US Army Corps
of Engineers

Philadelphia District

MANASQUAN INLET TO BARNEGAT INLET STORM DAMAGE REDUCTION PROJECT

OCEAN COUNTY, NJ

DRAFT ENVIRONMENTAL ASSESSMENT (EA)

DECEMBER 2013

PREPARED BY:

U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

MANASQUAN INLET TO BARNEGAT INLET
STORM DAMAGE REDUCTION PROJECT
OCEAN COUNTY, NJ
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

In 2002, the United States Army Corps of Engineers (USACE), Philadelphia District, evaluated the environmental impacts associated with the proposed construction of the Manasquan Inlet to Barnegat Inlet Storm Damage Reduction Project, and prepared a Final Environmental Impact Statement (FEIS), which was filed with the Environmental Protection Agency in 2002. A Record of Decision (ROD) was signed on July 2, 2008. The selected plan involves the placement of beachfill sand, which would be obtained from offshore sources to construct a berm and a dune for the purpose of storm damage reduction for the municipalities of Point Pleasant Beach, Bay Head, Mantoloking, Brick Township, Toms River Township, Lavallette, Seaside Heights, Seaside Park, and Berkeley Township. The plan extends approximately 13.7 miles and will result in a continuous dune line extending from Manasquan Inlet south to the northernmost portion of Island Beach State Park. Maintenance of the berm and dune would be accomplished by periodic sand nourishment of the project area.

Congress authorized construction of the Manasquan Inlet to Barnegat Inlet project in the Water Resources Development Act of 2007 (WRDA 07). However, there has been no construction of the project to date. As a result of Hurricane Sandy in October 2012, which caused significant storm damage to the project area, Congress passed Public Law 113-2, the “Disaster Relief Appropriations Act – 2013”. This act provided funding for USACE to construct “previously authorized Corps projects designed to reduce flood and storm damage risks”, including construction of the Manasquan to Barnegat project.

In 2013, the Philadelphia District conducted surveys of the beach and nearshore zones within the project area to determine the quantity of sand required for project construction, and reviewed the shoreline behavior of the project area in the period since the Feasibility Report was completed in 2002. As a result of these investigations, initial construction quantities were reduced and periodic nourishment quantities were increased for the project area from the plan proposed in the 2002 FEIS. The current initial sand quantity required is estimated at 9,865,000 cubic yards, which is a reduction from the original plan quantity of 10,689,000 cubic yards. Periodic nourishment was increased from 961,000 cubic yards to 1,364,000 cubic yards, and is scheduled to occur every 4 years.

The design template is a +22 ft NAVD dune, with a 25 ft crest width, slopes of 1V:5H from the crest to the berm which extends 75 ft seaward with an elevation of +8.5 ft NAVD for the municipalities of Bay Head, Mantoloking, Brick Township, Toms River Township, Lavallette, Seaside Park and Berkeley

Township. The municipalities of Point Pleasant Beach and Seaside Heights will have a dune with an elevation of +18 ft NAVD, and a berm width of 100 ft. Point Pleasant Beach will have a berm height of +11.5 ft NAVD, and Seaside Heights will have a berm elevation of +8.5 ft NAVD. The beachfill continues from MHW to MLW with slopes of 1:10H. The profile is expected to maintain the existing shape from MLW to the depth of closure, at approximately –26 ft NAVD. At the northern end, the project terminates at the Manasquan Inlet south jetty with no requirement for a taper. At the southern end, the project will taper to the existing beach within Berkeley Township and will avoid the need for any construction activity within Island Beach State Park.

For initial construction, material would be taken from the sand borrow areas identified as areas A, B, D, and E. Sand for periodic nourishment would be obtained from these four offshore borrow areas and potentially one that is currently being studied known as F2. Borrow Area F2 is located entirely within Federal waters and would be used upon approval from the Bureau of Ocean Energy Management. The Bureau of Ocean Energy Management (BOEM) has jurisdiction over mineral resources on the Federal Outer Continental Shelf (OCS) pursuant to section 8(k)(2)(d) of the OCS Lands Act (OCSLA), and is serving as a cooperating agency for this project. BOEM's purpose is to respond to an OCS sand use request under the authority granted to the United States Department of the Interior (USDOI) by the OCSLA. Any use of borrow areas located on the Federal Outer Continental Shelf (OCS) would require authorizations from BOEM to undertake the proposed project.

In compliance with the National Environmental Policy Act of 1969, as amended, and Council on Environmental Quality (CEQ) regulations, the Philadelphia District has prepared an Environmental Assessment (EA) to evaluate new information and proposed modified actions subsequent to the 2002 Manasquan FEIS. This Draft EA is being forwarded to the U.S. Environmental Protection Agency Region II, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the New Jersey State Historic Preservation Office, the New Jersey Department of Environmental Protection (NJDEP), and all other known interested parties for comment.

The EA concludes that the proposed storm damage reduction project, if implemented, would not likely jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

The EA also concludes that the project can be conducted in a manner, which should not violate New Jersey's Surface Water Quality Standards. Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate will be received from the NJDEP prior to project construction. Based on the information gathered during preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined, in accordance with Section 307(C) of the Coastal Zone Management Act of 1972, that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of New Jersey. A Federal consistency determination for this project will be received from the NJDEP prior to project construction.

There are no known properties listed on, or eligible for listing on, the National Register of Historic Places that would be adversely affected by the proposed activity. The proposed plan has been designed to avoid archaeologically sensitive areas, and is therefore not expected to impact any cultural resources.

In accordance with the Clean Air Act, this project will comply with the General Conformity (GC) requirement (40CFR§90.153) through the following options that have been coordinated with the New Jersey Department of Environmental Protection (NJDEP); statutory exemption, emission reduction opportunities, use of the Joint Base McGuire/Lakehurst GC State Implementation Plan budget, and/or the purchase of Environmental Protection Agency (EPA) Clean Air Interstate Rule (CAIR) ozone season oxides of nitrogen (NOx) allowances. This project is not *de minimis* under 40CFR§90.153, therefore one or a combination of these options will be used to meet the GC requirements. The project specific option(s) for meeting GC are detailed in the Statement of Conformity (SOC), which is required under 40CFR§90.158.

The proposed Manasquan Inlet to Barnegat Inlet Storm Damage Reduction Project will not significantly affect the quality of the human environment; therefore a Supplemental Environmental Impact Statement is not required.

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Date

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John C. Becking, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

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1.0 INTRODUCTION

This document is being issued pursuant to 33 CFR 230.10(a) and is intended to present and evaluate new information for the Manasquan Inlet to Barnegat Inlet Storm Damage Reduction Project located along the Atlantic Coast of New Jersey (Figure 1). The information in this document updates the previously published National Environmental Policy Act (NEPA) document for this project, which is the Final Feasibility Report and Integrated Environmental Impact Statement (EIS) dated June 2002. A Record of Decision (ROD) was signed on July 2, 2008. To minimize duplication, only items involving new pertinent information and changes in the plan as previously proposed are addressed in this document. Items covered previously in the Final Feasibility Report and Integrated EIS are incorporated by reference and are referenced herein as USACE (2002), unless otherwise specified.

The project evaluated in this document will require the use of sand resources in Federal waters. The Bureau of Ocean Energy Management (BOEM) has jurisdiction over mineral resources on the Federal Outer Continental Shelf (OCS) pursuant to section 8(k)(2)(d) of the OCS Lands Act (OCSLA), and is serving as a cooperating agency on this Environmental Assessment. BOEM's purpose is to respond to an OCS sand use request under the authority granted to the United States Department of the Interior (USDOI) by the OCSLA. Any use of borrow areas located on the Federal OCS would require authorizations from BOEM to undertake the proposed project.

2.0 PURPOSE AND NEED

The purpose of this project is to provide storm damage reduction for the municipalities of Point Pleasant Beach, Bay Head, Mantoloking, Brick Township, Toms River Township, Lavallette, Seaside Heights, Seaside Park, and Berkeley Township located in Ocean County, NJ (Figure 1) based on the vulnerability of these communities to significant economic damages to structures and properties due to storms. Severe storms in recent years have caused a reduction in the overall beach height and width along the study area. This exposes these communities to catastrophic damage from ocean flooding and wave attack in the absence of a long-term commitment of protection. The project area has recently experienced several significant storm events, most notably the Nor'Ida Storm of 2009, Hurricane Irene in 2011, and the devastating Hurricane Sandy in October 2012, which resulted in severe economic damages in the region. Based on the vulnerability of this area, a Federal storm damage reduction project is needed that will provide a long-term commitment to these communities. In response to Hurricane Sandy, the project schedule for implementation is being expedited in accordance with P.L. 113-2: Disaster Relief Appropriations Act (FY 2013) for authorized Federal projects in areas affected by Hurricane Sandy that have not been constructed.

3.0 ALTERNATIVES CONSIDERED

In USACE (2002), a number of structural and non-structural storm damage reduction alternatives were identified and evaluated individually and in combination on the basis of their suitability, applicability and merit in meeting the planning objectives, planning constraints, economic criteria, environmental criteria and social criteria for the study.

The final screening of alternatives concluded that only berm and dune restoration utilizing sandy material dredged from a nearby offshore source should be considered further. The NED plan identified for the project was berm and dune restoration utilizing beachfill. Detailed descriptions of these plans are provided in Section 4.1 and 4.2.

The selected plan was chosen because it would provide the maximum net benefits over costs based on storm damage reduction. USACE (2002) provided a comparative environmental impact analysis of the various alternatives considered. Additionally, a number of sand sources were screened based on their suitability and environmental impacts. The sand sources proposed in USACE (2002), Borrow Area A and Borrow Area B, were determined to be suitable based on their material grain sizes and lower impacts to fisheries resources.

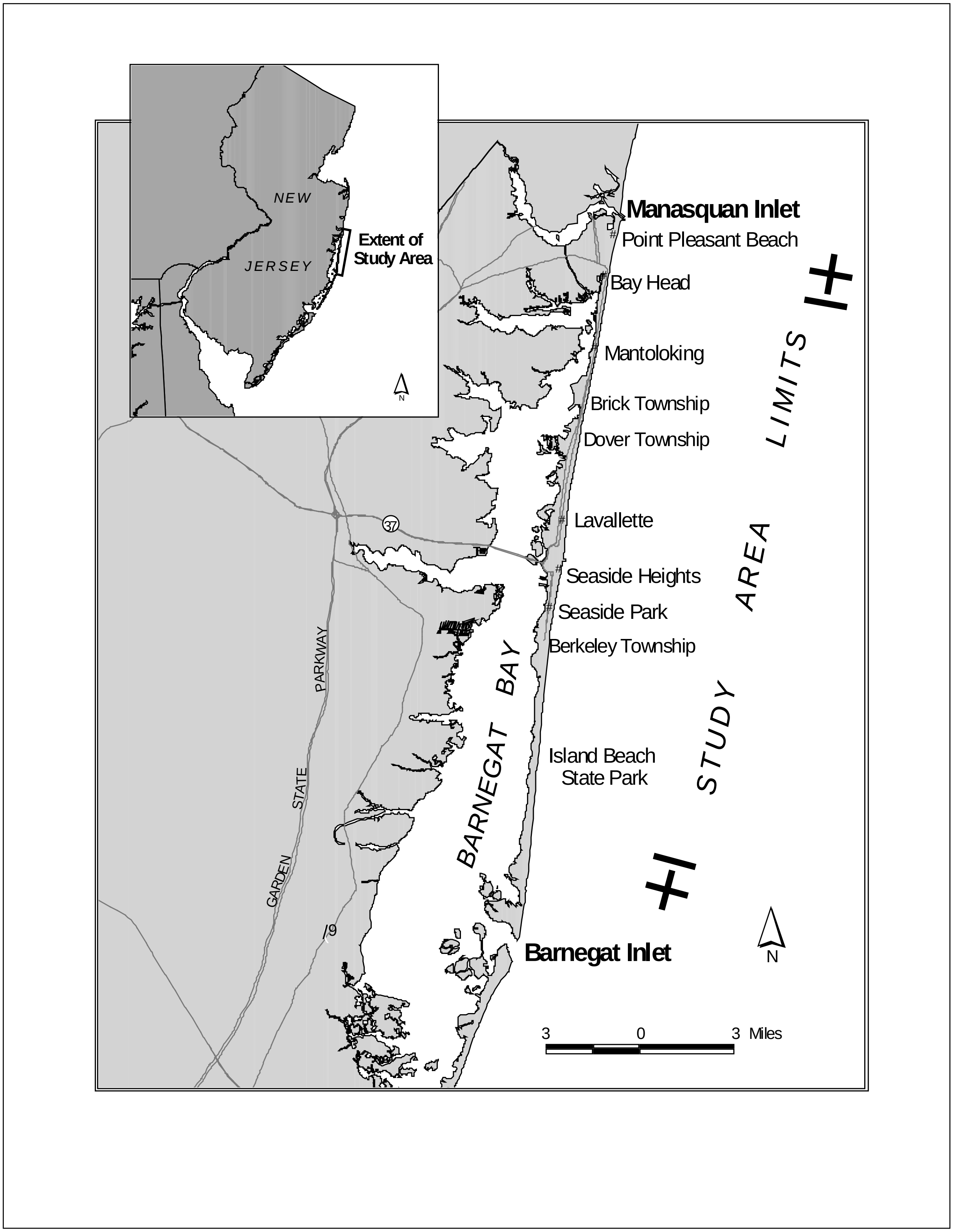

Figure 1. Project Area and Vicinity

4.0 EXISTING CONDITIONS, NO ACTION AND PROPOSED PROJECT

4.1 Proposed Plan from USACE (2002)

USACE (2002) evaluated various alternative plans of improvement formulated for hurricane and storm damage reduction. The selected plan was in the form of berm and dune restoration utilizing beachfill to reduce storm damages for these communities. Details of the authorized plan from USACE (2002) are provided below; however, initial construction and periodic nourishment quantities required for the authorized project were modified as a result of surveys and analysis conducted by the Philadelphia District after Hurricane Sandy. The proposed modifications to the plan involve reductions in initial construction quantities, increases in periodic nourishment quantities, and sand borrow area usage changes, which are provided in Section 4.2.

In USACE (2002), the selected plan consisted of a berm and dune constructed using sand obtained from offshore borrow sources. The plan extends approximately 13.7 miles and would result in a continuous dune line extending from Manasquan Inlet south to the northernmost portion of Island Beach State Park. The selected design template included a +22 ft NAVD dune, with a 25 ft crest width, slopes of 1V:5H from the crest to the berm which extends 75 ft seaward with an elevation of +8.5 ft NAVD for the municipalities of Bay Head, Mantoloking, Brick Township, Toms River Township, Lavallette, Seaside Park and Berkeley Township (Figure 2). The design template for the municipalities of Point Pleasant Beach and Seaside Heights included a dune with an elevation of +18 ft NAVD, and a berm width of 100 ft (Figure 3). The Point Pleasant Beach and Seaside Heights design included a berm height of +11.5 ft NAVD and +8.5 ft NAVD respectively. The beach fill would continue from MHW to MLW with slopes of 1:10H. The profile is expected to maintain the existing shape from MLW to the depth of closure, at approximately –26 ft NAVD. At the northern end, the project terminates at the Manasquan Inlet south jetty with no requirement for a taper. At the southern end, the project will taper to the existing beach within Berkeley Township and will avoid the need for any construction activity within Island Beach State Park.

