel to the authorized depth of 10 feet MLLW plus 2 feet of

overdepth, providing approximately 200,000 cy of sand. In subsequent years, it is anticipated that the channel would continue to require maintenance dredging but the quantity to remove annually would be significantly reduced (approximately 50,000 cy).

Initially, the pilot project would entail a nearshore placement within the depth of closure of the authorized beachfill design fronting Harvey Cedars south of the nodal point. The proposed placement location is located approximately 3 miles south of the inlet and the current nearshore placement site. The Dredge Murden has a draft of about 8-10 feet when fully loaded. Given that the mean ocean tide range at Harvey Cedars is about 4 feet, and that the mid-tide elevation is approximately 0 feet NAVD88, discharge of the dredged sand would typically take place at depths no shallower than about -10 feet NAVD88, immediately behind the zone of cresting waves. Annual USACE monitoring surveys of the beach and nearshore at Harvey Cedars indicate that the zone between -10 feet and -20 feet NAVD88 is about 300 feet wide in the cross-shore direction; i.e., the bottom slopes at about 1V:30H between -10 and -20 feet.

The initial proposed placement site is approximately 1 mile long and consists of 10 designated polygons (300 feet wide by 500 feet long) located within the 10-20-foot contours (NAVD88) (Figure 5 and Figure 6). The dredge will approach the beach bow-first as close into the breaking waves as the -10 foot contour allows, then open the hopper to slowly release approximately 250-300 cy per haul. This area of Harvey Cedars is an erosional “hotspot” and it is anticipated that the nearshore placement will help to mitigate shoreline erosion in this area. The operation would continue for approximately 45-60 days until the inlet shoals are removed and the channel returned to authorized depth.

Because this is an innovative pilot project using a Government-owned dredge with operational flexibility, the exact drop locations will depend on maximizing placements to retain the material within the littoral zone where it is most needed, and will depend on surf, wind, and tide conditions at the time of the discharges. USACE will have a hydrographic survey vessel and crew on site at the beginning of the nearshore placement project for an estimated one-week period, and periodically thereafter until all sand has been placed. Based on institutional knowledge of sediment transport and surf zone dynamics characteristics of the ocean coast of New Jersey, the material is expected to disperse towards the shoreline. Subsequent surveys will assess the location of the material over time. In subsequent years, placement may occur where it is most needed within the nearshore zone from the inlet south to Harvey Cedars (see Figure 1). The beach profile adjacent to the placement site will be monitored before, during and after placement.

This alternative meets the objectives pursuant to Section 1122 of the WRDA and is the proposed action. The nearshore placement designed under the Section 1122 pilot project will test an innovative placement concept to potentially increase the length of time between nourishment cycles and provide additional material to increase the profile near a documented erosional beach hot spot. At the same time, the effort should reduce the amount of channel maintenance dredging required annually and institute a strategy for future maintenance dredging efforts to place in the nearshore template to better support the federal shore protection project.

Figure 5. Location for the construction of the nearshore placement site at the southern half of Harvey Cedars, NJ.

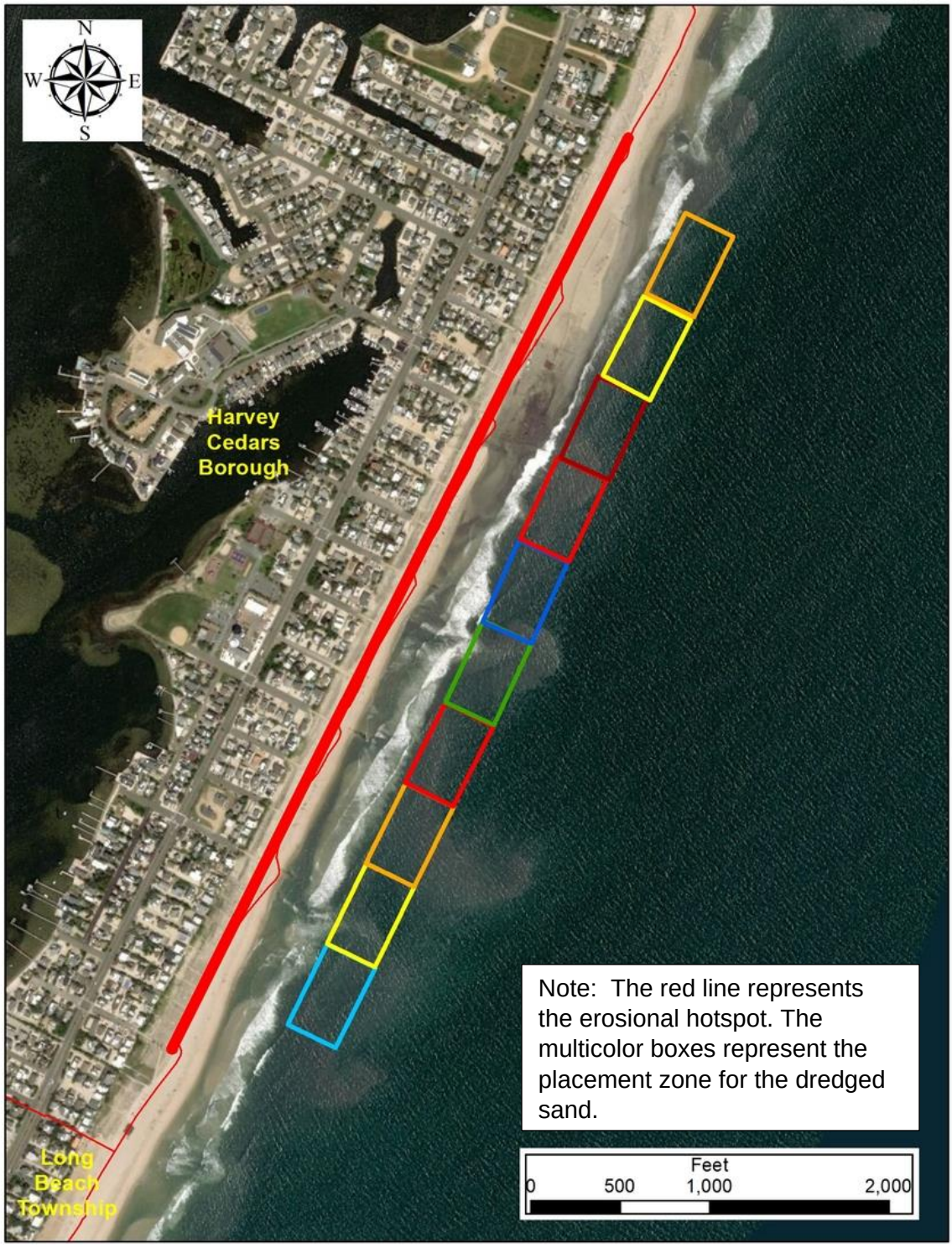

Figure 6. Planned beneficial use placement zone along Harvey Cedars, NJ.

5.0 Existing Environment

This section describes the existing and projected future conditions for each of the resources that reasonably may be impacted by the project. Existing and projected future condition descriptions include physical, chemical, biological and sociological conditions. These conditions are described without implementation of the alternative actions (No Action: no dredging activity and continued navigation use as at present) as well as Current Practice (*i.e*. current maintenance dredging and disposal and continued navigation as at present).

5.1 Air Quality

The Clean Air Act requires that all areas of the country be evaluated and then classified as attainment or non-attainment areas for each of the National Ambient Air Quality Standards. Areas can also be found to be "unclassifiable" under certain circumstances. The 1990 amendments to the act required that areas be further classified based on the severity of non-attainment. The classifications range from "Marginal" to "Extreme" and are based on "design values". The design value is the value that actually determines whether an area meets the standard. For the 8-hour ozone standard for example, the design value is the average of the fourth highest daily maximum 8-hour average concentration recorded each year for three years. Ground-level ozone is created when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight. NOx is primarily emitted by motor vehicles, power plants, and other sources of combustion. VOCs are emitted from sources such as motor vehicles, chemical plants, factories, consumer and commercial products, and even natural sources such as trees. Ozone and the pollutants that form ozone (precursor pollutants) can also be transported into an area from sources hundreds of miles upwind. The study area falls within the Northern New Jersey/New York City/Long Island Area (New Jersey Portion). The entire state of New Jersey is in non-attainment and is classified as being "Marginal." A "Marginal" classification is applied when an area has a design value of 0.085 ppm up to but not including 0.092 ppm (NJDEP 2012 Ozone Summary as cited in USACE 2014).

Greenhouse gases (GHG) trap heat in the atmosphere. Carbon dioxide is the most abundant GHG and enters the atmosphere through burning fossil fuels (coal, natural gas and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g. manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Methane is emitted during the production and transport of coal, natural gas and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substance (*e.g*., chlorofluorocarbons, hydrochlorofluorocarbons, and halons) (USEPA, 2016). The largest source of GHG emissions from human activities in the United States is from burning fossil fuels for electricity, heat and transportation. The USEPA tracks total U.S. emissions and reports the total national GHG emissions and removals associated with human activities.

Ambient air quality is monitored by the NJDEP Division of Air Quality and is compared to the National Ambient Air Quality Standards (NAAQS) throughout the state, pursuant to the Clean Air Act of 1970. Six principal "criteria" pollutants are part of this monitoring program, which include ozone (O3), carbon monoxide (CO), sulfur dioxide (SO2), nitrogen dioxide (NO2), particulate matter (PM10 and PM 2.5), and lead (Pb). Sources of air pollution are broken into stationary and mobile categories. Stationary sources include power plants that burn fossil fuels, factories, boilers, furnaces, manufacturing plants, gasoline dispensing facilities, and other industrial facilities. Mobile sources include vehicles such as cars, trucks, boats, and aircraft. New Jersey air quality data from air monitoring sites can be accessed from www.njaqinow.net/. New Jersey air quality has improved significantly over the past 40 years, but exceeds the current standards for ozone throughout the state and for fine particles in urban areas. With the exception of Warren County, outside of the project study area, New Jersey has attained the sulfur dioxide, lead and nitrogen dioxide standards.

5.2 Water Quality

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). Factors that influence coastal water quality over time include the influence of major coastal freshwater rivers, tides, seasons, ocean current fluctuations, nutrient enrichment, water depth, biotic communities, and extent of development.

