DECISION DOCUMENT AND PLANNING ANALYSIS

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

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

September 2020

US Army Corps of Engineers
Philadelphia District

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BENEFICIAL USE PLACEMENT OPPORTUNITIES IN THE STATE OF NEW JERSEY USING NAVIGATION CHANNEL SEDIMENTS: BARNEGAT INLET, NJ

1. Authority Requirements

Section 1122 of the Water Resources Development Act (WRDA) 2016 directs 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, including for the project purposes of:

- 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 material, civic improvement objectives, and other innovative uses and placement alternatives that produce public economic or environmental benefits.

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 Draft Guidance for Major Subordinate Commands (MSC) and District Commands was provided by the USACE Director of Civil Works in January 2019.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 Guidance indicates that the Section 1122 Pilot Projects should follow the policies outlined in the USACE Planning Guidance Notebook (ER 1105-2-100) for Section 204 of the Continuing Authorities Projects (CAP). Section 204 of the Water Resources Development Act of 1992, as amended, authorizes the U.S. Army Corps of Engineers to implement projects for the protection, restoration and creation of aquatic and ecologically related habitats, including wetlands, or to reduce storm damage to property, in connection with dredging for the construction or operations and maintenance of an existing authorized Federal navigation project.

In general, Section 1122 projects will be cost shared in accordance with Section 204 of the CAP; however, if the 204 project relies on dredged material from a federal navigation project, the transportation of the material beyond the Federal Standard will be at a 100% federal cost.

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 Decision Document and the Environmental Assessment: Beneficial Use Pilot Project Barnegat Inlet, New Jersey (the Barnegat Inlet project or

project). The *Programmatic Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Implementation of Section 1122 of the Water Resources Development Act of 2016 Selection of Recommended Projects* describes and documents the evaluation and selection process used to determine the 10 projects recommended for inclusion in the pilot program.

The Section 1122 pilot project will be implemented in two phases. Phase 1 of the pilot project is the beneficial use of material dredged from Barnegat Inlet in a nearshore placement adjacent to an erosional hot spot in Harvey Cedars, NJ supporting the federal Barnegat Inlet to Little Egg Inlet beach nourishment project. Phase 2 is the beneficial use of dredged material from the Oyster Creek portion of the Barnegat Inlet navigation channel with placement to build a new island and habitats and supporting coastal resilience in Barnegat Bay.

2. Congressional Delegation and Sponsor

a) **Congressional Delegation:** Senators Robert Menendez and Cory Booker (NJ), Representative Jeff Van Drew (NJ-2), Andy Kim (NJ-3).
b) **Sponsor:** New Jersey Department of Environmental Protection (NJDEP) Division of Coastal Engineering will serve as the non-Federal sponsor

3. Location of Study

The Section 1122 pilot project will be implemented in the region of the Barnegat Inlet Federal Navigation Project and Barnegat Bay, a complex and dynamic coastal system along the New Jersey Atlantic Coast. The study area for Phase 1 extends from Barnegat Inlet south along the shoreline of Long Beach Island to the nearshore zone at Harvey Cedars, Ocean County, New Jersey (Figure 1).

The overall study area includes the Oyster Creek portion of the Barnegat Inlet navigation channel. The Oyster Creek channel is located in Barnegat Bay west of Island Beach State Park (IBSP) and connects Barnegat Inlet with the NJ Intracoastal Waterway (Figure 2). The shallow marine environment contains numerous sand shoals and islands vegetated with salt marsh grasses and, in some areas, submerged aquatic vegetation (SAV). Barnegat Bay is separated from the Atlantic Ocean by the long Barnegat Peninsula (barrier island), the southern end of IBSP and the north end of Long Beach Island. The watershed is a valuable yet vulnerable resource for the state of New Jersey. It has a total area of 660 square miles. Nearly all 33 municipalities in Ocean County lie within the Barnegat Bay watershed, as well as four municipalities in Monmouth County.

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

BARNEGAT INLET FEDERAL NAVIGATION CHANNEL (Figure 2). 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). 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 inlet to the Oyster Creek channel to provide a connection to the New Jersey Intracoastal Waterway (NJIWW) federal channel. The channel at Oyster Creek is 200 feet wide by 8 feet deep (MLW).

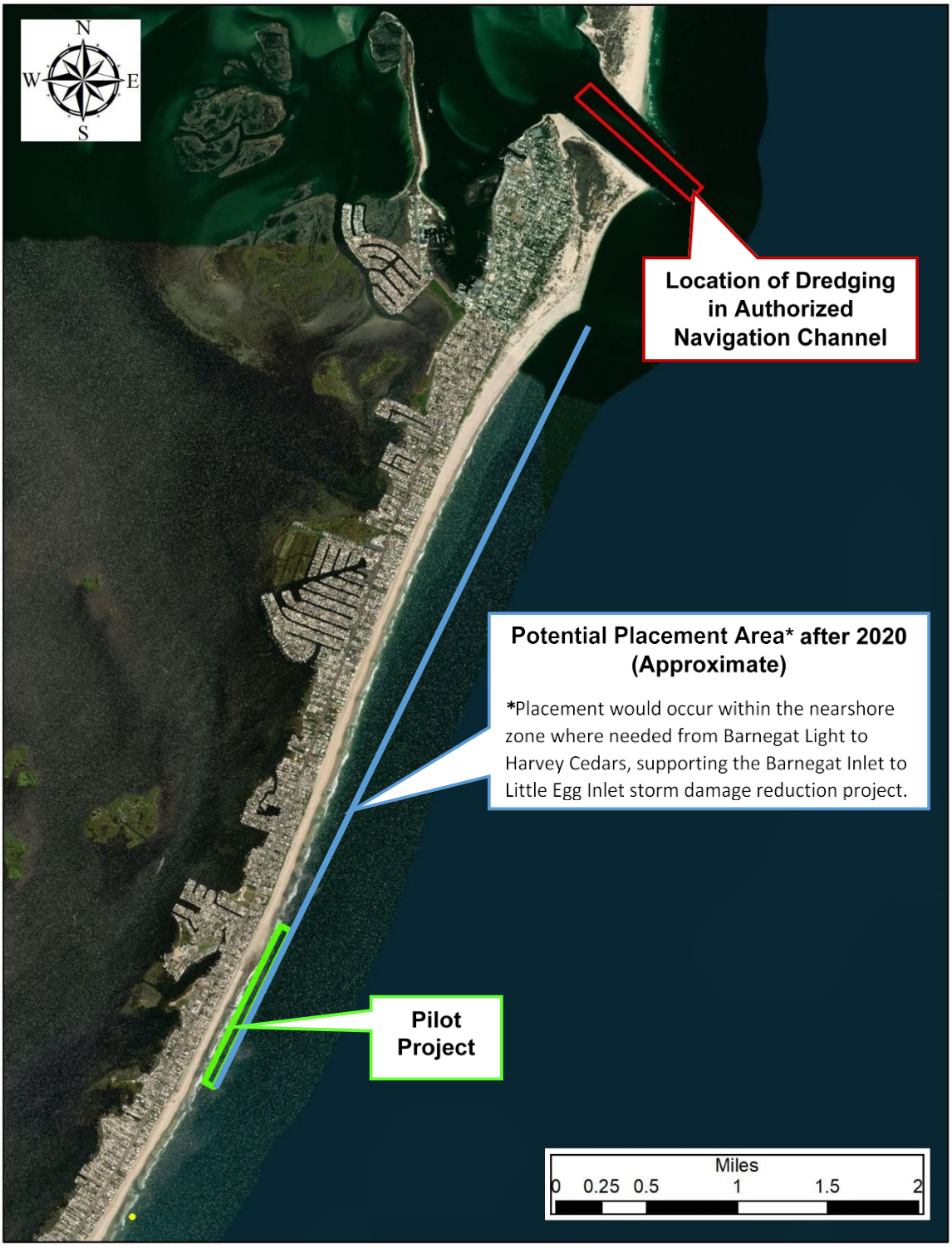

Figure 1. Barnegat Inlet Study Area for Phase 1 of the Section 1122 Beneficial Use Project

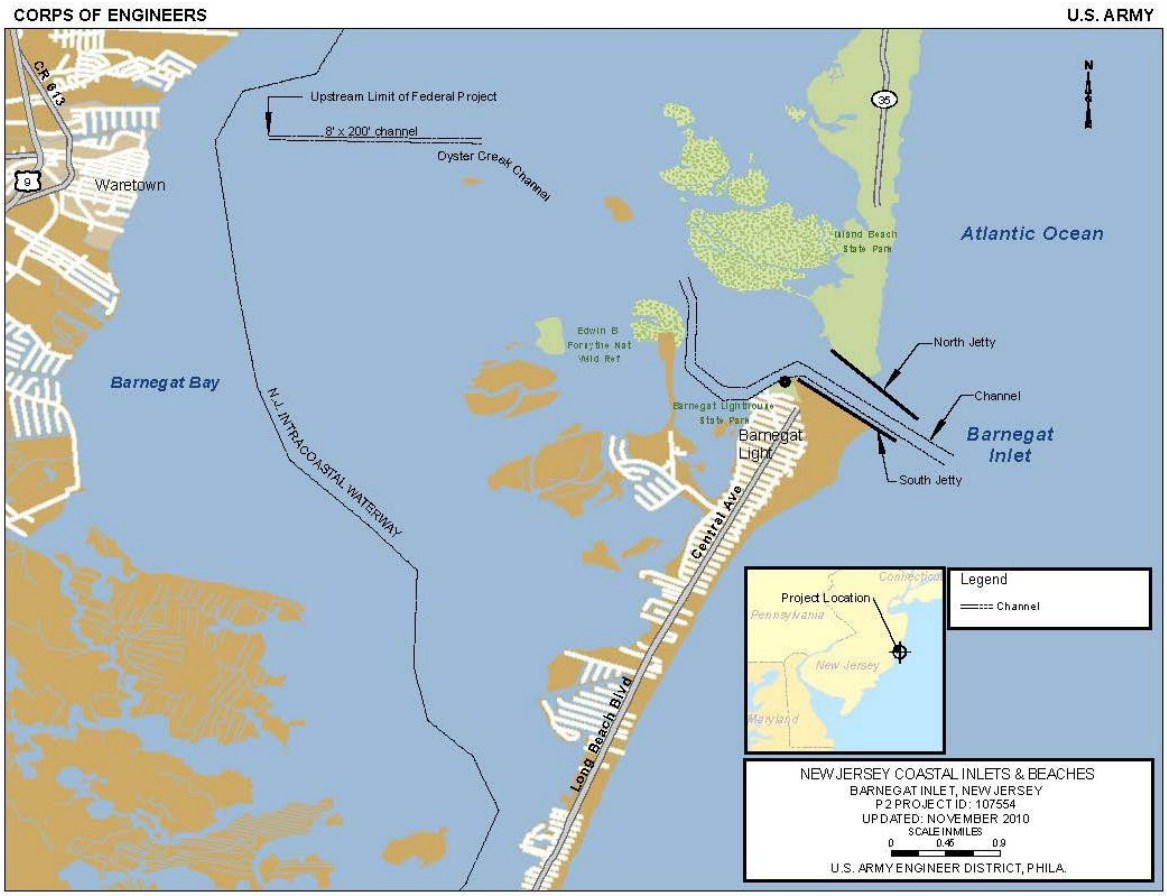

Figure 2. Barnegat Inlet Federal Navigation Project.

BARNEGAT INLET TO LITTLE EGG INLET STORM DAMAGE REDUCTION PROJECT. The Barnegat Inlet to Little Egg Inlet Storm Damage Reduction project (now referred to as a Coastal Storm Risk Management (CSRM) project) addresses coastal erosion and vulnerability to storms along the ocean coast fronting 17 miles along Long Beach Island. The project provides for 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 coastal storm risk management project was evaluated in a 1999 Environmental Impact 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 2005 through 2013, USACE constructed 4.5 miles of the Long Beach Island project 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. The first sand placement of this project occurred in 2005, with a small truck fill to Harvey Cedars. Additional emergency repair placements were conducted due to subsequent impacts from severe Nor'easters. After Superstorm Sandy, the Disaster Relief Appropriations Act of 2013 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.

4. Problems

Current Barnegat Inlet maintenance dredging is limited by funding constraints and enough maintenance is conducted to keep the channel minimally navigable. Critical limiting depths of 3 to 4 feet MLLW occur in portions of the federal channel, creating life safety concerns for vessel operators and the US Coast Guard. Dredging typically occurs one to two times per year in the inlet entrance channel, but current dredging operations are not sufficient to maintain the 300-foot wide channel to authorized depth. Additionally, the Oyster Creek portion of the project has frequent shoaling near Markers 38 to 40 with limited placement areas for the dredged sediment.

5. Opportunities

This pilot project provides the opportunity to test an innovative placement concept to alleviate an erosional hot spot and possibly to increase the length of time between nourishment cycles for the Long Beach Island Federal Coastal Storm Risk Management (CSRM) project by providing additional sediment in the system. Barnegat Inlet dredged material will be placed in order to add sandy sediment to the littoral zone at an erosional hot spot within Harvey Cedars. At the same time, maintenance dredging of sand will be conducted to restore the channel to authorized depth and should reduce the amount of channel maintenance dredging required annually moving forward. This project will also institute a strategy for future maintenance dredging efforts to place channel sediments in the nearshore template to optimize support for the Federal CSRM project. The pilot project also provides the opportunity to use sandy sediments dredged from the Oyster Creek channel portion of Barnegat Inlet to create natural infrastructure in the form of a new island to add to a system of placement areas, improving habitat and keeping sediments in Barnegat Bay supporting a resilient coastal system. In the Phase 2 project, opportunities exist to evaluate the protective and environmental benefits of island creation in a back bay environment, as well as to capture lessons learned that will inform design guidance for future island creation.

6. Project Purpose and 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 material dredged from these federally-authorized channels as a resource to provide social, economic, and environmental benefits. The Section 1122 Barnegat Inlet project team utilized and leveraged lessons learned, partnerships, and monitoring data for recently constructed projects in coastal New Jersey. Ongoing collaborative efforts with the Engineering with Nature (EWN) and Regional Sediment Management (RSM) Programs also contributed to the innovation included in this pilot project and will continue to develop and seek opportunities to construct natural and nature-based features using sediments from

federal navigation channels within NAP. Specific project objectives include:

- Promote public safety by dredging the inlet channel to the authorized depth plus overdepth (an additional 2 feet allowed for inaccuracies in the dredging process to achieve the required depth), 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 a single dredging and placement operation. Existing funding limits maintenance dredging to small quantities twice annually to obtain minimal navigable channel depths. It is anticipated that after the 1122 project is conducted and monitored, future dredging operations will be more effective at maintaining channel shoaling.
- 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 area 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 through coordination of the 1122 project alternatives.
- Use monitoring results to improve understanding of coastal processes associated with sand movement along the New Jersey Atlantic coast for application to future shoreline protection projects.
- Use design lessons learned and monitoring results to understand best practices for island creation and restoration

The initial objective of Phase 1 under this Section 1122 project 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 CSRM 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 pre-, during and post-construction to provide valuable scientific information in support of potential future beneficial uses of high quality dredged material. Nearshore placement of sediments will support the beaches in an environmentally sensitive manner in between nourishment cycles of direct placement and lessons learned will be documented to advance the practice. The objective of the Phase 2 placement is to beneficially use sand obtained from the Oyster Creek portion of the Barnegat Inlet channel to initiate creation of a new island and habitat areas within the Barnegat Inlet and Bay system.

Through the 1122 Program, the nearshore placement and island creation pilot projects will be constructed as one-time efforts, with the goal of providing significant environmental, social, and economic benefits. Subsequent overall operation and maintenance cost savings for the Barnegat Inlet Federal navigation channel and sections of the New Jersey Intracoastal Waterway will result from these efforts through an improved understanding of sediment pathways and optimization of future dredging and placement strategies.

7. Plan Formulation and Alternative Plans

The study involved reviewing existing conditions, proposing alternatives, preparing preliminary designs, communicating with local stakeholders, and assessing the potential for beneficially using sediments from Barnegat Inlet sediments for shore protection, as provided under Section 204 of the CAP and WRDA Section 1122.

The alternative plans presented provide a basis for the alternative analysis in Section 9. The range of alternatives considered here and assessed in the EAs include the no action alternative (not dredging), dredging and disposal of dredged material using the “Federal Standard” (current practice), and the proposed pilot project (recommended plan or beneficial use project).

For the purposes of this Decision Document, one action alternative and its associated costs were developed and compared to the cost of Federal Standard (current dredging and placement practices) and the no action alternative of not dredging. While the no action alternative is the lowest cost alternative and current practice is the Federal Standard, these do not meet the purpose and need of the WRDA Section 1122 and the Pilot Project.

No Action – No Dredging

Under the No Action Alternative maintenance dredging within the Barnegat Inlet navigation channel would not occur for the inlet entrance channel or the Oyster Creek portion of the project. The No Action Alternative would allow the sedimentation of Barnegat Inlet to progress and the channel would eventually become unnavigable. The entire Barnegat Inlet project 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 a critical inlet on the east coast. No material would be placed in the nearshore zone fronting the community of Harvey Cedars and natural infrastructure would not be created. 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 Section 1122, but is included as required by NEPA regulations.

Current Practice (Federal Standard)

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), based on funding

allocation. The work is performed 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 (Figures 3 and 4).

The portion of the Federal Navigation Channel through Oyster Creek is currently dredged approximately every 3 years, based on funding allocation, but shoaling occurs frequently between dredging events. The work is typically performed using a contract hydraulic pipeline/cutterhead dredge. The current practice for routine maintenance dredging of the Oyster Creek channel is to dredge and place the sediments on Placement Area 26A and B (Figure 5), however Placement Site 26A has not been used in over 10 years due to environmental sensitivities associated with the establishment of a heron rookery on the created upland. Placement Area 26B was last used in 2017, but over time the placement of dredged sediments has led to the development of dense SAV surrounding the open water placement site and this site has become environmentally sensitive as well. The alternative placement option is to pump the material five miles to an upland Confined Disposal Facility (CDF) that has limited capacity at an approximate cost of $125/cy (cost based on a recent operation conducted by NJ Department of Transportation for the adjacent state channels). This alternative is both cost prohibitive as well as against best RSM practices since it removes clean sand from the natural system by placing it in a CDF.

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.

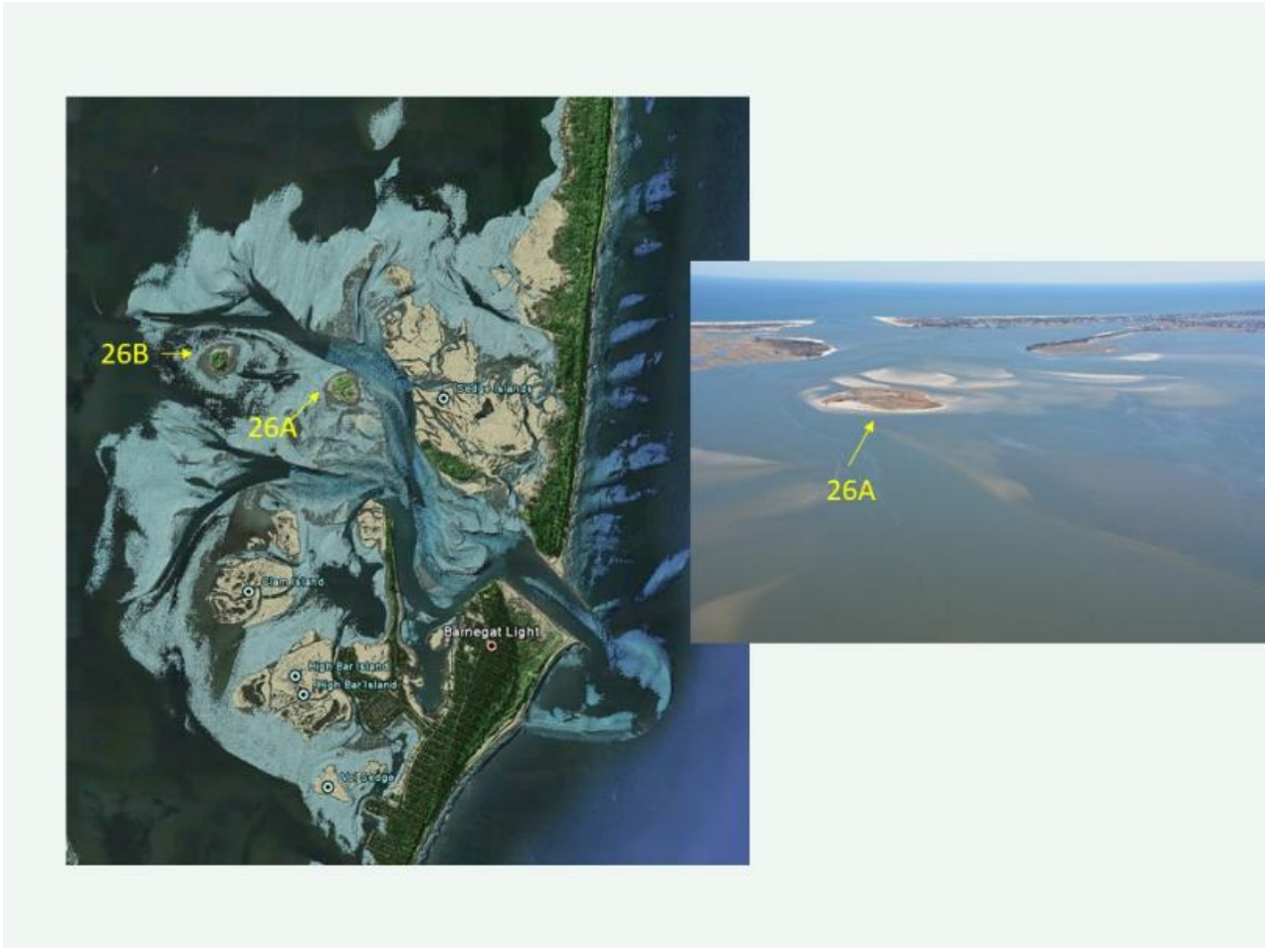

Figure 5. Dredged material placement islands, 26A and 26B, which have historically been used for disposal of material from the Oyster Creek channel but have become environmentally sensitive due to habitat establishment.

Beneficial Use of Inlet Sediments (Recommended Plan for Phase 1)

Under this alternative, the Phase 1 part of the pilot 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 150,000 to 200,000 cubic yards of sand. In subsequent years, channel infilling will be monitored and maintenance required, but dredging operations are anticipated to be more manageable and effective at maintaining authorized depth. This pilot project will 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 4 miles south of Barnegat Inlet. The 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. 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 in the cross shore direction by 500 feet long in the alongshore direction) located between the -10 and -20 foot NAVD88 contours (6 and 7). The dredge will approach the beach bow-first as close to the -10 foot contour as allowed by wave and tide conditions at the time and then open the hopper to release between 300 cy per haul (Currituck) and 500 cy (Murden). This area of Harvey Cedars is an erosional “hot spot” 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 entrance channel is 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 as needed 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 (post-construction, 30 days and 60 days following construction) will assess the location of the material over time. Additionally, beach profiles adjacent to the placement site will be monitored before, during and after placement to monitor conditions. Lessons learned will be developed that will inform and optimize subsequent maintenance dredging and placement activities within the nearshore zone from the inlet south along Long Beach Island.

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

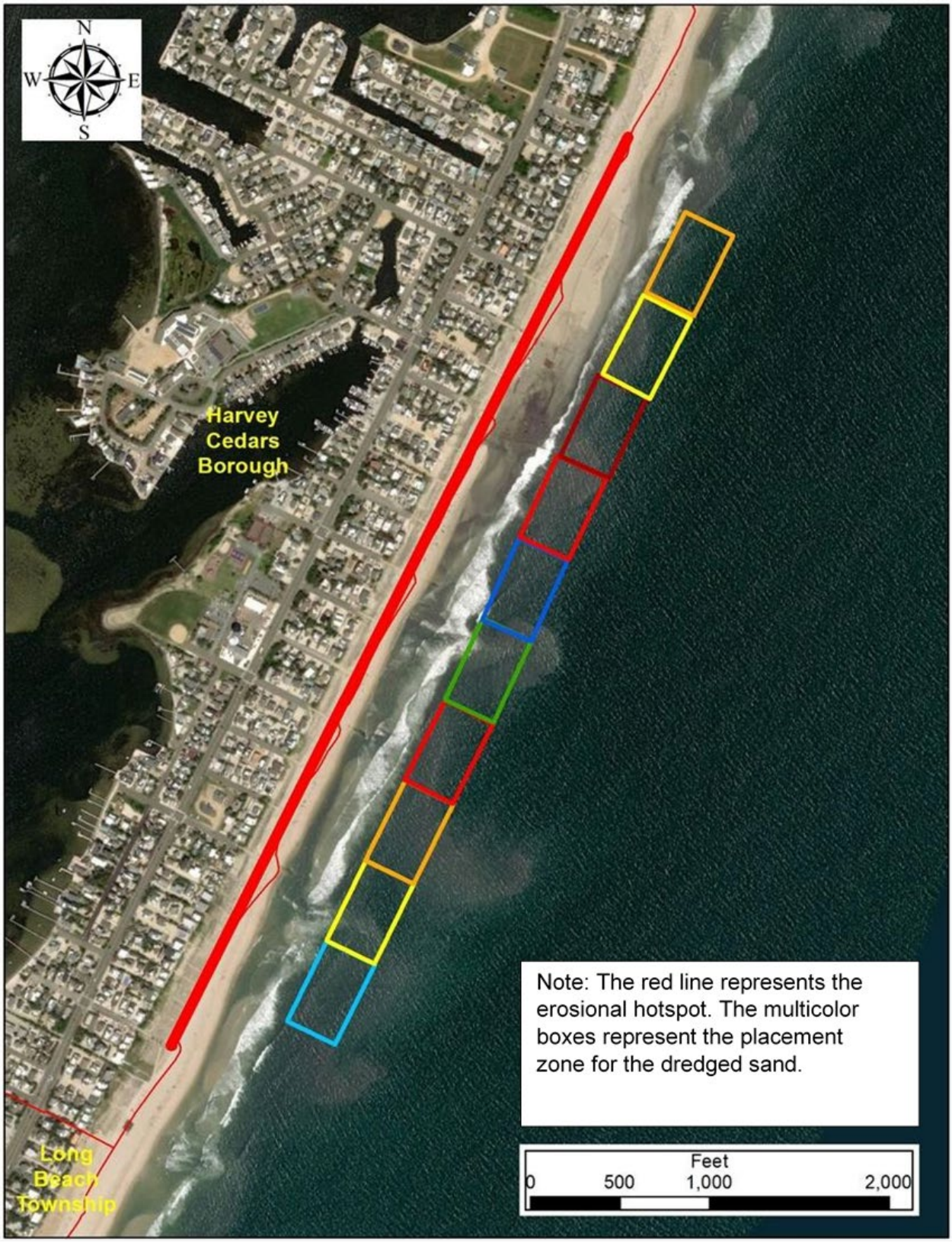

Figure 7. Planned beneficial use placement zone along Harvey Cedars, NJ.

Beneficial Use of Inlet Sediments (Recommended Plan for Phase 2)

Oyster Creek is a component of and the upstream limit of the authorized Barnegat Inlet navigation channel that has been maintained by the Philadelphia District U.S. Army Corps of Engineers since 1940. The channel at Oyster Creek is 200 feet wide by 8 feet deep (MLW). The western portion of the channel shoals frequently and is typically dredged every 3 years based on when funding is appropriated.

For Phase 2 of the Section 1122 Barnegat Inlet project, USACE and NJDEP study team members created a Section 1122 Project evaluation team by hosting meetings and inviting representatives from several natural resource agencies, local organizations and project stakeholders to share expertise on the various proposed locations that would benefit from an influx of clean dredged material in the vicinity of the Oyster Creek channel. USACE sought area expertise and innovative ideas on various locations for dredged material placement to benefit the natural environment. These efforts resulted in an intense and thorough process to review resources and missions within the study area and then develop a wide range of potential placement options (Figure 8). Ultimately, the Philadelphia District and the non-federal sponsor of the State of NJ selected Site 6 as the preferred placement location for maintenance material to meet the objectives of Phase 2 of the 1122 project with the highest degree of success (Figure 9).

The proposed placement location at Site 6 is located in Barnegat Bay, approximately 2,500 ft west of Placement Site 26B, in deeper water (Figure 10). There is strong support for island creation at this site as the depths are believed to be in excess of those needed for SAVs to proliferate. Both Sites 26A and 26B islands were aquatic placement sites that resulted in the eventual creation of islands in the near vicinity and provide significant natural resource value. The creation of an island at Site 26A has resulted in the establishment of a heron rookery. Site 26B has afforded shallow water habitat where fringing SAV has developed naturally over approximately 50 acres. Based on experiences in the methodology utilized for development of Sites 26A and 26B, the successive placements of dredged material at Site 6 is expected to provide comparable habitat benefits. This pilot project will conduct the first lift of an island that will inform lessons learned and future placements with intended long-term benefits similar to the highly successful islands created at Sites 26A and 26B.

A pre-project SAV survey was conducted within Area 6 on 2 September 2020 by the USACE Dive Team and Philadelphia District Biologists. The survey inspected and recorded video along two transects which crossed the entire Area 6 in an “X” configuration. The results of the survey indicate that Area 6 is devoid of any existing SAV habitat.

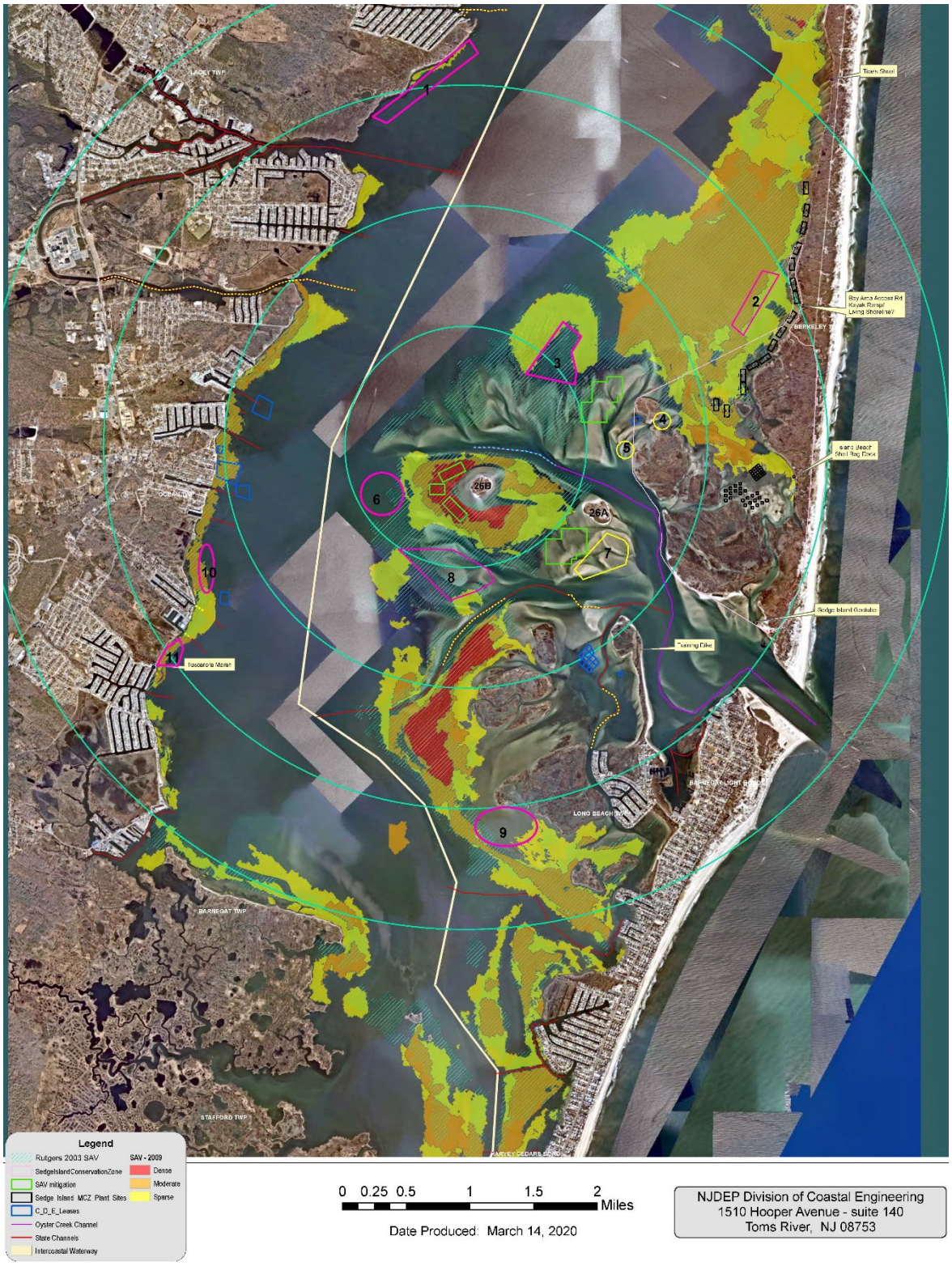

Figure 8: Comprehensive map of all locations proposed for potential future maintenance dredging placements by project stakeholders.