Initial sand quantity (from USACE, 2002) was 10,689,000 cubic yards (cy) which included a design fill quantity of 9,728,000 cy plus advance nourishment of 961,000 cy. Periodic nourishment (from USACE, 2002) of 961,000 cy was scheduled to occur every 4 years. Material for initial construction and periodic nourishment was proposed in 2002 to have been taken from the Borrow Areas A and B (Figure 4).

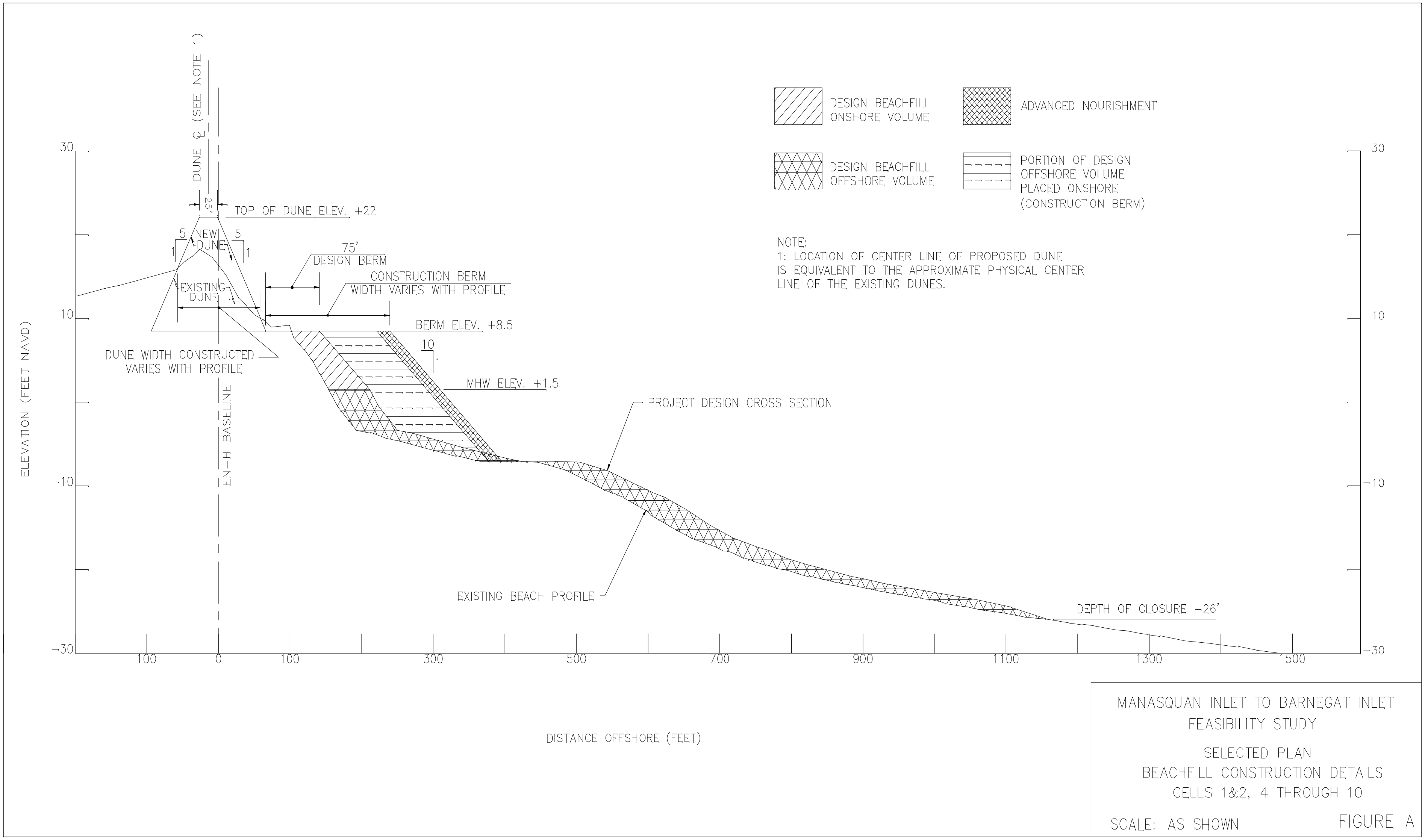

Figure 2. Selected Plan - Typical Design Cross-Section with 22-ft NAVD Dune (All Communities except Seaside Heights and northern Point Pleasant Beach)

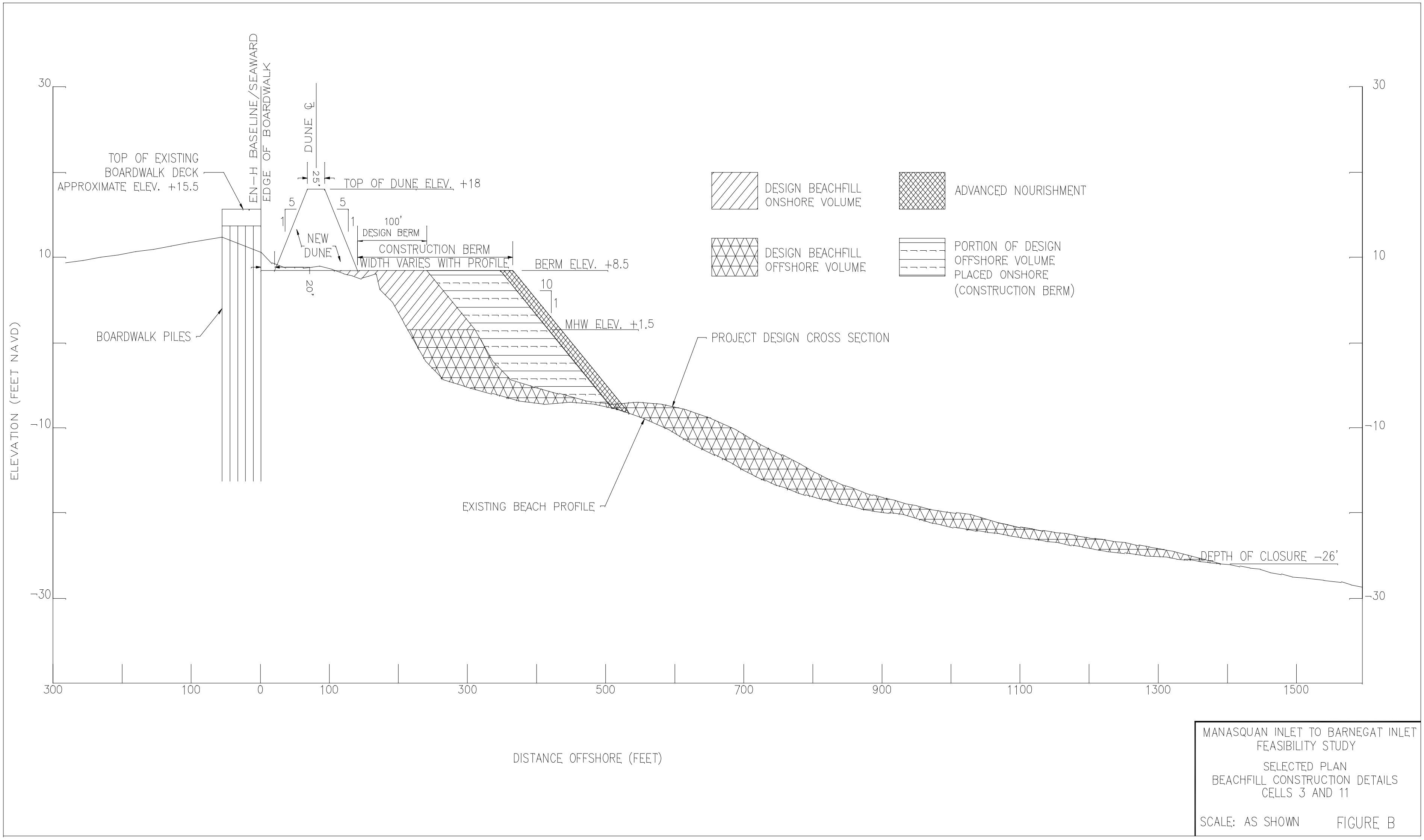

Figure 3. Selected Plan - Typical Design Cross-Section with 18-ft NAVD Dune (Seaside Heights and northern Point Pleasant Beach)

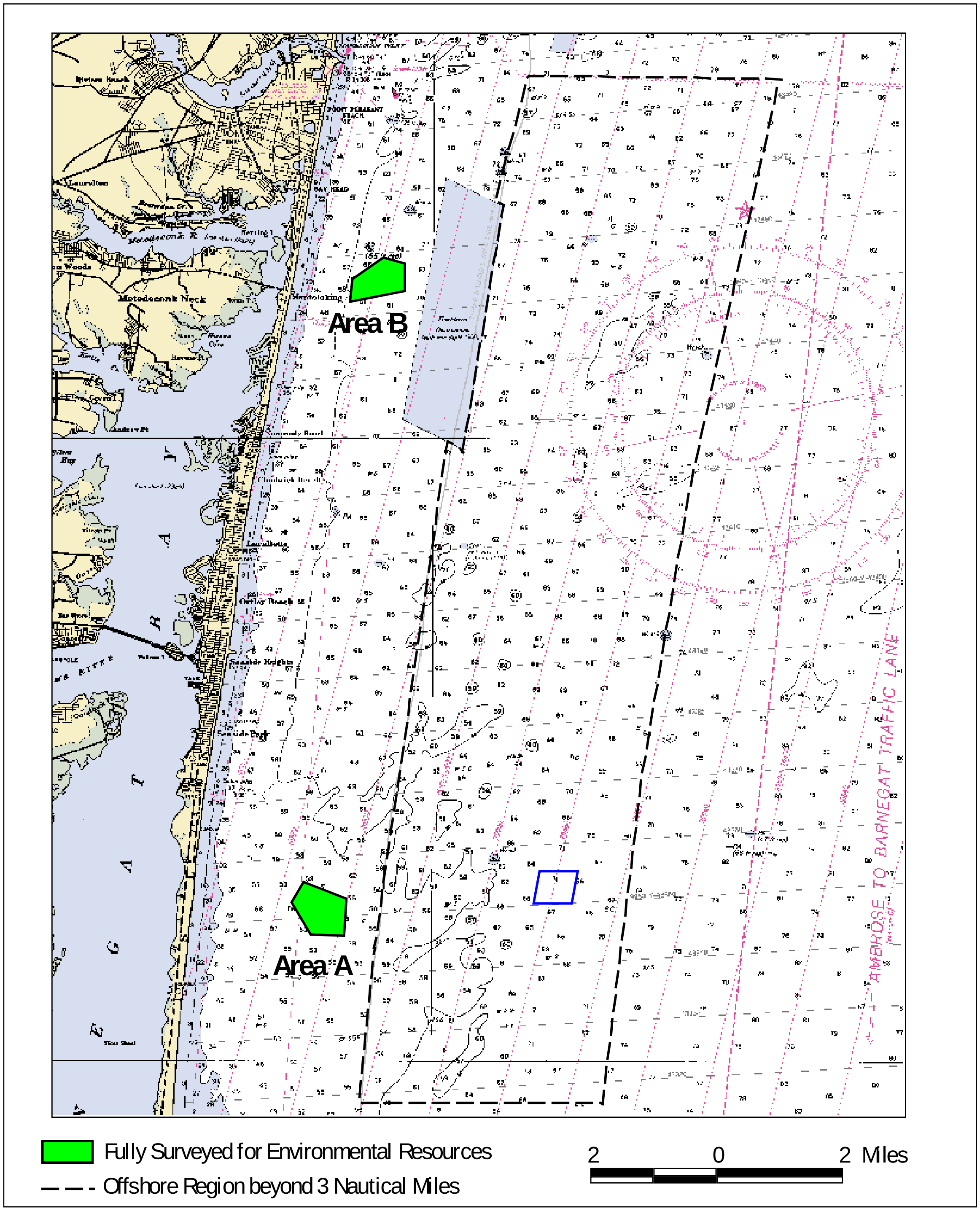

Figure 4. Proposed Sand Borrow Areas from USACE (2002)

4.2 Project Changes

Since the completion of the Feasibility report in 2002, changes to the existing project conditions and further detailed analyses have resulted in changes to the selected plan, but these changes do not impact the overall scope of the project. Changes to the project involve the borrow area utilization and quantities of beachfill required. However, there have been no changes to the project design template, beachfill placement locations or changes in the overall scope of the project.

4.2.1 Beachfill Quantities

Beach profile surveys were conducted for the Manasquan Inlet to Barnegat Inlet beaches in the spring of 2013 to provide updated beachfill quantity estimates for the selected plan. Table 1 provides a comparison of the required quantities reported in USACE (2002) and the current estimates. For initial construction, current sand quantities are less than the estimates in 2002, and current periodic nourishment quantities are greater than the estimates provided in USACE (2002). These new periodic nourishment quantities reflect additional data and analyses conducted since 2002. It should be noted that periodic nourishment quantities are an estimate, and that they may vary depending on variable erosion rates and the storm climate at the time of renourishment. Only areas that fall below the design template will be nourished for any given nourishment cycle.

Table 1. Comparison of Beachfill Quantity Estimates from 2002 and 2013.

2002 Sand Qty. Estimate (cubic yards)		2013 Sand Qty. Estimate (cubic Yards)	
Initial Construction (includes advance nourishment)	Periodic Nourishment	Initial Construction (includes advance nourishment)	Periodic Nourishment
10,689,000	961,000 (4 yrs.)	9,865,000	1,364,000 (4 yrs.)

Using the quantity estimates in Table 1 from 2013, total sand quantity estimates for the 50-year project life are provided in Table 2. The cumulative total sand required is approximately 28,015,000 cubic yards, which is approximately 4,000,000 cubic yards more than the original projection in USACE (2002).

Table 2. Total Sand Quantity Estimates Required Based on 2013 Estimates

2013 Estimated Quantities (cubic yards)			
Initial Construction (includes advance nourishment)	Total Periodic Nourishment	Major Replacement	Total 50 year estimate
9,865,000	16,362,000 (12 cycles)	1,788,000	28,015,000

4.2.2 Borrow Areas

As previously discussed, the Feasibility report identified 2 borrow areas (Borrow Area A and B) to be used for initial construction and several nourishment cycles of the project. Further investigations conducted since that time resulted in the addition of two new borrow areas that would be used for initial construction and subsequent nourishment (Borrow Areas D and E).

Borrow Area A is located about 2.25 miles offshore of the northern end of Island Beach State Park. This area is approximately 460 acres in size and contains approximately 13.3 million cubic yards of suitable beach fill material with a maximum disturbance depth of approximately -81 feet NAVD.

Borrow Area B is located about 1.75 miles offshore of Mantoloking, NJ. This area is approximately 360 acres in size and contains approximately 7.5 million cubic yards of suitable beach fill material with a maximum disturbance depth of approximately -81 feet NAVD.

Borrow area D is located about 1.75 miles offshore of Seaside Park, NJ. This area is approximately 232 acres in size and contains approximately 4.5 million cubic yards of suitable beach fill material with a maximum disturbance depth of approximately -81 feet NAVD.

Borrow area E is located about 2.5 miles offshore of the northern end of Island Beach State Park and is directly adjacent and to Borrow area A. This area is approximately 322 acres in size and contains approximately 8.8 million cubic yards of suitable beach fill material with a maximum disturbance depth of approximately -81 feet NAVD.