Water quality in Barnegat Inlet, the Atlantic Ocean, and other surface waters in the study area are generally good (USACE 2014). Exceptions are occasional waste discharges or offshore oil spills. The state of New Jersey has classified the water along the ocean side of Long Beach Island as approved for the harvest of oysters, clams and mussels, except for one mile of beach off of Surf City that is rated prohibited. It is expected that the primary cause of non-point source pollution be related to development on land and/or the activities that result from land development. Sources might include run-off of petroleum products, fertilizers and animal wastes from roadways and lawns. When it is generated on land, such non-point source pollution is carried by rainwater, which can drain to surface or ground water and ultimately reach the ocean (USACE 2014).

5.3 Sediment Quality and Hazardous, Toxic, and Radioactive Waste

Previous testing and maintenance dredging efforts indicate that shoaling in the inlet is greater than 90 percent sand and presumed to be free of chemical contamination by New Jersey's Dredging Technical Manual on the Management and Regulation of Dredging Activities and Dredged Material Disposal in New Jersey's Tidal Waters (NJDEP, 1997). Due to a larger mean grain size (>0.0625 mm) and insignificant smaller fines content, the sand in the inlet and in the nearshore zone fronting the resort residential beaches of Long Beach Island are more stable and produce less turbidity than fine-grained silty sediments typical of freshwater environments. No facilities with potential HTRW impacts are known to occur near the Study Area.

5.4 Biological Resources

5.4.1 Terrestrial Habitats

The study area is completely aquatic; however, the barrier island adjacent to the study area influences wildlife that inhabits the study area. Barrier islands include sandy beaches along the ocean and inlets, vegetated primary and secondary dunes, open sandy upland areas, and undeveloped back-bay areas. Beach habitat is important habitat of shorebirds and invertebrates such as ghost crabs. Beach habitat is sparsely vegetated, with only a few species growing in the upper beach.

The primary dune is susceptible to salt spray and wind, and is dominated by American beachgrass (*Amophila breviligulata*), sea rocket (*Cakile edentula*), seaside goldenrod (*Solidago sempervierens*), seaside spurge (*Euphorbia polygonifolia*), and seabeach pursulane (*Susuvium maritimum*). The back side of the primary dunes and the secondary dunes are more protected and provide suitable conditions for beach heather communities (*Hudsonia tomentosa*) and scrub thickets composed of bayberry (*Myrica pennsylvanica*), wax myrtle (*M. cerifera*), beach plum (*Prunus maritima*) and poison ivy (*Toxicodendron radicans*).

Open-sandy (unvegetated) upland areas on islands and spits in the Barnegat Inlet project area provide important habitat for colonial nesting birds. The majority of the ocean coast of Long Beach Island is developed with residential homes. Vegetation in these areas are limited to grassy strips, fields, lawns, and ornamental plantings, and waste areas that may harbor a number of non-native plant species.

5.4.2 Aquatic Habitats

Aquatic habitats within the Study Area are marine and include nearshore waters of the inlet and ocean beaches and associated benthic habitats. Benthic habitats of the nearshore waters include intertidal and subtidal sand substrates. Intertidal habitat occurs between the high and low tide lines and is subject to diurnal tidal fluctuations. The intertidal sand substrate is exposed during low tide twice daily. Subtidal habitat includes the waters seaward of the low tide, and the substrate is continually submerged. In Barnegat Inlet the mean tidal range is 3.1 feet with a maximum flood current of 2.2 knots and a maximum ebb current of 2.5 knots. The tides are diurnal with two floods and two ebbs during a 24.48 hour period.

The substrate within the project area is sand. Nearshore waters are strongly influenced by weather and the adjacent high-energy sandy beach which influence sediment transport. Along beach areas, shifting sands and pounding surf affect the available habitat. Fauna inhabiting the intertidal zone of the beach 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. At the base of the 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.

No wetlands or submerged aquatic vegetation (SAV) or macroalgae have been documented in the inlet, which is already disturbed and dredged twice per year, or in the nearshore area of Harvey Cedars.

5.4.3 Wildlife

The inlet and ocean beach provide shelter, nesting, and foraging habitat that support marine benthic and fish species and migratory shorebirds, raptors, reptiles and mammals. Wildlife

species that utilize these habitats include federal and state listed threatened and endangered species including the following, which are discussed in greater detail under Section 5.5:

- piping plover (*Charadrius melodus*)
- roseate tern (*Sterna dougallii*)
- red knot (*Calidris canutus*)
- black skimmer (*Rynchops niger*)
- least tern (Sternula antillarum)
- roseate tern (Stena dougallii)
- bald eagles (*Haliaeetus leucocephalus*)
- peregrine falcons (*Falco peregrinus*)
- northern harrier (Circus cyaneus)
- short eared owl (*Asio flammeus*)
- osprey (*Pandion haliaetus*)
- barred owl (*Strix varia*).

The following provides general information on the semi-aquatic and marine species within major wildlife groups that utilize the Barnegat Inlet project area.

Birds such as the sanderling (*Calidris alba*) forage on invertebrates such as beach fleas (amphipods such as *Orchestia agilis*), flies on the upper beach and on mole crabs (*Emerita talpoida*) and coquina clam on the outer beach. The willet (*Tringa semipalmata*) forages primarily on the outer beach on mole crabs. Ghost crabs (*Ocypode quadrata*) are another common invertebrate on the upper beach, which provide forage for species such as sea gulls (Family Laridae) The upper beach provides nesting habitat for colonial nesters, such as black skimmers (*Rynchops niger*) and solitary nesters such as piping plover (*Charadrius melodus*). Migratory shorebirds and gulls visit the New Jersey barrier beaches during spring and fall migrations but greater numbers occur in the backbay lagoons and mudflats.

The project area is heavily developed as a coastal residential resort and provides limited habitat for amphibians, reptiles and mammals. Species that may occur in the area of the inlet and the oceanfront beaches include eastern garter snake (*Thamnophia sirtalis*), American toad (*Bufo americanus*), raccoon (*Procyon lotor*), white-footed mouse (*Peromyscus leucopus*), house mouse (*Mus musculus*), Virginia opossum (*Didelphia virginiana*), and red fox (*Vulpes vulpes*).

5.4.4 Aquatic Invertebrates

Benthic invertebrate communities vary spatially and temporally as a result of factors such as sediment type, water quality, depth, temperature, predation, and competition.

The invertebrates inhabiting the beach intertidal zone have evolved special locomotory, respiratory, and morphological adaptations that enable them to survive in disruptive habitat. Most are excellent and rapid burrowers and tolerant to environmental stress. Typical invertebrate infauna include the mole crab (*Emerita talpolida*), haustorid amphipods (*Haustorius* spp.), coquina clam (*Donax variablilis*), and spionid worm (*Scolelepis squamata*). The epifaunal blue crab (*Callinectes sapidus*), and lady crab (*Ovalipes ocellatus*) are also found in the intertidal zone. These invertebrates are prey to various shore birds and nearshore fishes.

Subtidal nearshore waters are predominantly large grain and fine grain sand with some shell fragments. Benthic invertebrates in nearshore subtidal habitats include polychaete worms, mollusks, and arthropods (specifically crustaceans).

Other specialized habitats include the rock jetties on both sides of Barnegat Inlet and 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 rock.

5.4.5 Fisheries

Barnegat Inlet and the coastal waters of New Jersey support many nearshore fish species. 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.

More than 60 species of estuarine, marine, and anadromous fish use nearshore waters as a feeding area. Generally, there is an inshore and somewhat northward movement in the spring and summer. In the fall and winter the movement is generally offshore and southerly. Man-made structures such as groins and jetties add habitat diversity in the nearshores area. Juvenile and larval finfish such as black sea bass (*Centropristis striata*), summer flounder (*Paralichthys dentatus*), winter flounder (*Pseudopleuronectes americanus*), and striped bass (*Morone saxatilis*) utilize these areas for feeding and protection from predators. In a study conducted at Peck Beach, Cape May County, 178 species of saltwater fishes were recorded (USACE 2001). Of these, 156 were from the nearshore waters. Of the 124 species recorded in nearby Great Egg Harbor Inlet, 28 are found in large number in offshore waters. Eighty seven species were found in the nearshore ocean, bay and inlets adjacent to Peck Beach. Of these, 46 were located in the near shore waters.

Essential Fish Habitat

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (MSA), (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. Habitat Areas of Particular Concern (HAPCs) is a subset of EFH that is rare, stressed by development, provides important ecological functions for federally managed species, or is especially vulnerable to anthropogenic (or human impact) degradation. A purpose of the MSA is to “promote the protection of EFH 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 EFH of federally managed species.

Managed fish species are those species that are managed under a federal fishery management plan. The Guide to EFH Designations in the Northeastern United States Volume IV (NOAA 1999) and the EFH Mapper (NMFS 2019) were used to determine EFH designated for federally managed fish species and life stages within the Barnegat Inlet project area (

Table 1). It is important to note that EFH is defined by textual descriptions contained in the fishery management plans developed by the regional Fishery Management Councils (FMCs), in this case primarily the New England and Mid-Atlantic FMCs. All SAV (macroalgae and seagrasses) is designated HAPC for summer flounder; however, there are no SAVs in the project area. As such, there are no HAPC in the project area. Based on the species and life stages present in the project area and the description of the habitat in the project area in sections 5.2.1, 5.2.2, and 5.2.4, EFH present in the project area includes:

- Coastal and estuarine waters including
  - pelagic (open water)
  - demersal (near the bottom)
- Intertidal and sub-tidal benthic substrate is predominantly sand

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. A list of species with early life stages collected in Barnegat Inlet is presented in

Table 2. Additionally, aquatic invertebrates described in Section 5.2.4 can also serve as prey for federally managed species.

Table 1. Habitat Requirements of Federally Managed Species within the Barnegat Inlet Study Area.