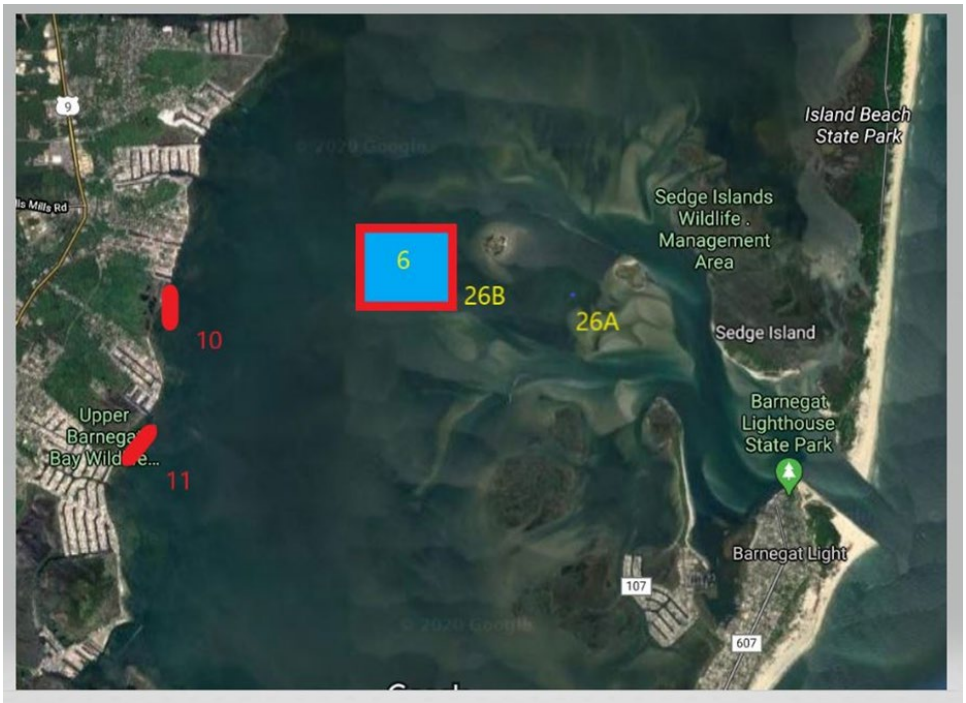

Figure 9: Proposed Section 1122 placement location (Site 6) and potential future maintenance dredging placement locations (Sites 10 and 11) showing current and future placement strategies.

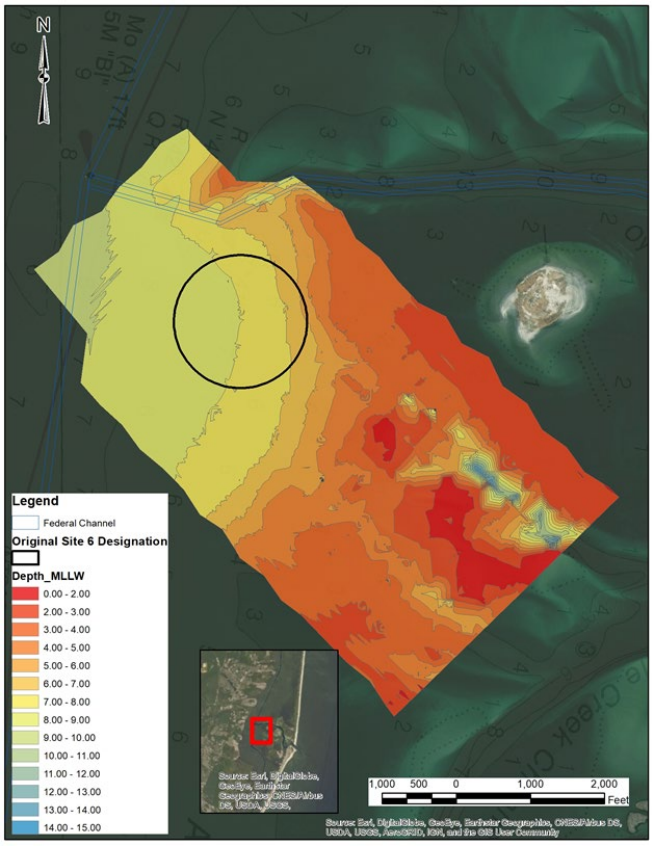

Figure 10. Bathymetry of Phase 2 Selected Placement Site 6 in Barnegat Bay.

To construct the Phase 2 project, the Oyster Creek channel will be dredged to the authorized depth of 8 feet MLW with one foot of overdepth, resulting in approximately 25,000 cy of material. A 12 to 14-foot long hydraulic pipeline (cutterhead) dredge will be utilized to conduct the initial placement and channel maintenance dredging. As an approximation, starting in water depths of 7 to 8 ft MLW, this quantity of dredged sand will create a lift of about 1 to 2 feet resulting in a submerged mound within an area about 11 acres in size. Bathymetry of the placed site is expected to vary dependent upon conditions during placement creating a natural topography. The dredging operation will be monitored throughout construction to inform and fine-tune future placements, both relative to resources and bathymetry/topography.

Material will be dredged and placed using a diffuser beginning in the center and at the bottom of Site 6. Material will be placed unconfined to allow the sand to naturally drop and create the first lift of a submerged island. This is assumed to be the method used for creation of Sites 26A and 26B beginning in the early 1980s. The first lift of the island will be monitored through a collaboration with the USACE's Engineering Research and Development Center and other project partners. Monitoring before, during and after placement will inform future placement operations that will meet the objectives of island creation. The target objectives are to increase SAV habitat around the island and future nesting bird habitat for the emergent part of the island, while documenting the development of both to inform future RSM and EWN applications. Since natural infrastructure changes over time, the target objectives and habitats may also need to be adaptively managed as the project progresses.

In subsequent years, channel infilling will be evaluated and maintenance will still be required, but dredging operations are anticipated to be more effective and efficient at maintaining authorized depth in the Oyster Creek channel given the close proximity of the proposed placement site. Future dredging and placement operations will utilize the island as part of a new system of placement solutions as well as potentially place sediment in the nearshore along the back bay shoreline of Sites 10 and 11 shown on Figure 8.

This alternative meets the objectives pursuant to Section 1122 of the WRDA and is the proposed action for Phase 2. The placement designed under the Section 1122 pilot project will test an innovative placement concept to create natural infrastructure in the form of a new island in Barnegat Bay. 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 create natural infrastructure and a system of solutions for dredged material placement that keep sediments in the natural system within Barnegat Bay.

8. Affected Environment and Potential Environmental Effects

The Philadelphia District has prepared EAs (Phase 1 and Phase 2) in accordance with the National Environmental Policy Act of 1969, as amended for the Barnegat Inlet Beneficial Use Project (Appendix B). The EAs describe the existing environment in the project area, assess the potential environmental impacts of the proposed alternatives, and document compliance with the applicable environmental statutes.

9. Alternative Assessment:

In accordance with the Planning Guidance Notebook (ER 1105-2-100, the alternative plans were assessed based on a standard set of four criteria: completeness, effectiveness, efficiency, and acceptability (Tables 1 & 2). Alternative plans must be complete in that they provide and account for all necessary investments or other actions to ensure the realization of the planned effects. Alternative plans must be effective so as to alleviate the specified problems and achieve the desired goals. Efficiency demonstrates the alternative plan's cost effectiveness of alleviating the specified problems and realizing the specified opportunities. Alternative plans must also be compatible with existing laws, regulations, and public policies. Through the Section 1122 program, the placement would be a one-time effort, with the goal of providing significant environmental, social and economic benefits and subsequent overall future cost savings for the operation and maintenance program of the Barnegat Inlet Federal navigation channel.

Dredging Barnegat Inlet

This pilot project will test an innovative placement concept to increase the length of time between renourishment cycles and provide additional material to increase the profile near the documented hot spot erosion area at Harvey Cedars. 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 CSRM project.

The No Action plan (not dredging) was not selected because it does not meet the purpose and need of Section 1122 and is not consistent with the three of the four planning criteria. Additionally, while current dredging and disposal practices are the Federal Standard, it is not an innovative RSM beneficial use project and is not consistent with two of the four planning criteria. Based on this assessment, the recommended plan is an innovative beneficial use project that is consistent with all four planning criteria and has been selected for implementation.

Table 1: Evaluation of Plans Using the Four Planning Criteria for Dredging Barnegat Inlet

	Completeness	Effectiveness	Efficiency*	Acceptability
No Action (Not Dredging)	No Federal investments or actions	Does not maintain the safe navigation at Barnegat Inlet and is not a beneficial use project.	Requires on-going emergency risk management costs without sustainable risk management	Not acceptable to Federal, state and local agencies (results in a risk to navigation and recreation).
Current Practice: Federal Standard	Accounts for all necessary investments and actions	Is not a beneficial use project as authorized by Section 1122 of WRDA. Keeps Barnegat Inlet minimally navigable	Not sufficient to maintain the 300-foot wide channel to authorized depth	Acceptable to Federal, state and local agencies
Recommended Plan: Beneficial Use of Sediments for Nearshore Placement	Accounts for all necessary investments and actions	Innovative pilot project that meets the requirements of WRDA Section 1122. If successful, can increase the length of time between nourishment cycles.	If successful, would reduce channel maintenance dredging at Barnegat Inlet; and provide significant environmental, social and economic benefits; and subsequent overall future cost savings.	Acceptable to Federal, state and local agencies

*Gray shading indicates that the measure did not meet the criteria.

Dredging the Oyster Creek Channel

This pilot project will test an innovative placement concept to create natural infrastructure in the form of a new island in Barnegat Bay. 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 create natural infrastructure and a system of solutions for dredged material placement that keep sediments in the natural system within Barnegat Bay.

The No Action plan (not dredging) was not selected because it does not meet the purpose and need of Section 1122 and is not consistent with the three of the four planning criteria. The current dredging and disposal practices at Oyster Creek are no longer viable due to altered environmental conditions and the alternative disposal option at an upland CDF would be cost prohibitive. Therefore, the current practice is not consistent two of the four planning criteria. Based on this assessment, the recommended plan is an innovative beneficial use project that is consistent with all four planning criteria and has been selected for implementation.

Table 2: Evaluation of Plans Using the Four Planning Criteria for Dredging Oyster Creek

	Completeness	Effectiveness	Efficiency*	Acceptability
No Action (Not Dredging)	No Federal investments or actions	Does not maintain the safe navigation at Oyster Creek and is not a beneficial use project.	Requires on-going emergency risk management costs without sustainable risk management	Not acceptable to Federal, state and local agencies (results in a risk to navigation and recreation).
Current Practice: Federal Standard	Accounts for all necessary investments and actions	Is not a beneficial use project as authorized by Section 1122 of WRDA. Keeps Oyster Creek minimally navigable	Historic island disposal sites are no longer available. Closest upland CDF is 5 miles away and would cost approximately $125/cy	Acceptable to Federal, state and local agencies
Recommended Plan: Beneficial Use of Sediments for Nearshore Placement	Accounts for all necessary investments and actions	Innovative pilot project that meets the requirements of WRDA Section 1122. Will create a new disposal for the project that also has potential for significant environmental uplift.	Will significantly lower disposal costs by creating an adjacent disposal site resulting in overall project efficiency	Acceptable to Federal, state and local agencies

*Gray shading indicates that the measure did not meet the criteria.

Cost Comparison

The USACE Implementation Guidance for Section 1122 (dated January 3, 2018) indicates that the Section 1122 Pilot Projects will be cost shared in accordance with Section 204 of the CAP. However, for projects under the Pilot Program that utilize dredged material from Federal navigation projects, Section 1122(e)(2) provides that the incremental costs above the Federal Standard for transporting and depositing such dredged material will be borne entirely by the Federal Government. If such Pilot Projects involve additional activities other than transportation and placement of dredged material, such as wetland plantings or mechanical shaping of dunes and beach berms, those costs shall be shared in accordance with the cost of sharing requirements of Section 204.

The selected plan for Phase 1 for nearshore placement of sand in Harvey Cedars only involves the transportation of the material beyond the Federal Standard and will therefore be funded at a 100% Federal cost. The selected plan for Phase 2 for island creation in Barnegat Bay will be an initial step in establishing a new Federal Standard for the Oyster Creek portion of the project. Given that the previous practice of disposal at islands 26 A and B has become unfavorable due to aquatic and upland habitat development, the current default Federal Standard would be pumping the material to the closest

upland CDF at a cost of approximately $125/cy. However, the creation of a new island disposal site through the 1122 project will demonstrate that this alternative is significantly more cost efficient, and should therefore be the new Federal Standard, funded at 100% Federal cost. There are no additional activities which would require cost-sharing with a non-Federal sponsor for either Phase 1 or 2. Beyond the initial placement in Harvey Cedars and the first lift of the new island in Barnegat Bay, the project will not require any on-going or increased Operations and Maintenance costs.

In order to compare the cost of the selected 1122 Pilot Project to the Federal Standard, the Project Delivery Team (PDT) used the following methodology and assumptions for Phase 1. The USACE Hopper Dredges Murden or Currituck charge the Barnegat Inlet Navigation Project a daily rate which can be further divided into hourly or minute rates. In March 2019, the PDT and the crew of the Dredge Currituck performed a test run to determine the time difference between placement at the Federal Standard location (downdrift of the ebb shoal of the inlet on the south side adjacent to Barnegat Light) and potential pilot project locations (including Harvey Cedars, approximately 3 miles south of the current location). The Currituck was fully loaded with sand for the outbound trip and empty for the return trip. The PDT was then able to calculate the difference in the cost between the two locations for a typical Government Dredge (Currituck/Murden) round trip depending on weather conditions. The estimate for additional time from the existing to proposed placement location is approximately 75 minutes roundtrip per cycle.

Bathymetric surveys of the Barnegat Inlet channel from July 2019 and June 2020 were used to calculate that maintenance dredging of approximately 150,000 to 200,000 cubic yards of sand is required for the Pilot Project to clear the full channel to the authorized depth of 10 feet MLLW plus 2 feet of overdepth. This quantity was then used to calculate the total cost difference between the Federal Standard and the Recommended Plan (Table 3).

Table 3: Cost Comparison of Alternatives (Total Cost for 150,000 Cubic Yards, Government Dredge)

Alternative	Transportation and Placement (Total Cost for 150,000 CY)
No Action (Not Dredging)	$0
Current Practice (Federal Standard)	$1,300,000
Recommended Plan (Beneficial Use of Sediments for Nearshore Placement)	$2,050,000

For Phase 2 (Table 4), the cost of pumping 25,000 cy to an upland CDF at an approximate cost of $125/cy (Federal Standard, cost based on a recent NJDOT dredging effort) was compared to the cost of the recommended plan at $30/cy (cost based on previous contract dredge disposal at 26A and B).

Table 4: Cost Comparison of Alternatives (Total Cost for 25,000 Cubic Yards, Contract Dredge)

Alternative	Transportation and Placement (Total Cost for 25,000 CY)
No Action (Not Dredging)	$0
Current Practice (Federal Standard)	$3,125,000
Recommended Plan (Island Creation)	$750,000

10. Real Estate Requirements

A Real Estate Plan (REP) for the project was prepared by the USACE Baltimore District and is provided as Appendix C. No real estate acquisition and no local cooperation agreements are required for the project.

11. Sponsorship and Funding

The NJDEP Division of Coastal Engineering (DCE) will be acting as the non-Federal sponsor for the 1122 Pilot Project and will execute the Project Partnership Agreement with the Philadelphia District. The NJDEP DCE will not have a cost-share responsibility since the Recommended Plan will be funded 100% at Federal expense. Therefore, the project will not require then NJDEP DCE to prepare a financial analysis or financing plan. NJDEP is fully supportive of the Recommended Plans and has been a valuable partner for the Philadelphia District on multiple other coastal storm risk management, navigation and ecosystem restoration projects. The NJ Department of Environmental Protection and the NJ Department of Transportation's Office of Maritime Resources also have significant interests for Phase 2 and provided technical support that informed alternatives for the placement of dredged material from the Oyster Creek portion of Barnegat Inlet.

12. Compliance with Appropriate Regulatory Requirements

Two separate EAs were completed for Phases 1 and 2 (Appendix B). For Phase 1, the draft EA was advertised for public review on 1 April 2020 for 30 days. Following a review of the public and agency comments by the PDT, the EA for Phase I was finalized and the Finding of No Significant Impact (FONSI) was signed by the Philadelphia District Commander on 21 July 2020. For Phase 2, the draft EA was advertised for public review on 1 September 2020. Relevant resource agencies have requested a 60-day review timeline, which will conclude on 2 November 2020. Following the public review and documented compliance with regulations discussed below, the FONSI for Phase 2 will be signed by the District Commander.

Impacts to Water Quality have been evaluated in accordance with Section 404(b)(1) guidelines of the Clean Water Act (CWA) and are not adverse. In accordance with Section 401 of the CWA, a Water Quality Certification (WQC) was received for Phase 1 on 28 May 2020 from the NJDEP. It is

anticipated that the WQC for Phase 2 will be received from the NJDEP on, or before, 2 November 2020.

In accordance with Section 307 (c) of the Coastal Zone Management (CZM) Act, an activity affecting land or water uses in a State's coastal zone must comply with the State's Coastal Zone Management Program. Concurrence with our determination of Federal Consistency with the CZM rules was received on 28 May 2020 for Phase 1 from the NJDEP. It is anticipated that the CZM Federal Consistency determination for Phase 2 will be received from the NJDEP on, or before, 2 November 2020.

For both Phases 1 and 2, USACE has determined that the proposed work is not likely to adversely affect listed species or their critical habitat pursuant to Section 7 of the Endangered Species Act (ESA), as amended. For Phase 1, National Marine Fisheries Service (NMFS) concurred with this determination for species under their jurisdiction on 5 March 2020. It is anticipated that NMFS will concur with the determination for Phase 2 on, or before, 2 November 2020.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires all Federal agencies to consult with the NMFS on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH). A preliminary assessment of the effects of the proposed action on Federally-managed species and their life stages within this area indicates the project would not adversely affect EFH. NMFS provided EFH conservation recommendations for Phase 1 on 23 March 2020 and the FONSI for Phase 1 indicates that USACE will adhere to the recommendations. It is anticipated that conservation recommendations for Phase 2 will be provided on, or before, 2 November 2020 and that the Phase 2 FONSI will also indicate adherence to any NMFS recommendations.

For Phase 1, the NJ State Historic Preservation Office (SHPO) concurred with the USACE determination that there will be no historic properties affected by the proposed undertaking within the project’s area of potential effects on 15 April 2020. It is anticipated that concurrence with a similar USACE determination for Phase 2 will be provided by the NJ SHPO on, or before, 2 November 2020.

13. Recommendations

As a result of this Decision Document, USACE recommends that both Phase 1 and Phase 2 proceed to the construction phase under the Section 1122 Pilot Program (referred to as the “Design and Implementation” phase under the CAP). Further, this Decision Document, EAs, and Real Estate Plan consists of all planning and design activities that demonstrate that Federal participation is warranted and no additional feasibility-level report is required. Other actions such as obtaining the necessary regulatory clearances and permits will be conducted prior to construction of the project with the USACE Dredge Murden beginning in June 2021 and the creation of a new island with sediments from the Oyster Creek portion of the Barnegat Inlet channel beginning in November 2020.

_____
Date

_____
Thomas J. Tickner
Brigadier General, USA
Division Commander

Appendix A
Technical Analysis for Nearshore Placement

Barnegat Inlet Section 1122 Project
Appendix A: Technical Analysis
Nearshore Placement of Inlet Dredged Material at Harvey Cedars

Outline

1. Need for dredging at Barnegat Inlet
2. Opportunity to augment the Barnegat Inlet to Little Egg Inlet CSRM project
3. Longshore transport regime
4. Harvey Cedars nearshore placement zone
5. Scoping-level estimates of site hydrodynamics and sediment mobility
6. Dredged material placement plan
7. Nearshore placement survey plan

1. Need for dredging at Barnegat Inlet

The Barnegat Inlet Federal navigation project was originally completed in 1940 and included dual jetties in an "arrowhead" configuration, with a dredged channel 8 ft deep mean low water (MLW) and 200 ft wide between the jetties and 10 ft deep across the ocean bar. The channel location and depth proved to be highly unstable and led to the several studies to investigate and design improvements in the interest of safer and more reliable navigation. A 1974 report prepared by the Corps of Engineers Waterways Experiment Station (WES) recommended construction of a new south jetty and a widened channel through the inlet.

The Supplemental Appropriations Act of 1985 provided funds to implement a number of the recommendations of the 1974 WES study, including a new south jetty 4,270 ft long generally parallel to the north jetty, extending from the Barnegat Lighthouse to the tip of the "old" south jetty and a navigation channel 300 ft wide by 10 ft deep MLW from the outer bar in the Atlantic Ocean to the north end of the sand dike in Barnegat Bay. The channel extends in a northwesterly direction from the inlet to the Oyster Creek channel to provide a connection to the New Jersey Intracoastal Waterway (NJIWW) (Figure 1). The new south jetty and deepened/widened channel were completed in early 1992.

Barnegat Inlet requires regular dredging to provide a safe, reliable navigation channel for vessels transiting between Barnegat Bay and the Atlantic Ocean. The US Coast Guard (USCG) designates Barnegat Inlet as a "Surf Station" based on the criterion that wave heights exceed 8 ft for 36 or more days per year. USCG vessels require a safe channel to fulfill their Homeland Security mission and critical life safety and search-and-rescue operations. The navigation project is also critical to a large fishing fleet that includes full-time commercial, charter, and recreational vessels that contribute to the economic value of the nation with an annual direct fish value of over $25M/year (NMFS, 2017).

Figure 2 presents the August 2019 survey of Barnegat Inlet following the most recent dredging by the USACE shallow draft hopper dredge Currituck. The area of soundings in red indicates depths shallower than the authorized project depth of 10 ft mean lower low water (MLLW). It can be seen that the shoal area (i.e., depths less than 10 ft MLLW) extends from the vicinity of the lighthouse on the west toward the east and south and encroaches on the navigation channel along a distance of about 1,500 ft.

Figure 3 is a plot of cumulative maintenance dredging at Barnegat Inlet from 1992, when the most recent inlet modifications were completed, through 2019. Data points are color-coded depending on the period covered: data in black cover the ten-year period 1/1/1992 through 12/31/2001; data in red cover the ten-year period 1/1/2002 through 12/31/2011; and data in blue cover the eight-year period 1/1/2012 through 12/31/2019. Each set of points also includes a least-squares linear best-fit line, with the annualized dredging rate for each period displayed in the text box in the top left of the figure. It can be see for the three periods included in the 28 years of data that the annualized rate of dredging has declined from 274,000 cubic yards per year (274 KCY/yr) to 146 KCY/yr to 55 KCY/yr for the final (eight-year) period. The diminishing rate of O&M dredging primarily is a reflection of reduced funding provided for shallow draft Federal navigation projects.

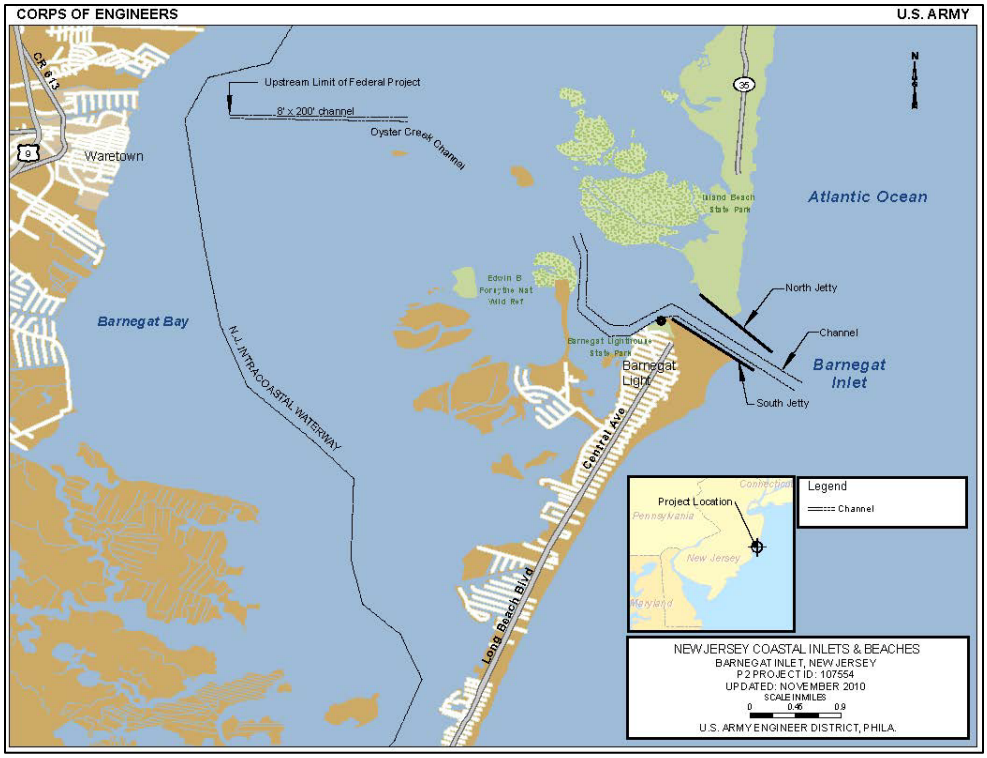

Figure 1. Barnegat Inlet Federal Navigation Project

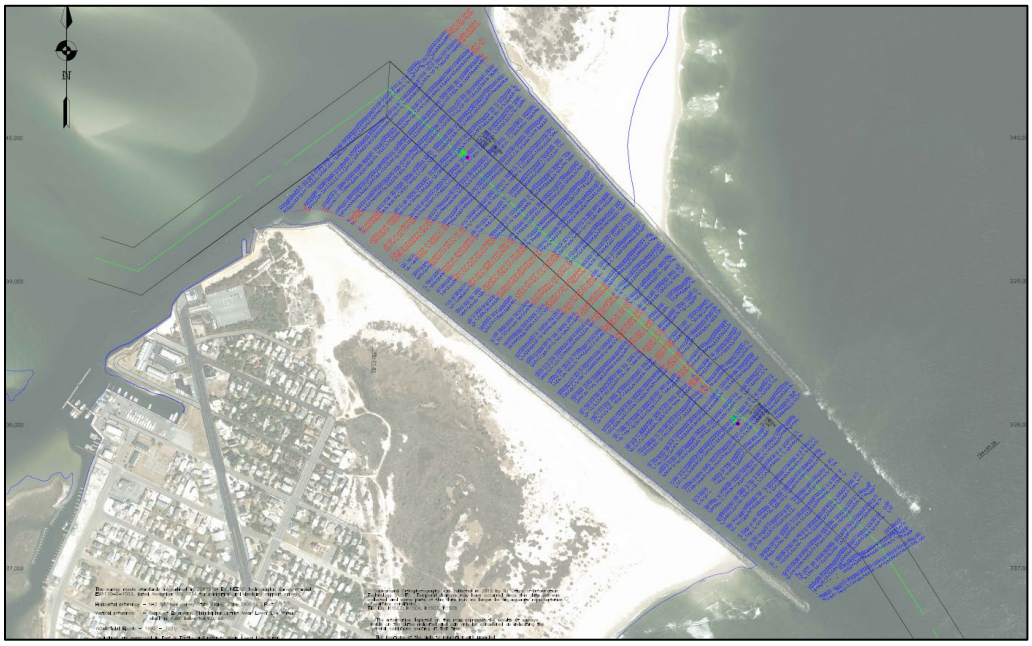

Figure 2. August 2019 Barnegat Inlet survey

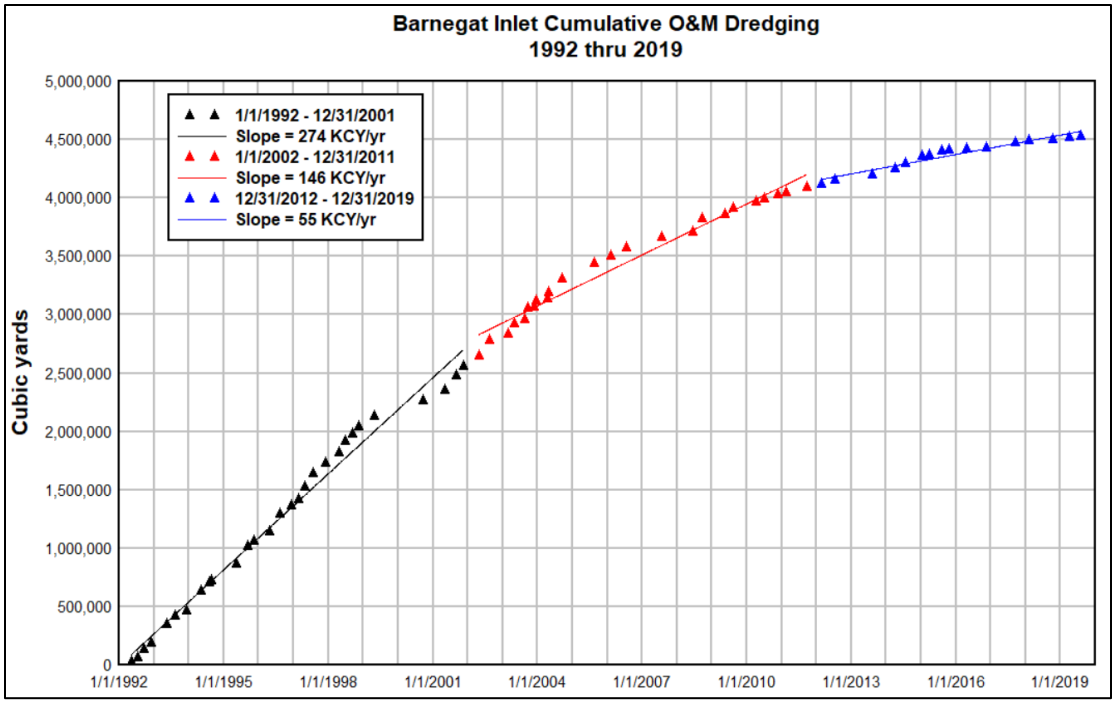

Figure 3. Cumulative O&M dredging, 1992 through 2019

2. Opportunity to augment the Barnegat Inlet to Little Egg Inlet CSRM project

The Barnegat Inlet to Little Egg Inlet coastal storm risk management (CSRM) project consists of a beachfill berm and dune along 17 miles of shoreline on Long Beach Island (LBI), NJ. The feasibility report was completed in September 1999 and Congress authorized the project for construction in WRDA 2000, Title 1, §101 (a) (1). The Non-Federal Sponsor (NFS) for the project is the NJ Department of Environmental Protection (NJDEP). Municipalities included in the project are: Long Beach Township (LBT), Harvey Cedars, Surf City, Ship Bottom, and Beach Haven (see Figure 4). Note that Long Beach Township includes four non-contiguous segments that are known as (from north to south) Loveladies, North Beach, Brant Beach and adjoining portion of LBT, and Holgate.

The LBI project was constructed in phases beginning with an emergency truck-haul beachfill in Harvey Cedars in 2005. Between 2005 and 2011 additional segments of the project were constructed in Surf City, Harvey Cedars, and Brant Beach using ocean-going hopper dredges to obtain sand from offshore and pump it onto the beach to construct the berm and dune beachfill. Hurricane Sandy impacted the region in October 2012 and led to the "Disaster Relief Appropriations Act, 2013" that provided funds to construct the remaining segments of the LBI CSRM project. Initial construction of the entire project was thus essentially complete by November 2016.