As discussed in the Feasibility report, the Corps is also pursuing the use of Borrow area F2 as another potential source of sand for future periodic nourishments for the project area. Borrow area F2 is located about 4.6 miles offshore of Mantoloking and is approximately 1700 acres in size. It contains approximately 38.6 million cubic yards of suitable beach fill material with a maximum disturbance depth of approximately -81 feet NAVD. Area F2 lies entirely within Federal waters (i.e. beyond 3 nautical miles from the New Jersey shoreline). Dredging or mining of sand from Federal waters requires coordination and approval from the Bureau of Ocean Energy Management (BOEM). Because of the expedited schedule to start initial construction, Borrow area F2 is not expected to be approved in time to meet this schedule. It is expected, however, that F2 will be available for use during periodic nourishment, in addition to Borrow areas A, B, D, and E.

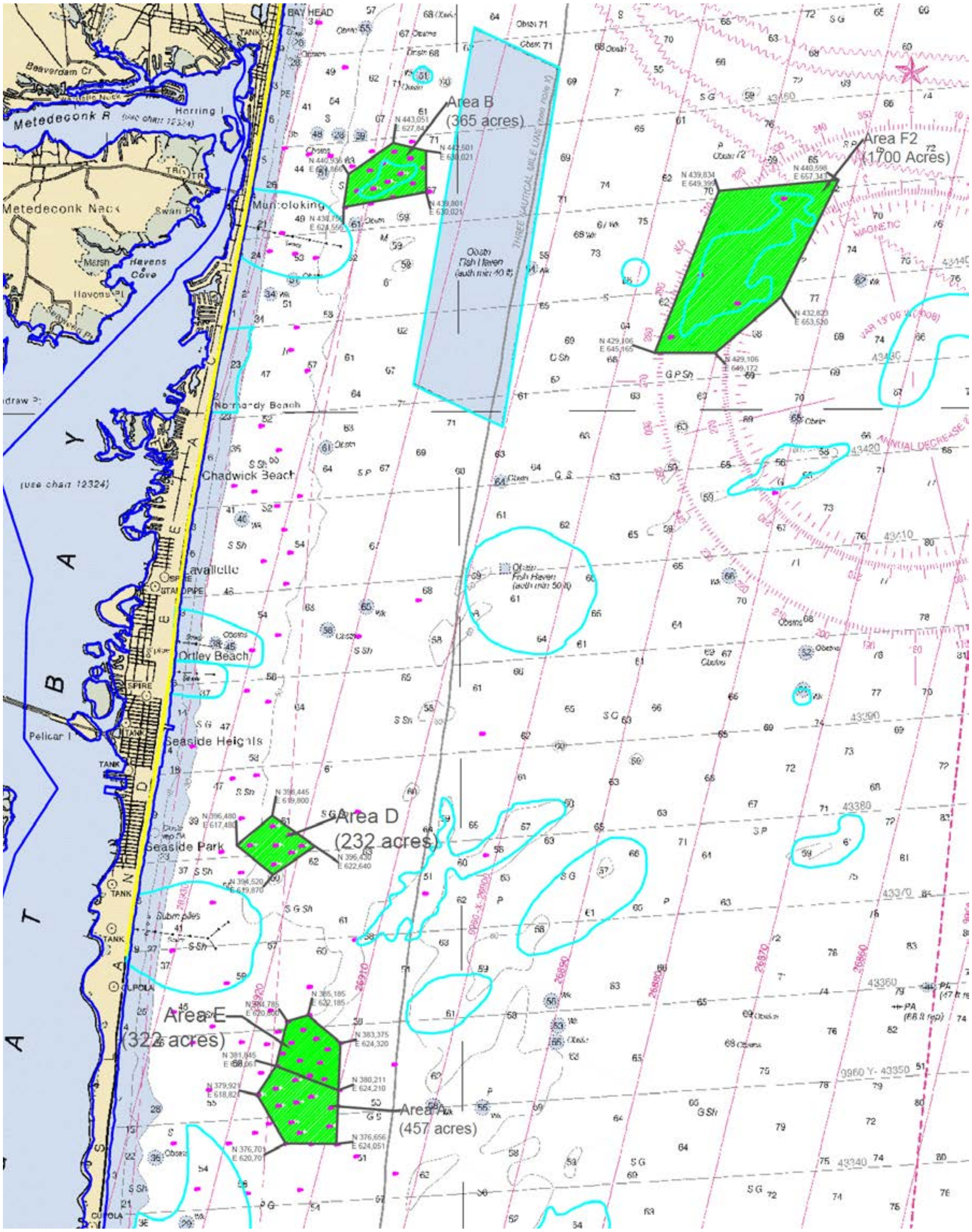

Figure 5. Currently Proposed Sand Borrow Areas

4.3 Recent Changes as a Result of Storms

In recent years, the project area has experienced several significant storm events including the recent Nor' Ida Storm of 2009, Hurricane Irene in 2011, and most notably the devastating storm, Hurricane Sandy, in October 2012.

Hurricane Sandy developed from a tropical wave in the western Caribbean on 22 October and was soon upgraded to Tropical Storm Sandy. On 24 October, Sandy became a hurricane and made landfall near Kingston, Jamaica. Sandy then re-emerged into the Caribbean and strengthened to Category 2. Early on 26 October, Sandy moved through the Bahamas. During 27 and 28 October, Sandy moved alongshore of the southeast U.S. coast, and reached a secondary peak of 90 mph on 29 October with a diameter of over 1,000 nautical miles. Sandy turned to the north-northwest and made landfall as a post-tropical cyclone at ~2000 EDT near Atlantic City, NJ with winds of 90 mph, causing extensive flooding, beach erosion, and coastal damage along the shorelines of Delaware, New Jersey, and New York. As Sandy approached landfall, it generated intense onshore winds, waves, and a storm surge that was augmented by astronomical spring tides associated with the full moon of 29 October. The remnants weakened over Pennsylvania and degenerated into a remnant trough on 31 October. The combined effects of wind, waves, and elevated tidal water levels led to significant storm damages to residential and commercial structures, public infrastructure and significant beach and dune erosion within the Manasquan Inlet to Barnegat Inlet Project Area. A summary of the impacts in each municipality is provided below.

Point Pleasant Beach: The dunes and beach berm in this area were severely eroded. Hundreds of homes and businesses were significantly impacted by flooding and damages ranged from minor structural issues to complete destruction. A majority of the boardwalk on the north end of the town was destroyed. Two to three feet of sand covered the streets in beach block areas.

Bay Head: Erosion of the dunes during Sandy uncovered a relic seawall that had been buried within the dune. The seawall is composed of stone and was initially constructed in the 1880s. It extends for approximately 4,100 feet from Karge Street to Egbert Street in a north to south direction. Despite the presence of the seawall, there was still significant structural damage to homes in Bay Head.

Mantoloking: Mantoloking experienced a complete loss of dunes and severe beach erosion during Sandy. Wave energy and storm surge was absorbed directly by many of the ocean front structures and they were catastrophically damaged and/or destroyed. Two to three feet of sand was deposited along the streets on the ocean block. Whole roads were washed out and overhead utility systems were destroyed. Breaches occurred in three locations where the ocean washed through the barrier spit and connected to the bay. The most significant breach was at Herbert Street where Route 528 comes across the bay on a bridge from the mainland and connects to Route 35 in Mantoloking. The Herbert Street breach was approximately 550 wide in a north to south direction and stretched approximately 900 feet from the ocean to the bay. The section of Route 35 at the breach location was completely destroyed.

Brick Township: Damages in Brick Township were similar to Mantoloking in their severity; however, no breaches occurred. Loss of dunes and severe beach erosion occurred and there was widespread destruction of homes.

Toms River Township: The northern portion of Toms River Township (Chadwick Beach) had a large dune system in place which reduced structural impacts. However significant beach erosion occurred on the lower berm and the seaward face of dunes. Wash though occurred at the pedestrian crossover cutouts at each street end. The southern portion of Toms River Township (Ortley Beach) suffered catastrophic damage to the entire infrastructure. The unobstructed wave energy and tidal surge created loss of all major underground utility systems, overhead power system, and paved surfaces. Many homes were completely destroyed on the ocean block. Sink holes were observed in many paved locations. Bay side bulkheads were destroyed.

Lavallette: There was a complete loss of dunes at the south end of Lavallette and very little beach berm remained following the storm. Major structural damage occurred on all of the ocean front buildings. Two to three feet of sand was observed covering the streets in the ocean block. The entire boardwalk was destroyed. Overhead power utilities, underground utilities and paved surfaces were significantly damaged.

Seaside Heights/Seaside Park: There was significant beach berm erosion and almost complete loss of dunes. Wave energy and tidal surge destroyed the boardwalk and amusement pier and caused significant structural damage to ocean block structures.

Berkeley Township: There were no significant impacts behind the large existing dune system. Significant erosion occurred on the beach berm and the seaward face of the dune.

Recovery efforts in the Manasquan Inlet to Barnegat Inlet project area have been on-going since Hurricane Sandy. These efforts have included some emergency storm damage protection projects to repair the most severely damaged areas that were most vulnerable to future storm events. The most severe damage, the breach at Herbert Street in Mantoloking, was repaired by the New Jersey Department of Transportation (NJDOT) and the US Army Corps of Engineers (with funding from FEMA) to restore the connection of Route 35 and Route 528. This repair involved the closure of the breach with a stone foundation in the former location of Route 35 and the installation of approximately 580 linear feet of a steel sheet pile wall on the beach side of the road. Sand and fill material were then used to restore the ground elevations to pre-breach conditions.

In the aftermath of Hurricane Sandy, the Federal Highway Administration and the State of New Jersey have begun a project that will reconstruct a 12.5 mile stretch of Route 35 from Point Pleasant to Island Beach State Park. As part of this plan, the New Jersey Department of Transportation has proposed a plan to construct a steel sheet pile wall along the oceanfront of the Borough of Mantoloking and Brick Township. The wall would run parallel to, and be covered by, the dunes proposed in the USACE (2002) project. The sheet pile wall would be similar to the one installed at the Herbert Street breach and would be driven 30 feet into the ground and stand 16 feet above the existing grade (Figure 5). The sheet pile would serve as a last line of defense against wave attack and storm surge if the proposed dunes were to be eroded by a storm similar to Hurricane Sandy in the future. The main purpose of the sheet pile wall would be to protect Route 35 and prevent another breach from occurring in these two municipalities, which are the narrowest populated section of the Barnegat Peninsula.

As noted earlier in this section, the erosion of the dunes in Bay Head during Hurricane Sandy uncovered a relic seawall that had been buried within the dune for approximately 100 years. Since the presence of this seawall appears to have given Bay Head a higher degree of protection than the dunes that were composed solely of sand and completely lost in the adjacent Mantoloking, the NJDEP has permitted beach front homeowners to extend the existing seawall. The structure has been extended approximately 1,600 feet to the south from Egbert Street to Mathis Place on the beach side of 17 properties. The relic seawall and the new extension will be covered by the dunes proposed in the USACE (2002) project. Current plans specify that the seawall extension in Bay Head will connect to the proposed sheetpile wall in Mantoloking with no gaps, resulting in a contiguous line of protection that utilizes underlying hard structures within the dune system.

Recovery efforts following Hurricane Sandy have also included the removal of debris that was deposited on land by the storm and the dredging of subaqueous areas where the deposition of materials has created shoals or navigation hazards. In 2013, USACE issued the NJDEP permits (under Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and a Nationwide Permit) which authorize these clean up and dredging activities within the project area from Point Pleasant south to Seaside Park. The subaqueous work involves the mechanical (bucket) dredging of shoals, marina basins, and state navigation channels within Barnegat Bay. Work at the land/water interface involves the cleaning of storm sewer outfalls that were choked with material. The permits specify that any of the dredged or clean up material that is greater than 90% sand can be screened and then stockpiled by the NJDEP for potential reuse in beach front areas, as long as the work remains on uplands/non-wetlands above the high tide line and the material is contained to prevent its escape to any aquatic areas. Within the project area, the permits authorize the dredging and potential reuse (given the cited conditions) of up to 415,000 cubic yards of material. Depending on where this reuse occurs in the beach front areas, these efforts could affect the quantities of beachfill needed for the proposed Federal Corps project.

4.4 Regulatory Changes

On October 6, 2010, the National Marine Fisheries Service (NMFS) published a Notice in the Federal Register proposing to list three Distinct Population Segments (DPSs) of Atlantic sturgeon (*Acipenser oxyrhinchus oxyrinchus*) in the Northeast Region. The New York Bight DPS, which includes Atlantic sturgeon whose range occurs in watersheds that drain into coastal waters, including Long Island Sound, the New York Bight, and the Delaware Bay, from Chatham, MA to the Delaware-Maryland border on Fenwick Island, as well as wherever these fish occur in coastal bays, estuaries, and the marine environment from Bay of Fundy, Canada to the Saint Johns River, FL, was proposed for listing as endangered. On February 6, 2012, NMFS issued two final rules (77FR 5880 and 77 FR 5914) listing five DPSs of Atlantic sturgeon as threatened or endangered under the Endangered Species Act (ESA). The effective date of the listing was April 6, 2012.

Since 1996, dredging projects have been conducted in the Philadelphia District in accordance with the Biological Opinion (NMFS, 1996) that provides conservation recommendation and reasonable and prudent measures for the shortnose sturgeon (*Acipenser brevirostrum*), four species of sea turtles, and marine mammals. By letter of February 21, 2013, the Philadelphia District reinitiated consultation in accordance with 50 CFR 402.14(c) under Section 7 of the Endangered Species Act to address the District's beach nourishment projects' effects on Atlantic Sturgeon and the sea turtles/marine mammals previously covered in NMFS (1996). A Programmatic Biological Assessment is currently being prepared by the Philadelphia District to cover all existing and proposed storm damage reduction projects within the Philadelphia District. This will be followed by a new BO to be issued by NMFS. In the interim, the Philadelphia District, through coordination with NMFS, has determined that allowing the District's beach nourishment program to continue to operate during the re-initiation period will not violate Section 7(a)(2) or 7(d).