Managed Species	**Eggs**	**Larvae (neonate for sharks and skates)**	**Juveniles**	**Adults**
Atlantic cod *(Gadus morhua)*	--	X	--	--
Atlantic sea scallop (*Placopecten magellanicus*)	X	X	X	X
Red Hake *(Urophycis chuss)*	X	X	X	X
Silver hake or whiting *(Merluccius bilinearis)*	X	X	--	--
White hake (*Urophycis tenuis*)	--	--	--	X
Pollock (*Pollachius virens*)	--	X	--	--
Yellowtail founder (*Pleuronectes ferruginea*)	X	X	X	X
Winter flounder *(Pleuronectes americanus)*	X	X	X	X
Windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
Witch flounder (*Glyptocephalus cynoglossus*)	X	X	--	--
Ocean pout (*Zoarces americanus)*	X	--	--	X

Atlantic sea herring *(Clupea harengus)*	--	--	X	X
Monkfish *(Lophius americanus)*	X	X	--	--
Little skate (*Leucoraja erinacea)*	NA	NA	X	X
Winter skate (*Leucoraja ocellata*)	NA	NA	X	X
Clearnose skate (*Raja eglanteria*)	NA	NA	X	X
Bluefish *(Pomatomus saltatrix)*	--	X	X	X
Atlantic butterfish *(Peprilus tricanthus)*	X	--	X	X
Atlantic mackerel (*Scomber scombrus*)	X	--	--	--
Longfin inshore squid (*Doryteuthis (Amerigo) pealeii*)	X	X	X	X
Summer flounder *(Paralicthys dentatus)*	--	X	X	X
Scup *(Stenotomus chrysops)*	--	--	X	X
Black sea bass *(Centropristus striata)*	--	--	X	X
Surfclam *(Spisula solidissima)*	NA	NA	X	X
Spiny dogfish (Squalus acanthias)	NA	NA	X	X
Bluefin tuna (*Thunnus thynnus*)	--	--	X	--
Skipjack tuna (*Katsuwonus pelamis*)	--	--	--	X
Yellowfinin tuna (*Thunnus albacares*)	--	--	X	--
Common thresher shark (*Alopias vulpinus*)	NA	X	X	X
Dusky shark *(Charcharinus obscurus)*	NA	X	X	X
Sandbar shark *(Cahcharinus plumbeus)*	NA	X	X	X
Sand tiger shark *(Odontaspis Taurus)*	NA	X	X	--
Smoothhournd shark complex (Atlantic stock)	X	X	X	X
Tiger shark *(Galeoceredo cuvieri)*	NA	--	X	X
White shark (*Carcharodon carcharias*)	NA	X	--	--

Notes: X = EFH present in the project area; -- = EFH not present in the project area; NA = no EFH designated for this life stage.

Table 2. Distribution of Early Life History Stages of Fishes Found in Various Barnegat Bay Coastal Habitats.

Species	**Life Stage**
American eel *(Anguilla rostrata)*	J
Conger eel *(Conger oceanicus)*	
Blueback herring *(Alosa aestivalis)*	ELJ
Alewife *(A. pseudoharengus)*	ELJ
American shad *(A. sapidissima)*	J

Species	Life Stage
Atlantic menhaden *(Brevoortia tyrannus)*	ELJ
Atlantic herring *(Clupea harengus)*	LJ
Striped anchovy *(Anchoa hepsetus)*	
Bay anchovy *(A. mitchilli)*	ELJ
Inshore lizardfish *(Synodus foetens)*	J
Pollack *(Pollachius virens)*	J
Red hake *(Urophycis chuss)*	J
Spotted hake *(U. regia)*	J
Oyster toadfish *(Opsanus tau)*	ELJ
Atlantic needlefish *(Strongylura marina)*	J
Sheepshead minnow *(Cyprinodon varigatus)*	ELJ
Mummichog *(Fundulus heteroclitus)*	ELJ
Spotfin killifish *(F. luciae)*	ELJ
Striped killifish *(F. majalis)*	ELJ
Rainwater killifish *(Lucania parva)*	ELJ
Rough silverside *(Membras martinica)*	J
Inland silverside *(Menidia beryllina)*	ELJ
Atlantic silverside *(M. menidia)*	ELJ
Fourspine stickleback *(Apeltes quadracus)*	ELJ
Threespine stickleback *(Gasterosteus aculeatus)*	ELJ
Lined seahorse *(Hippocampus erectus)*	LJ
Northern pipefish *(Syngnathus fuscus)*	LJ
Striped searobin *(Prionotus evolans)*	J
Northern searobin *(P. carolinus)*	J
Grubby *(Myoxocephalus aenaeus)*	ELJ
White perch *(Morone americana)*	ELJ
Striped bass *(M. saxatilis)*	J
Black sea bass *(Centropristis striata)*	LJ
Bluefish *(Pomatomus saltatrix)*	LJ
Crevalle jack *(Carnax hippos)*	J
Scup *(Stenotomus chrysops)*	J
Silver perch *(Bairdiella chrysoura)*	J
Weakfish *(Cynoscion regalis)*	ELJ
Spot *(Leiostomus xanthurus)*	LJ
Northern kingfish *(Menticirrhus saxatilis)*	ELJ
Atlantic croaker *(Micropogonias undulatus)*	LJ
Black drum *(Pogonias cromis)*	J
Striped mullet *(Mugil cephalus)*	J
White mullet *(M. curema)*	J
Tautog *(Tautoga onitis)*	ELJ
Cunner *(Tautogolabrus adspersus)*	ELJ
Northern stargazer *(Astroscopus guttatus)*	J
Feather blenny *(Hypsoblennius hentz)*	ELJ
American sand lance *(Ammodytes americanus)*	ELJ
Naked goby *(Gobiosoma bosc)*	ELJ

Species	Life Stage
Butterfish *(Peprilus triacanthus)*	LJ
Windopane *(Scophthalmus aquosus)*	ELJ
Smallmouth flounder *(Etropus microstomus)*	J
Summer flounder *(Paralichtys dentatus)*	LJ
Winter flounder *(Pseudopleuronectes americanus)*	ELJ
Hogchoker *(Trinectes maculatus)*	ELJ
Northern puffer *(Sphoeroides maculatus)*	ELJ

Notes: E = eggs; L = larvae; J = juveniles
Source: Able and Fahay, 1998

5.5 Threatened and Endangered Species

The Endangered Species Act (ESA) provides a program for the conservation of threatened and endangered species and a means for conserving the ecosystems upon which those species depend. Section 7 (a)(2) of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to ensure their activities are not likely to jeopardize the continued existence of listed species, or destroy or adversely modify their critical habitat. Under the ESA, an endangered species is in danger of extinction and a threatened species is likely to become endangered within the foreseeable future.

The New Jersey Endangered Species Act (NJESA) is designed to protect species whose survival in New Jersey is imperiled by loss of habitat, over-exploitation, pollution, or other impacts. Under the NJESA, endangered species are those whose prospects for survival in New Jersey 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.

The USFWS Information for Planning and Consultation website was queried to determine the potential occurrence of federally listed threatened, endangered, or candidate species within the Study Area (USFWS 2019).

5.5.1 Terrestrial Species

The seabeach amaranth (*Amaranthus pumilus*) was federally listed as threatened throughout its range in 1993 (58 FR 18035 18042). It is listed as endangered by the state of New Jersey. Historically, this species occurred on coastal barrier island beaches from Massachusetts to South Carolina. Extant populations are currently known to occur on coastal beaches in Ocean County. 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 plant and 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- and state-listed endangered small pale shorebird on sandy beaches along the Atlantic and Gulf coasts. The species was federally listed as threatened in 1986. In New Jersey piping plovers nest on coastal beaches in Monmouth, Atlantic, Cape May, and Ocean Counties generally between March 15 and August 31. They are territorial birds that build their nests above the high tide line, usually on sandy ocean beaches and barrier islands, but also on gently sloping foredunes, blowout areas behind primary dunes, washover areas or in between dunes. Females lay four eggs that hatch in about 25 days and chicks fledge after about 25 to 35 days. Flightless chicks follow their parents to feeding areas, which include the intertidal zone, washover areas, mudflats, sandflats, wrack lines and along the shoreline of coastal ponds, lagoons and salt marshes. Piping plover adults and chicks feed on macroinvertebrates such as worms, fly larvae, beetles, and small crustaceans. There were 119 nesting pairs of piping plovers recorded in the state of New Jersey in 2019; 56 of these pairs were in northern Monmouth County. In 2019, piping plovers nested in the Study Area and nearby vicinity, at Island Beach State Park on the northern side of Barnegat Inlet as well as on the southern side of the inlet at Barnegat Light. A pair were observed in Loveladies, the first sighting at this location since 1996. Although pair numbers increased in 2019, they remain well below the peak of 144 pairs in 2003.

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 as of 1987 in the northeast region, including New Jersey and state-listed in New Jersey initially as threatened in 1979 but reclassified as endangered in New Jersey in 1984. The roseate tern can be confused with similar-appearing common tern (*Sterna hirundo*) and Forster's tern (*Sterna forsteri*), both of which are fairly common in New Jersey. The roseate tern nests on barrier islands and saltmarshes and forages over shallow coastal waters, inlets, and offshore seas. Nesting colonies are located above the high tide line, often within heavily vegetated dunes which provide cover. Historically, roseate terns nested at Hereford Inlet and Five Mile Beach (1930s) and at Brigantine (1940s). However, populations continued to decline since the 1950s due to coastal development and high levels of recreational activity along the barrier islands. The New Jersey Natural Heritage Program considers the roseate tern to be a non-breeding species in the state and globally "very rare and local throughout its range" (NJDRP, Department of Fish and Wildlife).

The red knot (*Calidris canutus rufa*) is listed as federally-threatened (2015) endangered and state-listed as endangered (2007). The species is a large shorebird with a short straight black bill. During the breeding season, the breast and belly are a characteristic russet color (salmon to brick red). When not breeding, the bird is gray above with dirty white below with faint dark streaking. Small numbers of red knots may occur in New Jersey year-round, while large numbers of birds rely on New Jersey's coastal stopover habitats during the spring (mid-May through early June) and fall (late July through November) migration periods. The primary wintering areas for the *rufa* red knot include the southern tip of South America, northern Brazil, the Caribbean, and the southeastern and Gulf coasts of the U.S. Large flocks begin arriving at stopover areas along the Delaware Bay and New Jersey's Atlantic Ocean coast each spring. The birds feed on invertebrates, especially horseshoe crab eggs as well as clams, mussels, snails, small crustaceans, and marine worms. Horseshoe crab eggs, unlike any other food resource, are quickly metabolized into fat that is critical for red knots to double their body weight to reach their Arctic summer breeding grounds and successfully reproduce. With

a decline in horseshoe crab populations during the 90s due to harvesting produced a commensurate decline in red knot populations. Although primarily found within the Delaware Bay shoreline, and transients may be found anywhere along New Jersey's coasts, large numbers of migrating birds are known to use stopover habitats in Cumberland, Cape May, and Atlantic Counties.