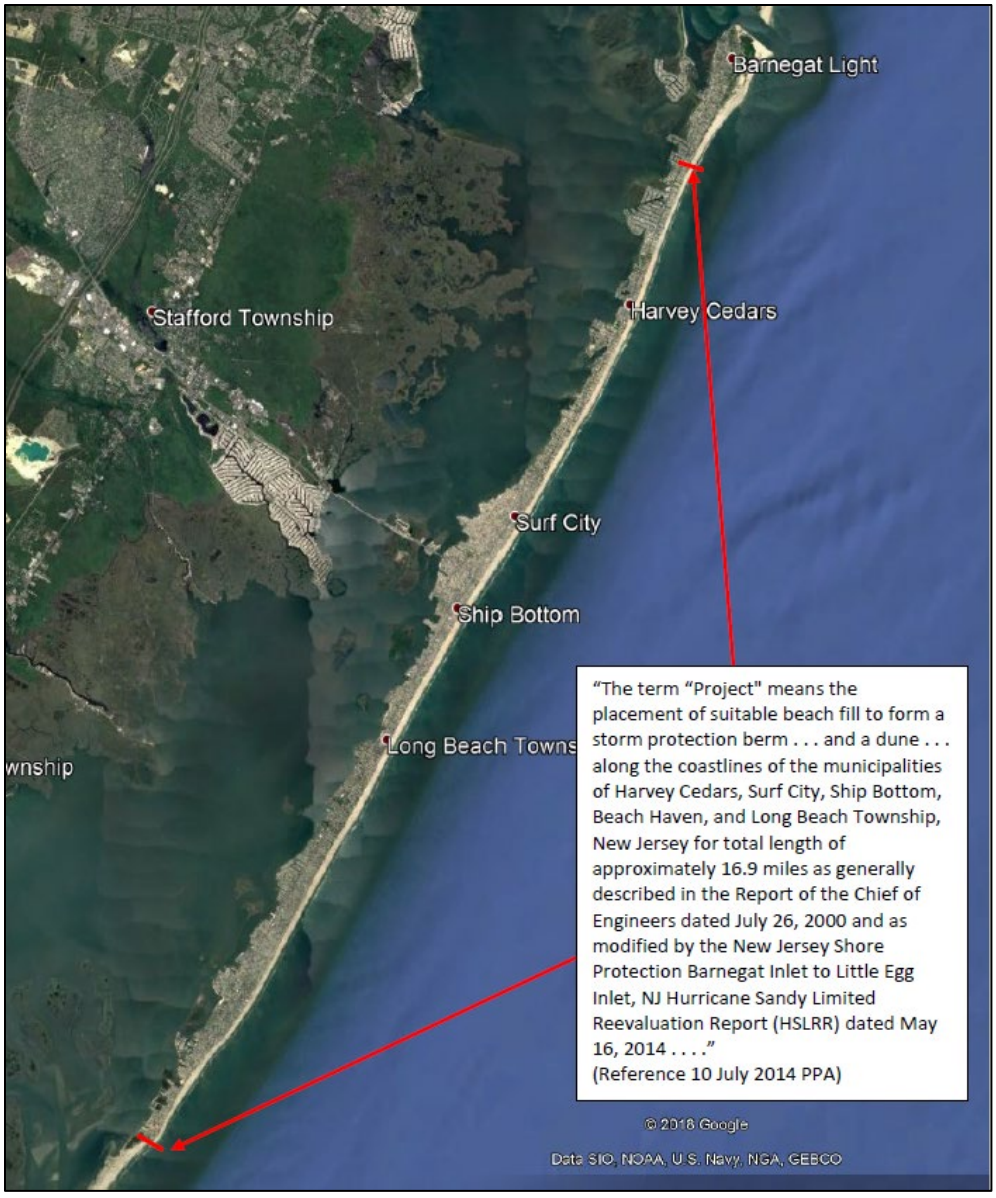

Figure 4. Barnegat Inlet to Little Egg Inlet (LBI) CSRM project limits

In the period since start of construction in 2005, the LBI location that has required the highest rate of beachfill placement per unit length of shoreline is the Borough of Harvey Cedars, with a total of 5.8 MCY placed from 2005 to the present along its approximately two miles of Atlantic Ocean shoreline. Compared to other portions of the LBI project, the Harvey Cedars shoreline is considered to be a relative erosional "hotspot". The Section 1122 project planned for Barnegat Inlet in 2020 includes dredging up to 200,000 CY with the USACE hopper dredges Murden and Currituck and transporting the sand for nearshore placement at Harvey Cedars, NJ. The overall goal of this placement is to beneficially use sediment dredged from the navigation project by placing it within the littoral system adjacent to the Harvey Cedars erosional hot spot. It is anticipated that this work will begin in August 2020 and continue into the early fall.

3. Longshore transport regime

Longshore transport in the vicinity of Barnegat Inlet and Long Beach Island was investigated during the LBI Feasibility Study and documented in a report titled "Wave Climate and Littoral Sediment Transport Potential, Long Beach Island, New Jersey" (ERDC/CHL TR-00-21, Cialone and Thompson, September 2000). The numerical model study evaluated the impact of potential borrow sites on the Long Beach Island shoreline. Wave transformation and nearshore bathymetry were modeled with the spectral wave model STWAVE. A 20-year WIS hindcast (1976-95) and a 10-year OCTI hindcast (1987-96) were used as the incident wave climate for model simulations.

The investigation computed net potential longshore transport rates for the study area using the GENESIS shoreline modeling system. A nodal zone was observed in the vicinity of Barnegat Inlet, where the general orientation of the New Jersey shoreline changes. North of Barnegat Inlet the regional net transport is generally recognized as northward, whereas south of the inlet the regional net transport direction is southward. However, there is also a well-documented local reversal of the net southward transport along LBI located on the order of 3 to 5 miles south of Barnegat Inlet, which corresponds to the zone from the southern end of Loveladies (a part of Long Beach Township) to the northern portion of Harvey Cedars. The exact location of this nodal zone is not fixed and its location varies over time depending on antecedent wave conditions. The transport reversal is attributed to wave refraction around the Barnegat Inlet ebb shoal complex. In addition to the longshore transport evaluation, this report also identified the greatest potential for shoreline retreat for the entire LBI project to be in Harvey Cedars.

4. Harvey Cedars nearshore placement zone

The proposed Section 1122 placement location offshore of the Harvey Cedars beach erosion hotspot is approximately 5 miles south of Barnegat Inlet. NAP monitors the condition of the LBI CSRM project annually, with beach and nearshore cross-sections ("profiles") obtained in the fall along the 17 miles of the project. Profile lines extend from the landward side of the dune out to depths of about -30 ft NAVD88, which is considered the seaward depth of closure, beyond which there is no perceptible change in bottom elevation and no significant net sediment transport between the nearshore and the offshore. About 30 monitoring lines are located along the 2 miles of Harvey Cedars oceanfront.

The USACE shallow-draft hopper dredges Murden and Currituck draw between 8 and 9 ft of water when fully loaded. Both are "split hull" hopper dredges and are only able to bottom dump dredged material. This analysis will conservatively assume that when loaded, neither dredge will venture into depths shallower than about 10 ft of water regardless of the stage of the tide. Given that the mean ocean tide range at Harvey Cedars is about 4 ft, and that the mid-tide elevation is approximately 0 ft NAVD88, discharge of the dredged sand would typically take place at depths no shallower than the -10 ft NAVD88 contour, and no deeper than the -20 ft NAVD88 contour. However, for any given hopper dredge load during the Barnegat Inlet dredging, wave and tide conditions at that time will govern how close to shore the dredge can get.

LBI monitoring surveys at Harvey Cedars indicate that the zone between -10 ft and -20 ft NAVD88 averages 300 ft wide in the cross-shore direction; i.e., the bottom slopes at about 1V:30H between

-10 and -20 ft NAVD88. Figure 5 shows the location of monitoring lines at Harvey Cedars. The light green data points depict depths between -10 and -20 ft NAVD88 and represent the planned location of the hopper dredge dump zone relative to the shoreline. Figure 6 shows cross sections obtained in October 2018 in Harvey Cedars and illustrates the relatively steep nearshore from 0 ft to -20 ft NAVD88.

Because the project will utilize Government-owned dredges, it will have a degree of operational flexibility that might not be possible with private sector contract dredging. Consequently the exact drop locations will depend on surf, wind, and tide conditions at the time of discharge. USACE will have a hydrographic survey vessel and crew on site at the beginning of the project and periodically thereafter until all sand has been placed. The survey plan is presented in Section 6 below.

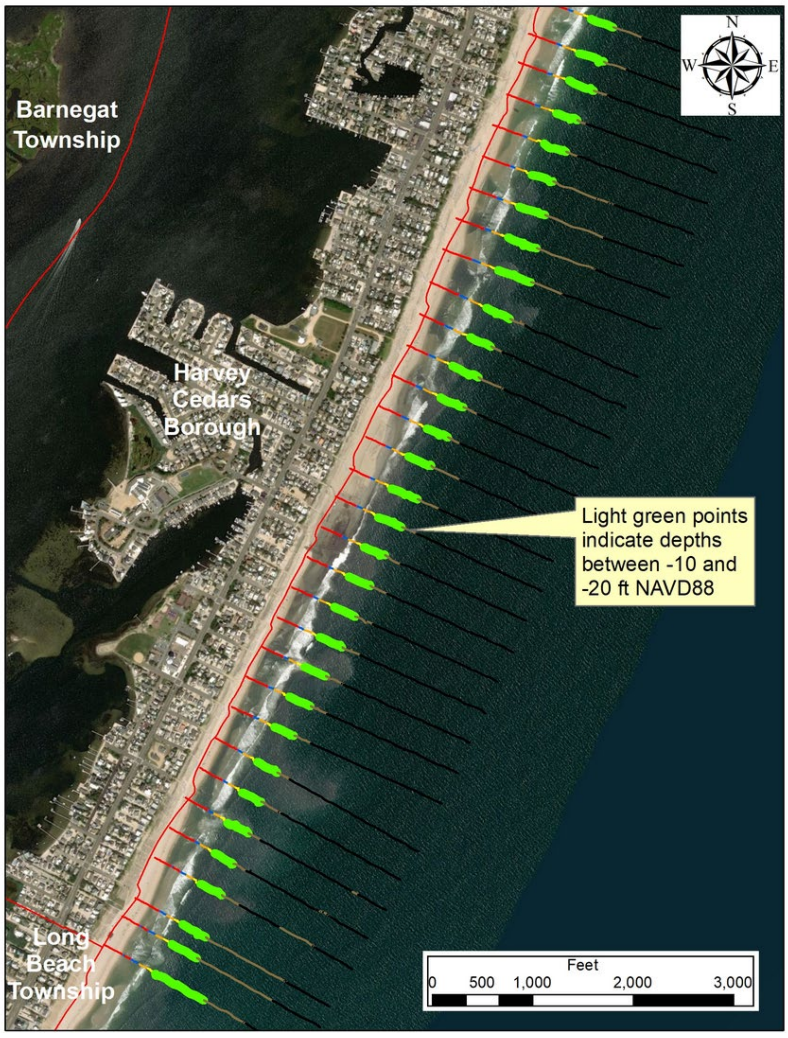

Figure 5. Profile lines at Harvey Cedars, showing depth zone from -10 to -20 ft NAVD88

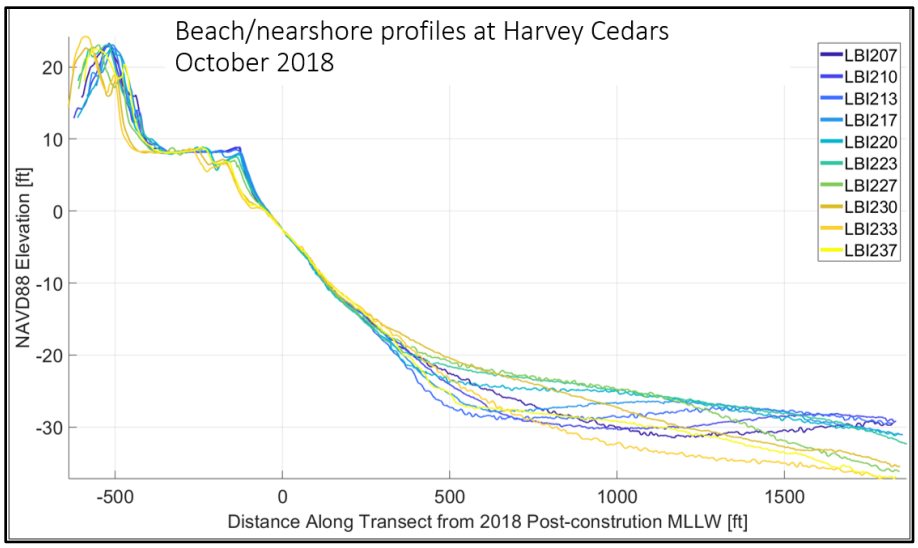

Figure 6. Beach and nearshore profiles, Harvey Cedars, October 2018

5. Scoping-level estimates of site hydrodynamics and sediment mobility

Preliminary estimates of wave conditions and sediment transport at the placement site were determined following the procedures of the Sediment Mobility Tool (McFall et al. 2016) with data from Wave Information Study (WIS) station 63136. Wave characteristics at the site were determined by applying Snell's law and the conservation of energy flux to significant wave height (H_{mo}), peak period (T_p), and mean wave direction (ϑ) from the WIS site to a 207° shoreline. Wave conditions are considered at depths of 10 and 20 ft. Alongshore transport directions were estimated using the CERC equation. As the equation was not tuned, transport volumes are not likely to be accurate, but are expected to provide a sufficient scoping level estimate of relative transport directions. While the energy-weighted mean wave angle is from slightly south of shore-normal, the alongshore transport estimate predicts net alongshore transport to the south with 56 % transport to the south. The waves which break near or seaward of the placement are likely to have a large impact. Waves with breaking depth estimates of 10 ft or deeper correspond to 56 % of the gross estimate for the entire profile, with 65 % of that material transported to the south. Alongshore transport estimates indicate that more placed material will likely be transported to the south than to the north (see Figure 7.)

Sediment mobility was assessed with maximum shear stress from linear wave theory and near-bed velocity from non-linear stream theory estimates following the procedures outlined in McFall et al. (2016) from the Sediment Mobility Tool. Sediment mobility was estimated at depths of 10 ft (Figure 8) and 20 ft (Figure 9). Velocities and shear stresses generally exceed the critical values for sediment mobilization, indicating sediment will frequently be mobilized.

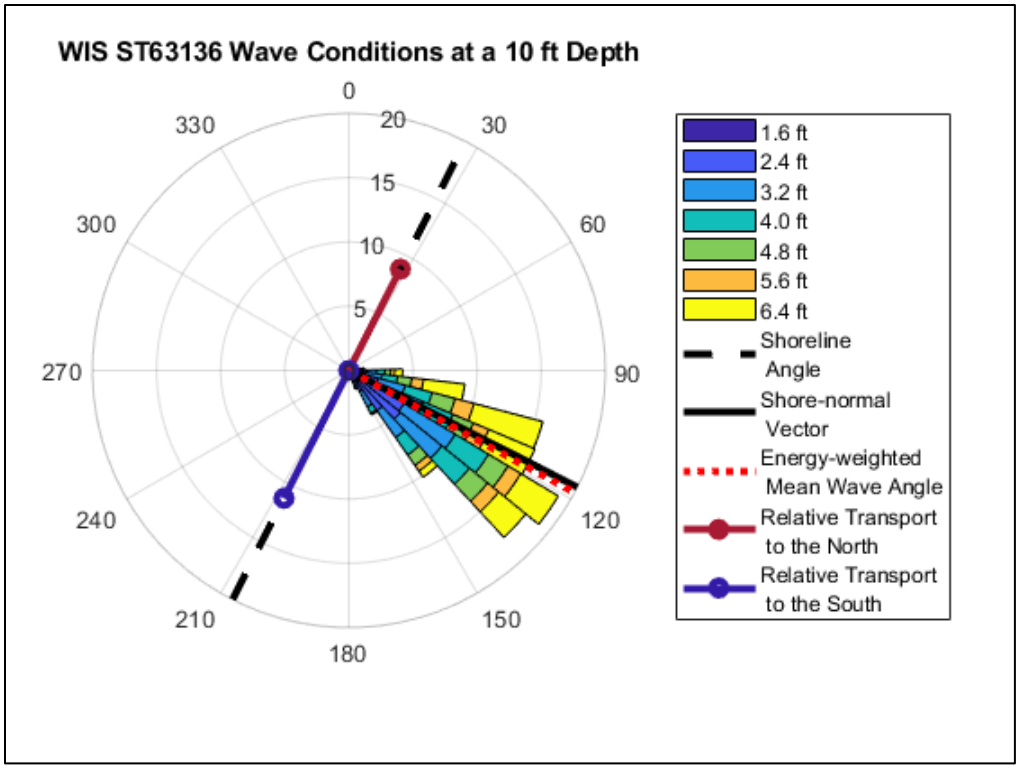

Figure 7. Significant wave height, mean wave angle, and net alongshore transport direction at the site transformed from WIS station 63136 to a site depth of 10 ft

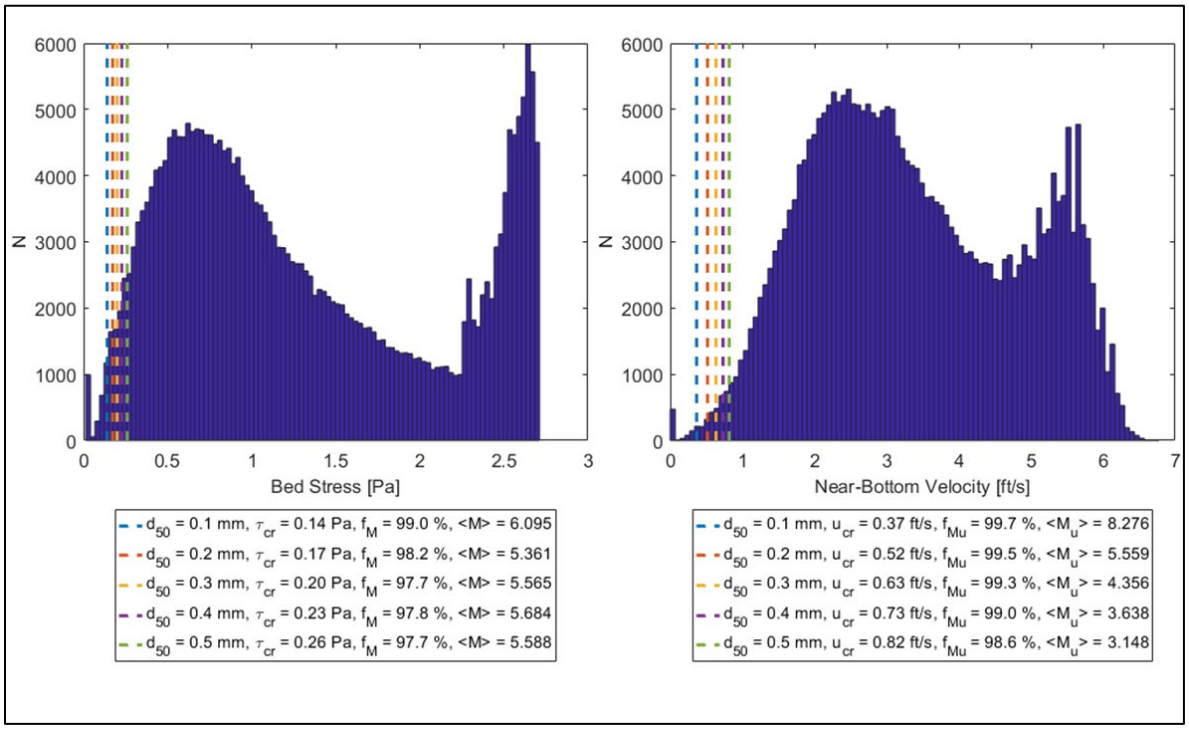

Figure 8. Bed stress and near-bottom velocity at the site transformed from WIS station 63136 to a site depth of 10 ft

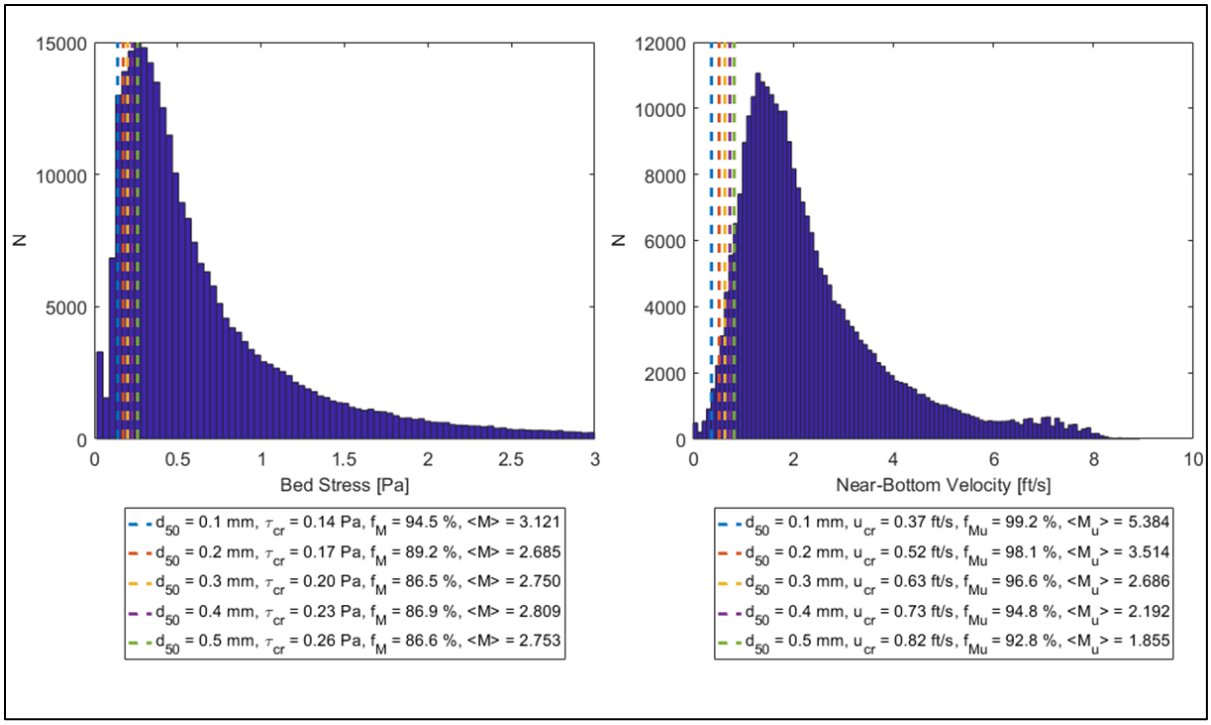

Figure 9. Bed stress and near-bottom velocity at the site transformed from WIS station 63136 to a site depth of 20 ft

Depth of closure approximations were estimated from WIS data following Brutsché et al. (2016). Estimates were made for inner and outer Hallermeier limits (Hallermeier, 1981) and Birkemeier inner limits (Birkemeier, 1985) conservatively estimating placement grain size as 0.3 mm. The region onshore of the inner limit indicates where surface waves have a strong impact in a typical year, and the region offshore of the outer limit indicates where surface waves have a negligible impact in a typical year (Hallermeier, 1981). Placements shallower than the inner limit generally begin to mobilize relatively quickly, with placements deeper than the inner limit but more than 50 % shallower than the outer limit also active (Hands and Allison, 1991). Considering these estimates as well as site-specific engineering knowledge, material placed at depths between 10 and 20 ft is expected to be within the depth of closure.

Depth of Closure Estimate Type	Depth of Closure Estimate
Hallermeier Inner (ft)	41 ft
Hallermeier Inner Simplified (ft)	37 ft
Hallermeier Outer (ft)	69 ft
Birkemeier (ft)	31 ft
Birkemeier Simplified (ft)	32 ft

Cross-shore sediment migration directions were estimated from WIS data. Dean Numbers are computed from offshore wave heights and sediment fall velocities for a range of grain sizes. Dean Numbers greater than 7.2 have been linked to offshore bar migration (Larson and Kraus, 1992). The fraction of each wave

record in which the Dean Number for a given grain size is reported as the percentage of a predicted sediment migration direction. Dean numbers estimated from WIS data indicate that material 0.2 mm or larger will move onshore during the majority of conditions in which sediment is mobilized.

Sediment Migration Direction	
grain diameter (mm)	Predicted Sediment Migration
0.1 (mm)	96.2 % offshore
0.2 (mm)	60.4 % onshore
0.3 (mm)	85.5 % onshore
0.4 (mm)	96.5 % onshore
0.5 (mm)	99.3 % onshore

6. Dredged material placement plan

While the primary purpose of Barnegat Inlet dredging is to restore safe and reliable navigability of the inlet, Section 1122 enables the additional purpose of innovative beneficial use of the dredged material. In this regard the goal is to provide a positive impact on the LBI CSRM project, specifically at Harvey Cedars, which experiences the highest rate of erosion within the 17 miles of project shoreline. The placement zone has been configured to keep the sand in the active littoral zone and provide the greatest probability for the placed sand to migrate onshore and alongshore to reduce erosional tendencies in Harvey Cedars.

It is presently anticipated that the dredge Murden will begin work in August 2020 and be joined by the Currituck around the same time. The two dredges will coordinate dredging and disposal operations between Barnegat Inlet and Harvey Cedars so as to not interfere with each other. The target quantity to be dredged and placed off Harvey Cedars is 200,000 CY. Work is planned to continue around the clock until the project is complete.

Hopper capacity on the Murden is about 500 CY, whereas the Currituck capacity is closer to 300 CY. For the two dredges operating together, this represents about 800 CY per two-dredge “load” with an estimated production rate of 8 loads per day (assuming a 3-hour dredge cycle) resulting in a potential daily production of 6,400 CY/day. At that idealized rate, removal of 200 KCY would require about 31 days. For practical reasons of weather and mechanical conditions on the dredges, it is assumed that a more realistic estimate of time required for the two dredges to move 200 KCY would be 50% greater, say about 45 days. It is estimated that the project should be complete in the late September to early October 2020 time frame.

Based on the nearshore geometry described in Section 4 above, a placement strategy was developed that is illustrated in Figure 10. The solid red line in Harvey Cedars represents the mile-long erosional hotspot previously described. Offshore of that zone there are ten “boxes” (rectangles) that are all sized 500 ft in the alongshore direction and 300 ft in the cross shore direction. The size and number of boxes were established in coordination with the Wilmington District (SAW) Port Captain who manages deployments of the Murden and Currituck, in addition to other SAW floating plant. The intent is to select one box at a time in which to begin the nearshore placement and continue until monitoring

surveys indicate a measurable accumulation of sand. At such time an adjoining box becomes the placement target and the process is repeated. Subsequent monitoring will provide information on the spatial evolution of the placed material. Given that 200,000 CY is the anticipated dredging quantity and 5,000 lineal feet (10 boxes each 500 ft long) is the anticipated placement zone, an average of 40 CY will be placed per lineal foot of beach at Harvey Cedars. Forty CY per foot is equivalent to a cross-sectional area of about 1,100 square feet added to the nearshore profile, which is expected to be sufficient to create a feature that is effectively a nearshore "berm", with the material is expected to disperse towards the shoreline.

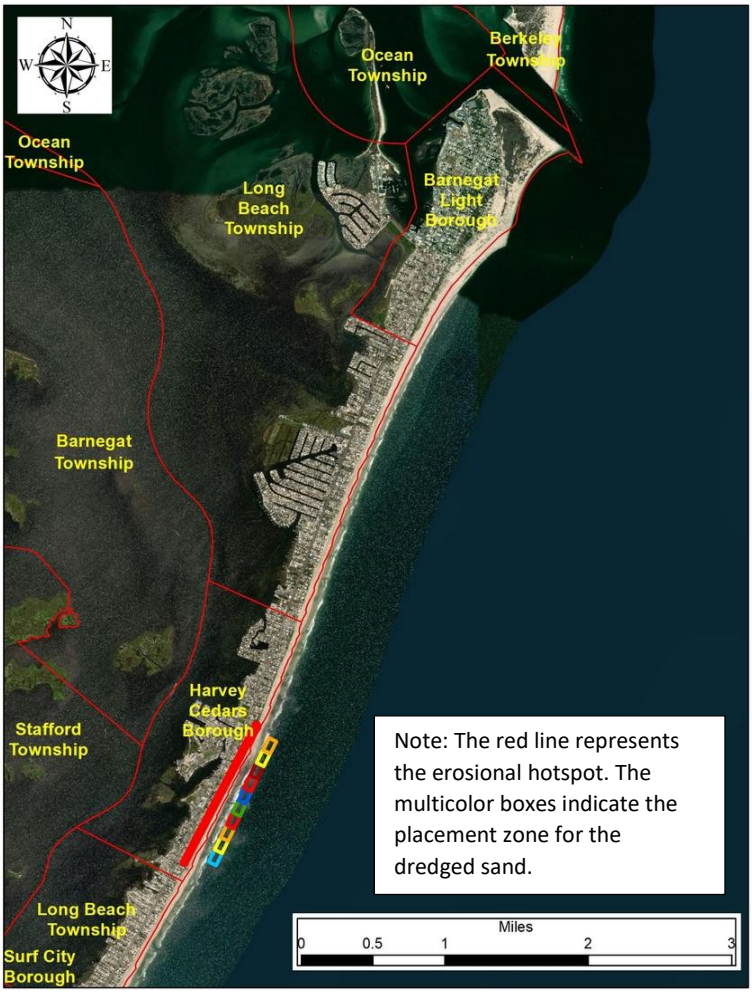

Figure 10. Nearshore placement locations at Harvey Cedars

By placing material directly in the active littoral system it is available to move along and onshore as part of natural beach building processes. In addition, the feature's relief will induce wave shoaling and cause larger waves to break in shallow water. Steep, short period waves generally associated with erosion are more likely to break at the placement site. Longer period waves generally associated with beach building processes often pass over the berm unhindered. Thus, the berm may act as a wave filter, damping erosive waves (Burke, McLellan, and Clausner, 1991).

7. Nearshore placement survey plan

Pre-Placement Condition Survey. Single-beam hydrographic surveys will be conducted within 45 days of the commencement of dredging operations. These surveys will consist of 20 lines perpendicular to the shore. Note: historic monitoring lines were incorporated into the planned line file for historic and future analysis. These surveys will extend from the seaward toe of dunes to 300' offshore of the seaward extent of each placement area, approximately the -25 to -30 ft NAVD 88 contour. These surveys should be requested 60 days prior to commencement of placement of material.

Before Dredge (BD) Surveys. A BD survey will be completed for the entire placement area utilizing multibeam hydrographic survey techniques. These surveys will consist of approximately 16 lines run parallel to the shore. This survey will extend 100 ft alongshore beyond the placement area and will be done concurrently with the single-beam pre-placement survey.

Post Placement Condition Surveys (Immediate, 30 days, and 60 days). Overall post placement multibeam condition surveys will be collected as soon as possible after final placement, 30 days after the first PP survey, and 60 days after the second PP survey. Single-beam hydrographic surveys will be conducted concurrently with the post placement multibeam surveys described above. These will be consist of the same lines and extents as the Pre-Placement Condition Surveys. Figure 11 is a schematic showing typical planned cross-shore and alongshore monitoring lines.

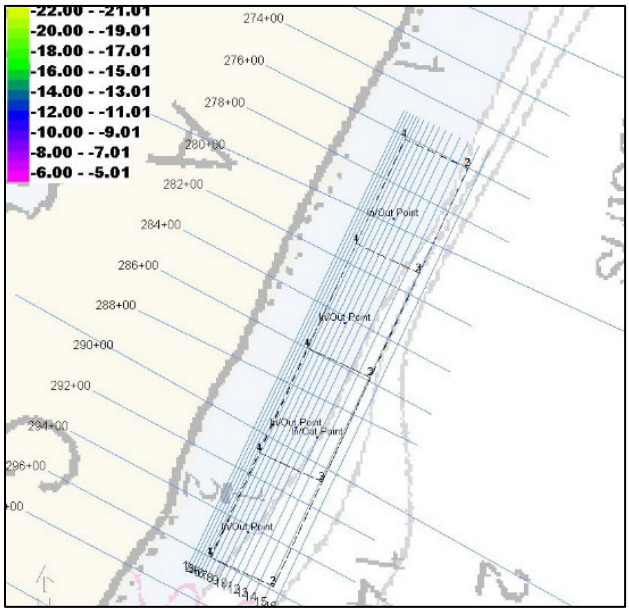

Figure 11. Alongshore and cross-shore survey lines.

Wave Measurements. This task will measure continuous wave conditions with an offshore buoy before, during and after construction, and get temporary (~5 day deployments) wave and current measurements on the landward side of the placement before construction, immediately post construction, and about 30 days after construction. The goal of the shallow deployment is to quantify the energy naturally dissipated by the beach profile and then quantify the energy dissipated with the presence of the nearshore berm.

An offshore wave buoy would be deployed at a depth of about 45 ft at approximately 39°40'39.16"N, 74° 06'36.70"W. The nearshore measurements would deploy sensors in 5-6 ft of water. ERDC field operations have an Aquadopp that can collect the information.

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Appendix B

Environmental Assessments for Phases 1 & 2

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

Barnegat Inlet, Ocean County, New Jersey

Prepared by:
U.S. Army Corps of Engineers
Philadelphia District
100 Penn Square East
Philadelphia, PA 19107

10 July 2020

US Army Corps
of Engineers®
Philadelphia District

FINDING OF NO SIGNIFICANT IMPACT

NATIONAL REGIONAL SEDIMENT MANAGEMENT (RSM) PROGRAM
WRDA 2016 SECTION 1122
BENEFICIAL USE PILOT PROJECT
BARNEGAT INLET, OCEAN COUNTY, NEW JERSEY

The U.S. Army Corps of Engineers, Philadelphia District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Environmental Assessment (EA), dated 10 July 2020 and titled *National Regional Sediment Management Program WRDA 2016 Section 1122 Beneficial Use Pilot Project, Barnegat Inlet, Ocean County, New Jersey*, evaluates existing environmental, cultural, and socio-economic conditions and the effects of the pilot project on existing resources at the proposed project site in the region of the Barnegat Inlet Federal Navigation Project and immediate surrounding area. The EA also evaluates the effects on existing resources of not dredging Barnegat Inlet (No Action Alternative) and the current maintenance dredging and placement practices (Current Practice).

Section 1122 of Water Resources Development Act (WRDA) requires the USACE to establish a pilot program to carry out ten projects for the beneficial use of dredged material. The Barnegat Inlet Beneficial Use Pilot Project was one of ten projects selected from a field of 95 proposals, based on criteria contained in Section 1122 of WRDA, as having a high likelihood of delivering environmental, economic, and social benefits.