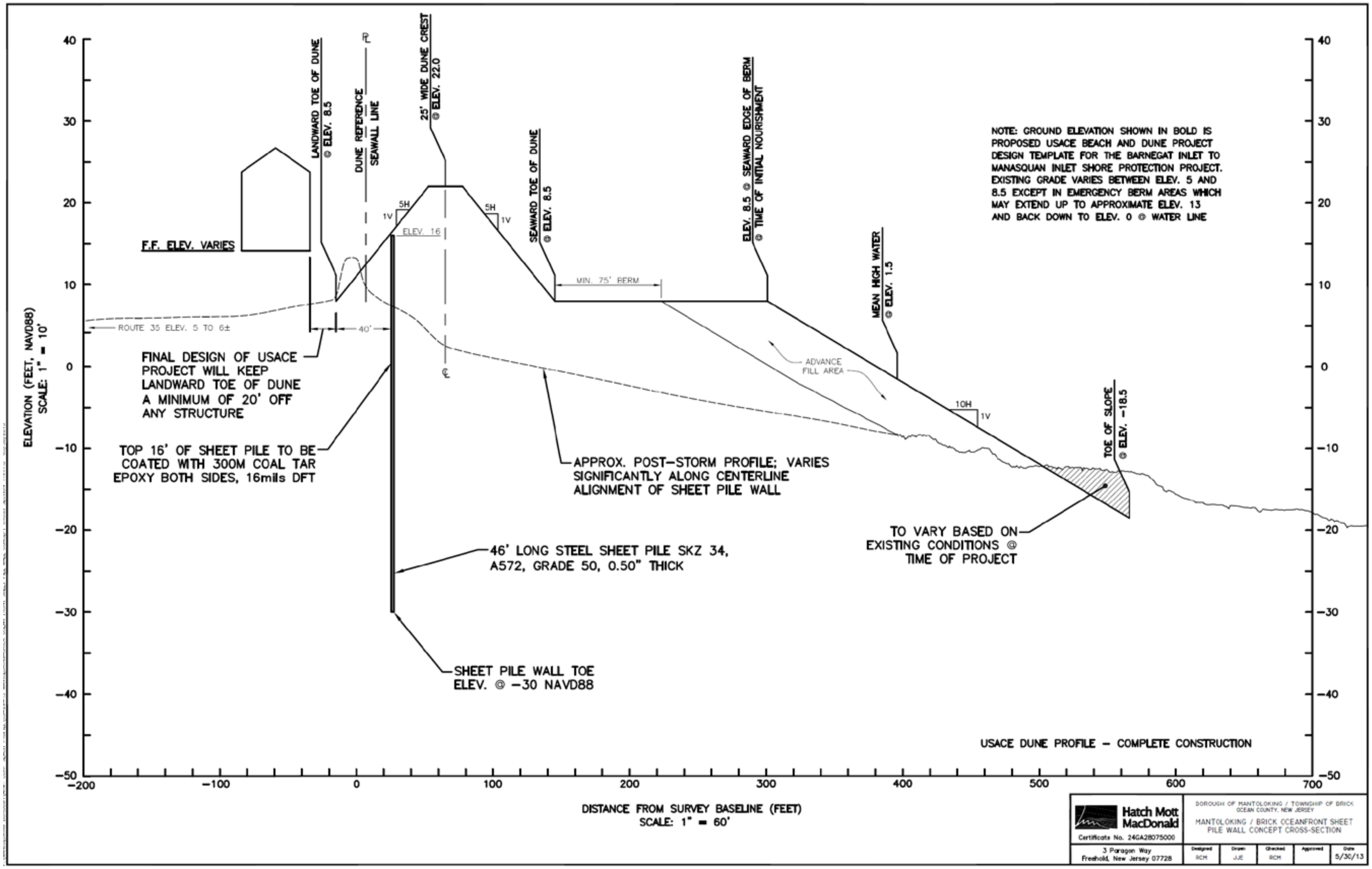

Figure 6. Concept Cross-Section for the Proposed Steel Sheet Pile Wall in Mantoloking and Brick Township

In 2006, the *rufa* subspecies of the red knot (*Calidris canutus rufa*) was added to the list of Federal candidate species due to the high magnitude of imminent threats to the subspecies, and the U.S. Fish and Wildlife Service (USFWS) is currently determining whether to designate it as threatened or endangered. Since 2006, listing has been precluded by other, higher priority listing actions. The Service is now preparing a Proposed Rule to list the species as either threatened or endangered. The Service must also consider whether there are areas of habitat believed to be essential to red knot conservation. If prudent and determinable, those areas will be proposed for designation as Critical Habitat. Transient red knots may be found anywhere along New Jersey's coasts. Concentrations of migrating birds are known to occur in Cumberland, Cape May, and Atlantic Counties ("Red Knot - New Jersey Field Office - U.S. Fish & Wildlife Service." *Red Knot - New Jersey Field Office - U.S. Fish & Wildlife Service*. N.p., n.d. Web. 24 July 2013. http://www.fws.gov/northeast/njfieldoffice/endangered/redknot.html).

Following a review of the final USACE (2002) report, the NJDEP provided the Philadelphia District and the non-Federal sponsor, NJDEP – Bureau of Coastal Engineering (BCE), with a series of conditions that would require the submission of additional information. This information was not available during the feasibility study phase of the project, but would be necessary for the NJDEP to issue a Federal Coastal Zone Consistency Determination (FEDCON) and Section 401 Water Quality Certification (WQC) for the project. Since 2002, the Philadelphia District has provided the NJDEP with the requested information as it became available. However, a number of the conditions cannot be met until shortly before the start of project construction, a date of which is currently uncertain. All of the required information will be provided to NJDEP to obtain their final concurrence and receive a FEDCON and WQC prior to project construction.

4.5 No Action

No action assumes that there would be no Federal involvement for storm damage reduction within the project area. USACE (2002) documented the vulnerabilities of the project area communities to storm damages associated with erosion, inundation and wave damages from the Atlantic Ocean. No action was eliminated early in the screening process because it did not meet the planning objectives for erosion protection, inundation protection and wave attack protection. Recent storms have demonstrated the vulnerability of this area to these types of damages. As described in Section 4.3, a majority of the project area experienced significant beach erosion, dune loss, flooding, structural damages and infrastructure damages from Hurricane Sandy. Based on the vulnerabilities of the project area to storm damages as demonstrated in USACE (2002), and the recent storms experienced in the project area, no action still does not meet the planning objectives, and is not considered further. Therefore, the selected plan with the proposed modifications is recommended for implementation.

5.0 AFFECTED ENVIRONMENT

USACE (2002) provided a comprehensive discussion on affected resources within the project area. A review of the affected environmental resources was conducted to determine if significant changes have occurred or if new information has become available since completion of USACE (2002). This review is presented as Table 3. Resource topics that do not require further discussion are incorporated by reference and are not discussed further. Resources that require further discussion are presented as indicated in Table 3.

Table 3. Status of Affected Resources

Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (2002)?**	**Notes**
General Environmental Setting	USACE (2002)	No	Although the area was affected by significant storm events, the overall environmental setting has not changed significantly since 2002.
Soils	USACE (2002)	No	No significant changes since 2002.
Mineral Resources	USACE (2002)	Yes	Three additional offshore borrow areas have been included and one requires approval from BOEM to extract sand resources.
Air Quality	USACE (2002)	Yes	Coordination to develop a conformity plan is on-going.
Water Quality	USACE (2002)	No	No significant changes.
Wetland Habitat	USACE (2002)	No	Some back-bay tidal wetland losses and storm-related debris deposition may have occurred since 2002.
Dune Habitat	USACE (2002)	Yes	Dune habitats experienced erosion from storm damages. Vegetation, shape and extent of dunes have been modified.
Upper Beach Habitat	USACE (2002)	Yes	Beaches experienced erosion due to storm damages.
Intertidal Zone Habitat	USACE (2002)	No	No significant change. Some storm-related debris could be in surf

Table 3. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (2002)?**	**Notes**
			zone. No significant changes to benthic communities expected.
Nearshore and Offshore Zone Habitats	USACE (2002)	No	No significant change. Some storm-related debris could be in nearshore. No significant changes to benthic communities expected.
Shellfish	USACE (2002)	No	No significant changes.
Finfish	USACE (2002)	Yes	Potential impacts to fisheries habitat related to near shore wrecks will be monitored following construction.
Prime Fishing Areas	USACE (2002)	Yes	Borrow Areas B and F2 now contain Prime Fishing Areas
Essential Fish Habitat	USACE (2002)	Yes	Borrow Area F2 will be coordinated with NMFS with regard to EFH.
Benthos (intertidal and nearshore)	USACE (2002)	No	Although the beaches were significantly affected by storm-related erosion, the benthic community is not expected to have been significantly altered due to its inherent resilience and adaptability in this dynamic environment.
Benthos (offshore)	USACE (2002)	Yes	Information on benthic sampling in Borrow Areas D and E is included in EA. Benthic sampling of Borrow Area F2 is being conducted
Birds	USACE (2002)	No	No significant change
Mammals (terrestrial)	USACE (2002)	No	No significant change
Mammals (marine)	USACE (2002)	Yes	Updated discussion of noise and effects on marine life.
Threatened and Endangered Species	USACE (2002)	Yes	Atlantic sturgeon listing requires Section 7

Table 3. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (2002)?**	**Notes**
			consultation. Interim measures are being implemented as per agreement with NMFS. Streamlined consultation as per USFWS (2005) for piping plovers and seabeach amaranth is required prior to construction.
Recreation	USACE (2002)	No	No significant changes since 2002.
Land Use	USACE (2002)	No	No significant changes since 2002.
Visual and Aesthetic Values	USACE (2002)	Yes	Significant dune and beach loss have altered the visual and aesthetic environment. Storm debris and structural damages from the storms have been addressed or are currently being addressed by local authorities.
Noise	USACE (2002)	No	No significant changes since 2002.
Cultural Resources	USACE (2002)	Yes	Phase II Cultural Resource Survey was conducted in 2005.
Hazardous, Toxic and Radioactive Waste (HTRW)	USACE (2002)	No	No significant changes since 2002.
Socioeconomics	USACE (2002)	No	A reanalysis of the socioeconomics of the project area will be conducted as part of a Limited Re-evaluation Report (LRR) to be completed in 2013

5.1 Mineral Resources

The offshore Borrow Area F2 lies outside of New Jersey State Waters and falls under Federal jurisdiction pursuant to the 1953 Outer Continental Shelf (OCS) Lands Act (43 U.S.C. 1331 et seq.; 43 U.S.C. 1801 et seq.). Under this Act, the Secretary of the Interior has direct responsibility for administration of oil, gas and mineral exploration; for development of the OCS; and for formulation of regulations to meet provisions of the Act. These functions are centralized under the U.S. Department of the Interior – Bureau of Ocean Energy Management (BOEM) (formerly the Minerals Management Service (MMS). Because this site would make use of Federal OCS sand resources, the Philadelphia District will coordinate with BOEM regarding the site location and pertinent site data. Prior to utilization of F2, a project-specific Memorandum of Agreement (MOA) between the USACE and BOEM will need to be negotiated and executed concerning the use of this site. However, because of the time constraints under the expedited schedule for initial construction of this project under P.L. 113-2: Disaster Relief Appropriations Act (FY 2013), F2 will not likely be available in time for initial construction. Therefore, initial construction will rely on Borrow Areas A, B, D and E, which are within state waters. Coordination with BOEM for the use of F2 for periodic nourishment has been initiated in order to comply with Outer Continental Shelf Lands Act. BOEM is a cooperating agency on this project.

5.2 Air Quality

USACE (2002) described the air quality in the project area. The U.S. Environmental Protection Agency (EPA) adopts National Ambient Air Quality Standards (NAAQS) for the common air pollutants, and the states have the primary responsibility to attain and maintain those standards. Through the State Implementation Plan (SIP), The New Jersey Department of Environmental Protection – Division of Air Quality manages and monitors air quality in the state. The goal of the State Implementation Plan is to meet and enforce the primary and secondary national ambient air quality standards for pollutants. New Jersey air quality has improved significantly over the last 40 years, but exceeds the current standards for ozone (O_3) throughout the state and fine particles (PM_{10} or $PM_{2.5)}$ in many urban areas. New Jersey has attained the sulfur dioxide (SO_2) (except for a portion of Warren County), lead (Pb), and nitrogen dioxide (NO_2) and Carbon Monoxide (CO) standards. The New Jersey Division of Air Quality also regulates the emissions of hazardous air pollutants (HAPs) designated by the U.S. EPA (accessed from internet website on 7/15/2013 at http://www.state.nj.us/dep/daq/).

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 four highest daily maximum 8-hour average concentration recorded each year for three years. Their classification with respect to the 8-hour standard is shown in Figure 7. Ground-level ozone is created when nitrogen oxides (NOx) and volatile organic compounds (VOC's) react in the presence of sunlight. NOx is primarily emitted by motor vehicles, power plants, and other sources of combustion. VOC's 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 entire state of New Jersey is in non-attainment and is classified as being “Marginal.” A “Marginal” classification is applied when an area has a design value of 0.085 ppm up to but not including 0.092 ppm (NJDEP, 2012 Ozone Summary).

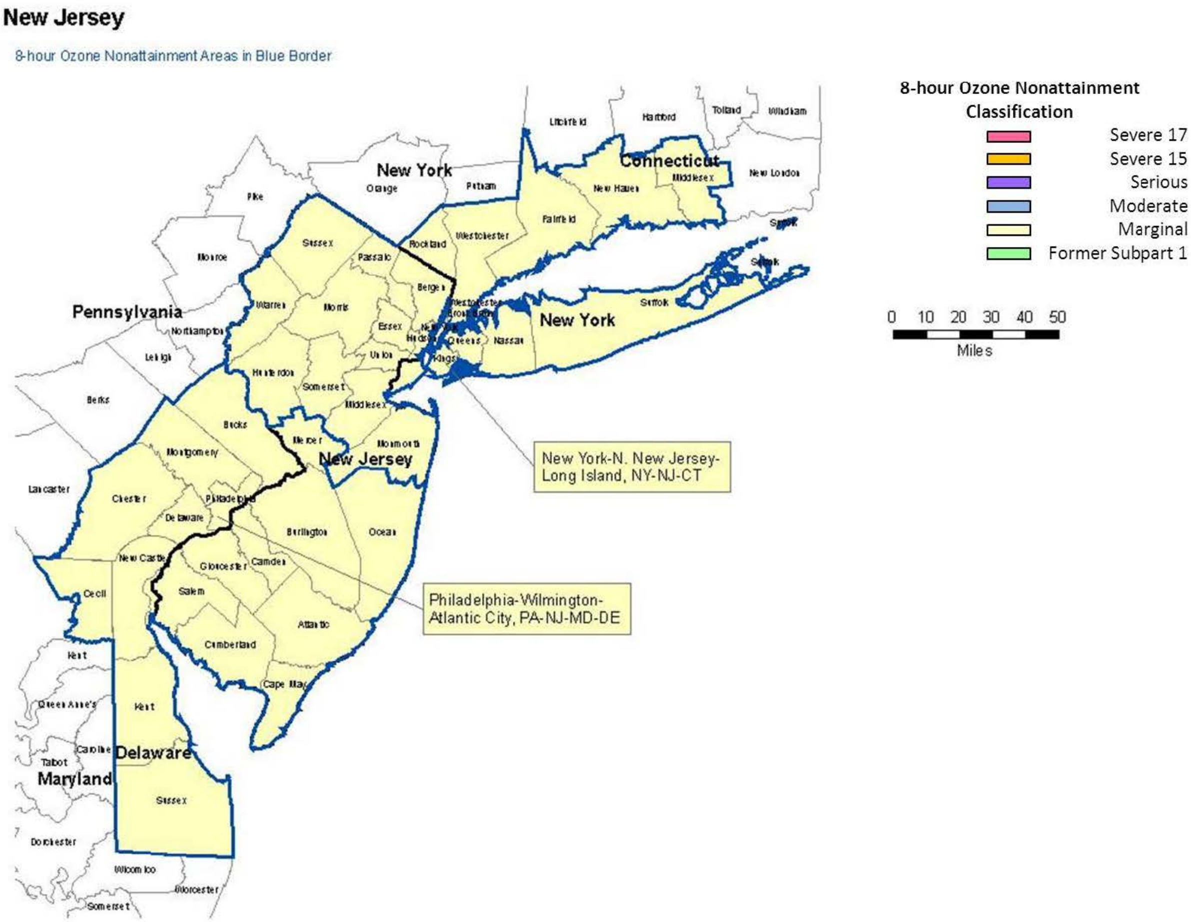

Figure 7. New Jersey Non-Attainment Areas for Ozone (Source: NJDEP, 2012).