The bald eagle was listed as a federally- as endangered species throughout the United States in 1978. Most bald eagle nests are located in large wooded areas associated with marshes and no nests are known to occur in the study area, however bald eagles do hunt for fish in nearby water bodies. Based on improvements in bald eagle population figures for the contiguous United States, the USFWS removed the bald eagle from the federal endangered species list in June 2007. Although the bald eagle has been removed from the federal 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 is a state-listed threatened species in New Jersey.

Peregrine falcons were placed on the federal endangered species list 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 list in August 1999. As with the bald eagle, peregrine falcons are protected by the Migratory Bird Treaty Act. The peregrine falcon remains a state-listed endangered species in New Jersey.

There are currently 34 bird species state-listed as endangered or threatened species in New Jersey. In addition to those already discussed, examples of state-listed species that may occur Atlantic beaches include the black skimmer (*Rynchops niger*), the least tern (*Sternula antillarum*), and the roseate tern (*Stena dougallii*). Several raptors occur in the area including the state-listed endangered northern harrier (*Circus cyaneus*), short eared owl (*Asio flammeus*), osprey (*Pandion haliaetus*), and barred owl (*Strix varia*).

5.5.2 Marine Species

There are five federally-listed threatened or endangered sea turtles that can occur along the New Jersey Atlantic 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.

The Atlantic sturgeon is a federally- and state-listed endangered anadromous fish. Adult and subadults can use the nearshore waters as a migratory corridor. 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.

There are five federally-listed species of endangered whales that have been observed along the New Jersey Atlantic coast. The North Atlantic right and fin whale are found seasonally in waters off New Jersey. The sperm whale (*Physeter catodon*), Sei whale (*Balaenoptera borealis),* and blue whale *(Balaenoptera musculus*) may be present in deeper offshore waters

and are not considered further. These are migratory marine mammals 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, generally living in the freshwater reaches rivers, but make short trips into salt water. Shortnose sturgeon conduct freshwater spawning migrations and are typically found in fresh and estuarine waters. Shortnose sturgeon rarely migrate between river systems or inhabit marine waters (Brundage and Meadows, 1982).

The harbor porpoise (*Phocoena phocoena*) and the bottlenose dolphin (*Tursiops truncatus*) are protected under the Marine Mammal Protection Act (MMPA) and New Jersey species of special concern. While mid-Atlantic waters are the southern extreme of the harbor porpoise distribution, stranding data indicate a strong presence off the coast of New Jersey, predominately during spring. The bottlenose dolphin is common in New Jersey ocean waters during the warmer months.

Seals are commonly found along the New Jersey coast in November through April and are also protected under the Federal MMPA of 1972. The most abundant species is the harbor seal (*Phoca vitulina*) but gray seal (*Halichoerus grypus),* and harp seal (*Pagophilus groenlandicus)* have been observed in New Jersey. New Jersey has the largest seal haul-out locations along the US Atlantic coastline south of Long Island, NY (C. Slocum, Richard Stockton College). Seals face several human-induced threats such as starvation due to over-fishing, collisions with boats, entanglement in fishing nets, weakened immunity and disease due to pollutants or oil spills.

5.6 Cultural Resources

In preparing this EA, USACE is consulting with the New Jersey State Historic Preservation Office (NJ SHPO), the Tribes and other interested parties to identify and evaluate historic properties in the project area in order to fulfill its cultural resources responsibilities under the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR Part 800. The Area of Potential Effects (APE) includes Barnegat inlet and the nearshore areas of Long Beach Island from Barnegat Light south to Harvey Cedars (see Figure 1). The shoreline and nearshore area has been previously surveyed in 1999 for the Barnegat Inlet to Little Egg Inlet (Long Beach Island) Storm Damage Reduction Project and the results are found in the report titled, *Phase I Submerged and Shoreline Cultural Resources Investigations and Hydrographic Survey, Long Beach Island, Ocean County, New Jersey* prepared for the USACE by Hunter Research, Inc. dated 1999. A subsequent investigation was conducted in 2001 and is titled, *Supplemental Phase IB and Phase II Cultural Resources Investigations, New Jersey Atlantic Coast, Long Beach Island, Ocean County, New Jersey* prepared by Dolan Research. Two of the five underwater targets proved to be shipwreck sites (Targets 4:735 and 9:643), and none of the six shoreline anomalies proved to be a historic property. The two shipwreck sites are located to the south of this proposed project and will not be impacted by the proposed nearshore placement of dredged material.

5.7 Land Use, Infrastructure, and Socioeconomics

The study area is completely marine. The study area is adjacent to Long Beach Island which is primarily residential. Long Beach Island is a recreation- and tourism-oriented resort area. Utilities that serve Long Beach Island municipalities adjacent to the study area include:

- Electric – Atlantic City Electric
- Natural gas – New Jersey Natural Gas
- Telecommunications – Comcast, Verizon
- Water and sewer – Harvey Cedars Borough, Long Beach Township, Barnegat Light Borough
- Storm Water – Harvey Cedars Borough, Long Beach Township, Barnegat Light Borough

Access to Long Beach Island is provided by an excellent network of federal, state, and local roads and highways.

The municipalities adjacent to the study area are in Ocean County and include Barnegat Light Borough, Loveladies in Long Beach Township and Harvey Cedars Borough. The population estimate for Ocean County American Community Survey (ACS) (2013-1017) data is 589,699. Approximately 91.3% Caucasian; 3.0% African American; 0.1% Native American; 2.0% Asian; and 9.0% Hispanic/Latino. Table 3. Socioeconomic Characteristics of Barnegat Light Borough, Long Beach Township, and Harvey Cedars Borough provides socioeconomic characteristics for these municipalities, based on ACS (2013-1017) data (U.S. Census Bureau 2020):

Table 3. Socioeconomic Characteristics of Barnegat Light Borough, Long Beach Township, and Harvey Cedars Borough

Municipality	Population	Median Household Income	Median Value for Owner Occupied Housing Units	Poverty Rate	Employment Rate
Barnegat Light Borough	494	$75,000	$699,700*	1.2%	39.3%*
Long Beach Township	3,040	$82,192	$855,100*	10%	34.0%*
Harvey Cedars Borough	430	$85,417	$935,400*	3.3%	35.3%*

Source: ACS 2013-2017. *Data for 2017 based on ACS 2013-2017 data (U.S. Census Bureau 2020).

Barnegat Inlet is critical to a large fishing fleet consisting of full-time commercial, charter, and recreational vessels that contribute to the total economic impact of New Jersey's marine fisheries. Saltwater recreational fishing in New Jersey has generated approximately $1.8 billion in sales, $746 Million in income, and $1.2 billion in value added in 2016 (NMFS 2018). Value-added is the contribution made to the gross domestic product in a region. Commercial fishing in New Jersey generated 37,100 jobs, $1.4 billion in income, $6.2 billion in sales, $2.3 billion in value added, and $193 million in landings revenue in 2016 (NMFS 2018). The values (ex-vessel price) of the commercial landings in New Jersey were $190 million and $170 million in 2017 and 2018, respectively. "Barnegat-Long Beach" was recognized as a major U.S. port

with commercial with landings valued at $25 million and $24 million in 2017 and 2018, respectively (NMFS 2020).

5.8 Recreational Resources

Recreation and ecotourism services provided by the Long Beach Island and Island Beach State Park ocean coasts for tourism. Bathing beach locations are monitored by local health departments for recreational beach water quality, which is reported to the NJDEP who issues beach advisories or closings if bacterial criteria are exceeded. Fishing is typically conducted along shoreline areas. Recreational and commercial fishing boats utilize Barnegat Inlet for access to and from marinas, the backbays and the ocean. Surf fishing is popular from the jetty rocks at the inlet and at IBSP. Anglers in the back bays and tidal creeks typically target summer flounder (fluke), winter flounder, weakfish, bluefish, striped bass, kingfish, white perch, and tautog. Other popular recreational activities Include beach combing, swimming, sunbathing, boating, water skiing, jetskiing, paddling (canoes, kayaks, stand-up paddle boards), windsurfing, and birdwatching.

5.9 Visual Resources and Aesthetics

Aesthetics refer to the sensory quality of the resources (sight, sound, smell, taste, and touch) and especially with respect to judgment about their pleasurable qualities (Canter 1993; Smardon et al. 1986). The aesthetic quality of the study area is influenced by the natural and developed environment. Visual resources include the natural and man-made features that comprise the visual qualities of a given area, or “viewshed.” These features form the overall impression that an observer receives of an area or its landscape character. Topography, water, vegetation, man-made features, and the degree of panoramic views available are examples of visual characteristics of an area.

The study area contains heavily developed residential areas consisting of homes, condominiums, and businesses. The inlet is bordered by the Barnegat Inlet and adjacent rock jetties. Sandy beaches and ocean views are considered desirable locales as long as they are clean with no obvious water pollution or litter.

6.0 Environmental Impacts

The initial pilot project entails dredging to remove shoaling from the section of the authorized Barnegat inlet navigation channel between the north and south jetties (Figure 1). The preferred plan will initially use the government-owned split-hull hopper dredge Murden to place the material in the nearshore depth of closure of the authorized beachfill project fronting the community of Harvey Cedars (see Figure 1 and Figure 6) and to provide a supplemental sand source to an area of accelerated beach erosion. Subsequent dredging events may utilize either the Murden or the Currituck, a smaller government-owned split-hull hopper dredge. Environmental impacts considered in this Environmental Assessment are those associated with dredging and placement in the nearshore littoral zone from Barnegat Light to Harvey Cedars. An evaluation of the long-term and short-term, positive and negative impacts to ecological, social, and economic factors associated with implementation of the alternative plans is provided below.