The purpose of the pilot project is to maintain the Barnegat inlet Federal navigation channel while using the dredged material beneficially through strategic placement in the nearshore zone fronting the Atlantic Ocean beach of the northern portion of Long Beach Island, New Jersey. The project includes pre- and post-placement monitoring surveys in support of the development of future beneficial use projects. There is considerable opportunity within the sediment-rich Barnegat Inlet complex to use dredged material from state and Federal navigation channels for beneficial use by placement on or near adjacent beaches, for marsh enhancement, and island creation. Such projects would improve overall coastal system resilience within the Barnegat Inlet region of New Jersey.

The Barnegat Inlet Federal Navigation Project, a complex and dynamic coastal system along the New Jersey Atlantic Coast, 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 8 feet Mean Low Water (MLW). 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 Water Way Federal

channel. Maintenance dredging for this Section 1122 pilot project will occur in the main inlet channel.

The pilot project will utilize a government-owned shallow-draft hopper dredge to dredge the Barnegat Inlet entrance channel to the authorized depth of 8 feet Mean Lower Low Water (MLLW) plus 2 feet of overdepth. In subsequent years, the channel would continue to be dredged once or twice per year as needed and as funding allows. The initial placement of sand will occur in the littoral zone fronting the Borough of Harvey Cedars. In subsequent years, dredged sand from the navigation channel within Barnegat Inlet will be placed anywhere in the nearshore zone along an approximate 3-mile stretch between Barnegat Inlet to Harvey Cedars, where it is most needed to provide a supplemental sand source to eroding beaches.

This pilot design will test an innovative placement concept to increase the length of time between nourishment cycles and provide additional material within the dynamic nearshore system to increase the profile near a documented erosional hot spot at Harvey Cedars beach. 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 support the federal shore protection project (Barnegat Inlet to Little Egg Inlet (LBI) Storm Risk Reduction project).

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐
Historic properties	☐	☐	☒
Other cultural resources	☐	☐	☒
Floodplains	☐	☐	☒
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☒	☐	☐
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Socio-economics	☒	☐	☐
Environmental justice	☐	☐	☒
Soils	☒	☐	☐
Tribal trust resources	☐	☐	☒
Water quality	☒	☐	☐
Climate change	☐	☐	☒

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs), as applicable, will be implemented to minimize impacts. [1] USACE will adhere to the Conservation Recommendations provided by the National Marine Fisheries Service (NMFS) to minimize potential impacts to diadromous fish and shark species. Dredging will occur outside of the recommended seasonal restricted periods and the dredge draghead will not be activated until it is resting on the bottom and deactivated prior to lifting. Appropriate actions will be taken to avoid adverse effects to the federally-listed seabeach amaranth during monitoring by incorporating a buffer zone for beach survey transects. Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (USFWS) concurred 1 May 2020 with our determination that the project is not likely to adversely impact the red knot, seabeach amaranth or piping plover. NMFS concurred 5 March 2020 that the project is not likely to adversely affect listed species or critical habitat for the following federally listed species: shortnose sturgeon, Atlantic sturgeon, loggerhead, Kemp's ridley, green, leatherback sea turtles, and marine mammals. All terms and conditions, conservation measures, and reasonable and prudent measures resulting from these consultations shall be implemented in order to minimize take or endangered species and avoid jeopardizing the species.

Public review of the draft EA was initiated 3 April 2020 and completed on 30 June 2020. All comments submitted during the public review period were responded to in the Final EA and included in the Correspondence Appendix. Comments from state and federal agency review did not result in any changes to the final EA. All state and federally-mandated approvals have been received.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, USACE determined that no historic properties will be adversely affected by the recommended plan. The New Jersey State Historic Preservation Office concurred with our determination 15 April 2020.

[1] 40 CFR 1505.2(C) all practicable means to avoid and minimize environmental harm are adopted.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with Section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is included in the Final EA.

Water Quality Certification pursuant to Section 401 of the Clean Water Act was obtained from the New Jersey Department of Environmental Protection on 28 May 2020. All conditions of the Water Quality Certification shall be implemented in order to minimize adverse impacts to water quality.

A determination of consistency with the New Jersey Coastal Zone Management Program pursuant to the Coastal Zone Management Act of 1972 was obtained from the New Jersey Department of Environmental Protection on 28 May 2020. All conditions of the consistency determination shall be implemented in order to minimize adverse impacts to the coastal zone.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

21 July 2020
Date

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Date: 2020.07.21 14:56:35 -04'00'

David C. Park
Lieutenant Colonel, Corps of Engineers
District Commander

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National Regional Sediment Management (RSM) Program
WRDA 2016 Section 1122 Beneficial Use Pilot Project
Barnegat Inlet, Ocean County, New Jersey

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FIGURES

TABLES

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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 includes the channel 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. (1) 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. This Act provided funds to implement a number of improvements, including a new south jetty 4,270 feet long, generally parallel to the north jetty, extending from the Barnegat Lighthouse to the top of the “old” south jetty, a navigation channel 300 feet wide by 10 feet deep MLLW from the outer bar in the Atlantic Ocean to the north end of the sand dike in Barnegat Bay, and jetty sport fishing facilities on the new jetty.

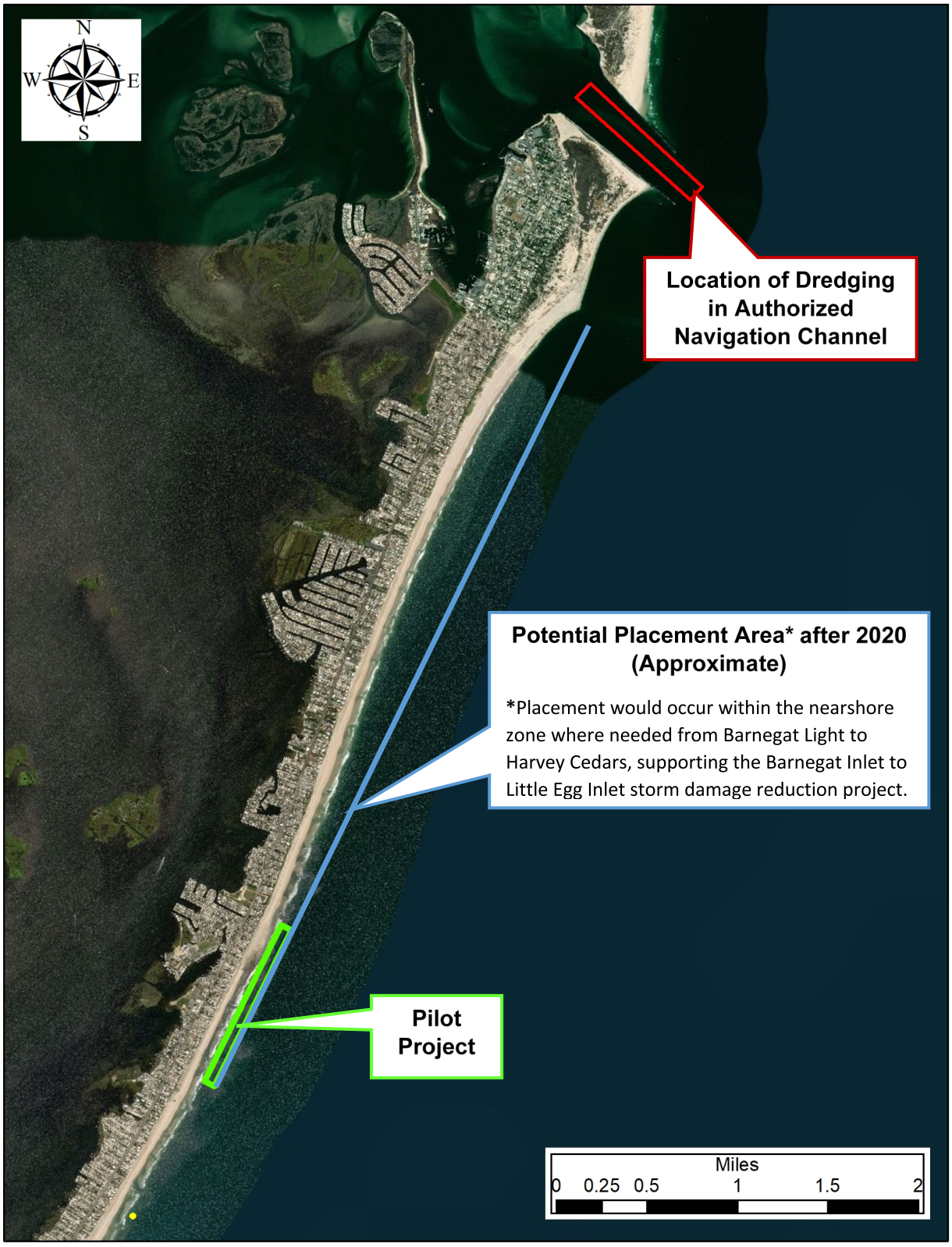

Figure 1. Barnegat Inlet Study Area

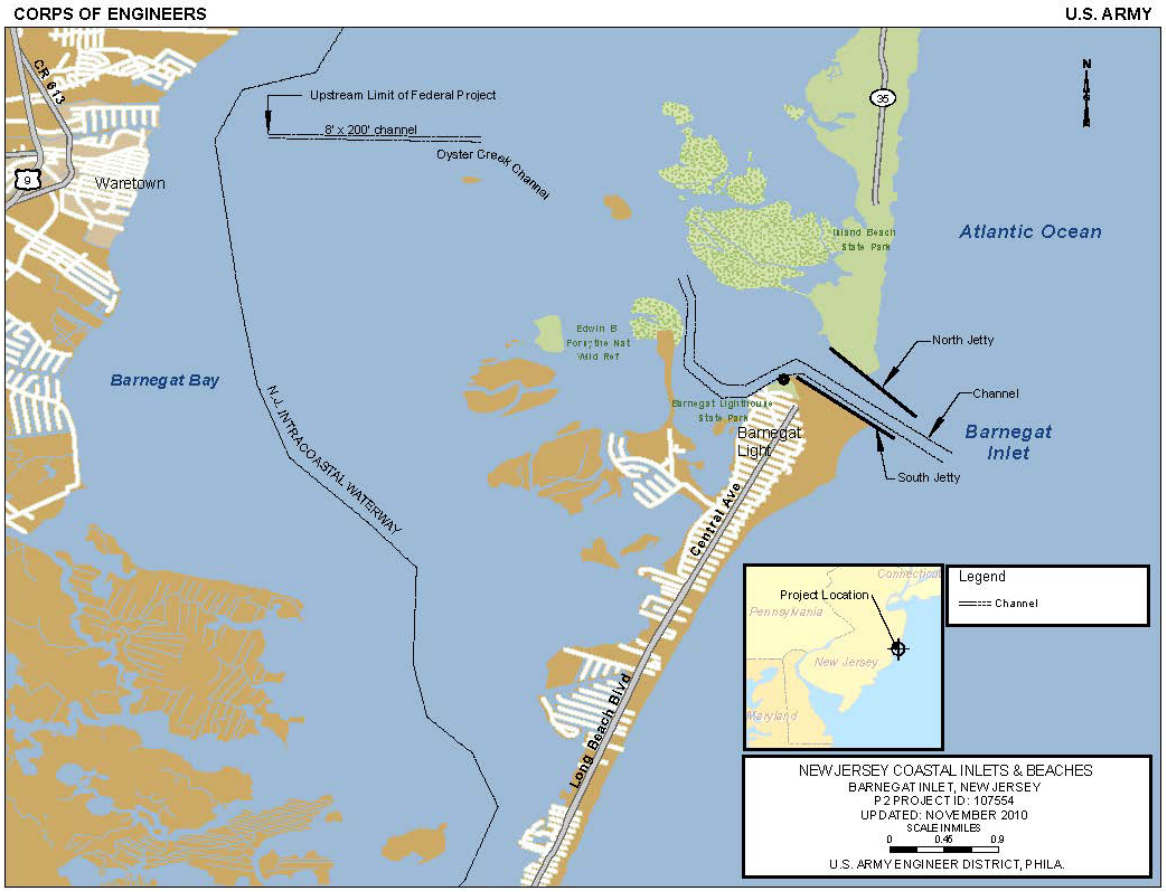

Figure 2. Barnegat Inlet Federal Navigation Project.

(2) 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 Barnegat 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 Relief Appropriations Act, 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 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 current nearshore placement site south of the inlet. 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. 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 to -20-foot NAVD88 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 NAVD88 contour allows, then open the hopper to slowly release approximately 500 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.

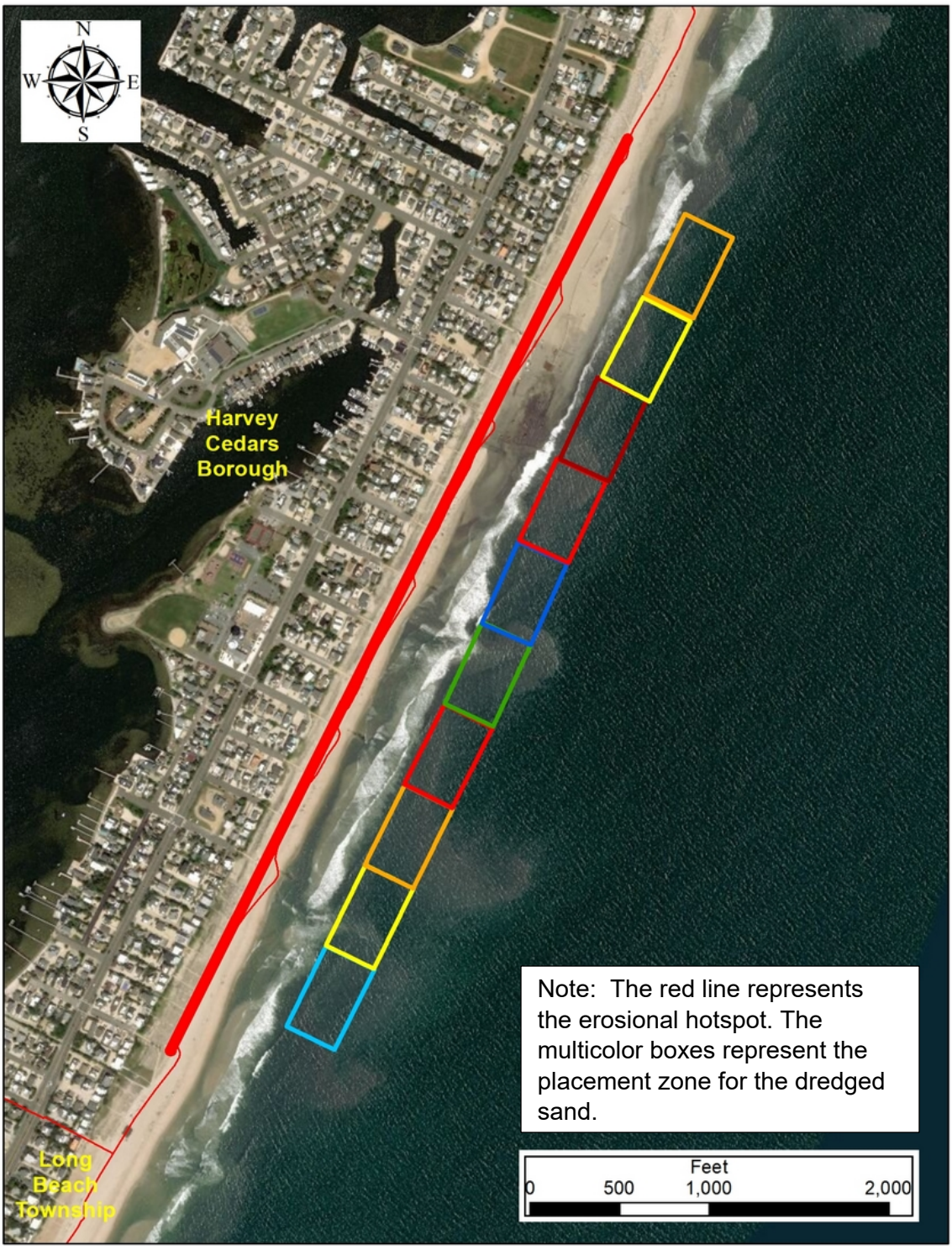

Figure 6. Planned beneficial use placement zone along Harvey Cedars, NJ.

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 Philadelphia-Wilmington Atlantic City, PA-NJ-MD-DE Area. The entire state of New Jersey is in non-attainment and the project site is located in an area 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 sediment 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
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

Species	Life Stage
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
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 (*Haliaeetus leucocephalus*) 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 (*Falco peregrinus)* 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 back bays 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, jet skiing, paddling (canoes, kayaks, stand-up paddle boards), windsurfing, and bird watching.

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

<u>No Action Alternative – No Dredging</u>

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.

<u>Current Practice</u>

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).

<u>Beneficial Use of Sediments (Proposed Action)</u>

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.

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). Both projects were successful in that they added sediment to the littoral system without directly impacting the terrestrial (beach and dune) habitat. The addition of sand to the littoral zone served to protect the beach from storm impacts, and equilibrated with the natural dynamic system making the placement site sustainable for future placements.

6.4.2 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. Benthic species typically recolonize dredged and depositions areas by recruitment from nearby undisturbed areas. Material is placed in small quantities over a small area with each hopper release is not expected to result in significant mortality of benthic organisms. Some species are capable of migrating through the newly placed small quantities of sand. These nearshore placement areas are naturally subjected to turbulence in the ebb shoal and littoral zones. Benthic organisms are continually exposed to burial and exposure as bottom sediments are transported by natural currents and wave action. Channel dredging within the inlet is an ongoing activity, however a significant portion of the inlet is outside the authorized channel boundaries. 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 per year). 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 not incur impacts typically associated with beach nourishment projects as the placements occur in-water and are done in significantly smaller quantities (500 cy) in the nearshore zone with each hopper load release. The placed material is distributed naturally in the littoral zone by wave and tidal action. As noted above, some nearshore invertebrate species may be buried during placement activities in the nearshore zone fronting Harvey Cedars, however, the small quantity releases will be placed along a 1-mile long placement zone and thereby reducing mortality for species that do not migrate through the newly placed material. Benthic

communities generally respond in stages to habitat disturbances. Response stages may include an increase (or decrease) in abundance or an increase (or decrease) in diversity (US EPA, 2009). Most of the organisms inhabiting the dynamic nearshore and intertidal zones are highly mobile or adapt quickly to significant changes in abiotic factors. 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 following 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 small areas that receive dredged material. Large-grained sediments settle quickly with larger grains settling out on the uppermost reaches of the intertidal zone and finer, smaller grain sizes in the deeper nearshore zone. 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 due to a potential loss of habitat. 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 ocean beaches is anticipated to result in an indirect benefit to habitat by providing an additional sand source in the nearshore zone that has been shown to reduce beach erosion (Brutsche *et al*. 2015). Wildlife species that may benefit include black skimmer, least tern, and piping plover as these species utilize the beaches in the nearby vicinity for foraging and in some areas nesting. 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. All proposed operations, with the exception of pre- and post-placement beach surveying, take place in the marine environment.

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 typically 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. Material is placed in small quantities over a small area with each hopper release. Most benthic organisms are capable of migrating through the newly placed small quantities of sand. Benthic habitat would begin to re-establish within 1 to 2 years, from impacts due to 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-magnitude 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
- roseate tern
- seabeach amaranth
- Kemp's ridley turtle
- leatherback turtle
- hawksbill turtle
- green turtle
- loggerhead turtle
- North Atlantic right
- fin whale

Because both dredging and placement alternatives occur in-water, direct impacts to piping plover, red knot, roseate tern are not expected. The eastern black rail, proposed for listing, occurs primarily in saltmarshes in backbay areas and is not likely to occur in the project area. Barnegat Inlet's navigation channel has been maintained for over 40 years. Hopper dredges working in the inlet and material placement in the nearshore zone do not appear to disturb birds on the shoreline. The vessels are a significant distance away from the beach, slow-moving with low engine vibration that is difficult to detect with the surrounding ambient sounds of waves crashing and wind. Prey species in the intertidal zone, where shorebirds such as the piping plover and red knot forage, would not be impacted by placement of sand in the nearshore zone of 10-20 feet MLW depths. Foraging shorebirds feed on the foreshore and intertidal zone of Atlantic Ocean beaches of New Jersey. This zone contains beach wrack, which is composed of drying seaweed, tidal marsh plant debris, and decaying marine animals. The beach wrack creates a moist micro-habitat suitable for crustceans such as amphipods (Family: Amphipoda): *Orchestia* spp. And *Talorchestia* spp., (beach fleas) (USFWS, 2001). Although there is annual variability and there can be some overlap among species, the primary benthic invertebrate species composition in the nearshore placement zone (10-20 feet MLW) differs from that which occurs in the intertidal zone, and are not available to beach foraging birds. Patterns in benthic species composition, distribution, and abundance are

primarily influenced by natural sources of environmental variation (i.e., depth, sediment type, and levels of total organic carbon). An assessment of benthic communities in New Jersey nearshore marine coastal waters in 2007-2009 (Ramey *et al*. 2011) observed the following dominant taxa/species: polycheates *Polygordius* spp., *Prionospio pygmaeus*, *Tharyx* sp. A, and *Aricidea catherinae*; the oligochaetes *Naidinae* sp. 2, *Grania longiducta, Peosidrilus coeloprostatus*, and *Tubificoides* sp. 1; the amphipod *Protohaustorius deichmannae*; and the bivalve *Nucula proxima*.

Likewise, dredging and placement activities 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.

As noted in Section 5.5.1, seabeach amaranth was federally-listed as a threatened plant throughout its range in 1993 and listed as endangered by the state of New Jersey. The NJDEP Endangered Nongame Species Program surveys the New Jersey coastline annually for beach nesting birds as well as seabeach amaranth and directly coordinates their findings with USACE. The plants establish primarily on accreting areas (non-eroding beaches) and lower foredunes. Although no seabeach amaranth plants were observed at Harvey Cedars in 2019, 1 plant was located in 2018 and 3 plants in in 2017 at Harvey Cedars. Although the proposed dredging and placement operation occurs entirely in-water, one of the objectives of the Section 1122 program is to monitor the action to better understand the benefits of nearshore placement to the beach and innovatively inform the design for application to future shoreline protection projects. USACE plans to conduct single beam hydrographic pre- and post-placement condition surveys, consisting of 25 lines running perpendicular to the shore from the beach seaward to the placement area. Typically these survey lines would begin from the seaward toe of the dunes to about 300 feet offshore to include the placement area. However, if seabeach amaranth plants are identified at Harvey Cedars, the survey lines will be modified to begin further down the beach berm away from the foredune area to establish a necessary buffer zone for the plants between 15 March and 30 September.

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). Anticipated impacts to beach habitat and prey species for beach nesting and foraging shorebirds due to a nearshore placement are minimal. In the event that either listed foraging birds, nests or seabeach amaranth plants are discovered by USACE or NJDEP observers, the areas would be fenced and appropriate required buffer zones established for beach surveyors. 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 for dredged inlet sand. This further reduces the potential to adversely affect threatened and endangered species by reducing the frequency of needed maintenance dredging and/or emergency beachfills.

The project objective to monitor the placement operation (pre-, during, and post-placement) at the in-water placement site as well pre- and post-placement surveys extending onto the beach berm will provide valuable information as to the efficacy of sand placement within the littoral zone. As noted previously, monitoring of similar operations along the east coast has demonstrated success with nearshore in-water placements serving to add sediment to the littoral system to protect the beach from storm impacts (Brutsche *et al.* 2015). Although shorebirds, and particularly, piping plovers have not nested on the beach at Harvey Cedars, observers survey the New Jersey Atlantic coast annually to ensure that the location of beach-nesting birds and seabeach amaranth plants are identified and protected with signage and fencing. USACE would coordinate with the USFWS and NJDEP to ensure that surveyors maintain the required distances from any identified threatened or endangered species that are identified in the vicinity during the beach nesting period (March 15 through September 30). 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, bird watching, 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 bird watching. 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 Cedars 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 monitoring program will provide valuable information for potential future applications. Monitoring will occur within the inlet to assess sedimentation patterns with the long-term goal of reducing channel dredging requirements. Monitoring at the nearshore placement site will reveal the efficacy of placements within the littoral system and its potential positive effect on adjacent beaches.

The results of the monitoring studies 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

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

Oyster Creek Channel
Barnegat Inlet Federal Navigation Project
Ocean County, New Jersey

Prepared by:
U.S. Army Corps of Engineers
Philadelphia District
100 Penn Square East
Philadelphia, PA 19107

1 September 2020

US Army Corps of Engineers®
Philadelphia District

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National Regional Sediment Management (RSM) Program
WRDA 2016 Section 1122 Beneficial Use Pilot Project
Oyster Creek Channel, Barnegat Inlet Federal Navigation Project
Ocean County, New Jersey

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APE	Area of Potential Effects
BBP	Barnegat Bay Partnership
CDF	Confined Disposal Facility
DO	Dissolved Oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
EWN	Engineering with Nature
FWCA	Fish and Wildlife Coordination Act
GHG	Greenhouse Gases
HAB	Harmful Algal Blooms
HAPC	Habitat Area of Particular Concern
HD	House Document
HTRW	Hazardous, Toxic, and Radioactive Waste
IBSP	Island Beach State Park
MBTA	Migratory Bird Treaty Act
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MSA	Magnuson Stevens Fishery Conservation and Management Act
MSC	Major Subordinate Commands
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NJDEP	New Jersey Department of Environmental Protection
NJDOT/OMR	New Jersey Department of Transportation/Office of Marine Resources

NJESA	New Jersey Endangered Species Act
NJIWW	New Jersey Intracoastal Waterway
NMFS	National Marine Fisheries Service
NNBF	Natural and Nature-based Features
NOAA	National Oceanographic and Atmospheric Administration
NOx	Nitrogen Oxides
NRHP	National Register of Historic Places
RSM	Regional Management Program
SAV	Submerged Aquatic Vegetation
TNC	The Nature Conservancy
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compound
WRDA	Water Resources Development Act

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 Federal Navigation Project, Oyster Creek Channel, New Jersey (the Oyster Creek 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. The Section 1122 program aligns with the NJDEP's Barnegat Bay Restoration, Enhancement, and Protection Strategy (BB REP Strategy) Ten-Point Plan to improve the ecological health of the watershed.

The WRDA Section 1122 program accomplishes the proposed goals of benefitting both federal and state navigation channels by using dredged material beneficially to support coastlines as well as innovatively creating natural and nature-based features and restoring degraded marsh habitat. Additionally, this project uses Regional Sediment Management (RSM) and Engineering with Nature (EWN) principles to look at nature-based approaches to manage and keep sediment out of channels, thereby reduce maintenance dredging needs and costs.

In fulfillment of the National Environmental Policy Act (NEPA) of 1969, this Environmental Assessment (EA) 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.

The Barnegat Inlet 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). 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. This Act provided funds to implement a number of improvements, including a new south jetty 4,270 feet long, generally parallel to the north jetty, extending from the Barnegat Lighthouse to the top of the “old” south jetty, a navigation channel 300 feet wide by 10 feet deep MLLW from the outer bar in the Atlantic Ocean to the north end of the sand dike in Barnegat Bay, and jetty sport fishing facilities on the new jetty.

2.0 Purpose and Objectives

The purpose of this project is to maintain the Barnegat Inlet Federal Navigation Project by dredging the channels to authorized depth and utilizing the dredged material for economic and environmental benefits (Figure 1). Under the Section 1122 program, the Philadelphia District USACE seeks to develop innovative approaches for the beneficial use of maintenance material for shoreline protection and 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.

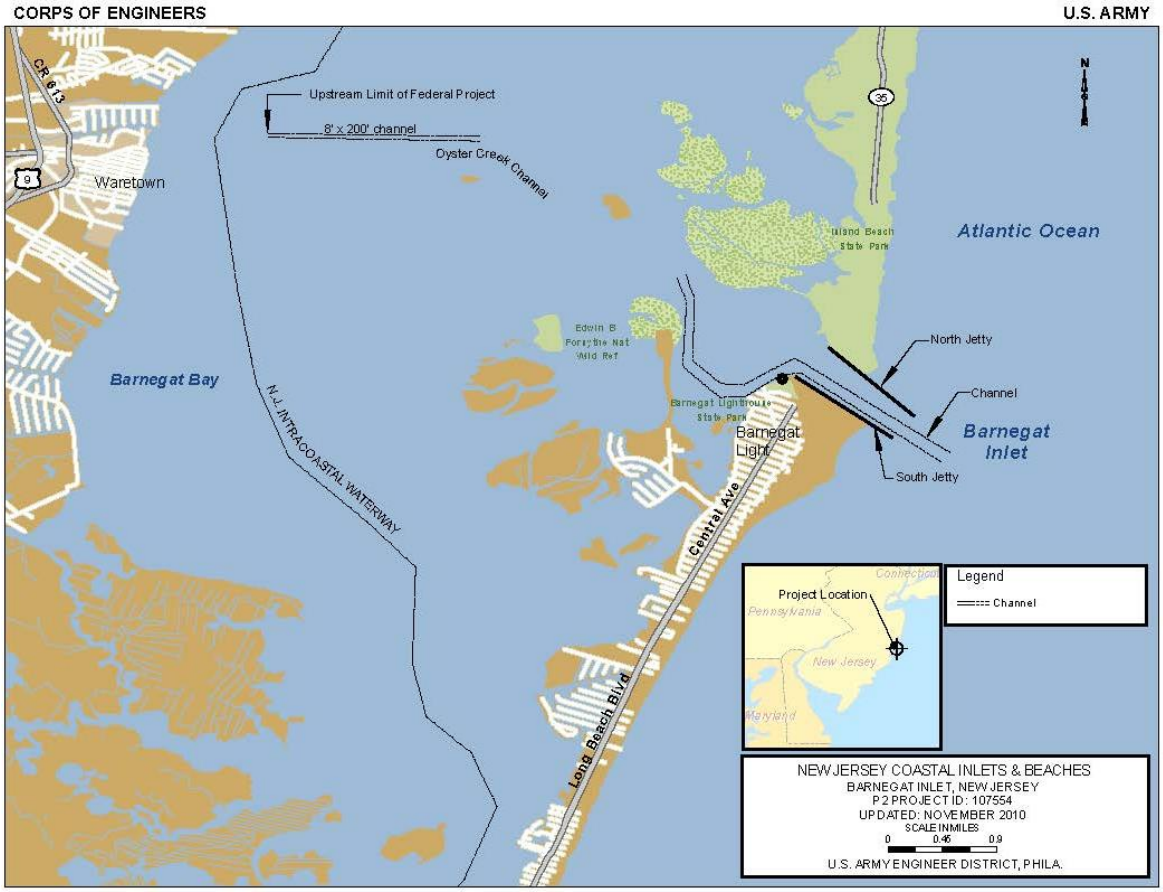

Figure 1: Barnegat Inlet Federal Navigation Project.

One of the USACE's 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 and reduce the need for upland confined disposal facilities (CDFs). The Section 1122 pilot project team utilizes lessons learned from other successful efforts and from partnerships with local knowledgeable organizations in coastal New Jersey. The proposed plan was developed through collaboration with the USACE's Engineering Research and Development Center (ERDC) to construct new islands and restore marsh and submerged aquatic vegetation (SAV) in the Barnegat Bay region behind Island Beach State Park (IBSP). These actions serve to retain sediment within the system while enhancing natural habitat. Ongoing collaborative efforts with ERDC through their Engineering with Nature and Regional Sediment Management Programs as well as the Barnegat Bay Partnership (BBP) have also contributed to the development of innovative natural and nature-based features (NNBF) using Barnegat Inlet channel sediments.

Specific project objectives include:

- Promote public safety by dredging the navigation channels to the authorized depths in

support of safe navigation for commercial and recreational boating use while providing clean dredge material for beneficial use.

- Use a Regional Sediment Management (RSM) approach in order to keep dredged sediment in the natural system most effectively and strategically in support of natural habitats for wildlife and coastal resilience.
- Establish cooperative working relationships with stakeholder groups/natural resource agencies to collaboratively support improved sediment management practices and coastal resiliency.
- Work collaboratively with the NJDEP and NJDOT/OMR for navigational safety.
- Use monitoring results to understand design, techniques, processes, and benefits associated with island creation and other innovative sediment management practices for application to future backbay projects.

The Section 1122 pilot program is being implemented as two distinct efforts in two locations within the Barnegat Inlet Federal Navigation Project channel system. Phase 1 of the pilot program entails maintenance dredging of the channel within Barnegat Inlet between the north and south jetties and beneficial placement of the material along 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 2:**). An Environmental Assessment (EA) for Phase 1 was completed 10 July 2020 (USACE, July 2020). Phase 2 of the pilot program is the subject of the current EA. This report will address maintenance dredging needs and evaluate potential beneficial uses of dredged material removed from the Oyster Creek Channel portion of the authorized Federal navigation channel in Barnegat Bay and innovatively create natural and nature-based features, support shoreline protection efforts and/or habitat restoration with the maintenance material within Barnegat Bay.

3.0 Project Location

The study area is a complex and dynamic coastal system on the New Jersey Atlantic Ocean Coast. Barnegat Bay is separated from the Atlantic Ocean by the long Barnegat Peninsula (barrier island), the southern end of IBSP and the north end of Long Beach Island. Barnegat Bay connects with the ocean through Barnegat Inlet. The watershed is a valuable yet vulnerable resource for the state of New Jersey. It has a total area of 660 square miles. Nearly all 33 municipalities in Ocean County lie within the Barnegat Bay watershed, as well as four municipalities in Monmouth County. Nearly 600,000 people populate the area year-round, while the number doubles during summer months (NJDEP, 2017). The Oyster Creek channel is located in Barnegat Bay west of IBSP and connects Barnegat Inlet with the NJIWW (see Figure 1). The shallow marine environment contains numerous sand shoals and islands vegetated with salt marsh grasses and in some areas SAV.