5.3 Water Quality

Water quality within the project area was discussed in USACE (2002). Versar (2000) measured water quality in borrow areas A and B in August 1999 and borrow areas D and E in July 2005. Temperature, pH, dissolved oxygen (DO), conductivity, and salinity were measured relative to depth. The measurements taken found the water columns to be fairly homogeneous with little differences detected between sites. Water column stratification was detected between the surface and bottom measurements in all borrow sites, especially in regard to DO and temperature which were substantially lower for the stations at the sediment interface (bottom) than at the water surface.

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 studying 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 in the ocean. Ocean and bay recreational beaches are subject to opening and closing procedures of the State Sanitary Code and must be resampled when bacteria concentrations exceed the primary contact standard of 104 enterococci per 100 mL of sample. Consecutive samples that exceed the standard require the closing of the beach until a sample is obtained that is within the standard.

Elevated enterococci counts along the coast of New Jersey may result from failing septic tanks, wastewater treatment plant discharges, combined sewer overflows, stormwater drainage, runoff from developed areas, domestic animals, wildlife and sewage discharge from boats. Point source discharges from coastal wastewater treatment facilities can affect water quality at bathing beaches. Accordingly, the NJDEP routinely monitors the treatment of effluent at these facilities, to ensure that they operate in accordance with the requirements of their permits. For recreational beaches, the health agency also surveys the area visually and collects additional samples ("bracket samples") at either side of the station to determine the extent of the pollution and possible pollution sources. The results of the bracket samples determine the extent of restrictions imposed along the shore and the number of beaches closed.

Between 2012 and August 2013, the Ocean County Health Department sampled recreational beach water for bacteria and pathogens. Sampling was conducted once a week during the swimming season. During the 2012 summer swimming season in Ocean County, water quality criteria were exceeded within:

- Lavallette on June 25
- Seaside Park on July 2
- Seaside Heights on July 9
- Lavallette, Seaside Park, and Seaside Heights on July 16
- Lavallette, Seaside Park, and Seaside Heights on August 6
- Lavallette on August 13
- Point Pleasant and Seaside Heights on September 4

In 2013 to date (August 26th), water quality criteria have not been exceeded within the project area (data obtained from internet website: http://www.nj.gov/dep/beaches/oc.html on 8/28/2013).

5.4 Wetland Habitat

The wetland habitat in the study area was described in USACE (2002) and consists of back bay/coastal salt marsh systems. The backbays are comprised of open water, a low marsh zone, tidal flats, a high marsh zone and a transition zone. All of these zones play a critical habitat roll for diverse number of species. Post-storm assessments performed after Hurricane Sandy indicated that wetlands in Barnegat Bay to the east of Mantoloking had been impacted by the breaches that occurred. Habitat in these wetlands had been degraded by the massive influx of sand from across the island which covered the zones mentioned above.

Wetlands on the bay side of Island Beach State Park were also impacted by the erosive forces of Hurricane Sandy. The elevations of these wetlands had been lowered which made them vulnerable to repeated tidal flooding, overwash, storm surge and wave action. These elevation changes can have critical impacts on coastal zone species that rely on this habitat for breeding, food source, cover, and travel corridors.

5.5 Dune and Upper Beach Habitat

As discussed in USACE (2002) natural dunes or remnants of ones are present within the study area, primarily within Island Beach State Park. However, large segments of the shoreline contain dense development consisting primarily of residential houses or commercial structures with a maintained dune or no dune at all. The presence and sizes of dunes vary throughout the project area. Flora typical of primary and secondary dunes were described.

Following Hurricane Sandy, a post-storm assessment of the beaches in the project area was performed by Philadelphia District personnel in early November 2013. Beach and dune erosion were documented and summarized in Section 4.3 of this report. Severe erosion or complete loss of dunes occurred along a majority of the project area. With damage to the dunes, vegetation along with habitat values for some wildlife was substantially or completely lost. As part of the Hurricane Sandy recovery efforts, some dunes have been partially rebuilt by the municipalities and NJDEP with sand that was deposited landward during the storm.

5.6 Fisheries

5.6.1 Shellfish

Shellfish resources within the project affected area were described in USACE (2002). Surfclams (*Spisula solidissima*) are the largest bivalve community found off the Atlantic coast from the Gulf of Saint Lawrence, Canada to North Carolina, and are of considerable resource value in New Jersey Atlantic Coastal waters.

The proposed sand borrow areas in USACE (2002) (A and B) were surveyed in 1999 and 2001 to document the presence and density of juvenile and adult surf clam stocks. In the initial survey, Versar, Inc., (2000) found that the mean abundance of juvenile clams at the two borrow areas were, in general, significantly lower than the clam abundances at the nearby Long Beach Island borrow areas (LBI regional areas).

In the 1999 survey, approximately 2,000 surf clams were collected among the 15 tows conducted in Area A. Density estimates for Area A averaged 6 clams/100 sq ft and ranged to 51 clams/100 sq ft. Overall, the standing stock of adult surf clams of Area A was estimated to be 1.2 million clams.

In the 1999 survey, no adult surf clams were collected in the five tows conducted within Area B. Subsequent to this survey, the size of Borrow Area B was increased to accommodate sand quantities required for the project so additional surf clam tows were conducted within the entire borrow area in 2001. Density estimates for Area B averaged 11.9 clams/100 sq. ft. and ranged to 69.6 clams/100 sq. feet. Overall, the standing stock of adult surf clams of Borrow Area B was estimated to be 1.86 million clams.

Borrow areas D and E were surveyed in 2006 to document the presence and density of juvenile and adult surf clam stocks (Versar, 2007). Hydraulic surf clam dredging conducted at 20 stations within each borrow area indicated that although adult clams were present in the area, overall, adult clam densities were low. Juvenile clam abundances collected with the grab sampler were also low, indicating that neither borrow area is an active nursery for surf clam recruits. At borrow area D, only 7 of 17 stations contained juvenile clams and abundances ranged from 1 to 6 clams per grab. At borrow area E, only 1 to 2 clams per grab were collected from the six stations with clams.

Versar (2008) conducted a comprehensive analysis of surfclam data collected by NJDEP over a 19-year period from 1988 to 2006. This data shows variable densities over the years, but tended to have the higher densities closer to Manasquan Inlet and Barnegat Inlet. From a historical perspective, some areas between Manasquan Inlet and Barnegat Inlet showed densities that were relatively high (>5.7 bushels/100m^2) (Figure 8).

5.6.2 Finfish

The species composition of finfish in the project area has not changed significantly since it was discussed in USACE (2002). However, the habitat for finfish, specifically near shore shipwrecks functioning as artificial reefs, may be altered by the proposed project. Potential impacts to the shipwrecks and the proposed monitoring plans are discussed in section 6.5.2.

5.6.3 Prime Fishing Areas

Several locations within or near the project area are classified as Prime Fishing Areas (NJAC 7:7E-3.4) by NJDEP (Figure 9). One of these features lies within Borrow Area B and one lies within Borrow Area F2 (“The Manasquan Ridge”). These areas were originally delineated by Long and Figley (1984) in a publication titled “New Jersey’s Recreational and Commercial Ocean Fishing Grounds”. The mapping was updated by the NJDEP in 2003 when they surveyed charter boat, party boat and private boat captains to identify the areas they consider recreationally significant fishing areas. This survey data was used as a basis for the mapping of these areas (NJDEP website: http://www.nj.gov/dep/gis/digidownload/metadata/statewide/sportfishing.htm). Prime Fishing Areas include tidal water areas and water's edge areas, which have a demonstrable history of supporting a significant local quantity of recreational or commercial fishing activity. Other fish habitats of value, within the study area include artificial reefs, wreck sites, groins and jetties.

5.6.4 Essential Fish Habitat

Under provisions of the reauthorized Magnuson-Stevens Fishery Conservation and Management Act of 1996, the entire study area including the borrow areas, nearshore and intertidal areas were designated as Essential Fish Habitat (EFH) for species with Fishery Management Plans (FMP's), and their important prey species. The National Marine Fisheries Service has identified EFH within 10 minute X 10 minute squares. The study area contains EFH for various life stages for 30 species of managed fish and shellfish. Table 4 presents the managed species and their life stage that have been identified within the study area. These squares are within the seawater biosalinity zone (NOAA, 1999). The habitat requirements for identified EFH species and their representative life stages are provided in Table 5. USACE (2002) provided an evaluation of EFH in the project area. Recent correspondence with NMFS identified a need to re-evaluate EFH. To provide a complete evaluation, information from USACE (2002) is included, and any new information is presented as appropriate.

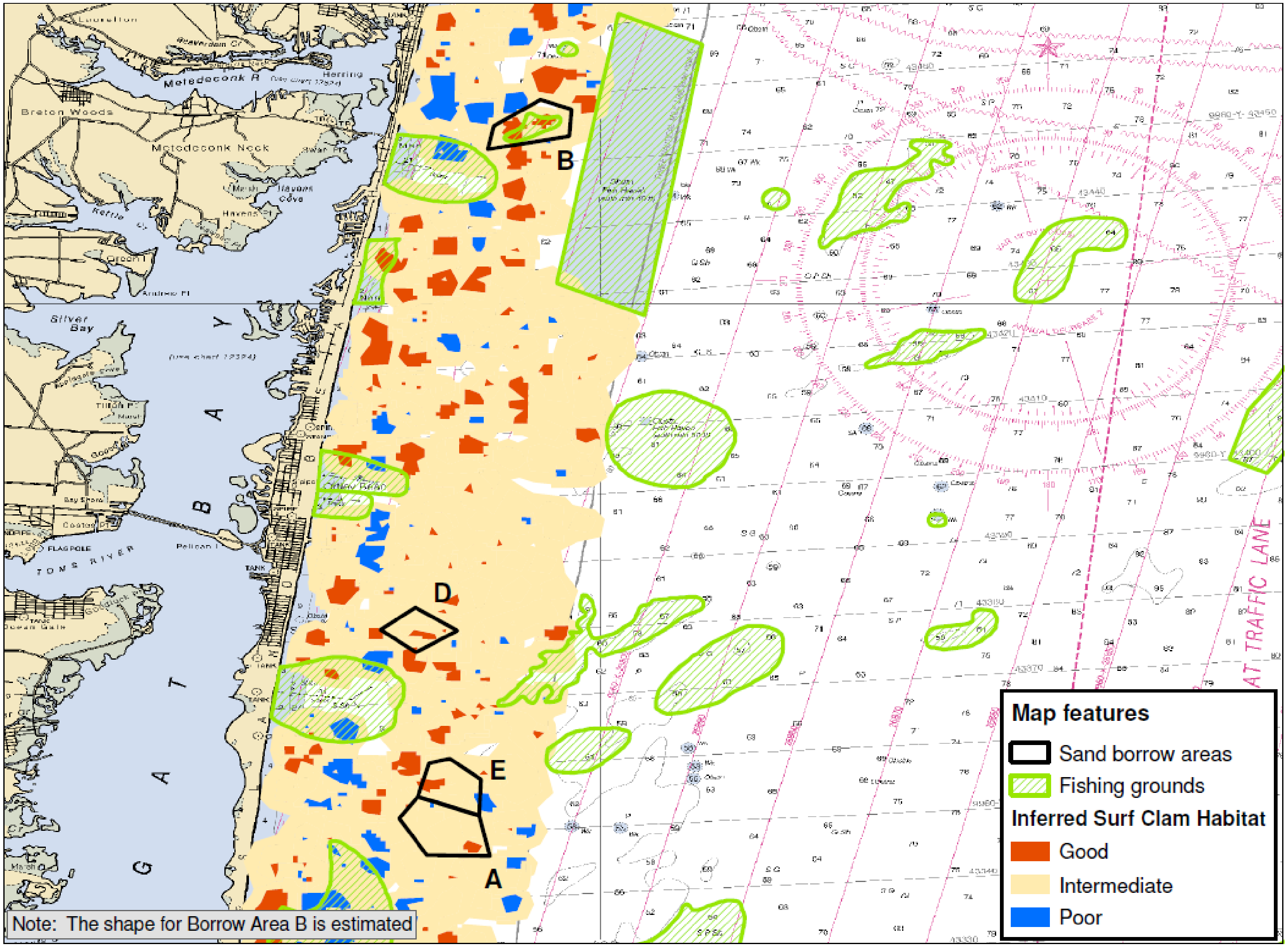

Figure 8. Surf Clam Habitat Map Based on the Geo-Spatial Analysis of 19 years of NJDEP Data (1988 to 2006).

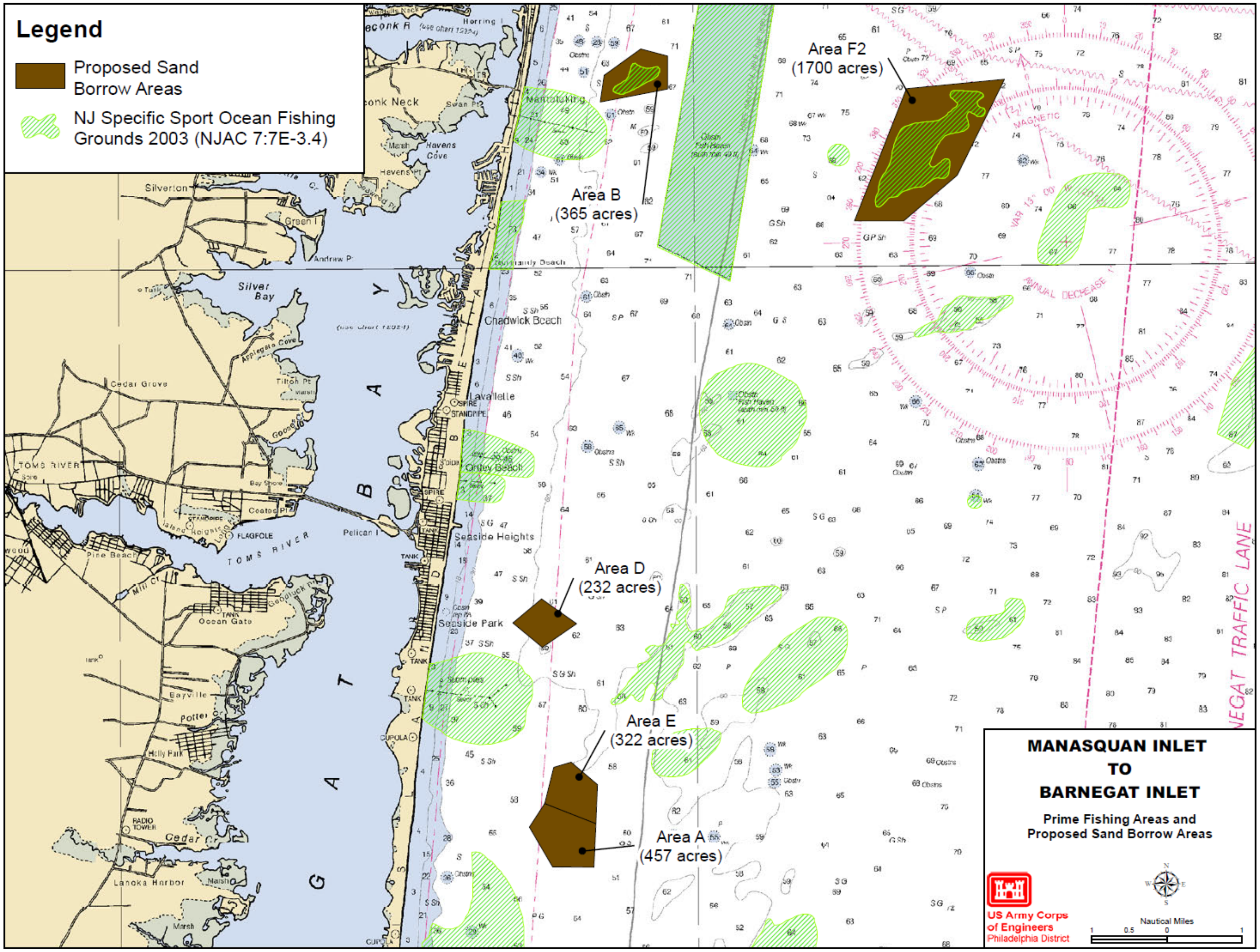

Figure 9. Prime Fishing Areas and Proposed Sand Borrow Areas

Table 4. Summary of Species with EFH Designations in the 10 Min. X 10 Min. Squares within the Study Area