6.1 Air Quality

No Action Alternative – No Dredging

Under the No Action Alternative, Barnegat Inlet maintenance dredging not occur. There would be no temporary negligible impacts on air quality associated with dredging and dredged material placement.

Current Practice

Currently, the Currituck or Murden dredge the Barnegat Inlet, twice each year for approximately 20 days per year. This results in short-term negligible effects on air quality; however, maintenance dredging is excluded from General Conformity requirements under 40 CFR Section 153(c)(ix).

Beneficial Use of Sediments (Proposed Action)

Impacts on air quality under this alternative would be similar to those under the current practice. While impacts on air quality would be temporary and negligible, maintenance dredging operations are excluded from General Conformity requirements under 40 CFR Section 153(c)(ix). However, the proposed pilot project would require the hopper dredge traveling an additional 1-3 miles during maintenance dredging placements further south along the oceanfront between Barnegat Light and Harvey Cedars as a beneficial use of the dredged sand.

6.1.1 General Conformity Rule

The Clean Air Act, and its subsequent amendments, established the National Ambient Air Quality Standards (NAAQS) for seven common pollutants: particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These air pollutants are referred to as “criteria pollutants” by the EPA because they are regulated for permissible levels based on human health and environmentally based guidelines. The General Conformity Rule, under the Clean Air Act, applies to all federal actions that are taken in designated nonattainment areas, with three exceptions: 1) actions covered by the transportation conformity rule; 2) actions associated with emissions below specified *de minimis* levels, and 3) other actions which are either exempt or presumed to conform. Maintenance dredging is excluded from General Conformity requirements under 40 Code of Federal Regulation (CFR) Section 153(c)(ix). The additional air emissions estimated to result from the dredge traveling the additional 1-3 miles to the beneficial use placement site is below *de minimis* levels for each annual dredging event.

6.2 Water Quality

No Action Alternative – No Dredging

Under the No Action Alternative, Barnegat Inlet maintenance dredging would no longer occur. The authorized channel within the inlet would continue to shoal until depths rendered the channel unnavigable. No material would be placed in the nearshore zone fronting the community of Harvey Cedars, although natural processes would continue to bypass sand around the south jetty to the ocean beach of Barnegat Light. Under this alternative, there would be no temporary negligible increase in turbidity associated with dredging and dredged material placement. No direct impacts on water quality would occur under this alternative.

Current Practice

Currently, the Currituck or Murden are used for dredging and placement operations at Barnegat Inlet, twice each year for approximately 20 days per year. This results in short-term negligible effects on water quality associated with a temporary and localized increase in turbidity at the dredging and placement sites shown in Figure 3. These are high energy areas and tidal currents and waves nearly negate any impacts from turbidity, which would last on the order of minutes after each placement. Sediment dredged from the inlet is expected to be greater than 90 percent clean sand, therefore, no adverse effects on water quality would occur due to release of contaminants. The sediment dredged from the channel and being place in the nearshore is zone is part of the natural sediment system of the inlet. Some of the material is naturally transported to adjacent beaches by alongshore processes towards the south.

Impacts on water quality associated with nearshore placement at the south jetty would result in a similarly short-lived elevation in turbidity in an area that incurs elevated turbidity naturally due to breaking waves.

Beneficial Use of Sediments (Proposed Action)

The temporary increase in turbidity associated with this alternative placement location in the nearshore zone in the vicinity of Harvey Cedars would be similar to the current practice of placement south of the south jetty at Barnegat Light. The increased turbidity would be short-term, temporary, and localized to the dredging and placement site. These are high energy areas where tidal currents and cresting waves would nearly negate any impacts from turbidity, which would last on the order of minutes. Best Management Practices would be used and may be required by conditions contained in State approvals (i.e., 401 Water Quality Certification and Coastal Zone Management regulations) to further minimize water quality impacts during project implementation. Material dredged from the inlet is expected to be greater than 90 percent sand and is assumed to be clean with no chemical contamination. The sediment dredged from the channel and being place in the nearshore is zone is part of the natural sediment system of the inlet. This sediment would have naturally transported to adjacent beaches. Therefore, the placement of sand in the proposed nearshore area is not expected to adversely affect water quality.

6.3 Sediment Quality and Hazardous, Toxic, and Radioactive Waste

No Action Alternative – No Dredging

Under the No Action Alternative, Barnegat Inlet maintenance dredging would no longer occur. While the authorized channel within the inlet would continue to shoal, there would be no change in sediment quality and no impact from Hazardous, Toxic, and Radioactive Waste (HTRW).

Current Practice

Currently, Barnegat Inlet is dredged twice each year. Sediment dredged from the inlet is expected to be greater than 90 percent sand and free of contamination. The sediment dredged from the channel and being place in the nearshore is zone is part of the natural sediment system of the inlet. Through longshore natural processes, some the material is naturally transported to adjacent beaches. There would be no change in sediment quality and no impact from HTRW.

Beneficial Use of Sediments (Proposed Action)

Under the Proposed Action, maintenance dredging of Barnegat Inlet is anticipated to be reduced both temporally as well as the quantity of material removed. Sediment dredged from the inlet shoals is expected to continue to be greater than 90 percent sand and free of contamination. The sediment dredged from the channel and being place in the nearshore zone is expected to remain a part of the natural longshore sediment transport to adjacent beaches. There would be no change in sediment quality and no impact from HTRW.

6.4 Biological Resources

6.4.1 Terrestrial Habitats

No Action Alternative – No Dredging

Barrier islands such as Long Beach Island provide important resting, feeding, and nesting habitat for many migratory and resident species of birds although birds tend to prefer foraging and nesting on reaches less populated with humans, such as at Barnegat Light at the northern end or the Holgate area at the southern end of the island. Under the No Action Alternative, Barnegat Inlet would not be dredged. The No Action Alternative would entail continued downdrift migration of some sand south of the jetty at Barnegat Light due to sand bypassing the inlet. The beach habitat at Harvey Cedars would continue to incur accelerated erosion, with the potential for minor indirect impacts on terrestrial wildlife habitat. Under the authorized storm risk reduction (beachfill) project, Long Beach Island beaches, including Harvey Cedars would be periodically nourished, funding permitting. Impacts to terrestrial habitat associated with beach nourishment activities are addressed in the 1999 EIS and 2014 EA.

Current Practice

Current maintenance dredging of Barnegat Inlet results in no direct adverse impacts on terrestrial habitats. Continued placement of the dredge material south of the south jetty is contributing to the expansion of the northern end of Long Beach Island. The beach habitat at Harvey Cedars would continue to erode under the current practice. This may result in minor impacts on terrestrial wildlife beach habitat at the erosion hotspot. Under the current practice, the beach is periodically nourished, funding permitting. Impacts on terrestrial habitat associated with the authorized beach nourishment project are addressed in the 1999 EIS and 2014 EA.

Beneficial Use of Sediments (Proposed Action)

There would be no adverse impacts to existing terrestrial habitats from dredging the inlet channel or from nearshore placement of the dredged material. Overall the project would result in beneficial effects associated with potential added protection of beach habitat with a supplemental sand source in the littoral zone. Barrier island habitats provide important resting, feeding, and nesting habitat for many migratory and resident species of birds. The proposed action is designed to allow some operational flexibility to determine where nearshore placement is most needed to protect these habitats.

Previous projects have utilized dredged material for nearshore placements with success. Work and Otay (1997) demonstrated that a nearshore submerged placement of dredged material in front of a nourished beach did not migrate inshore, but redistributed wave energy along the shoreline and 84 percent of the initial volume of nourished material remained in the beach fill. In 2009, an elongated, submerged material placement behind a small natural bar

using approximately 200,000 cy of mixed material resulted in coarse material being transported onshore and fine material offshore (Brutsche et al. 2015). Monitoring showed that the material continually migrated and the beach remained stable, even after the constructed bar split in two after a hurricane. Beach erosion was minimal compared to the control beach. After four years, the beach grew approximately 50 feet wide (Brutsche et al. 2015). In 2012, a swash zone placement of material at Perdido Key was completed with the intent of mobilizing sediments to nourish downdrift beaches. The material eroded and deposited sand on the beach immediately and through a tropical storm and hurricane. Some of the sand was accounted for in the nearshore area of the control beaches (Brutsche et al. 2015).

6.1.2 Aquatic Habitats

No Action Alternative – No Dredging

Under the No Action Alternative, Barnegat Inlet would not be dredged. There would be no localized increases in turbidity in the water column, however material bypassing the south jetty would continue to accumulate at Barnegat Light while some sand will be transported south due to natural currents. Disturbance to the submerged sand bottom benthic habitat at the placement area at Harvey Cedars would continue to occur as a result of periodic nourishment cycles of the authorized storm protection project. Impacts to benthic habitat are minimized through placement of material similar in grain size to existing substrate. Discontinuing dredging within the navigation channel would result in continued shoaling within Barnegat Inlet and reduced depths creating navigational hazards.

Current Practice

Currently, a specialty split hull hopper dredge is used for dredging and placement operations, twice each year for approximately 20 days per year. This would continue for the foreseeable future. This results in short-term negligible effects with a temporary and localized increase in turbidity and disturbance of the bottom substrate through removal at the dredging site and deposition of sand at the placement site. These are high energy areas and tidal currents and waves nearly negate any impacts from turbidity which would last on the order of minutes. Benthic organisms in the placement area are subject to burial although some species are capable of migrating through the material. Benthic species typically recolonize dredged and depositions areas by recruitment from nearby undisturbed areas but typically takes 18 months to 2 years, but because this is an ongoing activity, these areas are considered disturbed. Impacts on aquatic habitat associated with the authorized beach nourishment project are addressed in the 1999 EIS and 2014 EA.