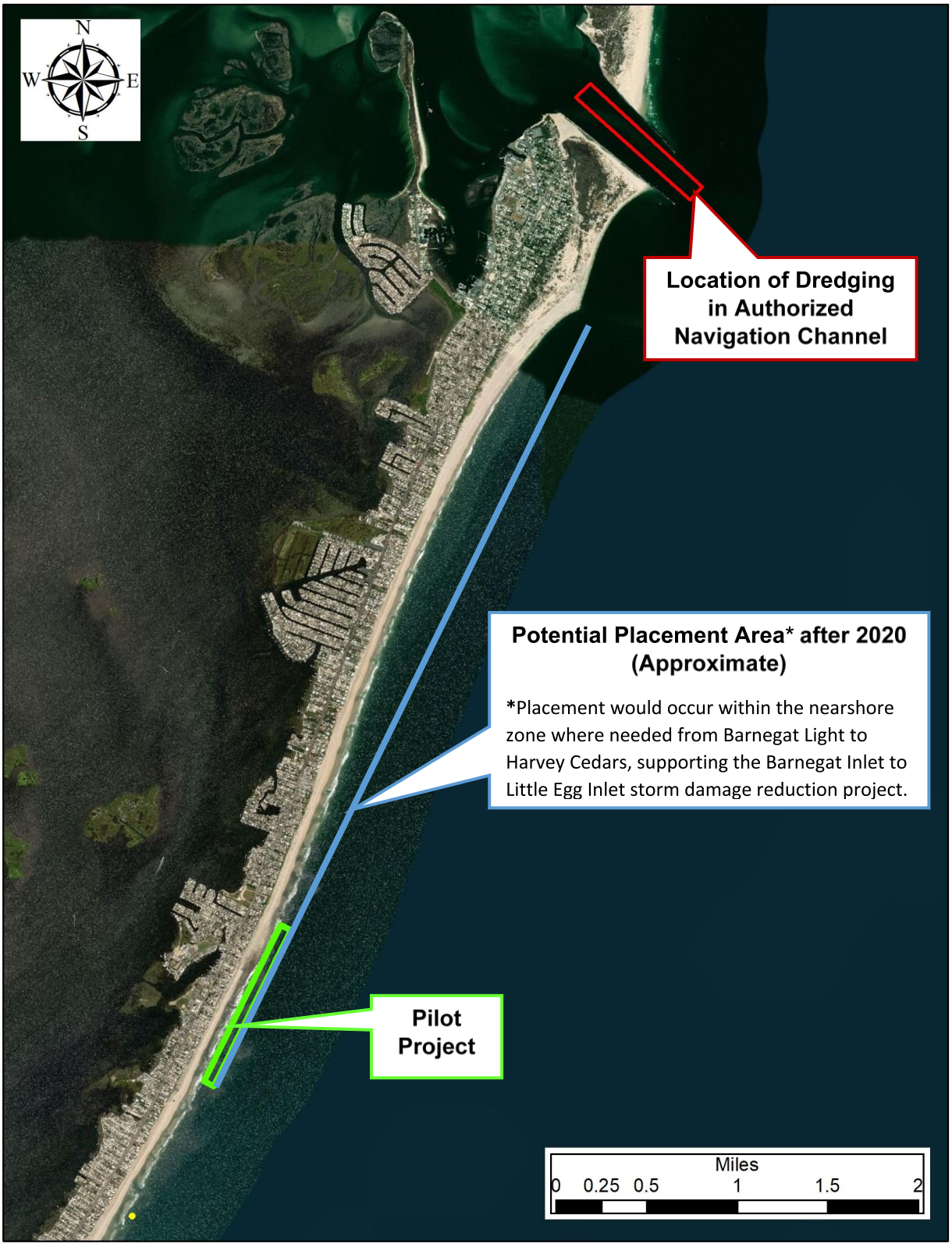

Figure 2: Barnegat Inlet Study Area, Phase 1 of the Section 1122 Pilot Program.

4.0 Alternatives

4.1 No Action – No Dredging

Under the No Action Alternative maintenance dredging within Oyster Creek channel would not occur. The No Action Alternative would allow the sedimentation of the channel within Barnegat Bay to progress and the channel would eventually become unnavigable. This alternative does not meet the project objective to maintain the authorized navigation channel for commercial and recreational watercraft, for Coast Guard missions, nor would this alternative fulfill the Section 1122 program objective to utilize the dredged material beneficially to create or restore natural habitat within Barnegat Bay.

4.2 Past and Current Practices

Oyster Creek channel is dredged as needed when shoals develop that impede navigation and when funding becomes available to maintain the channel. Over a period of 36 years from 1981 to 2017, records indicate that Oyster Creek channel has been dredged 16 times. The dredged material has historically been placed nearby in designated open water placement sites known as Site 26A and 26B (Figure 3). Over time, these placement actions resulted in the development of two islands. Site 26B was last used by USACE in 2017 for material dredged from the Oyster Creek Channel using a hydraulic pipeline dredge. The island is approximately 12 acres in size and has approximately 5 acres of wetlands. Thick beds of SAV have since established as a fringe around the island as placement of the dredged material created shallow depths suitable for the plants to thrive. Combined the island's uplands and SAV beds comprise approximately 60 acres.

Records show that placement of dredged material on Site 26A has not occurred since prior to 2008. Creation of the island resulted in a heron rookery naturally establishing on the island and no placements have occurred since. In the absence of these overboard placement sites in Barnegat Bay, material would need to be pumped 5 miles away to an upland disposal site on the mainland, removing sediment from the natural system.

Both islands are state-owned and had been historically used for dredged material placement by NJDEP as well. Site 26B has not been used for placement of material dredged by the state of New Jersey (from Double Creek Buoy Channel and High Bar Harbor entrance channel) since 1990.

4.3 Future Beneficial Use of Dredged Material

Beneficial use of dredged material can play a vital role in a variety of applications including marsh enhancement, beach nourishment, shoreline stabilization, and island creation/restoration. USACE, Philadelphia District has partnered with ERDC to move forward with the Engineering with Nature program in the Philadelphia District, becoming the third EWN Proving Ground in 2016. These EWN applications have gained recognition and favorability with natural resource regulatory agencies (https://www.fisheries.noaa.gov/feature-story/thinking-big-picture-engineering-nature), stakeholders and the general public with the continued need for dredging to maintain navigable depths in authorized channels If maintenance dredging is required, the historical alternative was to dispose of the dredged material, typically in an upland confined containment facility (CDF), thereby removing it from

the aquatic system where it no longer provides a sediment source benefit to the environment. Present and future RSM and EWN strategies are seeking to utilize dredged material as a resource by taking actions to keep sediment in the system. Natural forces dictate how the material is distributed. These programs foster coordination and partnering between USACE and other Federal agencies (*e.g*. NMFS, USFWS) and state agencies (NJDEP, NJDOT) to collaborate on dredging and placement needs. These projects are also encouraged and supported by local communities and non-governmental organizations (NGOs) such as The Nature Conservancy (TNC) and The Wetlands Institute (TWI).

Beneficial uses can increase shoreline habitat and community resilience while dramatically reducing the financial costs of dredged material placement and coastal restoration projects. The beneficial use objective requires dredging and restoration projects to be aligned in space and time. Maintenance dredging is conducted when there is a need to ensure navigational access and safety. The beneficial use of the dredged material needs to occur concurrently with the channel maintenance operation.

For the current project, USACE and NJDEP study team members created a Section 1122 Project evaluation team by hosting meetings and inviting representatives from several natural resource agencies, local organizations and stakeholders to share expertise on the various proposed locations that would benefit from an influx of clean dredged material in the vicinity of the Oyster Creek channel. USACE sought area expertise and innovative ideas on various locations for dredged material placement to benefit the natural environment. Table 1 lists the organizations that participated in the evaluation team meetings.

Table 1: Barnegat Bay Beneficial Use of Dredged Material Evaluation Team

US Army Corps of Engineers
NJDEP Division of Land Resource Protection
NJDEP Watershed & Land Management
NJDEP Division of Coastal Engineering
NJDEP Parks & Forestry
NJDEP Bureau of Shellfisheries
NJDEP Marine Fisheries Administration
NJDEP Fish & Wildlife Bureau of Land Management
NJDOT Maritime Resources
Barnegat Bay Partnership's (BBP) Scientific and Technical Advisory Committee including members from below:
Stockton University
Jacques Cousteau National Estuarine Research Reserve
NOAA National Marine Fisheries Service
US Fish and Wildlife Service
USFWS Edwin B. Forsythe National Wildlife Refuge
Long Beach Township

The following alternative locations were proposed by USACE and NJDEP for consideration and discussion by the evaluation team for dredged material placement (Figure 3):

Site 1 is located on the western side of the bay, a long shoreline area fronting both eroding wetlands and a lagoon community. New Jersey's Marine Fisheries Administration (MFA) noted that a portion of the area was mapped for SAV in 2003 and 2009 and recommends that the site's boundaries be delineated to avoid SAV areas if selected. The site was eliminated from further consideration under the Section 1122 pilot program due to its distance from the Oyster Creek channel.

Site 2 is located on the eastern side of the bay near the Island Beach State Park (IBSP) kayak launch. The area has long been identified as productive SAV habitat and mapped five times from 1979 to 2012. A "speed bump" approach to material placement would be preferred over creation of an emerging island to minimize impacts to SAV. The site was not recommended under the Section 1122 pilot program for construction in 2020 due to its considerable natural resources (*e.g*. SAV, shellfish) that required further evaluation and studies.

Site 3 is located approximately mid-bay and west of IBSP. The site and surrounding area have been mapped for SAV in 2003 and 2009). As with Site 2, this site was not recommended further by the evaluation team due to potential impacts to its SAV and shellfish resources. One proposed plan that may be viable for possible future applications: building a mound or berm to the north and west of the current site to provide a wave break and reduce depths that would be more conducive for natural SAV recruitment. Site 3 was not carried forward for further considering for the Section 1122 pilot program.

Site 4 is the Sedge Island Natural Resource Education Center east site. The evaluation team supports expanding the island or the elevation of parts of the house site, however ebb currents on the south side of the island are strong and further hydrodynamic data collection and potential numerical modeling are recommended. Part of the site has been mapped for SAV (2003) and a site investigation would be needed to delineate current boundaries of SAV to fine-tune potential placement locations. The site was not recommended for further evaluation since further investigation is needed to determine if placed sediments would be stable with the prescence of strong currents on the south side.

Site 5 is located on the other end of the creek by the Sedge Island Natural Resource Education Center. Part of the proposed site was mapped for SAV in 2003 and 2009. The evaluation group expressed less interest in this site for the Section 1122 beneficial use program due to the aforementioned reasons for Site 4. The site is confounded by user conflicts potentially interfering with ongoing DOT mitigation and research activities. The site was not recommended for further evaluation under the Section 1122 program.

Site 6 is located west of Site 26B in deeper water. There is strong support for island creation at this site as the depths are believed to be in excess of SAV to proliferate. Both Sites 26A and 26B islands were aquatic placement sites that resulted in the eventual creation of islands in the near vicinity and provide significant natural resource value. The creation of an island at Site 26A has resulted in the establishment of a heron rookery. Site 26B has afforded shallow water habitat where fringing SAV has developed naturally over approximately 50 acres. Based on experiences in the methodology utilized for development of Sites 26A and 26B, the successive placements of dredged material at Site 6 is expected to provide comparable habitat benefits.

Site 7 is south of 26A. The site appears to be a highly dynamic area of sand bars and the evaluation team did not express significant interest in using the site for a beneficial use

project. Part of the site was mapped for SAV in 2003 and 2009 and will necessitate a site investigation to ascertain the presence, if any, of any current SAV in the area. The material is not expected to remain stable in this location under storm conditions. As with Site 5, this site is also confounded by user conflicts, potentially interfering with ongoing DOT mitigation and research activities. Therefore, the site was not recommended for further review for the Section 1122 program.

Site 8 is south of 26B. The site was mapped for SAV in 2003 and 2009. The evaluation team expressed concern for the site for placement operations as it is nearly surrounded by SAV. There is also uncertainty regarding the direction and extent of sand movement which could potentially smother and degrade existing SAV beds. The site was not recommended further for the Section 1122 pilot program.

Site 9 is located south and east of the Edwin B. Forsythe National Wildlife Refuge (EBFNWR) property adjoining Long Beach Township. The site is very shallow and was identified as a shallow intertidal mudflat thought to be heavily used by migratory shorebirds. For this reason, the evaluation team did not recommend this site for the Section 1122 beneficial use program due to expected adverse impacts to shorebirds.

Site 10 is the EBFNWR site on the western side of the bay. The evaluation team felt that this aquatic site was a good location as a direct or nearshore placement area. The objective is to keep the high quality sediment in the natural system at this site, supporting shoreline protection in an area where erosion is a concern to the Refuge managers. Use of this location for placement may require pre-placement SAV and shellfish evaluations to be completed to fine-tune strategic placement to avoid adversely impacting these resources. The site will be carried forward for further, more in-depth review as a potential future placement site outside of the scope of the Section 1122 pilot program.

Site 11 is Lighthouse Camp. Like Site 10, it is also located on the western side of the bay just south of Site 10. The land is NJDEP-owned and currently leased to a non-governmental organization (NGO). The evaluation team felt that the site has potential for supporting shoreline protection by providing a supplemental sand source to promote improved shoreline resiliency and promote marsh restoration. The site also houses an SAV “grow-out” facility used to support SAV mitigation/restoration. As noted for Site 10, use of this site may require pre-placement SAV and shellfish evaluations to avoid impacting these resources. The marsh and shoreline have suffered extensive degradation, predominantly from historic mosquito-management, farming, chronic boat wake erosion, severe storms and sea level rise. The Lighthouse Center for Natural Resource Education is located nearby and marsh and shoreline degradation have made the Lighthouse Center’s facilities more vulnerable to coastal flooding. TNC has proposed a hybrid living shoreline project in this area to alleviate erosion. A sediment supplement using dredged material from the Oyster Creek channel and placed in the nearshore zone may complement future shoreline restoration efforts. The site will be carried forward for further, more in-depth review as a potential future placement site outside of the scope of the Section 1122 pilot program.

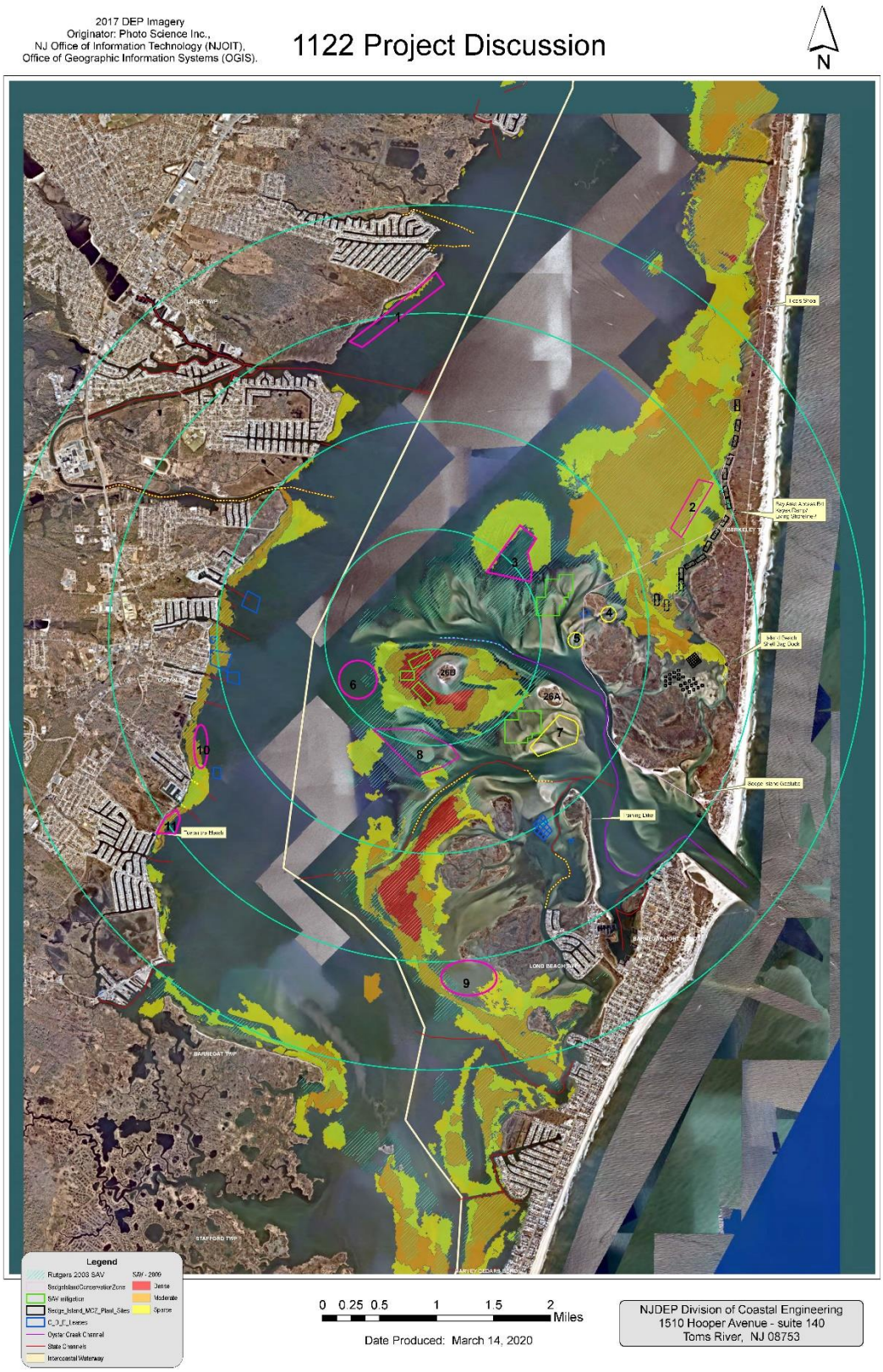

Figure 3: Barnegat Bay Alternative Beneficial Use Placement Sites.

Section 4.4. The Selected Plan

Oyster Creek is a component of and the upstream limit of the authorized Barnegat Inlet navigation channel that has been maintained by the Philadelphia District U.S. Army Corps of Engineers (USACE) since 1940. The channel at Oyster Creek is 200 feet wide by 8 feet deep (MLLW). The western portion of the channel shoals frequently and is typically dredged every 3 years based on when funding is appropriated. Under the Section 1122 Program, the Philadelphia District USACE, in collaboration with the project stakeholders and natural resource agencies identified in Section 4.3, selected Site #6 as the preferred placement location for maintenance material (Figure 4). The objective will be to conduct successive placements over years within this site, as maintenance dredging of the Oyster Creek channel is needed. Successive placements will eventually and intentionally develop an island with benefits similar to thehighly successful islands created at Sites 26A and 26B.

The Oyster Creek channel will be dredged to the authorized depth of 8 feet MLLW with one foot of overdepth, approximately 25,000 cy of material. A 12 to 14-foot long hydraulic pipeline (cutterhead) dredge, the Dredge Fullerton, owned and operated by Barnegat Bay Dredging Inc. will be utilized to conduct the initial placement and channel maintenance dredging (Figure 5). As an approximation, starting in water depths of 7 to 8 ft MLLW, this quantity of dredged sand will create a lift of about 1 to 2 feet resulting in a submerged mound within an area about 11 acres in size. Bathymetry of the placed site is expected to vary dependent upon conditions during placement. The operation will be monitored to inform and fine-tune future placements.

Material will be dredged and placed using a diffuser beginning in the center and at the bottom of Site 6. Material will be placed unconfined to allow the sand to naturally drop and create the first lift of a submerged island, similar to the method used for creation of Sites 26A and 26B. The first lift of the island will be monitored through RSMand 1122 program efforts and continuing under the Operations and Maintenance of the navigation project. Monitoring before, during and after placement will inform future placement operationsthat will meet the objectives of island creation. The target objectives are to increase suitable SAV habitat around the island and potential future nesting bird habitat for the emergent part of the island and document project development and management for future EWN applications. Since natural infrastructure changes over time, the target objectives and habitats may also need to be adaptively managed as the project progresses.

The two other sites proposed for future placements of maintenance dredged material from the Oyster Creek channel are Sites 10 and 11 (see Figure 4). Following the Section 1122 pilot program placement scheduled to occur in November/December 2020, future maintenance dredging operations may also consider placements at Sites 10 and 11 utilizing the government-owned small split-hull hopper dredge Currituck (Figure 6). The proposed placements at Sites 10 and 11 will be in a region approximately 1000 feet long and 500 feet wide and located in depths of approximately the 7-8 ft MLLW. The hopper dredge will approach bow-first and open the hopper to release the sand. The hopper will contain approximately 250 cubic yards each load and the loads can be placed over a grid pattern within the 1000 ft zone, allowing for small amounts of sediment to be placed with minimal impact. The maintenance dredging operation may occur annually, pending availability of funding and the government hopper dredge and take approximately 3 days to complete.

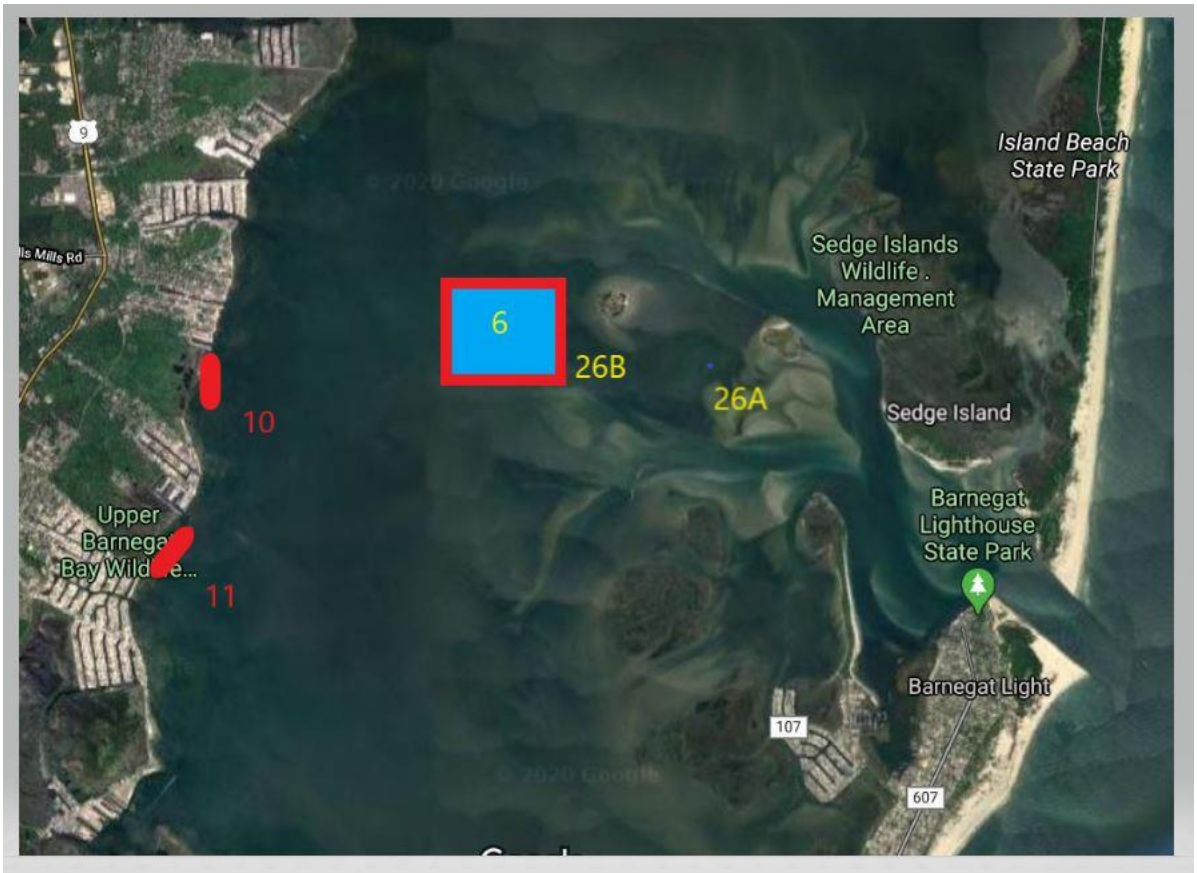

Figure 4: Proposed Section 1122 placement location (Site 6) and potential future maintenance dredging placement locations (Sites 10 and 11).

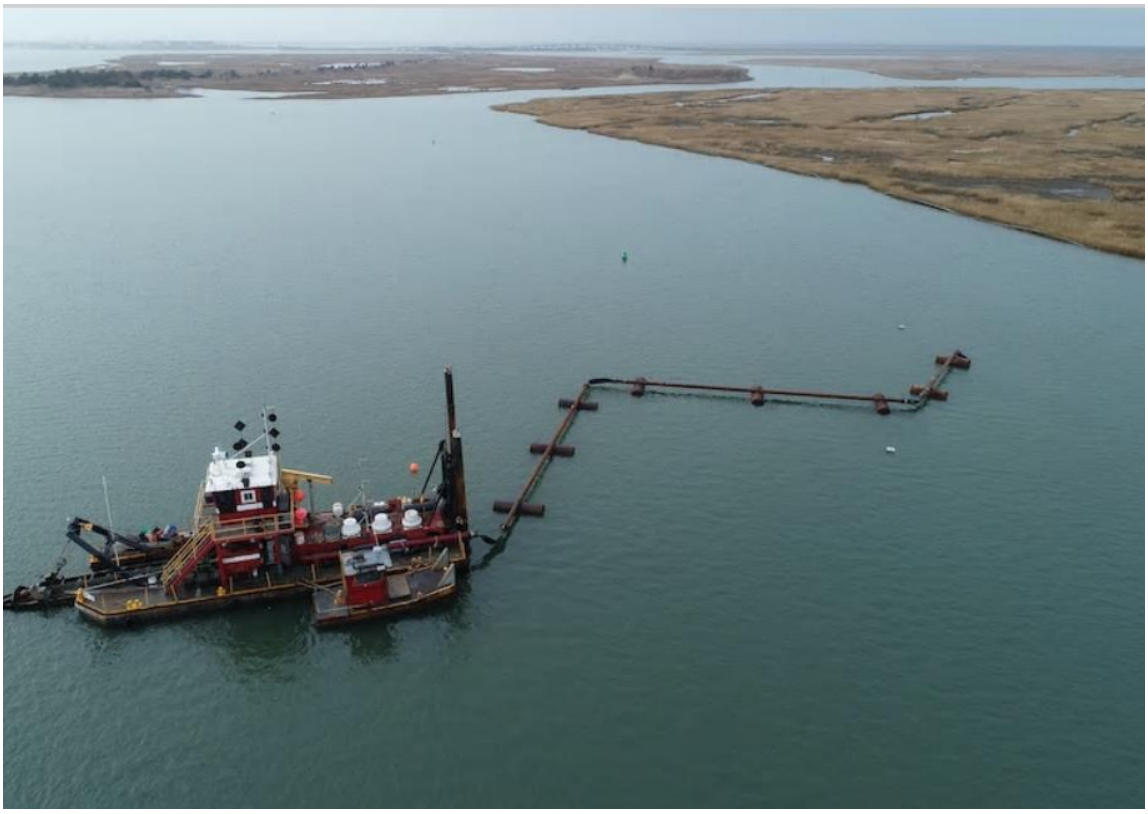

Figure 5: Cutterhead suction dredge Fullerton (Barnegat Bay Dredging Co., Inc.)

Figure 6: Government-owned small split-hull hopper Dredge Currituck.

5.0 Existing Environment

This section describes the existing and projected future conditions for each of the resources that occur in the project area and may be affected 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 channel dredging and continued navigation use until shoaling results in insufficient channel depths for continued navigational use) as well as Current Practice (*i.e*. periodic maintenance dredging and either placement at Site 26B or upland CDF disposal, with continued navigational use as at present), and finally, channel maintenance dredging with beneficial use of the dredged material.

5.1 Geology and Physiography

The study area is situated along the New Jersey coast, which is located within the New Jersey section of the Coastal Plain Physiographic Province of Eastern North America. In New Jersey, the Coastal Plain Province extends from the southern terminus of the Piedmont Physiographic Province southeastward for approximately 155 miles to the edge of the Continental Shelf. The Coastal Plain Province is part of the Atlantic Coastal Plain that extends along the entire eastern Atlantic Ocean coastline from Newfoundland to Florida. The Coastal Plain is the largest physiographic province in the state and covers approximately sixty percent of the surface area of New Jersey. More than half of the land area in the Coastal Plain is below an elevation of 50 feet above sea level (NGVD). The Atlantic Coastal Plain has been further differentiated into the Inner and Outer Coastal Plain regions. The Inner Coastal Plain consists of lowlands and rolling hills underlain by Cretaceous deposits and is border to the north by the Piedmont Province. The Outer Coastal Plain is a region of low altitude where low-relief terraces are bounded by subtle erosional scarps, and consists of the unconsolidated Tertiary deposits of sand, silt and gravels. The eastern boundary of the Coastal Plain includes many barrier bars, bays, estuaries, marshes and meadowlands along the Atlantic coast extending from Sandy Hook in the north to Cape May Point at the southern tip of New Jersey.

In the Coastal lowlands of the New Jersey shore, the sea meets the barrier islands and mainland. The barrier islands extend from Bay Head, down the coast for approximately 90 miles, to just north of Cape May Inlet and are generally continuous, except for the interruption by 10 inlets. These barrier islands occur in the study area and are susceptible to comparatively rapid changes. The geologic processes that supply Barnegat Bay with sediments are: (1) stream sedimentation, which contributes a small amount of upland material; (2) waves washing over the barrier islands during storms; (3) direct wind action blowing beach and dune sand into the lagoon; and (4) the work of tidal currents, which normally bring in more sediments.

5.2 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 Philadelphia-Wilmington Atlantic City, PA-NJ-MD-DE Area. The entire state of New Jersey is in non-attainment and the project site is located in an area 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 (*i.e.* 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 (CWA) of 1970. Six principal "criteria" pollutants are part of this monitoring program, which include ozone (O^3), carbon monoxide (CO), sulfur dioxide (SO^2), nitrogen dioxide (NO^2), 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.

5.3 Water Quality

Water quality is a primary determinant of habitat quality for fish and wildlife, and also affects recreational opportunities in regional water bodies and overall aesthetics of a water body. Parameters such as temperature, salinity, turbidity, dissolved oxygen (DO), nutrients,

pH, and heavy metals are important influences on the survival of aquatic life. Water quality is generally indicated by measuring levels of the following: nutrients (nitrogen/phosphorus), pathogens, floatable wastes, and toxins. Rainfall is an important parameter for assessing water quality; runoff leads to non-point source pollution and fresh water (rainfall, ground water seepage, runoff, and river discharge) can ultimately affect hydrodynamic circulation. The primary cause of non-point source pollution is 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).

Physical water quality parameters such as temperature, salinity and turbidity are influenced by natural processes, and can be used to establish baseline water quality conditions. Other parameters that are influenced directly by human activities can be used to indicate the extent of impairment of the aquatic ecosystem. DO, for example, is important to the survival of fish and other aquatic life and can be affected by human influenced nutrient loading. In addition, fecal coliform bacteria are an indicator of bacterial pollution often associated with sewage effluent that can affect habitat quality. Nitrates and other nutrients are indicators of the degree of eutrophication of the estuary, while heavy metals and other contaminants may directly affect habitat quality.

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

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

Water quality within the coastal waters of the New Jersey Atlantic Coast was comparable to that of similar coastal water bodies along the New York Bight and was indicative of similar coastal tidal river and estuary complexes along the Mid-Atlantic coast (USFWS, 1997). NJDEP (2017) summarizes that the coastal waters and estuaries of New Jersey were generally good for recreation and shellfish harvesting. However, there remain some areas where dissolved oxygen does not meet water quality criteria, which is a concern relative to aquatic life support particularly in Barnegat Bay.

5.4 Sediment Quality and Hazardous, Toxic, and Radioactive Waste

Previous testing and maintenance dredging efforts indicate that sediment in the inlet is predominantly coarse grained sand and a small amount of fines and 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). Oyster Creek channels are predominantly fine-grained sands and were tested for both grain size and chemical contamination with no exceedances. Due to a larger mean grain size and smaller fines content, the sand dredged from Oyster Creek channel is more stable and produces 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.

5.5 Biological Resources

5.5.1 Aquatic and Terrestrial Habitats

The Study Area within Barnegat Bay is comprised predominantly of shallow waters, deeper waters within the channel, but also possesses intertidal sandflats, saltmarshes and eroded peat and mudbanks, and upland areas along the shoreline and on islands (Figure 7). Barnegat Bay has a mean tidal range of 0.66 – 6.9 feet, with the widest range occurring at inlets with ocean/estuary exchange. It is relatively shallow (mean depth of 5.2 feet and relatively narrow (0.62 – 3.7 miles wide) (www.nj.gov/dep/barnegatbay/modeling.html).