(Guide to Essential Fish Habitat Designations accessed on 8/13/2013 at http://www.nero.noaa.gov/hcd/index2a.htm)

MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
Atlantic cod *(Gadus morhua)*				X
Whiting (*Merluccius bilinearis)*	X	X	X	X
Red hake *(Urophycis chuss)*	X	X	X	
Redfish *(Sebastes fasciatus)*	n/a			
Witch flounder (*Glyptocephalus cynoglossus)*	X			
Winter flounder (*Pleuronectes americanus*)	X	X	X	X
Yellowtail flounder *(Pleuronectes ferruginea)*	X	X		
Windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
Ocean pout *(Macrozoarces americanus)*	X	X		X
Atlantic sea herring *(Clupea harengus)*			X	X
Monkfish *(Lophius americanus)*	X	X		
Bluefish *(Pomatomus saltatrix)*			X	X
Long finned squid *(Loligo pealei)*	n/a	n/a		
Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus tricanthus)*			X	
Summer flounder *(Paralicthys dentatus)*		X	X	X
Scup *(Stenotomus chrysops)*	n/a	n/a	X	X
Black sea bass *(Centropristus striata)*	n/a		X	X
Surf clam *(Spisula solidissima)*	n/a	n/a	X	X
Ocean quahog *(Artica islandica)*	n/a	n/a		
Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
King mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
Cobia *(Rachycentron canadum)*	X	X	X	X
Dusky shark *(Charcharinus obscurus)*		X		
Sandbar shark *(Charcharinus plumbeus)*		X	X	X
Tiger shark *(Galeocerdo cuvieri)*		X	X	
Clearnose skate (*Raja eglanteria*)			X	X
Little skate (*Raja erinacea*)			X	X
Winter skate (*Raja ocellata*)			X	X

Table 5. Habitat Utilization of Identified EFH Species for Representative Life Stages (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Atlantic cod *(Gadus morhua)* (Fahay, 1998)				**Habitat:** Bottom (rocks, pebbles, or gravel) winter for Mid-Atlantic **Prey:** shellfish, crabs, and other crustaceans (amphipods) and polychaetes, squid and fish (capelin redfish, herring, plaice, haddock).
Whiting (*Merluccius bilinearis)* (Morse et al. 1998)	**Habitat:** Pelagic continental shelf waters in preferred depths from 50-150 m.	**Habitat:** Pelagic continental shelf waters in preferred depths from 50-130 m. (Morse et al. 1998)	**Habitat:** Bottom (silt-sand) nearshore waters in preferred depths from 150-270 m in spring and 25-75 m in fall. **Prey:** fish, crustaceans (euphasids, shrimp), and squids (Morse et al. 1998)	
Red hake *(Urophycis chuss)* (Steimle et al. 1998)	**Habitat:** Surface waters, May – Nov.	**Habitat:** Surface waters, May – Dec. Abundant in mid-and outer continental shelf of Mid-Atl. Bight. **Prey:** copepods and other microcrustaceans under floating eelgrass or algae.	**Habitat:** Pelagic at 25-30 m and bottom at 35-40 m. Young inhabit depressions on open seabed. Older juveniles inhabit shelter provided by shells and shell fragments. **Prey:** small benthic and pelagic crustaceans (decapod shrimp, crabs, mysids, euphasiids, and amphipods) and polychaetes).	
Witch flounder (*Glyptocephalus cynoglossus)* (Cargnelli et. al., 1998)	**Habitat:** Pelagic , generally over deep water in depths ranging from 10 – 1250			

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	m.			
Winter Flounder (Pseudopleuronectes americanus) (Pereira et. al., 1998)	**Habitat:** Demersal, inshore areas with sand, muddy sand, mud, and gravel bottoms. Water depths less than 5 meters.	**Habitat:** Pelagic and demersal inshore areas, water depths less than 6 meters.	**Habitat:** Young of the year (YOY) are demersal, nearshore low (primarily inlets and coves) energy shallows with sand, muddy sand, mud and gravel bottoms. **Prey:** YOY Amphipods and annelids JUV – Sand dollar, Bivalve siphons, Annelids, Amphipods	**Habitat:** Demersal offshore (in spring) except when spawning where they are in shallow inshore waters (fall). **Prey:** Amphipods, Polychaetes, Bivalves or siphons, Capelin eggs, Crustaceans
Yellowtail flounder *(Pleuronectes ferruginea)* (Johnson et al., 1998)	**Habitat:** Pelagic waters ranging from 10 to 750 m	**Habitat:** Pelagic waters **Prey:** Polychaetes		
Windowpane flounder *(Scopthalmus aquosus)* (Chang, 1998)	**Habitat:** Surface waters <70 m, Feb-July; Sept-Nov.	**Habitat:** Initially in pelagic waters, then bottom <70m,. May-July and Oct-Nov. **Prey:** copepods and other zooplankton	**Habitat:** Bottom (fine sands) 5-125m in depth, in nearshore bays and estuaries less than 75 m **Prey**: small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae	**Habitat:** Bottom (fine sands), peak spawning in May , in nearshore bays and estuaries less than 75 m **Prey**: small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae
Ocean pout *(Macrozoarces americanus)* (Steimle et. al., 1998)	**Habitat:** Demersal, cool waters across the continental shelf	**Habitat:** Coastal and saline (>25ppt) estuarine waters		**Habitat:** Intertidal areas across continental shelf and on upper continental slope to about 200 m. **Prey:** Variety of benthic inverts, including polychaetes, molluscs, crustaceans, and echinoderms
Atlantic sea herring *(Clupea harengus)* (Reid et al., 1998)			**Habitat:** Pelagic waters and bottom, < 10 C and 15-130 m depths **Prey:**	**Habitat:** Pelagic waters and bottom habitats; **Prey:** chaetognath, euphausiids, pteropods and copepods.

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			zooplankton (copepods, decapod larvae, cirriped larvae, cladocerans, and pelecypod larvae)	
Monkfish *(Lophius americanus)* (Steimle et al., 1998)	**Habitat:** Surface waters, Mar. – Sept. peak in June in upper water column of inner to mid continental shelf	**Habitat:** Pelagic waters in depths of 15 – 1000 m along mid-shelf also found in surf zone **Prey:** zooplankton (copepods, crustacean larvae, chaetognaths)		
Bluefish *(Pomatomus saltatrix)*			**Habitat:** Pelagic waters of continental shelf and in Mid Atlantic estuaries from May-Oct.	**Habitat:** Pelagic waters; found in Mid Atlantic estuaries April – Oct.
Long finned squid *(Loligo pealei)*	n/a	n/a		
Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus tricanthus)*			**Habitat:** Pelagic waters in 10 – 360 m	
Summer flounder *(Paralicthys dentatus)*		**Habitat:** Pelagic waters, nearshore at depths of 10 – 70 m from Nov. – May	**Habitat:** Demersal waters (mud and sandy substrates)	**Habitat:** Demersal waters (mud and sandy substrates). Shallow coastal areas in warm months, offshore in cold months
Scup *(Stenotomus chrysops)*	n/a	n/a	**Habitat:** Demersal waters	**Habitat:** Demersal waters offshore from Nov – April
Black sea bass *(Centropristus striata)*	n/a		**Habitat:** Demersal waters over rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas and wintere off shore at	**Habitat:** Demersal waters over structured habitats (natural and man-made), and sand and shell areas and winters off shore at depths of 25-50 m in shell beds and shell patches.

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
			depths of 1-38 m in shell beds and shell patches	
Surf clam *(Spisula solidissima)*	n/a	n/a	**Habitat:** Throughout bottom sandy substrate to 60 m depth	**Habitat:** Throughout bottom sandy substrate to 60 m depth
Ocean quahog *(Artica islandica)*	n/a	n/a		
Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
King mackerel *(Scomberomorus cavalla)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone
Spanish mackerel *(Scomberomorus maculates)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Cobia *(Rachycentron canadum)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Dusky shark *(Charcharinus obscurus)*		**Habitat:** Shallow coastal waters		
Sandbar shark *(Charcharinus*		**Habitat:**	**Habitat:**	**Habitat:** Shallow coastal

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
plumbeus)		Shallow coastal waters	Coastal and pelagic waters	waters
Tiger shark *(Galeocerdo cuvieri)*		**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters	
Clearnose skate (*Raja eglanteria*)			**Habitat:** Shallow soft bottoms or rocky, gravelly bottoms.	**Habitat:** Shallow shores moves to deeper water in winter.
Little skate (*Raja erinacea*)			**Habitat:** Shallow coastal water over sand or gravel to 80 fathoms **Prey:** Crustaceans, clams, squids and worms	**Habitat:** Shallow coastal water over sand or gravel to 80 fathoms **Prey:** Crustaceans, clams, squids and worms
Winter skate (*Raja ocellata*)			**Habitat:** Shallow coastal water over sand or gravel to 80 fathoms **Prey:** Crustaceans, clams, squids and worms	**Habitat:** Shallow coastal water over sand or gravel to 80 fathoms **Prey:** Crustaceans, clams, squids and worms

5.7 Benthos

Intertidal and Nearshore Zones: Benthic macroinvertebrates of the intertidal and nearshore zones within the affected area are described in USACE (2002), which includes those that inhabit soft sandy bottoms and hard rocky intertidal areas. This zone contains a mixture of deposit feeders and carnivores. A number of interstitial animals (meiofauna) are present feeding among the sand grains for bacteria and unicellular algae, which are important in the beach food chain. Meiofauna are generally < 0.5 mm in size and are either juveniles of larger macrofauna or exist as meiofauna during their entire life cycle. Some common meiofauna include Rotifera, Gastrotricha, Kinorhyncha, Nematoda, Archiannelida, Tardigrada, Copepoda, Ostracoda, Mystacocarida, Halacarida, and many groups of Turbellaria, Oligochaeta, and some Polychaeta.

Naturally occurring rocky intertidal zones are absent from the project area. However, man-made structures such as seawalls, jetties, and groins are present and provide suitable habitats for aquatic and avian species. Benthic macroinvertebrates such as barnacles (*Balanus balanoides*), polychaetes, molluscs (*Donax sp.*), small crustaceans such as, mysid shrimp (*Heteromysis formosa*), amphipods (*Gammarus* *sp.*), and uropods (*Idotea baltica*), reside on and around these structures. The blue mussel (*Mytilus edulis)* is a dominant member of this community.

Despite the disturbance of these zones from recent storm activity, no significant changes to this benthic community are expected. This is attributed to this community's highly adaptive and resilient nature because of the extreme environment that they inhabit.

Offshore Zone: Benthic macroinvertebrates of the offshore zone within the original two proposed offshore borrow areas (A and B) are described in USACE (2002). A benthic-sediment assessment was conducted focusing on infauna species within borrow areas A and B to establish a baseline for the benthic macroinvertebrate assemblages within the areas (Versar, Inc., 2000). Other objectives were to identify the presence of any commercial and/or recreationally important benthic communities within the proposed sand borrow sites. The data obtained from areas A and B were compared to each other, nearby reference areas, and other local borrow areas sampled under other studies.

For the 2000 assessment, 30 benthic macroinvertebrate samples were collected from areas A and B. The results of the Versar, Inc. investigation indicate that the community composition of the borrow areas and the nearby reference areas were similar. The borrow areas were dominated by a few very abundant taxa. Of the 20 dominant taxa collected from the areas, eleven were polychaete taxa. The most dominant polychaete taxa was the small bristle worm, *Polygordius* spp. Small, juvenile surfclams (*Spisula solidissima)* were the dominant bivalve in the two borrow areas.

In 2005, Versar, Inc. sampled benthic communities in borrow areas D and E. The benthic communities observed in these areas contained marine species common to stable mid-Atlantic coastline environments. The most abundant taxa consisted of common polychaete species and oligochaetes with opportunistic life-history characteristics. Such taxa possess characteristics that include short life cycles of one year or less, rapid growth, and the ability to produce multiple broods per year. These life-history characteristics lead to populations with natural boom and bust abundance patterns that can occur even on a microhabitat scale. Abundances of the three dominant taxa collected ranged from hundreds to thousands per square meter from station to station within each borrow area and accounted for over 90% of the total abundance within each borrow area. Cluster analysis performed on all of the stations within each borrow area were remarkably similar, leading to the conclusion that the benthic populations located in the deeper waters offshore of the project area are very stable over space and time.

Benthic communities can be variable seasonally or over the long-term. However, the benthic communities that currently exist in the offshore sand sources are not expected to be significantly different from those described in USACE (2002) and those sampled in 2005.

5.8 Wildlife

5.8.1 Birds

USACE (2002) provides a discussion of all of the avifauna within the affected areas. A majority of the species discussed utilize the isolated and undeveloped back bay and island habitats for wintering, nesting, and feeding. The erosive forces of Hurricane Sandy impacted the back bay habitats by eliminating nesting sites or by lowering the elevation of many nesting sites and making them vulnerable to repeated tidal flooding, overwash, storm surges and wave action. Much of this lost habitat included marsh hummocks which are critical to salt marsh obligate breeding birds. During the breaches that occurred at Mantoloking, avian wetland habitat in Barnegat Bay was impacted by the resulting sediment influx. Some wetland habitat at Island Beach State Park was also lost due to erosion during the storm.

On the ocean side of the project area, the loss of beach eliminated or significantly reduced the size of many high energy areas where shore birds feed. Both the biomass and species composition of the infaunal communities in these areas are critical for supplying the nutritional needs of shorebirds, especially during spring and fall migrations. The loss of dunes rendered areas less suitable for nesting and vulnerable to nest flooding. For obligate beach nesting shorebirds and seabirds, this habitat loss could have severe reproductive implications.

In some areas, the storm may have created habitat for beach nesting shorebirds and other shore and migratory species by pushing sand westward. However this habitat is not likely to be of a high quality since these areas are heavily accessed by humans.

5.8.2 Mammals, Reptiles and Amphibians

Terrestrial mammalian species are more likely to be found in the more upland habitats along the ocean coast. Several species of mammals are associated with dune habitats such as the raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), red fox (*Vulpes fulva*), white-footed mouse (*Peromyscus leucopus*), meadow vole (*Microtus pensylvanicus*), and white-tailed deer (*Odocoileus virginianus*).

Common reptilian and amphibian species associated with dune habitats may include Fowler’s toad (*Bufo woodhousei fowleri*), eastern hognose snake (*Heterodon platyrhinos*), and box turtle (*Terrapene carolina*). Tidal marsh and adjacent upland dunes of the inland bays system are important habitats for feeding and nesting of the diamondback terrapin (*Malaclemys terrapin terrapin*).