Beneficial Use of Sediments (Proposed Action)

Impacts of maintenance dredging within Barnegat Inlet with associated nearshore subtidal placement of the material at Harvey Cedars would result in similar impacts associated with the current practice of maintaining only a portion of the inlet shoaling and placement south of the jetty at Barnegat Light. This pilot project proposes to dredge to authorized channel depth in 2020 which will result in a greater quantity of dredged sand (approximately 200,000 cy), however, subsequent year quantities are expected to be significantly less (approximately 50,000 cy). Because this is an ongoing activity of maintenance of a Federal Navigation Channel, the channel bottom is repeatedly disturbed; however the channel is 300 feet wide while the inlet itself is over 1,700 feet wide and areas outside of the channel boundaries are

not disturbed. The benthic community in the immediate area of the proposed placement site would be buried during placement activities in the nearshore zone fronting Harvey Cedars, however, the deposition operation is done in small increments (250-300 cy) and will be distributed along a 1-mile long placement area. As noted previously, some burial of benthic organisms will result while other benthic species are capable of migrating through the newly placed material. Best management practices would be employed to minimize turbidity. Impacts associated with dredging and placement would potentially be minimized by reducing the frequency and subsequent year quantities dredged with the pilot project.

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 in the nearshore area from south of the nodal point along Long Beach Island to Harvey Cedars. 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 inlet circulation would negate any impacts from turbidity.

The sediments dredged from the inlet are expected to be greater than 90 percent sand and assumed to be clean with respect to chemical contamination. Therefore, the placement of sand in the nearshore area is not expected to adversely affect water quality. Best Management Practices would be used and may be mandated by conditions contained in State approvals (i.e., 401 Water Quality Certification and Coastal Zone Management regulations) to minimize water quality impacts during project implementation.

6.4.3 Wildlife

No Action Alternative – No Dredging

Under the No Action Alternative, Barnegat Inlet would not be dredged. The No Action Alternative would have no direct effects on wildlife. The beach habitat at Harvey Cedars would continue to erode, resulting in minor indirect impacts to wildlife. The beaches of Long Beach Island would continue to receive periodic nourishment, funding permitting, for the duration of the authorized beachfill project. Impacts on terrestrial wildlife associated with beach nourishment activities are addressed in the 1999 EIS and 2014 EA.

Current Practice

Current maintenance dredging has no direct effect on wildlife. Under current practice, dredged materials taken from shoals in the inlet navigation channel and placed just south of the south jetty contribute to an accreting beach at Barnegat Light, which results in an indirect benefit to wildlife in the vicinity. Based on current practice, beach habitat at Harvey Cedars would continue to erode resulting in minor indirect impacts on wildlife in between periodic nourishment cycles of the authorized storm protection beachfill project. Impacts on wildlife associated with beach nourishment activities are addressed in the 1999 EIS and 2014 EA.

Beneficial Use of Sediments (Proposed Action)

The barrier island habitat of Long Beach Island provides breeding, foraging, nesting and resting areas for many species of migratory birds and some small mammals and reptiles. The proposed action is designed to allow some operational flexibility to determine where nearshore placement is most needed to contribute to protection of these coastal habitats.

Placement of high quality dredged sand in the littoral zone of the ocean beaches is anticipated to result in an indirect benefit to wildlife species such as black skimmer, least tern, and piping plover as these species utilize the beaches in the vicinity. No long-term adverse impacts to wildlife resources are anticipated as a result of the project. Some species may leave the sites during construction, but are expected to return once operations cease. Overall there would be a net benefit to wildlife in the area.

6.4.4 Aquatic Habitats

No Action Alternative – No Dredging

Under the No Action Alternative, Barnegat Inlet would not be dredged. There would be no direct effects on fisheries in terms of interactions with the dredge and no indirect effects on fisheries as a result of potential temporary and localized increases in turbidity in the water column and disturbance of benthic habitat in the inlet and placement area. Discontinuing dredging would result in the shoaling of Barnegat Inlet, thereby reducing depths within the inlet and creating navigational hazards for commercial and recreational vessels.

Current Practice

Currently, a hopper dredge is used for maintenance dredging and placement operations, twice each year for approximately 20 days per year. Maintenance dredging is only expected to have negligible and temporary effect on fisheries, due to elevated turbidity during the dredging and placement activities and potential loss of prey species. With the exception of egg and larval stages, fish are mobile and generally leave the area of disturbance temporarily. The inlet is significantly wider than the authorized channel, allowing for fish passage. Dredging is not scheduled to occur during the time of year when egg and larval stages would occur in the area. Negligible impacts on fish habitat would occur. The current practice results in short-term negligible effects with a temporary and localized increase in turbidity and disturbance of benthic habitat in the inlet and placement area. These are high energy areas and tidal currents and waves nearly negate any impacts from turbidity and burial, which would last on the order of minutes. Because this is an ongoing activity, these areas are previously disturbed.

Beneficial Use of Sediments (Proposed Action)

Direct impacts from the nearshore placement alternative would be similar to the current practice. With the exception of some small finfish, most bottom dwelling and pelagic fishes are highly mobile and should be capable of avoiding interactions with the dredge and turbidity impacts due to dredging and placement operations. The dredging would result in the suspension of some benthic organisms in the water column, resulting in opportunistic feeding of some finfish. The dredging site is previously disturbed. At the placement site, impacts would be negligible relative to the available habitat in the adjacent areas. Benthic habitat would begin to recover in 1 to 2 years, from impacts from dredging and burial.

6.4.5 Essential Fish Habitat

No Action Alternative – No Dredging

Impacts on EFH (coastal waters subtidal benthic substrate) under the No Action Alternative would be identical to those described for aquatic habitat under the No Action Alternative described under Section 6.3.2. There would be short-term negligible effects associated with a

temporary and localized increase in turbidity and disturbance of benthic habitat in the inlet channel and placement area. There would be no impacts to any fish life stages. Discontinuing dredging would result in the shoaling of the Barnegat Inlet navigation channel, thereby reducing water depths and creating navigational hazards.

Current Practice

Impacts on EFH (coastal waters subtidal benthic substrate) would be identical to those described for aquatic habitats (Current Practice under Section 6.3.2). Currently, a hopper dredge is used for dredging and placement operations, twice each year for approximately 20 days per year. This results in short-term negligible effects from a temporary and localized increase in turbidity in the water column and disturbance of benthic habitat in the inlet and placement area. These are high energy areas and tidal currents and waves nearly negate any impacts from turbidity and burial, which would last on the order of minutes. Because this is an ongoing activity, these areas are disturbed. Dredging typically does not take place during the period of the year when fish larvae and eggs are present, however, the inlet is significantly wider than the shoaled areas within the authorized channel where dredging would occur. In the placement area, the benthic community should recover in 1 to 2 years. Maintenance dredging also allows the central connection between Barnegat Inlet and the ocean to be maintained.

Beneficial Use of Sediments (Proposed Action)

Impacts on EFH (coastal waters and subtidal benthic substrate) would be identical to those described for aquatic habitats (Section 6.3.2). Benthic habitat in the inlet navigation channel is predominantly sand and is considered disturbed, with dredging occurring twice each year. Impacts to benthos due to burial of the benthic community during placement activities in the nearshore areas would be localized and minimal. Some benthic infaunal species would be buried while others are capable of migrating through placed sediments. The community would also expect to recover quickly due to recruitment from nearby undisturbed areas. While the benthic community serves as EFH in the form of habitat and prey, impacts are expected to be negligible, as the area impacted is only a fraction of the available EFH in the area.

The creation of a nearshore sand feature through placement activities could provide beneficial effects on EFH in the form of topographical relief for some species (Yozzo et al. 2014, Clarke and Kasul 1994 as cited in Reine et al. 2012). Assuming the pilot project achieves its objective to reduce nourishment needs at the erosional hotspot at Harvey Cedars, there would be a reduction in the disturbance frequency of beach nourishment operations under the authorized storm reduction project and the use of offshore borrow areas, resulting in beneficial effects on EFH.

Cumulative effects associated with the project on EFH are not anticipated. The project would have temporary minor impacts to the bottom habitat by creating a nearshore sand feature but would not significantly alter the habitat type. 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. Table 4 provides the EFH Assessment Worksheet for the project.

Table 4. EFH Assessment Worksheet for Federal Agencies

PROJECT NAME: Beneficial Use Placement Opportunities in the State of New Jersey Using Navigation Channel Sediments: Barnegat Inlet, NJ

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 dredging and placement locations are subtidal. Natural processes will allow the nearshore material to migrate into the intertidal and deposit sediments onto the beach.
What are the sediment characteristics?	The material to be dredged is expected to be greater than 90 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 the spatial extent.	No
What is typical salinity and temperature regime/range?	Salinity generally ranges from 28 to 36 parts per thousand (ppt) over the continental shelf. Lower salinities are found near the coast. Salinity ranges between 19 and 30 ppt with an average 25 ppt in the estuary. Water temperatures range from a recorded winter low of 29.5 ºF to summer highs of 82 ºF.
What is the normal frequency of site disturbance, both natural and man-made?	The Barnegat Inlet is dredged twice per year and the sand in placed in the nearshore area south of the inlet. In the nearshore area, regular disturbance from wind and tide generated waves, recreational boating, and storm events.
What is the area of proposed impact (work footprint & far afield)?	See Figure 1 and **Error! Reference source not found.**. For order-of-agnitude perspective, placement of 200,000 cy of sand as a hypothetical rectangular solid could have dimensions of one mile long by 300 feet wide in the cross-shore direction and about 3 feet thick. Such a placement configuration would have a surface area of about 36 acres.

3. DESCRIPTION OF IMPACTS

Impacts	Y	N	Description
Nature and duration of activity(s)			Approximately 200,000 cy of material are required to be dredged from this portion of the Barnegat Inlet channel to restore the channel to the authorized depth of 10 feet MLW plus 2 feet of overdepth. The placement sites are nearshore. Material would be dredged from the channel and brought to the placement sites via the hopper dredge, Murden. The project is expected to take 45 - 60 days. Future maintenance dredging and placement in the nearshore zone will be conducted on an estimated annual basis with significantly less quantity anticipated per dredging cycle with placement in the nearshore zone to support the Long Beach Island beaches.
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, which is already disturbed. The benthic community would be temporarily disturbed via burial at the placement sites. Sites are expected to recover within 1 to 2 years.
Will SAV be impacted?		N	No SAV in the project area.
Will sediments be altered and/or sedimentation rates change?		N	Sediments in the nearshore placements are expected to be similar to those currently at the placement site. The project will potentially result in feeding sediments onto a beach that is currently eroding.
Will turbidity increase?	**Y**		A temporary increase in turbidity would occur during dredging and dredged material placement operations. Increases are expected to be minimal and comparable to background levels in the placement site.
Will water depth change?	**Y**		Shoaled material will be removed from the Barnegat Inlet. The channel will be returned to its authorized depth of 10 feet MLW plus 2 feet overdepth dredging. Water depth will temporarily change at the placement site from between -10 feet and -20 feet NAVD88 to approximately -7 to -13 feet.
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 90 percent sand and is clean with respect to chemical contamination, because of flushing. No contaminants would be released into the water column or sediments.
Will tidal flow, currents or wave patterns be altered?	Y		Nearshore feature along Harvey Cedars may result in some dissipation of energy from onshore waves.
Will water quality be altered?		N	No, negligible temporary increases in turbidity would occur. The project area is a high energy area, increases in turbidity would be comparable to background levels and would dissipate quickly.