Figure 7: Barnegat Bay habitats

Intertidal low marsh wetlands dominated by saltmarsh cordgrass (*Spartina alterniflora)* are present throughout much of the study area and are the dominant vegetation feature. Intertidal mudflats or sand flats often border saltmarsh habitats, pocket beaches along developed shorelines, or locations where either erosion or marsh dieback has removed vegetation or depositional shoals have formed in areas that were previously subtidal. These habitats are often rich in benthic food sources available to wading birds and shorebirds that forage at low tide. Mudflats and sandflats are common special aquatic sites in the Barnegat Bay, and are important areas for algal growth, as producers of fish and wildlife organisms, and as nursery areas for many species of fish, mollusks, and other organisms. High saltmarsh habitats are generally found near the mean high tide level and are generally dominated by saltmarsh hay (*Spartina patens*), seashore saltgrass (*Distichlis spicata*), and glasswort (*Salicornia spp.)*. High saltmarsh provides habitat for many of the same species found in the low tidal marsh areas.

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

More protected upland areas along back side of barrier islands and the mainland bordering high marsh habitats possess suitable conditions for scrub shrub thickets composed mainly of beach heather (*Hudsonia tomentosa*), bayberry (*Myrica pennsylvanica*), wax myrtle (*M. cerifera*), beach plum (*Prunus maritima*) and poison ivy (*Toxicodendron radicans*). Inland maritime forests of Barnegat Bay area occur support black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), red cedar (*Juniperus virginiana*), serviceberry (*Amelanchier canadensis*) and American holly (*Ilex opaca*). These habitats are important for millions of neo-tropical migratory songbirds.

5.5.2 Plankton

In the waters of Barnegat Bay, plankton are the primary producers in the marine ecosystem. Plankton (*i.e.* phytoplankton and zooplankton) are collectively a group of interacting minute organisms adrift in the water column. They both form the base of the food web and are assimiliated by higher organisms in the food chain. Phytoplankton production is dependent on light penetration, available nutrients, temperature and wind stress. A two-year baseline survey in Barnegat Bay and Little Egg Harbor reported that the most common phytoplankton species belonged to five major groups: diatoms (Bacillariophyceae), dinoflagellates (Dinophyceae), cryptophytes (Cryptophyceae), chlorophytes (Chlorophyceae), and chrysophytes (Chrysophyceae). Of these groups, diatoms made up approximately 50% of the total number of taxa, followed by dinoflagellates (Ren, 2015). Zooplankton typical have seasonal peaks that usually occur in the spring and fall (Howson, 2016). Common zooplankton species include *Acartia tonsa, Centropages humatus, C. furatus, Temora longicornis, Tortanus discaudatus, Eucalanus pileatus, Mysidopsis bigelowi* (mysid shrimp), and *Crangon septemspinosa* (sand shrimp).

Excessive phytoplankton blooms occur in Barnegat Bay and are attributed to eutrophication of the waters stemming from excessive nutrients and poor flushing in some areas. Excessive growth of some phytoplankton species can generate harmful algal blooms (HABs), characterized based on their pigments as brown, yellow, and red tides. HABs can cause numerous ecological and/or human health problems due to the toxins produced by certain species and/or their potential bioaccumulation in the food web or may cause hypoxia in the water column due to their decay and degradation (Gastrich, 2000). Toxic forms that are particularly dangerous to numerous organisms include macroalgae, shellfish, finfish, and humans. HAB species that have been recorded in the Barnegat Bay include *Aureococcus anophagefferens, Dinophysis* spp., *Gymnodinium* (*Karlodinium*) spp., *Heterosigma* sp., *Pseudo- nitzschia* sp. and *Prorocentrum* spp. (BBP, 2016).

Each summer, the New Jersey DEP Bureau of Marine Water Monitoring monitors for concentrations of chlorophyll '*a*' (an indicator to determine the amount of algal biomass

present) in New Jersey's coastal waters. A station network of over 45 sites in New Jersey's backbays are monitored for chlorophyll '*a*' multiple times throughout the year. In addition, these samples are closely evaluated to determine if the concentration of any toxic algal species is present and at an unsafe level (retrieved from https://www.nj.gov/dep/bmw/phytoplankton.htm#/. Several years of monitoring demonstrates that overall chlorophyll '*a*' concentrations are highest in the Barnegat Bay segment (generally from Barnegat Inlet in the south to the Metedeconk River in the north), but the blooms were generally localized (BBP, 2016).

5.5.3 Macroalgae and Submerged Aquatic Vegetation

Several species of macroalgae can be found within the study area. The productivity is primarily seasonal with the densest population occurring in June through August. Distribution and abundance of algae is closely related to seasonal temperature, salinity variations and nutrient levels coming from tributary streams. The predominant benthic algae is Rhodophyta (red algae) while Chlorophyta (green algae) comprise the largest number of intertidal algae species. Phaeophyta (brown algae) such as rockweed (*Fucus* spp.) may be found attached or floating free around rock jetties and pilings or washed onto the shore to make up part of the wrack line. Other common algae species include sea lettuce (*Ulva lactuca*), spaghetti grass (*Codium fragile*) and *Gracilaria* sp., a red algae that grows unattached among seagrass beds (Good *et al*., 1978). Eutrophication can influence the abundance of some macroalgae where excessive growth of sea lettuce, and the Rhodophytes: *Agardhiella subulata, Ceramium* spp., and *Gracilaria tikvahiae* can form extensive organic mats that can be detrimental to essential estuarine habitats such as seagrass beds (Kennish *et al*., 2010).

Submerged aquatic vegetation (SAV) and/or "seagrass" beds exist in localized areas of Barnegat Bay, and are an essential food for a number of waterfowl species, habitat for finfish, shellfish and a number of other invertebrates, and provide sediment stabilization. SAV are rooted vascular flowering plants that exist within the photic zone of shallow bays, ponds, and rivers. The Barnegat Bay – Little Egg Harbor Estuary have the most extensive beds and account for nearly 75% of the beds in New Jersey (Kennish *et al*., 2010). The most important species of SAV in New Jersey is eelgrass (*Zostera marina*), which is also the most common SAV that can form extensive beds important for fish, shellfish and other wildlife species. Other species of submerged vegetation found in the more brackish waters of the estuary that are also of ecological importance include widgeon grass (*Ruppia maritima*) and other more freshwater and slightly brackish species of pondweeds (*Zanichellia palustris* and *Potomogeton* spp.) and wild celery (*Vallisneria americana*).

SAV beds provide an important direct food source via the grazing chain, indirect food source via the detritus chain, a substrate for epiphytes, and cover and protective habitat. Bellrose (1976) lists various species of waterfowl, such as Atlantic brant (*Branta bernicla*) and black duck (*Anas rubripes*) that feed on eelgrass. Many fish species are associated with eelgrass beds, although most do not feed directly on the plants (Good *et al*., 1978). SAV provides important habitat for juvenile and adult blue crabs (*Callinectes sapidus*) and summer flounder (*Paralichthys* dentatus) and the leaves are used by bay scallops (*Argopecten irradians*) as a setting substrate. Hard clams (*Mercenaria mercenaria*) beds are assocated with SAV. Lathrop and Haag (2011) conducted aerial survey comparisons of eelgrass beds in Barnegat Bay and Little Egg Harbor in 2003 and 2009 and found that the general extent of the beds did not change significantly although they observed a 60% decline in bed extent. Some changes were noted in the difference in seasons sampled in Barnegat Bay and Little Egg Harbor. Fertig

et al. (2013) attribute declines in eelgrass populations and biomass in this area to increased Nitrogen loading within the watershed. Effects of high Nitrogen loading are accelerated algal growth, epiphytic infestation, light attenuation, and shading of the estuarine floor, which can heavily stress these plants.

5.5.4 Wildlife

The study area is a complex of shallow water, saltmarshes, channels, inlets, and barrier island upland habitats. They provide shelter, nesting habitat, and a rich food resource that support regionally significant wildlife populations, especially migratory and wintering waterfowl, nesting waterbirds, migratory shorebirds, raptors, reptiles and mammals. Wildlife species that utilize these habitats include federal and state listed threatened and endangered species. The following provides general information on the species within major wildlife groups that utilize the study area.

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 intertidal zone have evolved special locomotory, respiratory, and morphological adaptations that enable them to survive. Most are excellent and rapid burrowers and tolerant to environmental stress. Invertebrate species known to occur in Barnegat Bay include Cnidaria (hydra, corals, anemones, jellyfish), Platyhelminthes (flatworms), *Nemertinea* (ribbon worms), Nematoda (roundworms), Polychaetes (bristle worms), Oligochaetes, *Bryozoa*, Mollusca (chitons, bivalves, snails, squids, *etc*.), Crustaceans (crabs, shrimp, amphipods), insects (Dipterans), Echinodermata (sea urchins, sea cucumbers, sand dollars, starfish), and Urochordata (tunicates). More commonly known species include the mole crab (*Emerita talpolida*), haustorid amphipods (*Haustorius* spp.), and coquina clam (*Donax variablilis*), the epifaunal blue crab (*Callinectes sapidus*) and lady crab (*Ovalipes ocellatus*). These invertebrates are prey to various shore birds and nearshore fishes.

The horseshoe crab (*Limulus polyphemus*) is not commonly found in the backbay areas as compared to the Delaware Bay beaches during their spawning season but do occur in Barnegat Bay. Horseshoe crabs migrate from offshore waters to sandy beaches in the bays to lay their eggs near the water's edge. The eggs of the horseshoe crab provide a critical food source for migratory shorebirds during their annual spring migrations to their breeding grounds in the Arctic. Populations of horseshoe crabs have experienced recent and serious declines, which also correlate with declines in shorebird population prompting resource agencies to implement immediate conservation measures to protect this species.

Reptiles and Amphibians. The diamondback terrapin (*Malaclemys t. terrapin*) is the most commonly observed reptilian resident of Barnegat Bay. They feed actively during high tide when the marsh is flooded on a variety of fish, marine snails, invertebrates, mollusks, crabs and worms. Other species that may occur in the surrounding habitats include the bog turtle (*Clemmys muhlenbergii*), musk turtle (*Sternotherus odoratus*), snapping turtle (*Chelydra serpentine*), black rat snake (*Elaphe o. obsolete*), Eastern garter snake (*Thamnophis s. sirtalis*), and ground skink (*Scincella lateralis*).

Birds. Saltmarsh habitat and islands in Barnegat Bay provide habitat for a variety of wading birds including: cattle egret (*Bubulcus ibis*), great egret (*Casmerodius albus*), little blue heron

(*Egretta caerulea*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), yellow-crowned night-heron (*Nyctanassa violacea*), and black-crowned night-heron (*Nycticorax nycticorax*). Heron rookeries and gulleries have been sighted on marsh islands. Undeveloped marshes and beaches provide nesting grounds for a wide variety of migratory shorebirds including: glossy ibis (*Plegadis falcinellus*), green-backed heron (*Butorides striatus),* little blue heron, snowy egret, great egret, black-crowned night heron, yellow-crowned night heron, great black-backed gull (*Larus marinus*), herring gull (*Larus argentatus*), laughing gull (*Larus atricilla*), least tern (*Sterna antillarum*), black skimmer (*Rynchops niger*) and common tern (*Sterna hirundo*). Migratory shorebirds use coastal wetlands and adjoining areas during spring and fall migrations for foraging and staging. Common species include sanderling (*Calidris alba*), semi-palmated sandpipers (*Calidris pusilla*), ruddy turnstone *(Arenaria interpres)* and willet (*Tringa semipalmata*).

A variety of raptors use habitats along the New Jersey coastline for migrations and overwintering and may occur in the study area. The most numerous species encountered during these migrations are the sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), red-tailed hawk (*Buteo jamaicensis*), red- shouldered hawk (*Buteo lineatus*), broad-winged hawk (*Buteo platypterus*), American kestrel (*Falco sparverius*), and merlin (*Falco columbarius*). Owls, which undertake a similar migration, include the barn owl (*Tyto alba*), northern saw-whet owl (*Aegolills acadicus*), and long-eared owl (*Asio otus*).

The marshes and channels within the study area provide important resting and feeding areas for migratory waterfowl. Species known to occur include the tundra swan (*Cygnus columbianus*), mute swan (*Cygnus olor*), Canada goose, Atlantic brant, American black duck, gadwall, American wigeon (*Anas americana)*, northern pintail (*Anas acuta*), blue-winged teal (*A. discors*), green-winged teal (*A. crecca*), northern shoveler (*A. clypeata*), redhead (*A. Americans*), lesser scaup (*Aythya affinis*), common goldeneye (*Bucephala clangula*), mallard, bufflehead, greater scaup, canvasback, long-tailed duck (*Clangula hyemalis*), wood duck (*Aix sponsa*), ruddy duck (*Oxyura jamaicensis*), red- breasted merganser (*Mergus serrator*), hooded merganser (*Lophodytes cucullatus*), common merganser (*M. merganser*), and canvasback (*Aythra valisneria*).

The shorelines and island that possess woodland and scrub-shrub provide habitats for passerine songbirds that migrate south along the Atlantic coast in the spring and fall and for those that nest in the area. Species may include yellow-rumped warbler (*Dendroica coronate*), American redstart (*Setophaga ruticilla*), red-eyed vireo (*Vireo livaceus*), black and white warbler (*Mniotilta varia*), pine warbler (*Dendroica pinus*), and gray catbird (*Dumetella carolinensis*) (USFWS, 1997). Other birds that may inhabit the study area include the savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), brown thrasher (*Toxostoma rufum*), common grackle (*Quiscalus quisquala*), sharp-tailed sparrow (*Ammodramus caudacutus*), seaside sparrow (*A. maritimus*), eastern kingbird (*Tyrannus tyrannus*), tree swallow (*Tachycineta bicolor,* robin (*Turdus migratorius*) and Carolina wren (*Thryothorus ludovicianus*).

Mammals. Although the majority of the study area is aquatic, mammals known to occur within upland habitats in the study area and include raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), meadow vole (*Microtus pennsylvanicus*), eastern cottontail (*Sylvilagus floridanus*), Virginia opossum (*Didelphis virginiana*), red bat (*Lasiurus borealis*), little brown bat (*Myotis lucifugus*) and white-tailed deer (*Odocoileus virginianus*).

5.5.5 Fisheries

Shellfish. Extensive shellfish beds, which fluctuate in quality and productivity, are found in the shallow marine waters of Barnegat Bay. Atlantic surfclams, hard clams, blue mussels (*Mytilus edulis*) and blue crabs are common commercial and recreational shellfish within the coastal waters of the study area. Additionally, the soft clam (*Mya arenaria*), bay scallop (*Aequipecten irradians concentricus*) and Eastern oyster (*Crassostrea virginica*) are also found at certain locations within the study area. The blue crab and the hard clam are two of the most important invertebrates of recreational and commercial value along the New Jersey Coast, and are common in the back bays and inlets.

Fish. The presence of extensive estuarine wetlands, tidal creeks, mudflats, and SAV beds within Barnegat Bay provides extensive habitats for fish. Many species utilize the area for foraging and nursery grounds. The great diversity of fish fauna found in the study area includes both resident and transient species. Species habitat use is best understood in terms of life history, as many fish species occupy estuarine habitats only during certain life-stages. 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 (NOAA, 1994).

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

Estuarine-dependent species comprise the majority of the ecologically, recreationally, and commercially important fisheries. Other species include weakfish (*Cynoscion regalis*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), northern kingfish (*Menticirrhus saxatilis*), silver perch (*Bairdiella chrysoura*), bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatus*) and winter flounder (Beccasio *et al*., 1980).

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

habitat. This EFH assessment also examines the potential effects on prey species for the managed fish species potentially occurring within the area.

Federally managed fish species that may be found within the Barnegat Bay project area are listed in Table 2. Several of these species, including the highly migratory species, primarily inhabit marine offshore habitats throughout their lives and are not considered to be present in the study area but are included below due to the connection of the study area with the Atlantic Ocean via nearby Barnegat Inlet. The remaining fish species can be found within the inshore habitats of Barnegat Bay during at least part of their life cycle. Not all areas of the New Jersey Back Bays are EFH for the species in Table 2.

Table 2: Federally-managed fish species in Barnegat Bay.

Managed Species	Eggs	Larvae	Juveniles	Adults
Mid-Atlantic Species				
Atlantic butterfish *(Peprilus tricanthus)*	X		X	X
Atlantic mackerel (*Scomber scrombrus*)	X			
Atlantic surfclam *(Spisula solidissima)*			X	X
Black sea bass *(Centropristus striata)*			X	X
Bluefish *(Pomatomus saltatrix)*			X	X
Short finned squid *(Illex ilecebrosus)*	X	X		
Long finned inshore squid *(Loligo pealei)*	X		X	X
Scup *(Stenotomus chrysops)*			X	X
Spiny dogfish *(Squalus acanthias)*			X	X
Summer flounder *(Paralicthys dentatus)**HAPC***		X	X	X
New England Species				
Atlantic cod *(Gadus morhua)*	X	X		
Ocean pout *(Macrozoarces americanus*)	X			X
Pollock (*Pollachius virens*)		X		
White hake (Urophycis tenuis)	X			
Windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
Winter flounder (*Pleuronectes americanus*)** ****EFH for winter flounder does not occur south of Lat 39°22' N.**	X	X	X	X
Witch flounder (*Glyptocephalus cynoglossus*)	X			
Yellowtail flounder (*Limanda ferruginea*)	X	X	X	X
Silver hake/whiting (*Merluccius bilinearis*)	X	X	X	X
Red hake *(Urophycis chuss)*	X	X	X	X
Monkfish *(Lophius americanus)*	X	X		
Little skate (*Raja erinacea*)			X	X
Winter skate (*Raja ocellata*)			X	X
Clearnose skate (*Raja eglanteria*)			X	X
Atlantic sea herring *(*Clupea harengus*)*			X	X
Coastal Migratory Pelagic Species				
King mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
Cobia *(Rachycentron canadum)*	X	X	X	X
Highly Migratory Species				
Bluefin Tuna (*Thunnus thynnus*)			X	X
Skipjack Tuna (*Katsuwonus pelamis)*				X
Yellowfin Tuna (*Thunnus albacares*)			X	

Shark Species				
Managed Species	**Neonates**		**Juveniles**	**Adults**
Sand tiger shark *(Odontaspis taurus)*	X		X	X
Atlantic angel shark *(Squatina dumerili)*	X		X	X
Common thresher shark (*Alopias vulpinus)*	X		X	X
Dusky shark *(Charcharinus obscurus)*	X			
Sandbar shark *(Charcharinus plumbeus)*	X		X	X
Sandbar shark *(Charcharinus plumbeus)* ***HAPC***	**X**		**X**	**X**
Smoothhound shark (Mustelus mustelus)	X		X	X
Tiger shark *(Galeocerdo cuvieri)*			X	X
White shark *(Carcharodon carcharias)*	X		X	X

Habitat Areas of Particular Concern. As a subset of EFH, Habitat Areas of Particular Concern (HAPCs) are EFH habitats that are rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to anthropogenic (or human impact) degradation. HAPCs represent high priority areas for conservation, management, or research, are necessary for healthy ecosystems and sustainable fisheries, and are areas with greater focus, increased scrutiny, study, and planning. The NOAA Habitat Conservation and Habitat Protection EFH Mapper tool notes that Barnegat Bay is identified as HAPC for summer flounder due to the presence of SAV beds.

5.5.6 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.

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 occur on coastal beaches in Monmouth, Ocean, Atlantic, and Cape May Counties. Primary habitats include overwash flats on the accreting ends of islands, lower foredunes, and the upper strand on non-eroding beaches. No known plants occur in the project area of Barnegat Bay and are not expected to occur as the backbay shoreline does not provide suitable conditions for the species. It is an annual plant and its presence 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 plover 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. Piping plovers may forage in the study area. In 2019, the nearest piping plover nests were located 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.

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. The last nesting pair recorded in Barnegat Bay was in 1980. 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 ocean coasts and backbays, large numbers of migrating birds are known to use stopover habitats in Cumberland, Cape May, and Atlantic Counties.

On January 13, 2016, the U.S. Fish and Wildlife Service listed the northern long-eared bat (*Myotis septentrionalis*) as threatened under the Endangered Species Act (ESA). The species is associated with areas where trees or suitable hibernaculum and are not expected to occur in the aquatic study area.

The bald eagle (*Haliaeetus leucocephalus*) was listed as a federally as an 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 Barnegat Bay. 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.

The osprey (*Pandion haliaetus*) are fish-eating raptors found along shorelines and open marshes in coastal regions. Unlike other raptors that primarily nest in trees, forested habitat is not a limiting factor for the osprey. They have adapted to a changing landscape and now nest in any type of elevated, man-made structure near water. The osprey is protected under the Migratory Bird Treaty Act (MBTA). It is also a state listed endangered species in New Jersey. The number of nesting pairs continue to climb in New Jersey, particularly around the wetlands and waterways of Barnegat Bay and Great Egg Harbor. The recovery of both osprey and bald eagle numbers in New Jersey is largely the result of a decades-old ban on DDT, a once widely-used pesticide that caused egg failure.

Peregrine falcons (*Falco peregrinus)* 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 (www.state.nj.us/dep/fgw/tandespp.htm). In addition to those already discussed, examples of state-listed species that may occur in the Barnegat Bay vicinity include the black skimmer (*Rynchops niger*), the least tern (*Sternula antillarum*), black rail (*Laterallus jamaicensis*), and cattle egret (*Bubulcus ibis*). 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*).

Marine Species. There are five federally-listed threatened or endangered sea turtles that can occur along the New Jersey Atlantic Ocean coast and may enter Barneget Bay through inlets. 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. The species is not known to occur in Barnegat Bay.

The shortnose sturgeon (*Acipenser brevirostrum*) is also a federally- and state-listed endangered anadromous fish. The shortnose sturgeon generally lives in the freshwater reaches of rivers but make short trips into saltwater. 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) and are not expected to occur in the Barnegat Bay project area.

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. 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. Whales are not likely to venture into the shallow waters of Barnegat Bay and the project area.

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. Porpoises and dolphins are not common in the Barnegat Bay study area.

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. Seals are not expected to occur in the Barnegat Bay study area.

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 Oyster Creek, the diffuser Site 6, and the two nearshore areas Site 10 and Site 11 located adjacent to two open areas on either side of the town of Barnegat Beach.

Oyster Creek channel will be dredged to the authorized depth of 8 feet MLLW with one foot of overdepth, approximately 25,000 cy of material, and therefore will not be impacting any submerged historic properties.

Site 6 is located within Barnegat Bay just to the west of Site 26B in deeper water. Barnegat Bay was surveyed by FEMA contractors in 2012 and 2013 to identify potential submerged historic properties and providing a buffer of protection during subsequent sediment and debris removal efforts after Hurricane Sandy. No potentially sensitive anomalies were found within this area.

Site 10 to the northeast of Barnegat Beach is not within the archaeological sensitivity grid; however, the upland area exists an individually listed historic property known as the Falkinburg Farmstead. The listed Farmstead will not be impacted. The placement of sediments within this nearshore area would serve to encapsulate and protect any submerged archaeological sites.

Site 11 to the southwest of Barnegat Beach is located within the archaeological sensitivity grid; however, the placement of sediments within this nearshore are would serve to encapsulate and protect any submerged archaeological sites.

5.7 Land Use, Infrastructure, and Socioeconomics

The study area is the marine environment of Barnegat Bay west of Barnegat Inlet. To the north of the inlet is Island Beach State Park, a preserved barrier island including ten miles of sandy beach with dunes, dense maritime forests, and tidal marshes. The park is seasonally used primarily by visitors for swimming or surf fishing. The west side of Barnegat Bay is occupied by residential homes on canals interspersed with undeveloped tracts of both Federal and state-owned lands. To the south of Barnegat Inlet is the residential community of Barnegat Light and the Barnegat Lighthouse State Park on Long Beach Island. Long Beach Island is a recreation and tourism-oriented resort area.

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 provides socioeconomic characteristics of Barnegat Light Borough, Long Beach Township and Harvey Cedars Borough, residential communities near the study area (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).

Three bridges span Barnegat Bay from the mainland to the peninsula: the Mantoloking Bridge from Brick Township to Mantoloking, and the Thomas A. Mathis and J. Stanley Tunney Bridges from Toms River to Ortley Beach. The Edwin B. Forsythe National Wildlife Refuge comprises broad swaths of wetlands along the inner southern part of the bay.

Oyster Creek Channel connects Barnegat Inlet to the New Jersey Intracoastal Waterway (NJIWW). The NJIWW stretches 117.7 miles from Manasquan Inlet to the western entrance to the Cape May Canal on the Delaware Bay. The bay provides extensive areas for commercial, charter, and recreational fishing 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) to the gross domestic product in a region. Fourteen recreational species of interest were identified by the New Jersey Department of Environmental Protection (NJDEP) including: scup, black sea bass, summer flounder, weakfish, bluefish, striped bass, red hake, silver hake, Atlantic mackerel, Atlantic croaker, winter flounder, cunner, Atlantic cod, and tautog. 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). Fifteen commercial species of fish generated over $1 million of revenue each in 2014 (NOAA 2015). In total, commercial landings in New Jersey were valued at $151,930,102 in 2014. Some of the highest grossing species include sea scallop, Atlantic surf clam, blue crab, longfin squid, skates, menhaden, summer flounder, scup, and black sea bass. "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 Barnegat Bay, adjacent resort communities of Long Beach Island and recreational services provided by Island Beach State Park are a significant economic driver for tourism for the State of New Jersey. Recreational and commercial fishing boats utilize Barnegat Inlet for access to and from marinas, the back bays and the ocean. Surf fishing is popular from the jetty rocks at the inlet and at IBSP. Anglers in Barnegat Bay's waters 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, jet skiing, paddling (canoes, kayaks, stand-up paddle boards), windsurfing, and bird watching.

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 is aesthetically appealing due to its predominant coastal water environment surrounded by natural undeveloped green marshes and maritime forests and also developed resort residential areas consisting of homes, condominiums, and businesses.

6.0 Environmental Impacts

This section evaluates the No Action Alternative, the Current Operations and Maintenance Practice Alternative, and the proposed Beneficial Use of Dredge Material Alternatives in terms of their potential impacts to natural and socioeconomic resources in the study area. As presented in Section 4, the No Action Alternative would entail no longer maintaining the Oyster Creek channel for navigation through maintenance dredging. Under the Current Practice Alternative, the channel would continue to be periodically dredged, as needed, and the material either pumped to the previously used Site 26B or to an upland confined disposal facility (CDF) five miles away on the mainland. These options are not preferred due to concerns for existing SAV beds fringing Site 26B and the excessive cost to pump the material into the mainland CDF. The selected Beneficial Use Placement Alternative for the Section 1122 pilot program is the preferred plan (Site 6), strategically selected in order to avoid SAV beds to the east (Figure 4) and to keep valuable sediment in the natural system versus disposal in an upland site. The federal channel (Oyster Creek) would be dredged to the authorized depth (8 feet MLLW) with one foot of overdepth (approximately 25,000 cy) using a cutterhead dredge (see Figure 2:) in November/December 2020. The selected plan will pump the material using the Fullerton, owned and operated by the Barnegat Bay Dredging Co., Inc. and under contract to USACE. The material placement at the aquatic Site 6 will provide the first lift in the eventual development of an emergent island. This methodology at aquatic Sites 26A and 26B resulted in the eventual development of islands over many years. The beneficial use target objectives are to reduce water depths to create potential suitable SAV establishment as well as avian habitat and foraging areas. The plan includes monitoring to document pre- and post-placement project development and lessons learned for adaptive management as well as future EWN applications in coastal areas.

Future maintenance material placement sites are also proposed at Sites 10 and 11, utilizing the government-owned small split-hull hopper dredge Currituck. Annually, approximately 3,000 cubic yards (cy) of dredged sand would be placed (in 250-300 cy quantities/hopper) in shallow water as close to the shoreline as the Currituck's draft will allow (*i.e*. approximately 7-8 feet deep MLLW) such that the material will remain in and benefit the natural sediment system adjacent to the undeveloped shoreline.

6.1 Geology and Physiography

No Action. Under the No Action Alternative, no dredging would occur in Oyster Creek channel and no placement of dredged sand in Barnegat Bay. No impacts to geology and physiology of the study area would occur.

Current Practice. Oyster Creek channel maintenance dredging would continue to occur with either placement at either Site 26B or upland CDF disposal. No impacts to geology and physiology would result from this practice.

Beneficial Use Placement (Proposed Action). No impacts to geology or physiology are expected to result from dredging Oyster Creek channel and placing the dredged material in Barnegat Bay. Future placements that may occur at the nearshore Sites 10 or 11 are not expected to result in any impacts to geology but aims to provide a positive impact to physiography by providing a supplemental sand source in the nearshore zone for shoreline protection.

6.2 Air Quality

No Action. With no dredging and placement operations, there would be no impacts to air quality.

Current Practice. Currently, the Oyster Creek channel is dredged periodically to maintain safe navigational depths. 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 Placement (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). A beneficial use alternative would reduce the amount of emissions resulting from the Current Practice because the distance traveled by the dredge from the channel to the placement sites is slightly reduced. The quantities proposed for placement operations are small and the activity short-term and would result in negligible impacts on air quality. Emissions resulting from the placement of dredged material used to benefit the environment nullifies the anticipated *de minimus* levels of emissions of the placement action.

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 to the proposed beneficial use placement site is below *de minimis* levels for each annual dredging event.

6.3 Water Quality

No Action. Under the No Action Alternative, Oyster Creek channel maintenance dredging would no longer occur. The authorized channel would continue to shoal until depths rendered the channel unnavigable. 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, Oyster Creek channel is dredged with placement most recently (2017) occurring at Site 26B. This results in short-term negligible direct effects on water quality associated with a temporary and localized increase in turbidity at the dredging and placement areas. Barnegat Bay is subject to tidal and wind-generated waves that nearly negate any impacts from turbidity generated by dredging and placement operations. Material dredged from the channel is clean sand, therefore, no direct, indirect or cumulative adverse effects on water quality would occur due to release of contaminants.

Beneficial Use of Dredged Material (Proposed Action). The temporary increase in turbidity associated with this alternative at the channel dredging location and the placement location in Barnegat Bay would be similar to the current practice of channel dredging and ocean disposal. The increased turbidity would be short-term, temporary, and localized as large grained sand particles settle quickly. Barnegat Bay is subject to tidal currents and wind-generated waves, particularly during storm conditions, due to the predominantly shallow nature of the bay. Best Management Practices would be used to further minimize water quality impacts during project implementation. Material dredged from the channel has been analyzed (2020) is and is clean with no chemical contamination. The benefit of placing dredged channel sand in Barnegat Bay is to keep the material in the natural sediment system. The operation is not expected to adversely affect water quality.

6.4 Sediment Quality and Hazardous, Toxic, and Radioactive Waste

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

Current Practice. Currently, Oyster Creek channel is dredged periodically to maintain navigable depths. The material was tested in 2020 and is clean sand, free of contamination, and , similar to the natural system where placement will occur. There would be no change in sediment quality and no impact from HTRW.

Beneficial Use of Dredged Material (Proposed Action). Sediment quality is not expected to change. Placement of the dredged material nearby at Site 6 or in future years, potentially placed at the nearshore Sites 10 or 11 would serve to maintain the clean, high quality material

within the natural sediment system of Barnegat Bay. There would be no impact to sediment quality due to dredging and beneficial use placement operations and no impact from HTRW.

6.5 Biological Resources

6.5.1 Terrestrial Habitats

No Action. The terrestrial habitat in and surrounding Barnegat Bay provide important resting, feeding, and nesting habitat for many migratory and resident species of birds. Under the No Action Alternative, no impact would occur to nearby terrestrial habitats in the absence of dredging and placement activities. Also, no beneficial placement of dredge material would occur to create new terrestrial habitat nor provide a sand source for natural processes to potentially increase shoreline resilience of existing habitat.

Current Practice. Under the Current Practice Alternative, no terrestrial direct, indirect, or cumulative impacts occur. Material last dredged from the Oyster Creek channel was placed at Site 26B in 2017. The placement of an additional relatively small quantity of similar sand on the island is managed effectively and is not considered an adverse impact on existing habitat.

Beneficial Use of Dredged Material (Proposed Action). There would be no adverse impacts to existing terrestrial habitats from dredging the channel, placement at Site 6 (aquatic) or nearshore placement of the dredged material at Sites 10 or 11 (aquatic). Overall the project would result in beneficial effects associated with the creation of shallow water habitat by decreasing water depths and eventually establishing an island. A heron rookery has established on the nearby island Site 26A, created previously in a similar manner by pumping sand dredged from the channel into an aquatic site. Potential future placements at either Sites 10 or 11 would provide a supplemental sand source to be naturally distributed within the nearshore by waves and currents. Barrier island habitats will continue to 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.

6.5.2 Aquatic Habitats

No Action. Barnegat Bay provides valuable habitat to marine organisms including shellfish, SAV, macroinvertebrates and fish. It also provides important feeding habitat for migratory shorebirds, waterfowl and waterbirds. Under the No Action Alternative, no impact would occur to aquatic habitats as no dredging or placement activities would be conducted. Also, no beneficial placement of dredge material would occur to establish shallow depths conducive to SAV growth in association with island creation. Lastly, no supplemental sand source would be provided during future maintenance dredging operations adjacent to the undeveloped western shoreline to potentially increase shoreline resilience of existing habitat.