The erosion of the dunes that occurred across the project area during Hurricane Sandy diminished the dune habitats that are available to these species.

5.8.3 Rare, Threatened and Endangered Species

USACE (2002) provides a discussion of all of the rare, threatened and endangered species within the affected areas. The Federally listed (threatened) and state listed (endangered) piping plover (*Charadrius melodus*) has historically nested near the study area in Island Beach State Park. NJDEP, Division of Fish and Wildlife, reports that the last known documentation of nesting pairs of piping plovers in the study area was in 2005 at Island Beach State Park.

The candidate species, red knot (*Calidris canutus rufa*,) can be found in lower densities during the spring and fall migrations along Atlantic Coast beaches, and could occur within the project area. In wintering and migration habitats, red knots may forage on bivalves, gastropods, and crustaceans (USFWS 2013; Harrington 2001).

The seabeach amaranth (*Amaranthus pumilus*) is a Federally listed threatened plant. The seabeach amaranth is an annual plant, endemic to Atlantic coastal plain beaches, and primarily occurs on overwash flats at the accreting ends of barrier beach islands and lower foredunes of non-eroding beaches. The species occasionally establishes small temporary populations in other areas, including bayside beaches, blowouts in foredunes, and sand and shell material placed as beachfill. The 2012 U.S. Fish and Wildlife Service Survey and Monitoring Report for the seabeach amaranth indicated that 16 plants were found in Island Beach State Park. No seabeach amaranth was documented in any other locations within the study area in 2012.

The New York Bight population of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) was recently listed as endangered by the NMFS. Atlantic sturgeon are anadromous, spending a majority of their adult life phase in marine waters, migrating up rivers to spawn in freshwater then migrating to brackish water in juvenile growth phases. The Atlantic sturgeon are known to spawn within the Delaware River and migrate along the coast of New Jersey, although the extent of the use of marine habitat by Atlantic sturgeon is not fully known. This species could be present within the project impact area. Studies have indicated that depth distribution appears seasonal, with sturgeon inhabiting the deepest waters during the winter and the shallowest during summer and early fall.

5.9 Visual and Aesthetic Values

As noted in USACE (2002), the resort towns in the study area draw on the high aesthetic values of the seashore environment, which includes sandy beaches, dunes, and ocean views. The significant dune and beach losses that occurred during Hurricane Sandy have altered the visual and aesthetic environment. Although storm debris and structural damages from the storm are currently being addressed by local authorities, the condition of the dunes and beaches are, in some areas, significantly different than described in USACE (2002).

5.10 Noise

USACE (2002) discussed noise in the affected area and determined that noise is of environmental concern because it can cause annoyance and adverse health effects to humans and animal life. Noise can impact such activities as conversing, reading, recreation, listening to music, working, and sleeping. Wildlife behaviors can be disrupted by noises also, which can disrupt feeding and nesting activities. Because of the developed nature of the communities in the study area, noises are common and can come in the form of restaurant and entertainment facilities, automobiles, boats, and recreational visitors. However, these communities impose local restrictive noise ordinances to minimize noise.

5.11 Cultural Resources

Several terrestrial and marine cultural resource investigations were conducted by the USACE and discussed in USACE (2002). These investigations were conducted in consultation with the New Jersey State Historic Preservation Office (NJSHPO) and other interested parties for the Manasquan Inlet to Barnegat Inlet project to fulfill Section 106 responsibilities under the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR Part 800.

For one of the investigations mentioned above (Dolan Research, Inc. 2001), researchers examined proposed project offshore borrow areas, submerged near-shore locations, and terrestrial shoreline areas utilizing magnetometer, side-scan, and bathymetric data collection techniques. No remote sensing targets were identified in the project's two offshore borrow areas (A and B) or on the terrestrial portion of the shoreline. Nineteen remote sensing targets exhibiting shipwreck characteristics were identified in the submerged portion of the near-shore area. One possible shipwreck was also identified 15 feet offshore of South Mantoloking/Camp Osborne Beach near Seneca Dunes. It was determined that the proposed construction activities had the potential to impact these 20 sites and that they should be further investigated by a Phase II underwater investigation during the next Planning, Engineering and Design (PED) phase of the project.

Subsequent coordination in 2004 between the Philadelphia District, the NJSHPO, and Dolan Research determined that 10 of the remotely sensed targets did not require Phase II investigations because one was an outfall pipe and 9 others had no sonar image and were completely buried. It was agreed that the deposition of sand in the near-shore portion of the project would have no effect on the 9 buried targets. This left 9 remaining targets that did exhibit shipwreck characteristics, as well as the Seneca Dunes target and a newly identified "Lizzie Brayton" shipwreck, for a total of 11 remote sensing Phase II targets.

A Phase II investigation of the "Lizzie Brayton" Shipwreck, the Seneca Dunes Shipwreck and nine previously recorded magnetic anomalies was conducted in 2005. The report was titled, *Phase I and II Underwater Archaeological Investigations, Manasquan Inlet to Barnegat Inlet, Ocean County, New Jersey* prepared by Dolan Research, Inc. Only three of these nearshore sites (3-249, 3-1401 and 33-1048) appear to meet the criteria of eligibility for inclusion in the NRHP. The remaining anomalies /wreck sites do not appear to be potentially significant; however, a buffer was recommended to avoid unnecessary impacts. The wreck of the Seneca Dunes was not located during the investigation.

At the time of the investigation, sites 3-249 and 3-1041 were almost completely buried and site 33-1048 located approximately 300 feet offshore was partially buried. The proposed beach nourishment may result in the migration of sand over the three eligible sites but should not adversely affect them. In fact their reburial will act to protect the sites from sport divers and possible looting. In order to ensure that no dredging, pipe placement, mooring or anchoring occurs, a 200-foot radius buffer was recommended around each of the potentially eligible site centroids, and around both major aspects of the wreck of the Creole (33-1048). A 100-foot buffer around the other existing wrecks will be applied to ensure no further impacts. These avoidance areas will be depicted on our project plans and specifications.

Since the 2002 publication of the Environmental Impact Statement, additional Phase I surveys were conducted in Borrow Areas D and E. No significant remote sensing anomalies with characteristics that could be considered indicative of submerged historic properties were identified in either Borrow Area D or Borrow Area E.

6.0 ENVIRONMENTAL IMPACTS

USACE (2002) provided a comprehensive discussion on the direct, indirect and cumulative effects of the selected plan. A comparative impact analysis of the alternatives considered was also provided in this document and is incorporated by reference. Table 6 provides a review of the affected environmental resources, and if any significant changes in the project or project area require additional discussion. Resource topics with impacts that do not require further discussion are incorporated by reference (USACE, 2002). Resources that require further discussion are presented as indicated in Table 6.

Table 6. Potential Impacts to Affected Resources

Impact Category	Incorporate By Reference	Impacts of Changes since USACE (2002)	Section
Mineral Resources	USACE (2002)	Increase in periodic nourishment quantities results in approximately 4 million cubic yards more than 2002 estimate	6.1

Impact Category	Incorporate By Reference	Impacts of Changes since USACE (2002)	Section
		for 50-yr project. Borrow Area F2 requires approval from BOEM for periodic nourishment.	
Air Quality	USACE (2002)	Philadelphia District has completed a general conformity analysis which can be found in Appendix A of this document.	6.2
Water Quality	USACE (2002)	No significant changes in impacts from project changes discussed in Section 4.2.	--
Wetland Habitats	USACE (2002)	No significant changes in impacts from project changes discussed in Section 4.2.	--
Dune and Upper Beach Habitat	USACE (2002)	Dune and upper beach habitats experienced significant erosion from recent storms. Project would restore these habitats and provide more stability.	6.3
Benthos (offshore)	USACE (2002)	Acreage of benthic habitat impacted is expected to increase given the increased number of borrow areas and sand quantities required for periodic nourishment.	6.4
Shellfish	USACE (2002)	Acreage of surf clam habitat impacted may increase given the increase in borrow areas and sand quantities required for periodic nourishment.	6.5.1
Finfish	USACE (2002)	Habitat value of near shore shipwrecks functioning as artificial reefs may be impacted if covered by sand. A shipwreck monitoring plan has been prepared.	6.5.2
Prime Fishing Areas	USACE (2002)	Prime Fishing Areas as identified in NJAC 7:7E-3.4 have been updated since 2002. Prime Fishing Areas are now located in Borrow Areas B and F2.	6.5.2
Essential Fish Habitat	USACE (2002)	NMFS requested an updated EFH assessment. New species were updated to EFH list. Impacts on EFH including project changes not considered significant.	6.5.3
Birds	USACE (2002)	Some upper beach and primary dune habitats damaged by storms. Loss of nesting habitat in severely eroded areas, but enhancement of habitat in overwash area for beach nesting	6.6.1

Impact Category	Incorporate By Reference	Impacts of Changes since USACE (2002)	Section
		birds. Project would benefit terrestrial-oriented birds by providing more stable habitat.	
Mammals, Reptiles and Amphibians	USACE (2002)	Some upper beach and primary dune habitats damaged by storms. Project would benefit terrestrial-oriented species. Effects of noise on marine mammals discussed in Section 6.9.	6.6.2.
Rare, Threatened and Endangered Species	USACE (2002)	Atlantic sturgeon listing requires Section 7 consultation. Interim measures are being implemented as per agreement with NMFS. Streamlined consultation as per USFWS (2005) for piping plovers and seabeach amaranth is required prior to construction.	6.7
Visual and Aesthetic Values	USACE (2002)	Project would restore the aesthetics of the beach and dunes.	6.8
Noise	USACE (2002)	Noises produced from dredging could affect marine life.	6.9
Cultural Resources	USACE (2002)	New shipwrecks identified in project area. No adverse effect determination by NJSHPO.	6.10
Cumulative Impacts	USACE (2002)	Multiple beach repair and restoration projects will be conducted in short time-frame with no significant cumulative effects. Project modifications will have no significant cumulative effects.	6.11

6.1 Mineral Resources

As discussed in USACE (2002), approximately 24.0 million cubic yards of sand were expected to be required from the offshore borrow sites over the 50-year life of the project. A more recent estimate in 2013 projects an increase in sand quantity required over the project life to approximately 28.0 million cubic yards. Although sand resources will be removed from the borrow sites, the sand will be redistributed to the shoreline and littoral system. Therefore, this does not result in a permanent consumptive loss of this resource.

USACE (2002) and Section 5.1 discuss the requirement for offshore sand sources. The newly identified Borrow Area F2 will require the approval from the Bureau of Ocean Management (BOEM), prior to utilization. Due to the time constraints based on an expedited schedule for project implementation, approval from BOEM is not likely prior to initial construction; therefore, F2 is being deferred for periodic nourishment. An additional NEPA document may be required by BOEM for this site.

6.2 Air Quality

Air quality impacts resulting from the release of carbon monoxide and particulate emissions will occur at the site during project related activities. Exhaust from the construction equipment will have an effect on the immediate air quality around the construction operation but should not impact areas outside of the construction area. These emissions will subside upon cessation of operation of heavy equipment.

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the Manasquan Inlet to Barnegat Inlet Storm Damage Reduction Project, the Federal Action is to construct a berm and dune restoration project utilizing beachfill sand dredged from offshore sand sources. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction. The Federal Action would take place in Ocean County, New Jersey, which is classified as marginal nonattainment for ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). Ocean County, NJ is within the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Nonattainment Area.

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

Pollutant	**General Conformity Trigger Levels (tons per year)**
NOx	100
VOCs	50

Following a review of the USACE (2002) report, EPA Region 2 requested that the Philadelphia District complete a general conformity analysis as required under the Clean Air Act. In 2007, the Philadelphia District responded to the EPA and indicated that it would be unable to prepare an accurate general conformity analysis until the exact details of the project construction were available. These details would not be available until after a project partnership agreement was signed, which would be several years in the future. However, the District indicated that they intended to employ SCR (selective catalytic reduction) technology to meet the emissions requirements of the

Clean Air Act. The District also indicated that an enforceable statement would be placed in the ROD that would commit USACE to perform a formal general conformity analysis prior to project construction. EPA concurred with the District and indicated that these plans were acceptable.

Since that time, the Philadelphia District conducted a project emissions inventory starting with a list of equipment necessary for construction as itemized in the project construction cost estimate. Pertinent construction equipment identified in the inventory included: hydraulic pipeline dredge, booster pump, various work boats and work barges, dozers and other earth moving equipment, and various trucks. The emissions contribution for each piece of equipment was calculated to identify total tons of VOCs and NOx released during project construction. The procedure to calculate these releases involved the following basic steps:

- List equipment, number of engines, engine hp, and duration of operation required for project construction
- Apply a Load Factor (LF) for each engine (the average percentage of rated horsepower used during an engine's operation). This calculation results in the total number of horsepower-hours (hp-hr) for each piece of equipment.
- Calculate total emissions of VOC and NOx from each engine category (multiply hp-hr by an emission factor (g/hp-hr). This calculation results in the total mass of VOC and NOx produced during project construction.

The total VOC emission estimate calculated for project construction is 8.4 tons in 2014, 20.3 tons in 2015, and 11.8 tons in 2016, which are below the annual General Conformity *de minimis* threshold level of 50 tons/yr and therefore meets the conformity requirement for the project area.

The total NOx emission estimate for project construction is 374.5 tons for the projected first year of construction, 898.9 tons for the second year, and 524.3 tons for the third year are above the 100 tons/year *de minimis* threshold (Table 7).

Table 7. Manasquan Inlet to Barnegat Inlet Shore Protection Project - Initial Construction -NOx and VOCs Estimates.

PROJECT SEGMENT	**2014**	**2015**	**2016**
Total Project NOx Emissions (Tons)*	374.5	898.9	524.3
Total Project VOCs Emissions (Tons)*	8.4	20.3	11.8

*Starcrest Consulting Group, LLC provided technical support in developing project emissions estimates

Because the 100 tons/year threshold for NOx emissions is exceeded in all three construction years, General Conformity (GC) (40CFR§90.153) will apply to this action. Based on this, a compliance plan has been developed in order to comply with the GC requirement through the following options that have been coordinated with the New Jersey Department of Environmental Protection (NJDEP); statutory exemption, emission reduction opportunities, use of the Joint Base McGuire/Lakehurst GC State Implementation Plan budget, and/or the purchase of Environmental Protection Agency (EPA) Clean Air Interstate Rule (CAIR) ozone season oxides of nitrogen (NOx) allowances. This project is not *de minimis* under 40CFR§90.153, therefore one or a combination of these options will be used to meet the GC requirements. The project specific option(s) for meeting GC are detailed in the Statement of Conformity (SOC), which is required under 40CFR§90.158. The SOC is provided in Appendix A.

6.3 Dune and Upper Beach Habitat

USACE (2002) described the construction impacts on the upper beaches and dunes in the affected area. This action would greatly disturb the impacted beach and dune area during the construction and periodic nourishment phases; however, impacts to terrestrial upland vegetation are expected to be minor and temporary. Since there is little vegetation on the beach area, the direct impact on vegetation will mainly be limited to the existing constructed dune areas that require the dunes to be built-up to specified elevations. Because of the erosion experienced from recent storms including Hurricane Sandy, a fortified berm and dune system would have beneficial effects on terrestrial beach and dune habitats within the project area.