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	No dredging and placement during the spawning period.
Nursery		N	
Forage	Y		Dredging occurs in an already disturbed authorized navigation channel. Placement in the nearshore area could result in some burial of benthic species. Mobile benthic and finfish species would be able to avoid adverse impacts. Benthic infaunal invertebrates would recover in 1 to 2 years. The amount of habitat disturbed is negligible relative to similar habitat available in the area for foraging. 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?			The majority of the impacts will be temporary. The placement of a nearshore feature would result in beneficial effects for species that prefer topographical relief. Placed material is expected to migrate inshore to feed the adjacent beach.
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**

N/A=Not applicable.

6.5 Threatened and Endangered Species

Due to the marine nature and nearshore location project, the following federally-listed species were considered

- Atlantic sturgeon,
- piping plover,
- red knot,
- seabeach amaranth
- Kemp's ridley turtle
- leatherback turtle
- hawksbill turtle
- green turtle
- loggerhead turtle
- North Atlantic right
- fin whale

Because the alternatives occur in the water, impacts to piping plover, red knot, Eastern black rail, and roseate tern are considered to be minimal. Hopper dredges working in the inlet and material placement in the nearshore zone do not appear to disturb birds on the shoreline. Likewise, the project would not pose any adverse impact on State-listed species of birds that occur in the vicinity. The pilot project proposes to beneficially use high quality clean sand dredged from the inlet navigation channel to supplement the shore-protection (beachfill) project that in turn, provides protection to both infrastructure and coastal habitat important to resting, feeding, and nesting habitat for these species.

No Action Alternative – No Dredging

Under the No Action Alternative, the Barnegat Inlet navigation channel would not be dredged. There would be no direct or indirect impacts on threatened and endangered terrestrial or marine species.

Current Practice

Current dredging practices at Barnegat Inlet are not known to result in adverse effects on threatened and endangered species. As noted previously, hopper dredges working in inlets and the nearshore placement zone do not appear to disturb beach nesting or foraging bird species, emitting minimal noise and slow-moving. The Currituck and Murden, which operate at

low suction, have grid screens with small openings and have demonstrated a very low likelihood of entraining or impinging sea turtles (NMFS 2014). The draghead is not activated until it is resting directly on the bottom to avoid impingement of marine species. NMFS (2014) concluded that when sea turtles are likely to be present, one sea turtle is likely to be entrained for every 3.8 MCY of material removed by a hopper dredge.

All dredging occurs only within shoaled areas of the authorized navigation channel of Barnegat Inlet, a small portion of the total wide of the inlet. Because of the previous disturbance within the authorized channel and the lack of SAV, the inlet is not expected to be potential sea turtle foraging habitat. Additionally, the amount of material dredged from Barnegat Inlet is small (approximately 50,000 to 100,000 cy two times per year) resulting in unlikely entrainment of sea turtles during dredging under the current practice. Sea turtles rarely occur in the shallow waters close to the beach where the proposed placement operations will occur. Additionally, sea turtle mobility would help them avoid the dredge as it motors slowly into place for release of the material. Current maintenance dredging practices may affect, but are not likely to adversely affect threatened and endangered sea turtles for an inlet and nearshore placement operation.

Atlantic sturgeon in the marine environment are highly mobile and entrainment of sturgeon during hopper dredging operations appears to be relatively rare. NMFS (2014) calculated an interaction rate of 1 Atlantic sturgeon is likely to be injured or killed for approximately every 8.6 mcy of material removed during hopper dredging operations. Currently, approximately 50,000 to 100,000 cy of sediment are dredged two times per year; therefore, the potential for entrainment of sturgeon under the current dredging practice is unlikely. Additionally, Atlantic sturgeon are demersal species and would likely leave the area of temporary elevated turbidity associated with current dredging and placement. Their mobility would help them avoid the areas of increased turbidity. Atlantic sturgeon are unlikely to occur in the nearshore shallow waters fronting the ocean beaches. Current maintenance dredging practices may affect, but are not likely to adversely affect threatened and endangered Atlantic sturgeon.

North Atlantic right whales and fin whales are highly mobile and able to avoid the slow-moving dredge and are unlikely to occur in the nearshore beach zone. Additionally, the dredge crew continually keep watch for protected marine species and employ all required NMFS vessel avoidance measures to avoid interactions with protected marine species. Current maintenance dredging practices may affect, but are not likely to adversely affect endangered whales.

Beach nourishment impacts associated with the authorized Long Beach Island storm damage reduction project the current practice are addressed in the 1999 EIS, the 2014 EA, and the National Marine Fisheries Service (NMFS) (2014) Biological Opinion.

Beneficial Use of Sediments (Proposed Action)

The impacts of dredging for the proposed nearshore placement at Harvey Cedars alternative would be identical to the current practice (i.e. maintenance dredging and placement south of the south jetty). While Atlantic sturgeon, sea turtles, and whales have the potential to occur in the vicinity, it is unlikely during the operation. The species are highly mobile and able to avoid the dredge and areas of temporarily elevated turbidity due to operations. Any effects from placement of sand or an increase in turbidity would be temporary and insignificant. Additionally, the dredge crew would continually keep watch for protected marine species and

employ all required NMFS vessel avoidance measures to avoid interactions with protected marine species.

If this alternative is successful at decreasing periodic nourishment needs or extending the storm protection period near Harvey Cedars, the pilot project would demonstrate a valuable beneficial use of dredged material through the monitoring program. This further reduces the potential to affect threatened and endangered species by reducing the frequency of needed maintenance dredging and/or emergency beachfills.

Based on the available information, it has been determined that the proposed project is not likely to adversely affect these threatened and endangered species.

6.6 Cultural Resources

As a Federal agency, USACE has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with the project. Present statutes and regulations governing the identification, protection and preservation of these resources include, but are not limited to, the National Environmental Policy Act of 1969 (NEPA) and the National Historic Preservation Act (NHPA). A historic property is defined in the NHPA as any prehistoric or historic district, site, building, structure or object included in or eligible for inclusion on the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property or resource.

No Action Alternative – No Dredging

The no action alternative would not impact historic properties eligible for or listed on the National Register of Historic Places (NRHP).

Current Practice

Current dredging practices do not impact historic properties eligible for or listed on the NRHP.

Beneficial Use of Sediments (Proposed Action)

Since the Barnegat Inlet Navigation Channel will only be dredged to its authorized depth, and since the placement of dredged material within this nearshore location will not impact the two recorded shipwrecks, USACE has determined that the proposed action will have *No Effect* on historic properties eligible for or listed on the National Register of Historic Places pursuant to 36CFR800.4(d)(1).

A determination letter of *No Effect* was sent to the New Jersey State Historic Preservation Office and to the Tribes including: the Delaware Nation of Oklahoma, the Delaware Tribe, the Eastern Shawnee Tribe of Oklahoma, the Oneida Indian Nation, the Stockbridge-Munsee Mohican Tribe, the St. Regis Mohawk Tribe, and the Seneca Nation of Indians.

6.7 Land Use, Infrastructure, and Socioeconomics

No Action Alternative

Under the No Action Alternative, the Barnegat Inlet navigation channel would continue to shoal. This would result in an indirect negative effect on socioeconomic resources such as tourism, and commercial and recreational fisheries. These are not only economically important to the local region, but to the economy of the State of New Jersey.

The beach at Harvey Cedars would continue to be periodically nourished under the authorized storm risk reduction project. The No Action Alternative would not meet the objective of the project to beneficially use maintenance dredge material in a known erosion hotspot.

Current Practice

Current dredging practices would not adversely affect socioeconomic resources, land use, infrastructure, or utilities. Dredging is necessary for maintaining the safety of Barnegat Inlet which allows safe navigation for important industries such tourism or commercial and recreation fisheries. Growth in employment, business, and industrial activity in the study area is expected to follow economic trends in national economies. As previously mentioned, the region's economic anchors of the fishing and tourist industries are expected to continue to remain important to the local and regional economy.

The beach at Harvey Cedars would continue to be nourished under the authorized storm risk reduction project. The Current Practice Alternative would not meet the objective of the project to beneficially use maintenance dredge material for shore protection and enhance recreational resources at a known erosion hotspot on Long Beach Island.

Beneficial Use of Sediments (Proposed Action)

Both dredging and nearshore placement would be result in indirect beneficial effects on the socioeconomic resources, land use, infrastructure, and utilities on Long Beach Island. Nearshore berm placement would result in beneficial effects associated with potential added protection of beach habitat with a supplemental sand source in the littoral zone.

Barnegat Inlet and the proposed nearshore placement locations are located in Ocean County, New Jersey. Ocean County, as well as other coastal counties of Atlantic, Cape May, and Monmouth have historically suffered extensive damage from nor'easters, hurricanes, and tropical storms. The impacts from these damages and recovering from these damages places a significant financial burden on the predominantly residential communities.

Waterfront communities are at a significant risk from storm surge and inundation. The communities are heavily populated and inhabited by individuals who contribute to the economic health of the entire state of New Jersey through employment. These communities are critical to the regional economy that is supported by tourism, water recreation, as well as by industry and offices located in the area. Critical infrastructure includes assets that are essential to the function of communities and the economy such as electricity, gas distribution, water supply, transportation, education, and community services (e.g. police, fire department, postal and courier services, etc.).

Severe storm surge events threaten the health and safety of residents living within the study area. Loss of life, injury, and post-flood health hazards may occur as the result of significant storms. Hurricane Sandy reduced the accessibility and availability of health facilities, postal service and required first-responders.