Current Practice. Oyster Creek channel is periodically dredged to maintain navigable depths with placements at either Site 26B or an upland CDF on the mainland at considerable expense due to the distance as demonstrated by a recent NJDOT project for Double Creek and High Bar Harbor channel dredging. Disturbance to the channel bottom would continue to occur periodically and impacts to aquatic habitat at Site 26B are minimal as the material is placed on the upland portion of the island which minimizes water turbidity as the large grain material settles quickly and fines beneficially contribute to the surrounding fringe areas. No

impacts to aquatic habitat result when material placement is in a CDF due to the required settlement process of total suspended solids in effluent water prior to release from the CDF.

Beneficial Use of Dredged Material (Proposed Action). As noted in Section 6.3, there would be a temporary elevation of water turbidity due to dredging the channel and placement at Site 6 or nearshore placement of the dredged material at Sites 10 or 11. The elevation of turbidity in the water column is expected to be short-lived as the material is clean fine sand that settles rapidly. Benthic organisms in the placement area are subject to burial. Benthic species typically recolonize dredged and deposition areas by recruitment from nearby undisturbed areas. The quantity of the proposed material is small and not expected to result in significant mortality of benthic organisms. Some species are capable of migrating through the newly placed sand. Overall the project would result in beneficial effects associated with the creation of new habitat by decreasing water depths suitable for the establishment of SAV. Islands provide refuge areas for fish and benthic invertebrates on the down-current side. Shallow sandy shoals formed in association with sand placement provide more foraging habitat for birds. The proposed action is designed to allow some operational flexibility to determine where nearshore placement is most needed and protect existing valuable aquatic habitat. Disturbance to the bay bottom would occur at both the channel and the placement area, however, the quantities proposed for dredging and placement are small and adverse impacts to benthic habitat are minimized through placement of material similar in grain size to existing substrate.

6.5.3 Plankton, Macroalgae, and Submerged Aquatic Vegetation

No Action. The No Action alternative would involve no effect on plankton, macroalgae, or SAV. Barnegat Bay conditions are subject to varying wind, waves, tidal currents dependent on weather conditions. With no action, no significant direct, indirect, and cumulative changes in the planktonic, algal or SAV communities would result. Barnegat Bay is subject to increased phytoplankton blooms (including Harmful Algal Blooms) associated with increases in nutrient loadings and estuarine eutrophication. BBP (2016) report that algal blooms, which include macroalgae and phytoplankton, are considered to be in a “degraded” state within northern Barnegat Bay.

Current Practice. Dredging of Oyster Creek channel and placement on the upland portion of Site 26B or the open ocean outside of Barnegat Inlet would result in a temporary elevation of turbidity that can affect plankton. Increased turbidity can temporarily inhibit photosynthesis and primary production provided by phytoplankton. However due to the dynamic environment in Barnegat Bay and large grain size of the dredged material, elevated turbidity is expected to dissipate quickly once the dredging and placement operations cease. Surveys will be completed at the proposed placement area prior to operations to develop a strategic placement plan to avoid impacting algal or SAV beds in the vicinity. No significant direct, indirect or cumulative impacts are expected to occur on SAV or macroalgae coverages. BBP (2016) reports that the current condition of seagrasses in Barnegat Bay are “degraded” with no discernable trends. Any significant interventions, such as changes in land use or improvements to water quality due to improvement programs may have a positive impact in reducing nutrient loads in the bay.

Beneficial Use of Dredged Material (Proposed Action). As noted previously, there would be a temporary elevation of water turbidity due to dredging the channel and placement at Site 6 or nearshore placement of the dredged material at Sites 10 or 11. The elevation of turbidity in the

water column is expected to be short-lived as the material is clean sand that settles rapidly. An increase in turbidity can temporarily inhibit photosynthesis and primary production provided by phytoplankton. The quantity proposed for dredging (25,000 cy) and the placement area are small (approximately 11 acres) and unlikely to pose a significant impact to benthic species populations. Surveys will be conducted prior to operations to develop a strategic placement plan to avoid valuable habitats such as nearby shellfish, algal or SAV beds. Overall, the project would result in beneficial effects in association with the creation of habitat for macroalgae and SAV by decreasing water depths suitable for their establishment. These sites were selected due to their water depths where macroalgal beds and SAV do not currently exist or are sparse. Environmental parameters, such as depth and water temperature dictate where SAV can establish. Aoki *et al*. (2020) found that water depth is a critical determinant of seagrass restoration success and found of seeds that germinated below 4.92 feet (MLW) their shoots did not persist. Koch (2001) noted the effect of physical parameters such as waves, currents, tides, and turbulence, and geological parameters (*e.g.* grain size and organic content) on SAV habitat suitability. The proposed action at Sites 10 and 11 is designed to allow some operational flexibility to determine where nearshore placement is most needed and to protect any neighboring existing valuable seagrasses and macroalgae beds. The additional benefit of the Section 1122 pilot program is to monitor the site in order to adaptively manage future placement operations.

6.5.4 Wildlife

No Action. With the No Action Alternative, no significant direct, indirect, and cumulative impacts are expected to affect wildlife in the area. The dredging and placement locations are all aquatic areas.

Current Practice. As with the No Action Alternative, the current practice of dredging Oyster Creek channel take place in the aquatic environment. Placement operations on Site 26B or at an upland CDF poses temporary impacts to wildlife terrestrial habitats.

Beneficial Use of Dredged Material (Proposed Action). Although dredging is not anticipated to result in any direct, indirect, or cumulative impact to wildlife, the placement of dredged material within the Barnegat Bay system may have the potential to provide some positive benefits to wildlife through the establishment of new island habitat at Site 6 or the addition of shoreline resiliency through the introduction of dredged sand in the nearshore zones of Sites 10 and 11. In these locations where marshes and transitional areas have room to migrate, providing a supplemental sand source contributes to the natural movement within transition zones of intertidal sand flats, flooded marshes and upland scrub shrub habitats.

6.5.5 Shellfish and Fish

No Action. Under the No Action alternative, no dredging or placement operations would take place and no physical direct impacts or water quality impacts to shellfish or fish species would result.

Current Practice. Impacts to shellfish and finfish species under current maintenance dredging practices are not considered significant. Shellfish are not likely to occur in the maintained channel and adult species of fish are capable of swimming out of the action area to avoid the dredge and temporarily elevated turbidity. Egg and larval fish stages are less mobile. There is significant acreage of fish habitat in Barnegat Bay surrounding the proposed dredging and

placement areas. The dredging and placement operations are typically 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 due to the small quantities proposed to be dredged and placed on the bay bottom. 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. Natural coastal processes such as 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.

No impacts to these species occur as a result of placement operations at either Site 26B or the upland CDF by reducing total suspended solid levels in the effluent water. Impacts to larval fish may result from elevated turbidity, however the operation is proposed to occur in November/December 2020, outside of the seasonal restriction period recommended by NMFS.

Beneficial Use of Dredged Material (Proposed Action). As noted, there would be a temporary elevation of water turbidity in the action area due to dredging the channel and placement at Site 6 or future nearshore placements of dredged material at Sites 10 or 11. The elevation of turbidity in the water column is expected to be short-lived as the material is clean sand that settles rapidly and not expected to adversely affect shellfish or fish. These species are adapted to the dynamic nature of marine environments. Shellfish are filter-feeders and trap particular matter and dissolved substances suspended in the water as a source of food. The material is large-grained and free of contamination. Bivalves are also adapted to shut down filter-feeding when water conditions become too turbid. In Barnegat Bay's shallow water depths, elevated turbidity is not expected to significantly reduce light penetration. Phytoplankton production for planktivorous mollusks depend on daylight for photosynthesis. DO levels can be reduced by elevated water turbidity but the effect is temporary and higher DO levels will return upon cessation of the operation. Finfish species can either be attracted to elevated turbidity levels or avoid turbidity by swimming out of the area. Dredging can result in the suspension of some benthic organisms in the water column, resulting in opportunistic feeding by 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. As with current practices, high turbidity can adversely affect larval fish, but the impact is avoided by conducting the operation outside of the NMFS recommended time periods. The proposed placement areas carried forward were selected specifically to avoid known shellfish areas. On the 2012 shellfisheries map, Site 6 is in a low to moderate area for hard clam (https://www.nj.gov/dep/landuse/download/map_058.jpg). The proposed action is designed to allow some operational flexibility to determine where best to place to avoid or minimize impacts to shellfish.

Essential Fish Habitat

No Action. Impacts on EFH (*i.e.* Barnegat Bay waters and subtidal benthic substrate) under the No Action alternative would be identical to those described for aquatic habitat in Section 6.5.2. There would be no negligible impacts to water quality or sand placement on the bay bottom substrate. There would be no impacts to any fish life stages. Discontinuing dredging would result in excessive shoaling in Oyster Creek channel, thereby reducing water depths and creating navigational hazards.

Current Practice. Short-term negligible effects would occur, associated with a temporary and localized increase in turbidity and disturbance of benthic habitat in the channel and placement area. Maintenance dredging 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 channelt and placement area. These are high energy areas and tidal currents and waves nearly negate any impacts from turbidity. Because this is an ongoing activity, these areas are disturbed periodically. Dredging typically does not take place during the period of the year when fish larvae and eggs are present, however, Barnegat Bay offers expansive aquatic habitat outside of the authorized channel and placement areas.

Beneficial Use of Sediments (Proposed Action). Impacts on EFH is essentially identical to those described for aquatic habitats (Section 6.5.2). Benthic habitat in channel and placement area is predominantly sand, with the channel bottom disturbed periodically when maintenance dredging is needed. Impacts to benthos due to burial of the benthic community during placement activities would be localized and minimized by implementing a strategic placement plan to avoid areas identified as having greater benthic assemblages. Some benthic infaunal species may be buried but the amount of dredged material to be placed is small and most benthic species 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 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). Cumulative effects associated with the project on EFH are not anticipated. The project would have temporary through the creation of a sand feature but would not significantly alter the habitat type. It is concluded that the project would have a minimal direct effect on EFH and not result in cumulative impacts to EFH. The NOAA Fisheries Greater Atlantic Regional Fisheries Office Essential Fish Habitat (EFH) Assessment & Fish and Wildlife Coordination Act (FWCA) Worksheet is provided in Appendix A.

6.5.6 Threatened and Endangered Species

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

- Atlantic sturgeon,
- piping plover
- red knot
- roseate tern
- seabeach amaranth
- Kemp’s ridley turtle
- leatherback turtle
- hawksbill turtle
- green turtle
- loggerhead turtle
- North Atlantic right

- fin whale

Because both dredging and placement locations have water depths unsuitable for impacts to piping plover, red knot, and roseate tern. The dredging and placement locations have water depths unsuitable for foraging. The eastern black rail, proposed for listing, occurs primarily in shallower areas within the surrounding saltmarshes and is not likely to occur in the more open water areas of the dredging and placement areas. Hopper dredges working in the backbay and inlet do not appear to disturb birds on the adjacent saltmarshes and shorelines. The vessels are a significant distance away, slow-moving with low engine vibration that is difficult to detect with the surrounding ambient sounds of wind and waves. Birds prominent in the area seek out prey species in shallower waters. Likewise, dredging and placement activities are not expected to pose an 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 Oyster Creek channel to place high quality sand material in water to create improved foraging habitat for birds by decreasing water depths and eventually creating an emergent island for resting and possibly nesting.

Seabeach amaranth was federally-listed as a threatened plant throughout its range in 1993 and listed as endangered by the state of New Jersey. The plant is not expected to occur in the backbay region of the proposed project area. The plants establish primarily on accreting areas (non-eroding beaches) and lower foredunes. They are found between 15 March and 30 September. The project is not scheduled to take place until November/December 2020. The NJDEP Endangered Nongame Species Program surveys the New Jersey coastline annually for beach nesting birds as well as seabeach amaranth and directly coordinates their findings with USACE.

No Action. Under the No Action alternative, Oyster Creek channel would not be dredged and no sand placement would occur in Barnegat Bay. There would be no direct or indirect impacts on threatened and endangered terrestrial or marine species.

Current Practice. Current dredging practices do not pose adverse effects on threatened and endangered species. Dredged sand has not been placed on Site 26A since prior to 2008 after establishment of a heron rookery on the created island. As noted previously, dredges working in Barnegat Bay and Inlet with nearshore aquatic placements do not appear to disturb beach nesting or foraging bird species, emit minimal noise, and are slow-moving. Dredges are equipped with turtle exclusion devices to prevent impingement of sea turtles or sturgeon. 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.

Sea turtles are less likely to occur in the study area during fall and winter months. Additionally, sea turtle mobility would help them avoid the dredge as it motors slowly from dredging to placement site. Current maintenance dredging practices may affect but are not likely to adversely affect threatened and endangered sea turtles in the study area. The operation is of a short duration for a small quantity of material to be dredged.

Atlantic sturgeon occur in the marine environment but are not likely to occur in the study area. They 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. 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. 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 Barnegat Bay. 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.

Beneficial Use of Sediments (Proposed Action). The impacts of dredging and proposed placement operations would be similar to that described previously for impacts to aquatic habitats (Section 6.5.2). Anticipated impacts to prey species for beach nesting and foraging shorebirds due to a nearshore placement are minimal as the dredging and placement areas in-water and sand is distributed naturally by currrents. . Listed marine species are unlikely to occur in the project vicinity with the exception of sea turtles. The species are highly mobile and able to avoid the action area. Operations are of a short duration and 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. Dredging Oyster Creek channel and beneficial use placement operations are not anticipated to result in significant direct, indirect, or cumulative adverse impacts to federally- or state-listed threatened or 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. The No Action alternative would not impact historic properties eligible for or listed on the National Register of Historic Places (NRHP).

Current Practice. Current maintenance dredging of Oyster Creek channel occurs periodically every few years to maintain depths sufficient for navigation. Placement of dredged material either on the upland portion of Site 26B or in an upland CDF does not impact historic properties eligible for or listed on the NRHP.

Beneficial Use of Sediments (Proposed Action). Since Oyster Creek Navigation Channel will only be dredged to its authorized depth, and placement of dredged material may occur the two nearshore locations of Site 10 and 11 and the mid-bay Site 6, the USACE has determined that the proposed action will have *No Effect* on historic properties eligible for or listed on the National Register of Historic Places pursuant to 36CFR800.4(d)(1). 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. Under the No Action alternative, the Oyster Creek 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. Oyster Creek channel connects the Barnegat Inlet navigation channel with the NJIWW.

Current Practice. Current maintenance dredging practices would not adversely affect socioeconomic resources, land use, infrastructure, or utilities. Dredging Oyster Creek channel is necessary to provide a safe, reliable navigation channel to connect Barnegat Inlet to the NJIWW. The NJIWW extends from Manasquan Inlet to the Delaware Bay, passing through a series of bays, lagoons, and thoroughfares along the New Jersey coast to Cape May Harbor. It provides a safe, reliable and operations navigation channel for the East Coast's largest and 5th most valuable commercial fishing fleet in the U.S. The Barnegat Inlet Federal Navigation channel complex is critical to a large fishing fleet consisting of full-time commercial, charter, and recreational vessels. The US Coast Guard requires a safe channel to fulfill their Homeland Security mission and critical life safety, search and rescue operations.

Beneficial Use of Sediments (Proposed Action). This alternative provides the same infrastructure and socioeconomic benefits as current practice but would provide an additional land use benefit by utilizing the dredged sand beneficially by keeping the material in the backbay system and potentially providing improved shallow water habitat and future island habitat. It is important to both the region and state to maintain the safety of the channel and connecting Barnegat Inlet to the NJIWW for vessel access for tourism (recreational boating and fishing) and commercial fisheries. Growth in employment, business, and industrial activity in the study area is expected to follow economic trends in national economies. 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. Under the No Action Alternative, the Oyster Creek navigation channel would continue to shoal, which would result in a negative effect on navigation, recreational boating, and safety. This alternative would eliminate the safe connection of the NJIWW to Barnegat

Inlet and the Atlantic Ocean. The No Action Alternative would not meet the objective of the project to beneficially use maintenance dredge material for habitat creation.

Current Practice. Under the current maintenance dredging practices, Oyster Creek channel would continue to be dredged as needed to maintain safe depths for recreational boaters, however the dredged sand would either be placed on Site 26B or pumped into an upland CDF five miles away. The current practice would not meet the objective of the project to beneficially use maintenance dredged material for development of a new habitat or would be costly to pump to a CDF, thereby reducing the likelihood of maintenance dredging cycles due to cost.

Beneficial Use of Sediments (Proposed Action). Both dredging and aquatic placement would result in indirect beneficial effects on recreational resources and natural habitat in Barnegat Bay. Dredging is necessary for maintaining the safety of the navigation channel which would benefit recreational and commercial boating. The creation of shallow habitat and eventual island creation at the placement sites is beneficial to the natural environment that draws vacationers each year for boating, fishing, and bird watching. The proposed action is designed to allow some operational flexibility to determine where best to placement the material to minimize impacts to valuable habitat. Adverse effects on recreational resources are expected to be negligible while positive effects are likely to occur through development of new shallow water and future island habitats.

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. Under the No Action alternative, there would be no effects on visual and aesthetics of the project area.

Current Practice. Dredging Oyster Creek channel and aquatic placement within Barnegat Bay do not impact the visual aesthetics of the backbay area. Some may consider observing the dredge under operation as an adverse effect on visual aesthetics while others my appreciate observing the working dredge.

Beneficial Use of Sediments (Proposed Action). The propose dredging and aquatic beneficial use placement does not require any onshore construction activities or construction equipment. The dredge may be observable by nearby vessels but the majority of boats utilizing Barnegat Bay will not be present in November. As with the current practice, no adverse visual or aesthetic impacts would be expected. The proposed action is designed to allow some operational flexibility to determine the strategic placement location to reduce impacts to valuable habitat such as SAV beds.

6.10 Unavoidable Adverse Environmental Impacts

No Action. Under the No Action alternative, the unavoidable impact would be continued shoaling of Oyster Creek channel until it was no longer navigable, leading to economic impacts resulting from a decrease in commercial and recreational boat usage.

Current Practice. Under the current practice, there would be no operational flexibility to place dredged material within the bay where it would best serve to enhance or create additional valued habitat in Barnegat Bay. An unavoidable adverse impact would be temporary and insignificant impacts to water quality with short-term elevation of water turbidity and a direct but temporary impact on resident benthic organisms in the action area. Continued use of an upland CDF for placement of the dredged material adversely impacts the area by removing the high quality sand material from the bay system. Maintenance dredging results of Oyster Creek channel results in temporary impacts to air quality and emissions are considered *de minimus* based on New Jersey air quality standards.

Beneficial Use of Sediments (Proposed Action). The unavoidable adverse impact of the proposed beneficial placement of dredged sand is the same as what results from the current practice: a temporary elevation of water turbidity; a potential for the reduction of benthic organisms in the channel due to dredging and in the placement area due to the potential for burial; and *de minimus* impacts on air quality. Benthic communities are known to recover in time, such that displacement of benthic invertebrates is temporary. A strategic placement methodology would avoid impacting areas where existing SAV beds occur. Use of the dredged sand beneficially will result in long-term beneficial effects on aquatic natural resources, recreational resources, and visual resources.

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

No Action. No short-term uses of the environment or long-term productivity would result.

Current Practice. Barnegat Inlet requires maintenance dredging to ensure navigational safety for recreational and commercial vessels that travel between the inlet and the NJIWW. The current practice of pumping the channel material to an upland CDF removes a valuable resource from the bay system. Alternatively, placing the material at Site 26B keeps the material in Barnegat Bay and augments the size of the island to add to its long-term productivity.

Beneficial Use of Sediments (Proposed Action). The proposed action will ensure that a valuable resource of high quality channel sand will remain in the Barnegat Bay system. Placements at Site 6 will potentially increase habitat suitable for SAV growth and future placements at either Site 10 or Site 11 will provide a supplemental sand source adjacent to important undeveloped but eroding shoreline. These future placements may afford additional shoreline protection to the EBFNWR or to the Lighthouse Center for Natural Resource Education. The monitoring program will provide valuable information for potential future beneficial use, RSM and EWN based applications in the project area but also in other parts of coastal NJ. Monitoring will assess the pre- and post-application sedimentation patterns and the results of the monitoring studies will contribute to the understanding of RSM for this region. Adverse impacts to the placement area are short-term and minimal as currents will distribute the material naturally and benthic fauna will re-establish.

6.12 Irreversible and Irretrievable Commitments of Resources

No Action. No commitment of resources.

Current Practice. The dredging of Oyster Creek channel and current placement operations utilize 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.

Beneficial Use of Sediments (Proposed Action). As with current practice, dredging Oyster Creek Channel and beneficial use placement in Barnegat Bay 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.

6.13 Climate Change

USACE considers three sea level rise scenarios when describing a project's study area (Figure 8). These include a low rate based on the historic rate of rise and intermediate, and high rates of rise. See the USACE Sea Level Change Curve Calculator, available at: http://www.corpsclimate.us/ccaceslcurves.cfm. This calculator uses the methodology described in Engineer Regulation (ER) 1100-2-8162, *Incorporating Sea Level Changes in Civil Works Programs* (USACE 2013). The low (historic) sea level change scenario produces a 0.46-foot rise during the 50-year period of analysis and the intermediate and high rates of rise produce a 0.94 and 2.43 rate over the same period. Over a 100-year period, the projected increase is 0.84, 2.23, and 6.62 for the low, intermediate, and high rates of rise respectively. New Jersey coastal areas, including Barnegat Bay, are experiencing some of the highest rates of sea-level rise in the continental United States.

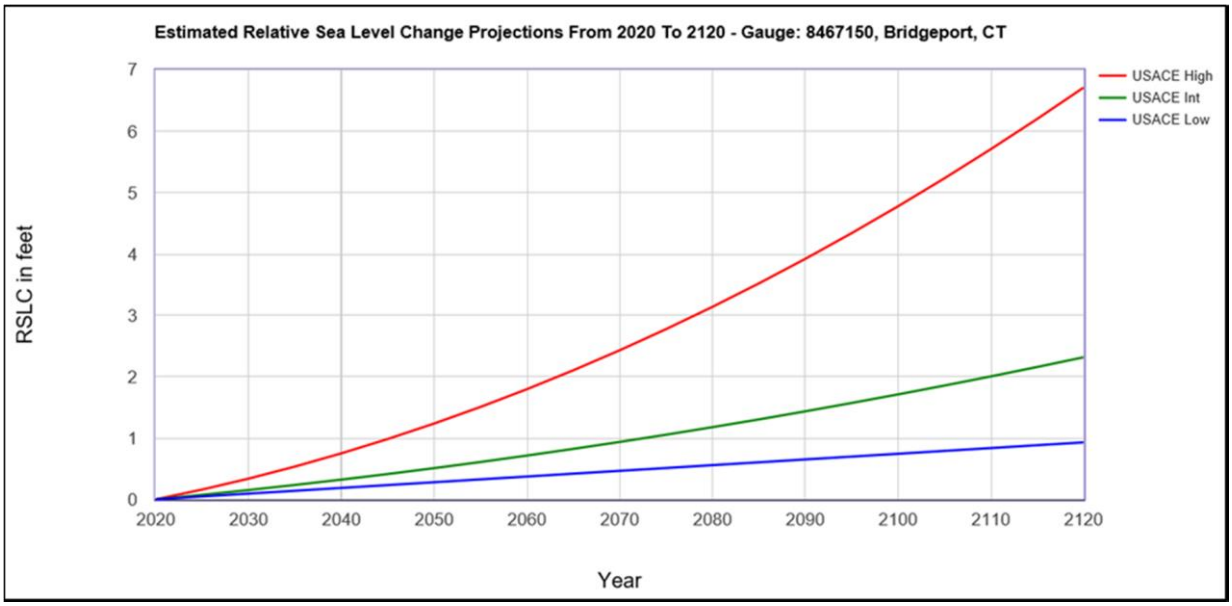

Figure 8: Relative sea level rise projections.

No Action. The backbay region of New Jersey is a dynamic environment that is densely populated. Hurricane Sandy emphasized the vulnerability of the area to coastal storms that are expected to become more frequent and devastating in the future with climate change and rising sea levels. In the absence of channel dredging and placement operations, no dredged material placement will occur in areas where it could potentially provide additional resilience and these areas would continue to be exposed to the cumulative damages of inundation. The study area that is currently at risk will likely see an increase in future damages with the expected sea level rise in the future without project condition. Valuable foraging and nesting habitats will be impacted as sea level rises.

Current Practice. Barnegat Inlet requires maintenance dredging to ensure navigational safety. The current practice of pumping the channel material to an upland CDF removes a valuable resource from the bay system where it is most needed to combat sea level rise and land subsidence. Alternatively, placing the material at Site 26B keeps the material in Barnegat Bay and augments the island's elevation to add longer-term resilience and habitats in the face of rising sea levels.

Beneficial Use of Sediments (Proposed Action). The target objective of the Section 1122 pilot program and subsequent maintenance dredging operations is to use Oyster Creek channel dredged material in a manner that benefits the Barnegat Bay ecosystem. Accelerating losses of seagrass beds is of primary concern in Barnegat Bay and has prompted restoration efforts of these highly productive habitats. Sea level rise has contributed to the loss of SAV, saltmarsh, and island habitats. The proposed plan will place dredged material in an area where current conditions are not suitable for the establishment of SAV with an objective to eventually develop an emergent island over many years. The monitoring plan will provide valuable information to direct future placements in an effort to reduce seagrass losses.

6.14 Cumulative Effects

The National Environmental Policy Act (NEPA) defines cumulative effects as: "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or Non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

No Action. No cumulative impacts resulting from dredging or placement would occur in the absence of these operations.

Current Practice. The last dredged material placement to Site 26B (2017) occurred on the east side upland portion of the island in order to minimize runoff impacts to the fringing SAV beds. The deposition of dredged material on Site 26B would likely not provide additional suitable habitat for SAV to establish. No adverse cumulative effects would occur to benthic invertebrate resources or fish as benthic organisms are known to recolonize disturbed bottom and fish are mobile and can leave the area temporarily while turbidity is elevated.

Beneficial Use of Sediments (Proposed Action). Past actions that have occurred in Barnegat Bay not associated with navigation channel dredging include bulkheading, piling driving, the filling of saltmarshes, and the destruction of maritime forest for development. These actions have degraded the habitat quality of Barnegat Bay. Development in turn attracts more recreational users to the bay. Boaters impact bay habitats with water pollution and

disturbance to saltmarshes and SAV beds with boat wakes. Future activities in Barnegat Bay are anticipated to remain similar to those present actions.

Cumulative impacts associated with the propose action (*i.e*. recurring beneficial use of dredged material) are positive effects. Use of the dredged material to reduce depths and other environmental conditions that are conducive to SAV growth at Site 6 and to provide a supplemental sand source in the nearshore zone of Sites 10 and 11 will benefit the Barnegat Bay ecosystem and help in combatting adverse effects due to sea level rise.

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 nearest residential areas 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 surrounding area of the Barnegat Bay study area do not meet the criteria for a population with predominant 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 the Selected Plan to Environmental Requirements, Protection Statutes, and other Requirements

Compliance with environmental quality protection statutes and other environmental review requirements is ongoing. Table 4 provides a listing of compliance with 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.

Table 4. 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

STATUTES	COMPLIANCE STATUS
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 Phase 2, Oyster Creek Channel 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 in Barnegat Bay in Ocean County, New Jersey. See Figure 2:.

B. General Description. A project description and objectives are provided in Sections 3.0 and 4.0 of this EA. Approximately 10 acres of shoaling within Oyster Creek channel will be dredged (25,000 cy) and placed initially at Site 6 in 2020 and in subsequent maintenance dredging years, approximately 3,000 cy of dredged material may be placed at Sites 10 or 11.

C. Purpose. The purpose of the project is to remove critical shoaling from Oyster Creek channel that pose hazards to navigation and public safety and beneficially utilize the dredged material by keeping the high quality sand material in the system and expanding habitat suitable for SAV establishment and future island habitat for foraging and nesting birds.

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 25,000 cy in 2020 and approximately 3,000 cy/year during future maintenance dredging operations.

3. Source of Material: All material would be obtained from the existing authorized Oyster Creek channel which is part of the Barnegat Inlet navigation project.

E. Description of Discharge Sites.

1. Location: See Section 4.4 (Selected Plan) and Figure 4 in the EA for the project location.

2. Size (acres): The initial proposed placement location (Site 6) is approximately 11 acres. The future proposed placement locations at Sites 10 and 11 are approximately 11 acres.

3. Type of Sites: The project entails placement of material in waters of Barnegat Bay (7-8 feet MLLW).

4. Type of Habitat: nearshore subtidal sand.

5. Timing and Duration of Discharge: initial construction: approximately 1 month. Future placements: approximately 3 days. Initial construction is anticipated during November/December 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 naturally settle at the placement sites under existing natural hydrodynamic conditions.

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 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: strategic placement of small quantities of dredged material to minimize impacts to nearby bottom habitats.

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 due to the predominantly large grained sand content of the material.

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 a temporary decrease in 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: Potential positive benefit to shoreline with supplemental sand source in system.
(b) Wetlands: Potential positive benefit to shoreline with supplemental sand source in system.
(c) Tidal flats: Potential positive benefit to shoreline with supplemental sand source in system.
(d) Vegetated Shallows: Potential positive benefit to shoreline with supplemental sand source in system.

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 offseason.

c. Water Related Recreation: Temporary, minor effect during construction offseason.

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. <u>FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE</u>

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 enhancing 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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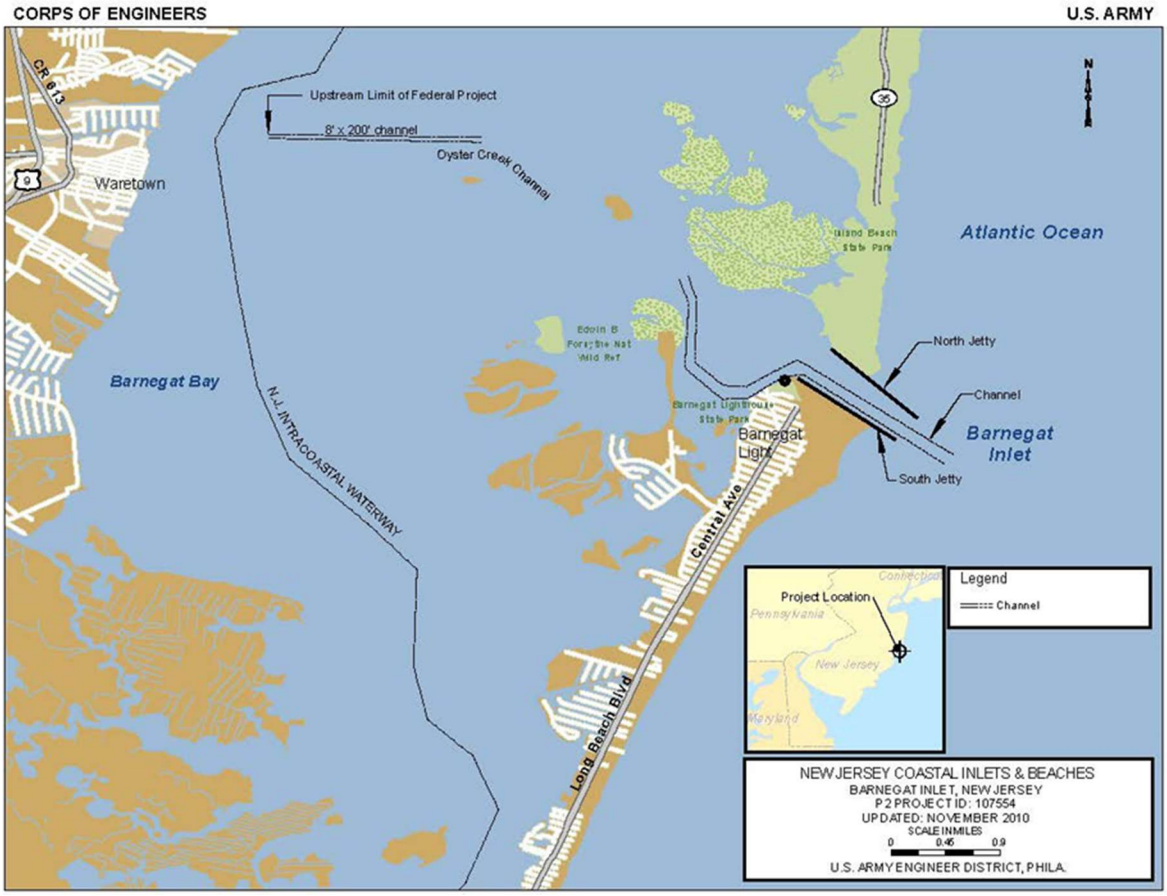
Appendix C
Real Estate Plan

WRDA 2016 SECTION 1122 BENEFICIAL USE PILOT PROJECT

Barnegat Inlet, NJ



Real Estate Plan
July 2020

US Army Corps
Of Engineers
Philadelphia District

DEPARTMENT OF ENVIRONMENTAL PROTECTION
NEW JERSEY

NATIONAL REGIONAL SEDIMENT MANAGEMENT (RSM) PROGRAM

WRDA 2016 SECTION 1122 BENEFICIAL USE PILOT PROJECT

Table of Contents

Exhibits and Attachments

1. Introduction

The purpose of this REP is to describe the minimum LERRD requirements for the construction, operation and maintenance of the Recommended Plan.

a) Study Authorization: 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.

b) Official Project Designation: WRDA 2016 Section 1122 Beneficial Use Pilot Project, Barnegat Inlet, NJ

c) Study Area: The study area is located in Ocean County, spanning an area offshore of the Borough of Harvey Cedars, New Jersey.

d) Non-Federal Sponsor: The New Jersey Department of Environmental Protection's Bureau of Coastal Engineering will act as the Non-Federal Sponsor (NFS) and execute a Section 1122 Project Partnership Agreement (PPA) with USACE.

2. Study Purpose and Features

a) Study Purpose: 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. Section 1122 of the WRDA of 2016 seeks to develop innovative approaches for the beneficial use of dredged material and potential habitat creation/restoration 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.

b) Recommended Plan: The project will occur in two phases:

Near-shore Placement (Phase 1): The pilot project will utilize the Currituck or Murden (USACE shallow-draft hopper dredges) to dredge the Barnegat Inlet channel to the authorized depth of 10 feet MLW plus 2 feet of overdepth, providing approximately 200,000 cubic yards of sand beginning in August 2020. In subsequent years, dredged sand from Barnegat Inlet would be placed somewhere from Barnegat Light to Harvey Cedars, where it is most needed to protect these beaches. The Harvey Cedars placement site for the pilot is approximately 2 to 3 miles south of the current nearshore placement sites. Sediment will be placed offshore of the southern half of Harvey Cedars along a distance of about one mile. 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.

Island Creation (Phase 2): The portion of the Barnegat Inlet navigation channel that runs through Oyster Creek is maintained via a contract hydraulic pipeline dredge with placement historically occurring on two dredged material "islands" known as 26A and 26B. Construction of these islands led to the creation of critical habitat for many avian species and developed prime conditions for submerged aquatic vegetation (SAV) surrounding the islands. New Jersey Department of Environmental Protection (NJDEP), maintains several state channels in the Barnegat Inlet system. In the past, placement of material dredged from the state channels contributed to the creation of islands 26A and 26B. The current practice of pumping material to an alternative uplands site has been extremely costly. The proposed pilot will design a system of placement sites that will permit and construct a new island (or islands) as well as restore marsh behind Island Beach State Park. Placement sites for this phase have not yet been determined. Once a plan is created, a separate environmental assessment and decision document will be developed. Present and future strategies are seeking to eliminate the upland confined disposal facility (CDF) placement alternative and utilize this state and Federal channel material as a resource by taking actions to retain sediment in the system through island creation and/or marsh restoration.

c) Required Lands, Easements, and Rights-of-Way:

Near-shore Placement (Phase 1): The current recommended plan requires a placement surface area of approximately 36.00 acres below MHWL, offshore from the Borough of Harvey Cedars.

Due to the fact that the placement of dredged material will only occur offshore of the Borough of Harvey Cedars and that the lands below the MLW are owned by the State of New Jersey in Fee pursuant to the Submerged Lands Act 43 U.S. Code § 1301 et seq., it is believed that no additional real estate is required for the non-federal sponsor to operate and maintain the project. Normally, on similar upland dredged material placement sites, a standard Channel Improvement Easement would be required. See Section 3 for explanation of this easement.

Immediately offshore of the surf zone are ten rectangles ("boxes") that are each 500 feet long in the alongshore direction and 300 feet wide in the cross-shore direction. The boxes are located such that the inshore edge is approximately at the -10 ft NAVD88 contour and the outer edge is at the -20 foot contour. It is presently anticipated that all discharge of dredged sediment from Barnegat Inlet will take place within the ten boxes. To construct the berm, the dredged sand would be placed at target points within each 500-ft by 300-ft box. Because this is a pilot project, there is some flexibility on the placement locations, and the exact placement location would depend on surf, wind, and tide conditions at the time of discharge. For order-of-magnitude 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.

As mentioned above, this project will reinforce the project footprint of the Barnegat Inlet to Little Egg Inlet Storm Damage Reduction Project. For this project, the New Jersey Department of Environmental Protection provided an "Authorization for Entry for Construction" dated 4 August 2009. While it is understood that the real estate interest above is specific to the Barnegat Inlet to Little Egg Inlet Project, it documents with further confidence that if such interests were in fact needed for the Section 1122 project, the NFS currently owns sufficient interests. No borrow area easements are required, since the material required for construction is to be

obtained through required maintenance dredging of navigation areas. Due to navigational servitude, no right-of-entry or acquisition will be necessary with the current design.

Island Creation (Phase 2): A standard Channel Improvement Easement would be required for construction, operation and maintenance of the island sites. However, placement sites for material have not yet been determined. Once a recommended plan is developed, acreage of the placement areas will be calculated.

There may be riparian grants issued by the State of New Jersey to some private owners which extend beyond the MHWL and MLLW. If lands covered by riparian grants are found to be included in the project area, the State of New Jersey must either demonstrate that they still retain the rights required to operate and maintain the project areas or acquire the rights required to conduct ongoing operations and maintenance activities.

According to CECC-R Memorandum, dated 19 March 2014, "Availability of the Navigational Servitude for Coastal Storm Damage Reduction Projects":

> "If it is determined through preparation and coordination of a District legal opinion that the Corps may exercise the navigation servitude when placing sand or other material on shore lands below the mean high water level, the New Jersey Department of Environmental Protection would not need to acquire any lands that are held by private interests pursuant to riparian grants to support project construction… In the case of a coastal storm damage reduction project constructed on lands below the mean high water level that are owned by private interests, the non-Federal sponsor may need to acquire the privately owned lands if the sponsor would not otherwise be able to ensure that conditions of public use and access are maintained or prevent encroachments on the project. If privately owned lands must be acquired solely to provide public access, such costs are not reimbursable or creditable."

The above excerpt asserts the position that navigation servitude rights are not transferrable to the sponsor. Riparian grants do not need to be acquired with the invocation of navigational servitude, but the sponsor would have to acquire the riparian grants, if it had to ever operate at the site.

3. Standard Estates

According to Department of the Army Regulation No. 1165-2-130: "It is Corps policy to accomplish construction and maintenance dredging in the least costly and most environmentally sound manner possible (ER 1130-2-307). If placement of dredged material on a beach or beaches is determined by the Corps to be the least costly acceptable means for disposal of the material, then such placement should be considered integral to accomplishment of the project work and not subject to any special non-Federal cost sharing requirements."

Near-shore Placement (Phase 1): No easement acquisition is necessary for material placement because navigational servitude is being invoked. This pilot placement of dredged material is to reinforce a shore protection project and mitigate an erosional hotspot.

Should the recommended plan be changed and have terrestrial requirements, a standard Perpetual Beach Storm Damage Reduction Easement (Standard Estate No. 26, EC 405-1-11, Exhibit 5-29) and standard Channel Improvement Easement (Standard Estate No. 8, EC 405-1-11, Exhibit 5-29) would be required for construction, operation and maintenance access for project areas.

PERPETUAL BEACH STORM DAMAGE REDUCTION EASEMENT
(Standard Estate No. 26)

A perpetual and assignable easement and right-of-way in, on, over and across (the land described in Schedule A) (Tract No. __) for use by the (Project Sponsor), its representatives, agents, contractors, and assigns, to construct; preserve; patrol; operate; maintain; repair; rehabilitate; and replace; a public beach [a dune system] and other erosion control and storm damage reduction measures together with appurtenances thereto, including the right to deposit sand; to accomplish any alterations of contours on said land; to construct berms [and dunes]; to nourish and renourish periodically; to move, store and remove equipment and supplies; to erect and remove temporary structures; and to perform any other work necessary and incident to the construction, periodic renourishment and maintenance of the (Project Name), together with the right of public use and access; [to plant vegetation on said dunes and berms; to erect, maintain and remove silt screens and sand fences; to facilitate preservation of dunes and vegetation through the limitation of access to dune areas;] to trim, cut, fell, and remove from said land all trees, underbrush, debris, obstructions, and any other vegetation, structures and obstacles within the limits of the easement (except_____); [reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns, the right to construct dune overwalk structures in accordance with any applicable Federal, State or local laws or regulations, provided that such structures shall not violate the integrity of the dune in shape, dimension or function, and that prior approval of the plans and specifications for such structures is obtained from the (designated representative of the Project Sponsor) and provided further that such structures are subordinate to the construction, operation, maintenance, repair, rehabilitation and replacement of the project; and further] reserving to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights and easements hereby acquired; subject however to existing easements for public roads and highways, public utilities, railroads and pipelines.

CHANNEL IMPROVEMENT EASEMENT
(Standard Estate No. 8)

A perpetual and assignable right and easement to construct, operate, and maintain channel improvement works on, over and across (the land described in Schedule A) (Tracts Nos. _____, _____ and _____) for the purposes as authorized by the Act of Congress approved_____, including the right to clear, cut, fell, remove and dispose of any and all timber, trees, underbrush, buildings, improvements and/or other obstructions therefrom; to excavate: dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; and for such other purposes as may be required in connection with said work of improvement; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby

acquired; subject, however, to existing easements far public roads and highways, public utilities, railroads and pipelines.

Island Creation (Phase 2): A standard Channel Improvement Easement would be required for construction, operation and maintenance of the island sites. See above for Easement language.

4. Non-Standard Estates

There are no proposed non-standard estates for the current recommended plan. Non-standard estates are necessary only when there is no corresponding USACE approved standard estate for the real estate interest required, or where changes to a corresponding standard estate (or previously approved non-standard estate) are desired. In such situations, a non-standard estate must be approved by Headquarters USACE.

5. Existing Federally-Owned Lands and Projects

As part of the Barnegat Inlet Improvement Project, there are 22.7 acres easement and 1.71 acres fee of federally owned land. The Recommended Plan for the placement sites for this pilot project includes no Federally-owned lands as part of its LER requirements.

USACE Philadelphia District 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 correction measures were constructed in 1991, including a new south jetty 4,270 feet in length along an alignment generally the following the design navigation channel and jetty sport fishing facilities were constructed on the new jetty.

Barnegat Inlet to Little Egg Inlet Storm Damage Reduction Project:
The Borough of Harvey Cedars is situated on Long Beach Island which is a 17-mile long barrier island located in southern Ocean County, New Jersey. The Barnegat Inlet to Little Egg Inlet Coastal Storm Damage Reduction Project, also known as the Long Beach Island Beachfill Project, provides flood and coastal storm risk management. The completed project extends continuously from the north end of Loveladies to the south end of Holgate. 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 Barnegat 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. 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

6. Navigational Servitude

Per the March 19, 2014 CECC-R Memo entitled "Availability of Navigation Servitude for Coastal Storm Damage Reduction Projects," the determination of the applicability of Federal Navigation Servitude for the construction of coastal storm damage reduction measures by the United States under a Federal cost-shared project is done on a case-by-case basis and requires a two-step review process: a legal opinion of applicability completed by the District and a review for concurrence through the Real Estate Law Section of the Office of the Chief Counsel, staffed through Division Counsel. In order to align real estate timelines with current project-planning best practices, the request for concurrence through Division Counsel will occur concurrently with this REP. NAB Office of Counsel provided a determination memorandum dated 11 May 2020 and entitled "Legal Opinion on the Use of Federal Navigation Servitude for the National Regional Sediment Management (RSM) Program's Beneficial Use Pilot Project at Barnegat, Inlet, NJ." Per the NAB-OC opinion document:

"It is the district opinion that Navigation Servitude may be invoked for construction of the proposed beneficial use pilot project, in utilization of both the federal channel to be dredged, and the placement area below MHW. USACE concurrence for utilization of Navigation Servitude for the submerged lands necessary for construction of the proposed project is requested, with the understanding that New Jersey already possesses the necessary property interests and rights needed to operate and maintain the completed project and, if not, NJDEP must obtain any additional rights that are needed."

7. Real Estate Maps

Maps displaying the proposed project placement area and surrounding Federal Projects are shown in Exhibit "A".

8. Induced Flooding

No induced flooding is anticipated at this time for this study project area.

9. Baseline Cost Estimate for Real Estate

Due to the nature of this project being under navigational servitude, there are no anticipated LERRD costs, so no MCACES estimate for real estate has been developed.

10. Public Law 91-646 Relocations

It is anticipated that there will be no project features that will require relocations of any persons, farms or businesses in the subject area as would be required under Public Law 91-646, as amended

11. Mineral Activity

There is no present or anticipated mining and drilling activity in the vicinity of the project that may affect the operation thereof.

12. Timber Activity

There is no present or anticipated timber harvesting activity in the vicinity of the project that may affect the operation thereof.

13. Assessment of Non-Federal Sponsor Acquisition Capability

The New Jersey Department of Environmental Protection (NJDEP) is the Non-Federal Sponsor (NFS). Although no real estate acquisition is anticipated for this project, the NFS is fully capable of acquiring property should it become necessary. The assessment of the NFS's Real Estate Acquisition Capability is included as Exhibit "B" to this plan.

14. Zoning

The enactment of zoning ordinances is not proposed to facilitate acquisition.

15. Acquisition Schedule

No acquisition schedule has been developed since the United States will be invoking navigational servitude for the construction of the project.

16. Utility and Facility Relocations

The proposed plan does not identify any utilities and/or facilities that will require relocation.

17. Environmental Concerns

There are no known hazardous, toxic and radioactive waste (HTRW) or suspected presence of contaminants that are in, on, under, or adjacent to the placement area.

18. Project Support

There is no known opposition to the project from adjacent landowners.

19. Notification to Non-Federal Sponsor

Since the NFS acquisition of additional LERRD is not necessary for this project, no notification regarding the risks associated with the acquisition of land prior to execution of the PPA is necessary.

20. Risk Analysis

There are minimal real estate risks associated with this project.

PLAN CERTIFICATION

This Real Estate Plan has been prepared in accordance with Corps of Engineers Regulation 405-1-12, Chapter 12. It is recommended that this REP be accepted for the purposes stated herein.

Prepared by:

VORACHACK.NATHAN.C.1573686655 Digitally signed by VORACHACK.NATHAN.C.1573686655 Date: 2020.07.16 12:26:24 -04'00'

NATHAN C. VORACHACK
Realty Specialist
Civil Projects Support Branch

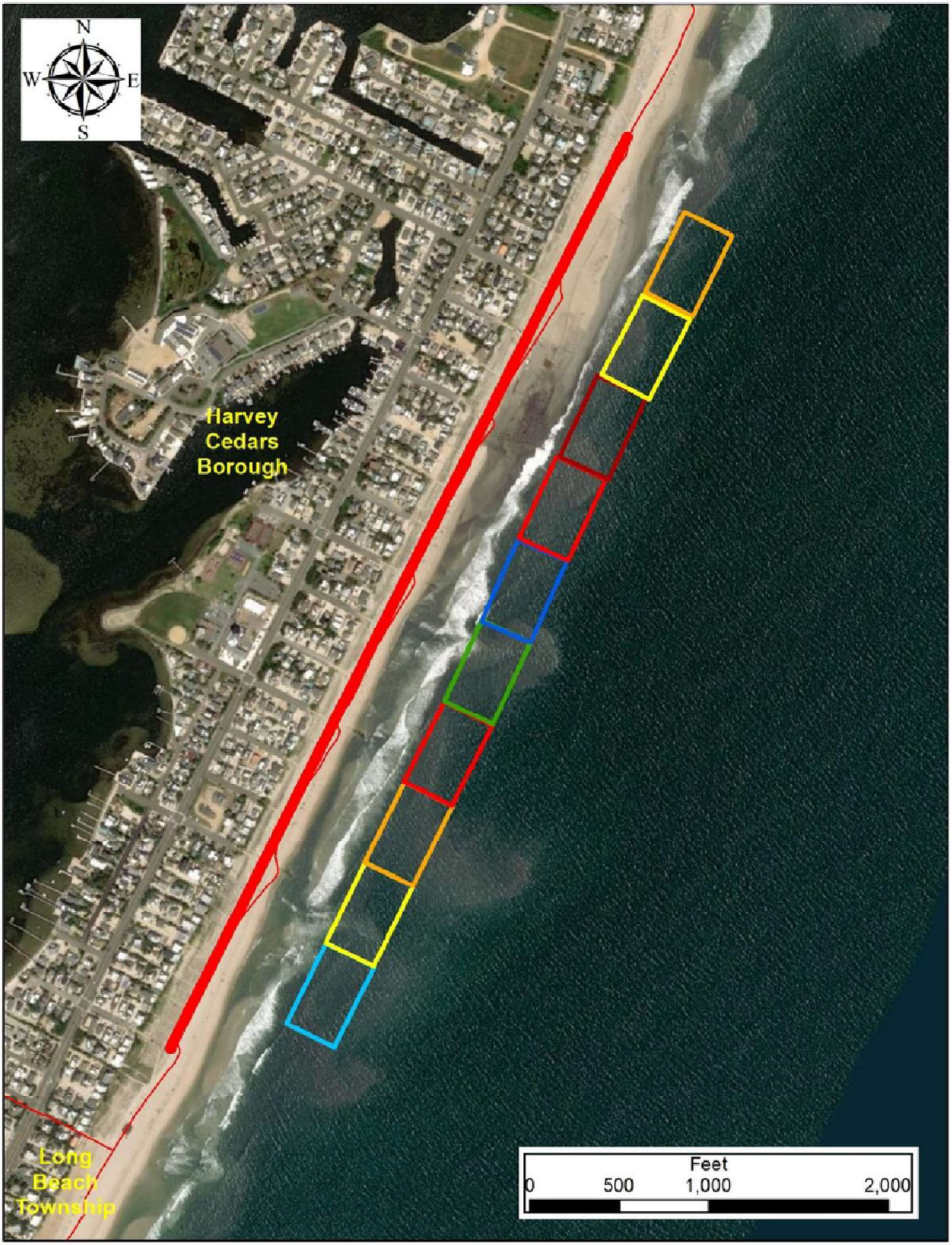
Reviewed and approved by:

LEWIS.SUSAN.K.1229405698 Digitally signed by LEWIS.SUSAN.K.1229405698 Date: 2020.07.17 08:03:57 -04'00'

SUSAN K. LEWIS
Chief, Real Estate Division
Baltimore District

EXHIBIT “A”

PROJECT MAPS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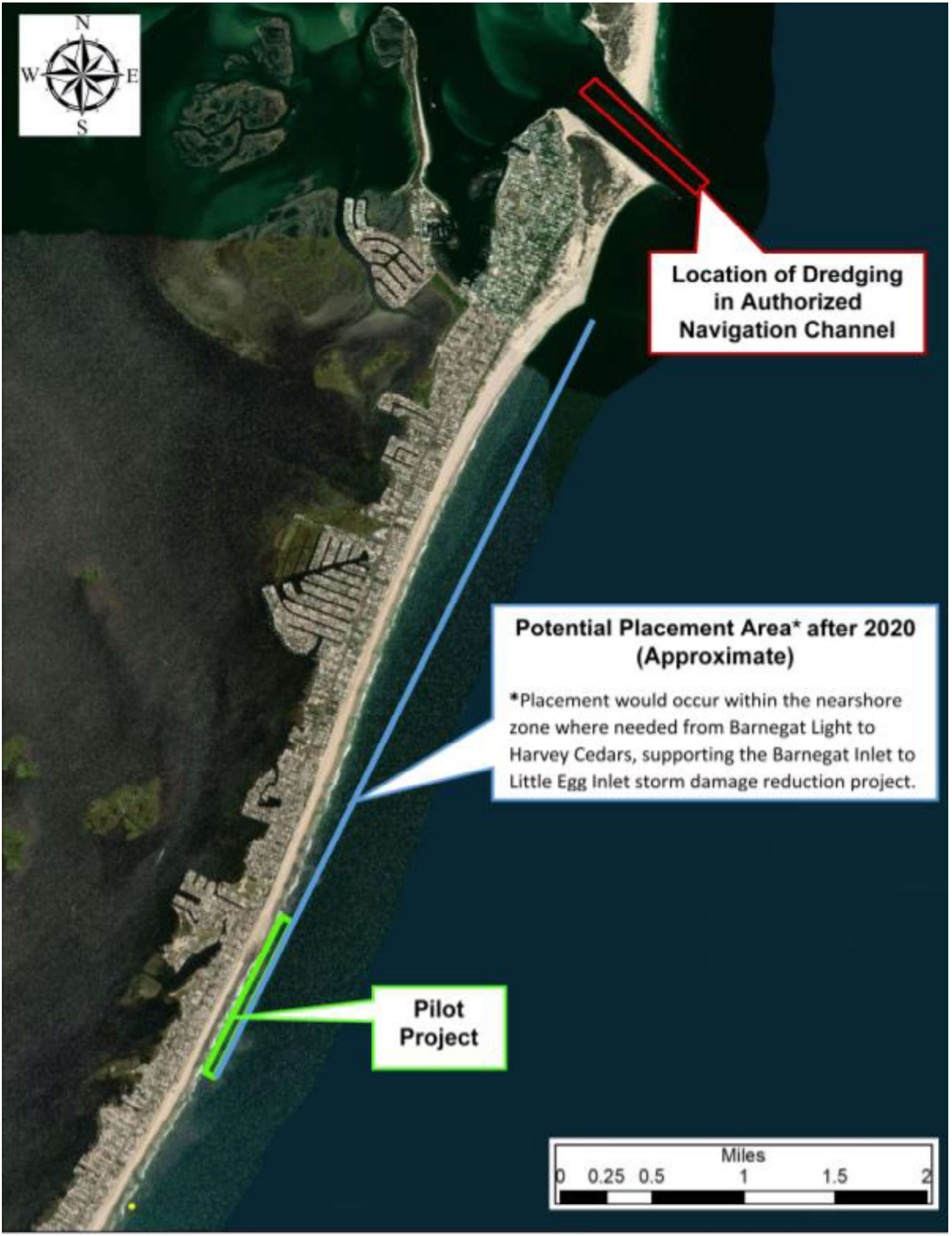
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S
Location of Dredging in Authorized Navigation Channel
Potential Placement Area* after 2020 (Approximate)
*Placement would occur within the nearshore zone where needed from Barnegat Light to Harvey Cedars, supporting the Barnegat Inlet to Little Egg Inlet storm damage reduction project.
Pilot Project
Miles
0 0.25 0.5 1 1.5 2


26B
Clam Island
26A
High Bar Island
Sedge Islands
Broadway
60
Barnegat Light
Island Beach State Park
Shore Rd
Google Earth
© 2020 Google
Image © 2020 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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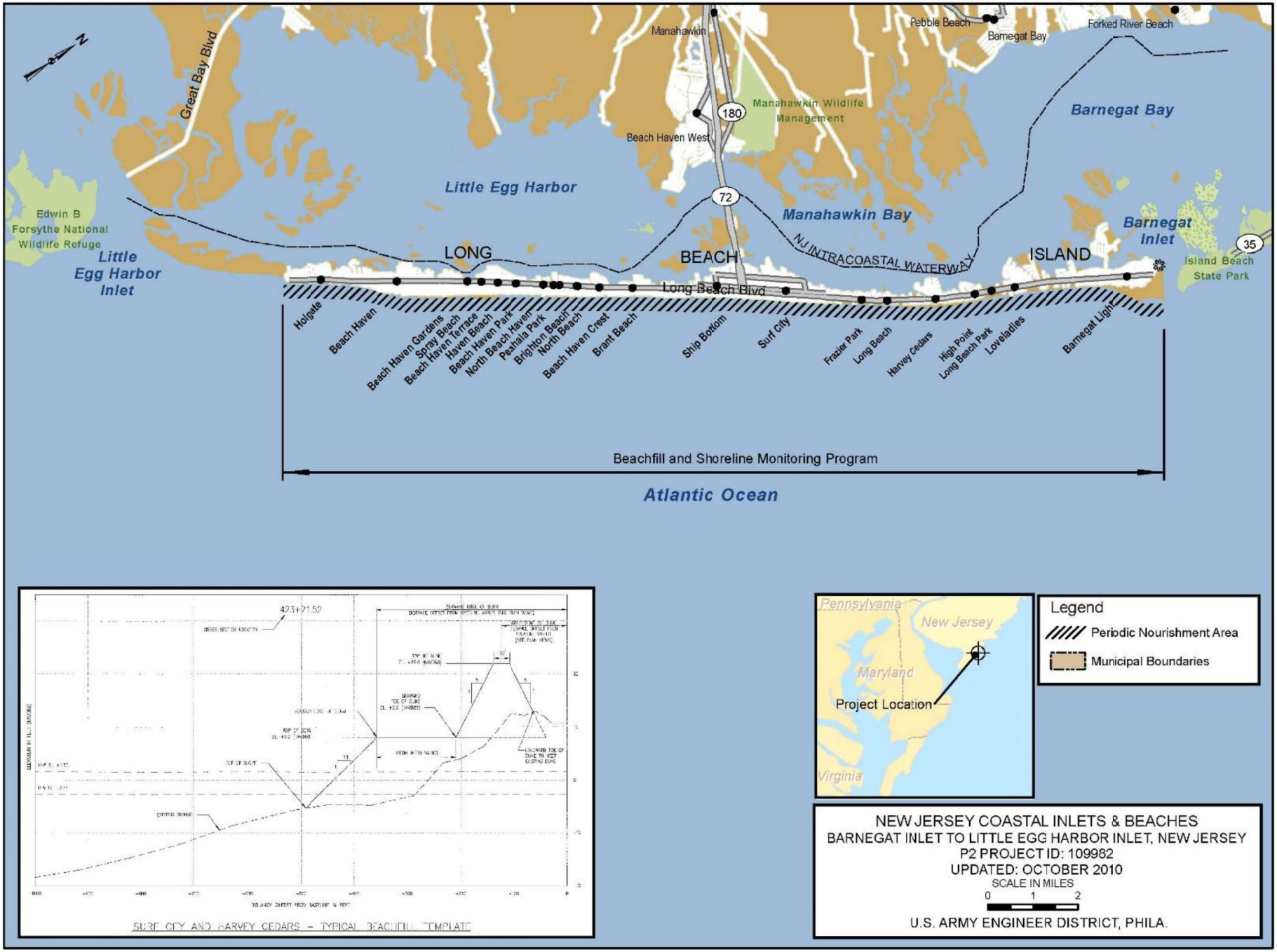
CORPS OF ENGINEERS

U.S. ARMY



SURF CITY AND HARVEY CEDARS – TYPICAL BEACHFILL TEMPLATE

Legend

Periodic Nourishment Area

Municipal Boundaries

NEW JERSEY COASTAL INLETS & BEACHES

BARNEGAT INLET TO LITTLE EGG HARBOR INLET, NEW JERSEY

P2 PROJECT ID: 109982

UPDATED: OCTOBER 2010

SCALE IN MILES

0 1 2

U.S. ARMY ENGINEER DISTRICT, PHILA.

CORPS OF ENGINEERS

U.S. ARMY

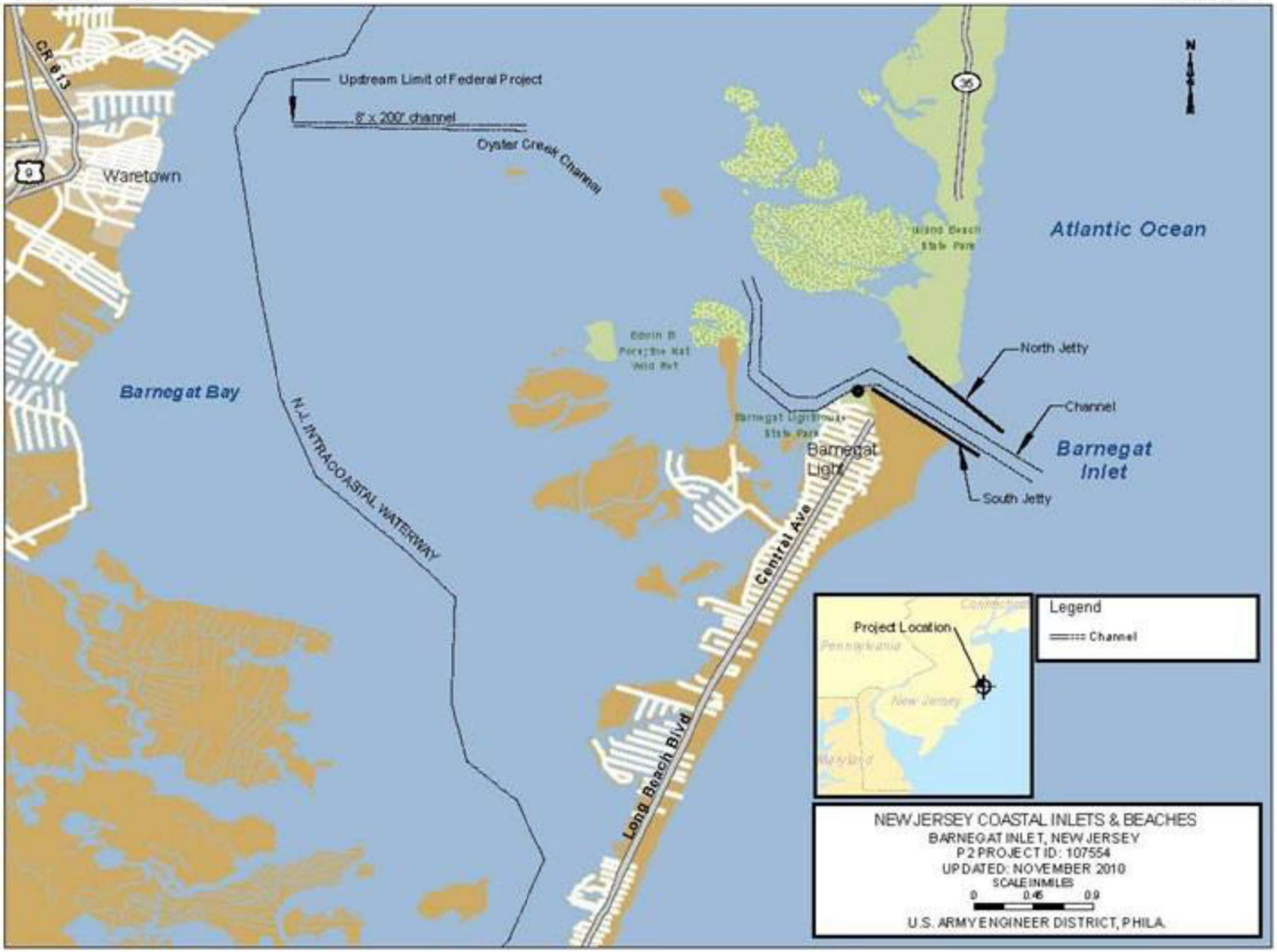


EXHIBIT “B”

ASSESSMENT OF NON-FEDERAL SPONSOR
ACQUISITION CAPABILITY

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY

Project: WRDA 2016 Section 1122 Beneficial Use Pilot Project, Barnegat Inlet, NJ
Non-Federal Sponsor (NFS): New Jersey Department of Environmental Protection (NJDEP)

1. Legal Authority

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes?

Yes. The NFS has acquisition authority in the project area.

b. Does the sponsor have the power of eminent domain for this project?

Yes. The State of New Jersey has the power of eminent domain, but the delegated authority to the NFS was rescinded more than 10 years ago. The NFS can request assistance with eminent domain actions through the New Jersey Division of Law or from local municipalities through a State Aid Agreement to acquire necessary real estate interests. Local municipalities do have the power of eminent domain.

c. Does the sponsor have "quick-take" authority for this project?

No. The NFS does not have "quick-take" authority for this project. If a local municipality were to acquire the real estate, they would file a Declaration of Taking and deposit the estimated just compensation with the court.

d. Are there any lands/interests in land required for the project located outside the sponsor's political boundary?

No.

e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn?

The NFS does have condemnation authority for this project. There are no lands/interests required for this project that may not be condemned by the sponsor.

2. Human Resource Requirements:

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended?

No. The NFS is familiar with the requirements of P.L. 91-646.

b. If the answer to 2a is yes, has a reasonable plan been developed to provide such training?

N/A

c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project?

Yes.

d. Is the sponsor's projected in-house staffing level sufficient considering its other workload, if any, and the project schedule?

Yes

e. Can the sponsor obtain contractor support, if required, in a timely fashion?

Yes

f. Will the sponsor likely request USACE assistance in acquiring real estate?

No

3. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site?

Yes

b. Has the sponsor approved the project/real estate schedule/milestones?

Yes

4. Overall Assessment:

a. Has the sponsor performed satisfactorily on other USACE projects?

Yes

b. With regard to this project, the sponsor is anticipated to be highly capable/fully capable/moderately capable/marginally capable/insufficiently capable?

Highly Capable

5. Coordination

a. Has this assessment been coordinated with the sponsor?

Yes

b. Does the sponsor concur with this assessment?

Yes

Prepared by:

VORACHACK.NATHAN.C.1573686655 Digitally signed by VORACHACK.NATHAN.C.1573686655 Date: 2020.07.16 12:28:08 -04'00'

NATHAN C. VORACHACK
Realty Specialist

Reviewed and approved by:

HOMESLEY.CRAIG.R.1231317925 Digitally signed by HOMESLEY.CRAIG.R.1231317925 Date: 2020.07.16 12:49:38 -04'00'

CRAIG R. HOMESLEY
Chief, Civil Projects Support Branch
Real Estate Division

Appendix D

Certificate of Legal Review