Under the Proposed Action, growth in employment, business, and industrial activity in the study area is expected to follow economic trends in national economies. As previously mentioned, the region's economic anchors of the fishing and tourist industries are expected to continue to remain important to the local and regional economy.

6.8 Recreational Resources

No Action Alternative – No Dredging

Under the No Action Alternative, the Barnegat Inlet navigation channel would continue to shoal, which would result in a negative effect on navigation, recreational boating, and safety. Additionally, the beach at Harvey Cedars would continue to erode, which would have adverse effects on recreational activities such as swimming, fishing, birdwatching, and surfing and habitat. The No Action Alternative would not meet the objective of the project to beneficially use maintenance dredge material for shore protection and enhance recreational resources on Long Beach Island.

Current Practice

Under the current maintenance dredging practices, the beach at Harvey Cedars would continue to erode, which would have adverse effects on recreational activities and beach habitat. The current practice would not meet the objective of the project to beneficially use maintenance dredge material for shore protection and enhance recreational resources on Long Beach Island.

Beneficial Use of Sediments (Proposed Action)

Both dredging and nearshore placement would result in indirect beneficial effects on recreational resources and beach habitat at Long Beach Island. Dredging is necessary for maintaining the safety of Barnegat Inlet which would benefit recreational and commercial boating. The nearshore placement would benefit activities that take place on the beach such as fishing, sunbathing, and birdwatching. The proposed action is designed to allow some operational flexibility to determine where nearshore placement between Barnegat Light and Harvey Cedars where it is most needed to protect onshore recreational resources. Effects are expected to be negligible.

6.9 Visual and Aesthetics

Visual resources can be subjective by nature, and therefore the level of a proposed project's visual impacts can be challenging to quantify. Generally, projects that create a high level of contrast to the existing visual character of a project setting are more likely to generate adverse visual impacts due to visual incompatibility. Thus, it is important to assess project effects relative to the existing conditions of the area. On this basis, a project components effect on the visual environment are quantified and evaluated for impact assessment purposes based on factors affecting setting compatibility such as changes in visual vividness, intactness, and unity from the existing conditions.

No Action Alternative – No Dredging

Under the No Action Alternative, the beach at Harvey Cedars would continue to erode, which could be considered an adverse effect on visual resources and aesthetics. Beachfill operations under the authorized storm protection project would continue to address eroded beaches on a periodic basis, funding permitting.

Current Practice

The beach at Harvey Cedars would continue to erode under current dredging and placement practices, which could be considered an adverse effect on visual resources and aesthetics. Beachfill operations under the authorized storm protection project would continue to address eroded beaches on a periodic basis, funding permitting.

Beneficial Use of Sediments (Proposed Action)

No onshore construction or construction equipment would be present during the project. A hopper dredge would be visible from Barnegat Inlet to Harvey Cedars for 45 - 60 days. Placement operations will occur in the nearshore littoral zone. No adverse visual or aesthetic impacts would be expected. The proposed action is designed to allow some operational flexibility to determine where nearshore placement is most needed to eroding beaches, which could be considered an indirect beneficial effect on visual resources and aesthetics.

6.10 Unavoidable Adverse Environmental Impacts

No Action Alternative – No Dredging

Under the No Action Alternative, the unavoidable impacts would be the shoaling of Barnegat Inlet leading to a severe economic impacts resulting from a decrease in commercial and recreational boat usage. Although Harvey Cedars would be periodically nourished under the ongoing shore protection project, Harvey Ceders exhibits an accelerated erosion rate relative to other portions of the beachfill project and would continue to erode in between replenishment cycles. The potential for increased flooding and structural damages at Harvey Cedars and other locations would occur as a result of storm damages. As the risk of storm damage increases, property values would decrease.

Current Practice

Under the current practice, there would be no operational flexibility to place dredged material where most needed to protect eroding beaches. An unavoidable adverse impact would be continued erosion of the existing beach, which would result in loss of habitat and eventually damage to structures. The potential for increased flooding at Harvey Cedars and other locations would occur as beach loss continues in between replenishment cycles of the shore protection project. As the risk of storm damage increases, property values would decrease.

Beneficial Use of Sediments (Proposed Action)

The unavoidable adverse impact of the nearshore alternative placement area is a temporary decrease in benthic habitat and populations, due to burial of some species. It is anticipated that these communities would recover in time and the displacement of benthic invertebrates is temporary. Visual, noise and air quality impacts that may occur during dredging operations are temporary and will cease upon completion of the dredging operation. By providing a supplemental sand source within the nearshore zone to augment between beachfill replenishment cycles, erosion of the beach should be reduced, the proposed action would result in long-term beneficial effects on terrestrial habitat, recreational resources, and visual resources such as a sandy beach..

6.11 Short-term Uses of the Environment and Long-term Productivity

Barnegat Inlet requires maintenance dredging to ensure navigational safety for recreational and commercial vessels that travel through the inlet. Inlets provide a replenishing valuable

resource of high quality sand due to shoaling that offshore sand resource borrow areas do not. The use of sand from Barnegat Inlet for a shore protection pilot project will positively affect the economy of the project area by supplying additional sand to the littoral zone of beaches while maintaining a navigable channel. The results of the monitoring study will contribute to the understanding of RSM. The project will provide a cost effective RSM approach for the beneficial use of dredge material for protection to infrastructure and coastal habitat. Adverse impacts to the placement area are short-term as currents will distribute the material naturally in the inshore zone and nearshore benthic fauna will re-establish post-construction.

6.12 Irreversible and Irretrievable Commitments of Resources

The dredging of Barnegat Inlet and nearshore placement involves the utilization of time and fossil fuels, which are irreversible and irretrievable. Impacts to the benthic community would not be irreversible, as benthic communities recolonize through recruitment from neighboring areas with cessation of placement activities.

7.0 Environmental Justice

Environmental justice issues arise if activities associated with the project caused a disproportionate impact to low-income or minority populations. Disproportionate impacts could be related to human health effects or adverse environmental effects. Census data indicate that the racial makeup of the area is 91.3% Caucasian; 3.0% African American; 0.1% Native American; 2.0% Asian; and 9.0% Hispanic/Latino. The median household income (2006-2010) ranged from $75,000 - $85,000, depending on the municipality (U.S. Census Bureau 2020). The communities present in the study area do not meet the criteria for a population with members of a minority group or low-income.

Therefore, 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 5 provides a listing of compliance with federal 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. USACE has applied for these approvals. All approvals will be obtained prior to initiation of construction.

The proposed plan, as evaluated in this EA is being coordinated with the USFWS and the NMFS regarding issues related to Section 7 of the ESA (16 U.S. C. 1531 et seq.). The project is also being coordinated with NMFS regarding EFH pursuant to Section 305(b)(2) of the MSA (1996 amendments).

This EA concludes that the proposed beneficial use of dredged material in the vicinity of Barnegat Inlet, New Jersey is not a major federal action 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 5. Compliance of the Proposed Action with Environmental Protection Statutes and other Environmental Requirements

STATUTES	COMPLIANCE STATUS
Clean Air Act	Complete
Clean Water Act	Complete
Coastal Zone Management Act	In progress
Endangered Species Act	In progress
Fish and Wildlife Coordination Act	In progress
National Historic Preservation Act	In progress
National Environmental Policy Act	In progress
Environmental Justice (E.O. 12898)	Complete
Marine Mammals Protection Act of 1972	Complete
Magnuson-Stevens Fishery Conservation and Management Act of 1976	In progress
Federal Water Project Recreation Act	Complete
Submerged Lands Act of 1953	Complete
Rivers and Harbors Act of 1899	Complete
Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990	Complete
Anadromous Fish Conservation Act	Complete
Migratory Bird Treaty Act and Migratory Bird Conservation Act	Complete
Marine Protection, Research and Sanctuaries Act (Ocean Dumping Act)	Complete
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970	Complete
Executive Order 11988, Floodplain Management	Complete
Executive Order 12898, Environmental Justice	Complete
Executive Order 13045, Disparate Risks Involving Children	Complete

9.0 Section 404(b)(1) Analysis

A review of the impacts associated with discharges to waters of the United States for the National RSM Program WRDA 2016 Section 1122 Beneficial Use Pilot Project in Barnegat Inlet, NJ 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 at Barnegat Inlet and Long Beach Island in Ocean 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 critical shoaling from Barnegat Inlet that poses a hazard to navigation and public safety and beneficially utilize the dredged material for protection eroding coastal habitats.

D. General Description of Dredged or Fill Material.

1. General Characteristics of Material: sand

2. Quantity of Discharge: The estimated quantity of dredged material is initially approximately 200,000 cy in 2020. Based on past shoaling history, it is anticipated that there will be a need to dredge sand from the Barnegat Inlet channel each year and the quantity will vary but be approximately 50,000 cy/year and will rarely exceed 100,000 cy/year.

3. Source of Material: All material would be obtained from the existing Barnegat Inlet navigation project. Material would be removed between channel markers in the inlet between the north and south jetties.

E. Description of Discharge Sites.

1. Location: See Figure 1 and Figure 5 in the EA for the project location.

2. Size (acres): The proposed placement will occur in portions of 10 polygons 300 feet x 500 feet (1 mile long), where needed. The initial placement of 200,000 cy of sand, as a hypothetical rectangular placement 1 mile long x 300 feet and 3 feet thick would require 36 acres of surface area.

3. Type of Sites: The project entails placement of material on in a nearshore littoral zone along the ocean coast..

4. Type of Habitat: nearshore subtidal sand.

5. Timing and Duration of Discharge: 2 months. Construction is anticipated during the Summer 2020.

F. Description of Discharge Method. Discharge from hopper dredge.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations.

1. Substrate Elevation and Slope: varies.

2. Sediment Type: sand.

3. Fill Material Movement: Sediment from the initial placement is expected to be naturally distributed by longshore transport and wave action in the nearshore area fronting Harvey Cedars. Future small placements will occur between Barnegat Light and Harvey Cedars in the nearshore littoral zone.

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 nearshore 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 expected to be greater than 90 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: None.
   (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 during construction.

   d. Aesthetics: Temporary, minor effect during construction.

   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 - The selected plan was determined to be the best alternative for protecting habitat at the placement site.

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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