6.4 Benthos of Offshore Borrow Areas

A discussion of impacts to the benthic community in the borrow areas is provided in USACE (2002). The primary ecological impact of dredging within the sand borrow sites will be the complete removal of the existing benthic community within the affected area through entrainment into the dredge. Dredging will primarily involve the immediate loss of infaunal and some of the less mobile epifaunal organisms. These may include polychaetes (worms), mollusks (clams and snails), and crustaceans (amphipods and crabs). Some of the more noticeable and larger benthos that would be impacted include horseshoe crabs and whelks. Mortality of these organisms will occur as they pass through the dredge device and/or as a result of being transplanted into an unsuitable habitat on the beach or nearshore. Despite the initial effects of dredging on the benthic community, recolonization is anticipated to occur within one year. However, depending on the post-dredging conditions, recovery of the benthic community through abundance, diversity, and biomass can be variable by taking a few months to several years (Burlas, et al, 2001). Accumulations of fine sediment may also shift a benthic community from predominantly a filter-feeding community to a deposit-feeding community. It is important that for recovery to a similar benthic community, the bottom sediments should be composed of the same grain sizes as the pre-dredge bottom. It can be expected that after sand is removed from the borrow sites, the affected areas would first be colonized by surface-dwelling opportunistic species. This may gradually change within a few years to a more-deeper burrowing community composed of larger-sized organisms.

Benthic investigations in and around the borrow sites indicate the presence of a benthic community that has abundance and diversity typical for sandy bottoms in offshore waters of the middle Atlantic Coast (Versar, Inc., 2000 and 2007). Versar, Inc. did not find any rare or unique benthic assemblages within the vicinity of the sand borrow areas. However, shifts in benthic community composition can be expected if the physical habitat is significantly different than the pre-dredging habitat. Since the majority of offshore borrow areas are in a less dynamic area (as opposed to the high-energy ebb shoal or inlet area), little replenishment of new sand into these areas is expected after dredging ceases. Therefore, the recruitment of benthic species similar to the existing community requires the exposure of a similar substrate after dredging operations terminate. Vibracore data from the borrow areas will be used to calculate appropriate dredging depths that will ensure that similar sand strata will remain exposed following dredging. Although the bathymetry of the borrow areas will be modified, the dredging will be performed in a manner that would not produce any deep pits.

USACE (2002) provided estimates of benthic habitat impacted based on a dredging depth of 9 to 13 feet. It was estimated then that a total of approximately 822 acres of sandy marine benthic habitat could be impacted from dredging associated with initial construction and the first six nourishment cycles. The addition of borrow areas D and E will add approximately 554 acres of benthic habitat impacts, for a total of 1376 acres for all four borrow areas. The change in borrow area utilization as described in Section 4.2 is not expected to have any significant new impacts on benthic resources as originally described in USACE (2002). The stable nature of all four borrow areas suggest that if they were used as a sand source for the project, the benthic community should recover relatively quickly. Since the dominant taxa are present in large numbers, they should provide a good recruitment base after the dredging disturbance.

6.5 Fisheries

6.5.1 Shellfish

As discussed in USACE (2002), surfclams are the most prominent shellfish resource that would be impacted by project activities. The direct effect of dredging operations on the commercial shellfish of the region is of great concern to natural resource managers. The Atlantic surfclam (*Spisula solidissima*) harvest along New Jersey’s coast accounted for more than 80% of the total mid-Atlantic catch (NJDEP 1997b). Annual commercial surfclam surveys conducted by the New Jersey Department of Environmental Protection, Division of Fish and Wildlife indicate that the vast majority of commercial surfclam beds in New Jersey waters are located between Atlantic City and Shrewsbury Rocks, which includes the proposed borrow areas.

Dredging sand for beach replenishment has the potential to impact these resources. An immediate potential effect is the removal of existing shellfish communities and alteration of the substrate composition, which may affect important nursery habitats and hinder surfclam recruitment success (Scott and Wirth, 2000). To minimize the impacts of the proposed project on the surf clam population, periodic monitoring of the benthic communities in the borrow areas will be conducted prior to each dredging cycle to provide information for selecting dredging locations within these borrow areas that minimize surf clam impacts. If commercial populations of clams are found in an area prior to dredging, the Corps will coordinate with NJDEP Bureau of Shellfisheries to develop a plan to try to avoid portions of any site that supports productive surf clam habitat. The clams in the areas avoided should provide a good recruitment base for population recovery. Evidence from a dredged area at Great Egg Harbor Inlet near Ocean City, New Jersey, indicates that surfclam populations are resilient and will be able to successfully recruit even after multiple dredging operations (Scott and Kelley 1998). Data from that study indicated that good clam recruitment is occurring and the clams in the area are reaching mature and harvestable sizes.

Based on the existing surfclam populations within the four borrow areas, each area is expected to recover from dredging operations provided suitable environmental conditions are present following dredging. These conditions include a thick (at least 3 feet) surficial sandy substrate and sufficient dissolved oxygen concentrations. Dredging depths could be restricted to maintain appropriate sandy substrate depth and physical/chemical conditions favorable for surfclam recruitment. Monitoring would be required to determine physical substrate and dissolved oxygen content along with determining rate of recruitment. Adaptive measures such as modifying dredging depths may be required if recruitment is poor within impacted areas. Within 6 months of dredging, the Philadelphia District will coordinate with the NJDEP Bureau of Shellfisheries to determine if a new surfclam survey is needed in the area. Results of such a survey would provide a basis if mitigative measures are necessary such as avoidance of high density areas.

Given these plans for monitoring and potential mitigation in the borrow areas, the use of them for beach restoration and periodic renourishment is not expected to have any significant impact on the surf clam population or the commercial fishery along the New Jersey Coast.

6.5.2 Prime Fishing Areas/Fisheries Resources

Prime Fishing Areas (as identified in NJAC 7:7E-3.4) have been updated since 2002. As depicted in Figure 9, currently both Borrow Area B and the proposed F2 borrow area contain features identified as NJ Specific Sport Ocean Fishing Grounds. Prior to construction, further coordination with the NJ Division of Fish and Wildlife and NMFS will be required to develop a plan to minimize impacts to these prime fishing areas. The plan may include modifying the dredging depths to maintain some of the bottom area relief or avoiding portions of the borrow area.

One of the conditions stipulated by NJDEP during their review of the final USACE (2002) report (discussed in Section 4.4) was that the Philadelphia District would monitor any shipwrecks in the project area that provide valuable marine habitat to determine the significance of any impacts from the project. During the Phase II investigation in 2005, it was determined that 6 of the shipwrecks in the project area provided valuable marine fisheries habitat. In conjunction with the Phase II cultural resource field effort, Versar conducted biological investigations on the six shipwrecks to determine the level of fish use on the structures and to estimate the benthic secondary productivity the wrecks provide to higher trophic levels.

The biological investigations of the shipwrecks determined that they have an established community of epibenthic macroinvertebrates, associated forage fish, and large macroinvertebrate species. Most of the biomass on the wrecks was dominated by larger mussels, which are prey for larger mobile invertebrates, such as crabs and starfish, as well as larger forage fish. Based on the sampling results, the loss of all six shipwrecks due to potential smothering by sand from the project could results in the loss of approximately 600,000 Kcal/yr benthic secondary productivity and 608 square meters of habitat for reef dwelling fish and invertebrates.

A monitoring plan for these 6 shipwrecks was prepared by Versar, Inc. for the Philadelphia District in 2006. The monitoring plan provides for 3 annual monitoring cycles following project construction with annual reports provided to the NJDEP. If the post-construction monitoring documents that permanent loss of habitat occurred as a result of the beach nourishment activities, USACE will negotiate a plan with NJDEP to mitigate for the loss through the construction of an artificial reef at a minimum of a 1 to 1 surface area basis.

In 2013, additional ROV surveys were conducted in order to determine the current conditions of the shipwrecks following Hurricane Sandy and other recent coastal storms. The results of the survey indicated that most of the features were still intact and functioning as fish habitat. One site, the Lizzie Brayton, was not located during the 2013 survey and may have been destroyed as a result of coastal storms. Some of the other sites had less exposed surface area then in 2005. The current conditions will be coordinated the NJDEP and the monitoring plan will be adjusted accordingly.

6.5.3 Essential Fish Habitat

As discussed previously, there are a number of Federally managed fish species where essential fish habitat (EFH) was identified for one or more life stages within the project impact areas. Fish occupation of waters within the project impact areas is highly variable spatially and temporally. Some of the species are strictly offshore, while others may occupy both nearshore and offshore waters. In addition, some species may be suited for the open ocean or pelagic waters, while others may be more oriented to bottom or demersal waters. This can also vary between life stages of Federally managed species. Also, seasonal abundances are highly variable, as many species are highly migratory.

In general, adverse impacts to Federally managed fish species may stem from alterations of the bottom habitat, which result from dredging offshore in the borrow sites and beachfill placement in the intertidal zone and nearshore. EFH can be adversely impacted temporarily through water quality impacts such as increased turbidity and decreased dissolved oxygen content in the dredging and placement locations. These impacts would subside upon cessation of construction activities. More long-term impacts to EFH involve physical changes to the bottom habitat, which involve changes to bathymetry, sediment substrate, and benthic community as a food source.

One major concern with respect to physical changes involves the potential loss of prominent offshore sandy shoal habitat within the borrow sites due to sand mining for the beach replenishment. It is generally regarded that prominent offshore shoals are areas that are attractive to fish including the Federally managed species, and are frequently targeted by recreational and commercial fishermen. Despite this, there is little specific information to determine whether shoals of this type have any enhanced value for fish. However, it is reasonable to expect that the increased habitat complexity at the shoals and adjacent bottom would be more attractive to fish than the flat featureless bottom that characterizes much of the mid-Atlantic coastal region (USFWS, 1999a).

Since mining of sand in these shoals may result in a significant habitat alteration, it is proposed that these areas be avoided or the flatter areas surrounding the prominent shoals be mined. Prominent shoal habitat was avoided as part of the borrow site screening process to the greatest extent possible. This was accomplished by eliminating such sites with prominent shoal habitat such as the “Seaside Lumps”, “Manasquan Ridge” and “Fish Heaven”, which are considered an important sport and commercial fishing ground (Long and Figley, 1982). Other physical alterations to EFH involve substrate modifications. An example would be the conversion of a soft sandy bottom into a hard clay bottom through the removal of overlying sand strata. This could result in a significant change in the benthic community composition after recolonization, or it could provide unsuitable habitat required for surfclam recruitment or spawning of some finfish species. This could be avoided by correlating vibracore strata data with sand thickness to restrict dredging depths to avoid exposing a different substrate. Based on the vibracore data, dredging depths would be considered to minimize the exposure of dissimilar substrates. Biological impacts on EFH are more indirect involving the temporary loss of benthic food prey items or food chain disruptions. Table 7 provides a brief description of direct or indirect impacts on the designated Federally managed species and their EFH with respect to their life stage within the designated EFH squares that encompass the entire project impact area.

Of the 30 species identified with Fishery Management Plans, the proposed project could have immediate direct impacts on habitat for surf clams, ocean pout, black sea bass, and egg and larval stages of winter flounder. This is attributable to the benthic or demersal nature of these species and their affected life stages. However, the effect on surfclams and other benthic food-prey organisms present in the borrow areas and sand placement areas is considered to be temporary as benthic studies have demonstrated recolonization following dredging operations within 1 to 2.5 years.

Table 8. Direct and Indirect Impacts on Federally Managed Species and Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)

Direct And Indirect Impacts On Federally Managed Species And Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
1. Atlantic cod *(Gadus morhua)*				**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
2. Whiting (Merluccius bilinearis)	Eggs are pelagic and are concentrated in depth of 50 – 150 meters, therefore no direct or indirect effects are expected.	Larvae are pelagic and are concentrated in depth of 50 –150 meters, therefore no direct or indirect effects are expected.	**Direct:** Occur near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
3. Red hake *(Urophycis chuss)*	Eggs occur in surface waters; therefore, no direct or indirect effects are expected.	Larvae occur in surface waters; therefore, no direct or indirect effects are expected.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	
4. Redfish (*Sebastes fasciatus*)	n/a			
5. Witch flounder (*Glyptocephalus cynoglossus*)	Eggs are pelagic, generally over deep water, therefore no direct of indirect effect are expected.			
6. Winter flounder (Pseudop*leuronectes americanus*)	Eggs are demersal in very shallow waters of coves and inlets in Spring.	Larvae are initially planktonic, but become more bottom-oriented as they develop. Potential for some to become entrained during	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary

Direct And Indirect Impacts On Federally Managed Species And Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
	Dredging may have some effect on eggs if construction occurs during Spring .	dredging borrow areas.	juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms	disruption of benthic food prey organisms.
7. Yellowtail flounder (*Pleuronectes ferruginea*)	Eggs are pelagic, generally over deep water, therefore no direct of indirect effects are expected.	Larvae occur in pelagic waters; therefore, no direct of indirect effects are expected.		
8. Windowpane flounder *(Scopthalmus aquosus)*	Eggs occur in surface waters; therefore, no direct or indirect effects are expected.	Larvae occur in pelagic waters; therefore, no direct or indirect effects are expected.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
9. Ocean Pout (*Macrozoacres americanus*)	Eggs are demersal, laid in masses on the bottom. Dredging may impact eggs if construction occurs when eggs are present.	Larvae generally stay at or near bottom, possibly near nesting site. Dredging may impact larvae if present. Impacts will be minimized due to short duration of larval stage.		**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
10. Atlantic sea herring *(Clupea harengus)*			**Direct:** Occur in pelagic and near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** None, prey items are planktonic	**Direct:** Occur in pelagic and near bottom. Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** None, prey items are primarily planktonic
11. Monkfish *(Lophius americanus)*	Eggs occur in surface waters with depths greater than 75 ft; therefore, no direct or indirect effects are expected.	Larvae occur in pelagic waters with depths greater than 75 ft; therefore, no direct or indirect effects are expected.		
12. Bluefish *(Pomatomus saltatrix)*			**Direct:** Juvenile bluefish are pelagic	**Direct:** Adult bluefish are pelagic species. No

Direct And Indirect Impacts On Federally Managed Species And Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
			species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
13. Long finned squid *(Loligo pealei)*	n/a	n/a	**Direct:** Adult squids tend to be demersal during the day and pelagic at night (Hammer, 2000). There is a potential for entrainment.	**Direct:** Adult squids tend to be demersal during the day and pelagic at night (Hammer, 2000). There is a potential for entrainment.
14. Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
15. Atlantic butterfish *(Peprilus tricanthus)*			**Direct:** Juvenile butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	
16. Summer flounder *(Paralicthys dentatus)*		Larvae occur in pelagic waters; therefore, no direct or indirect effects are expected.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. **Indirect:** Temporary disruption of benthic food prey organisms.
17. Scup *(Stenotomus chrysops)*	n/a	n/a	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults should be capable of relocating during impact. **Indirect:** Temporary disruption of benthic food prey organisms.
18. Black sea bass *(Centropristus striata)*	n/a		**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Offshore sites are mainly sandy soft-bottoms, however, some pockets of gravelly or shelly bottom may be impacted. Some mortality of juveniles could be expected from entrainment into the	**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Offshore sites are mainly sandy soft-bottoms, however, some pockets of gravelly or shelly bottom may be impacted. Some intertidal and subtidal rocky habitat may be impacted due to sand partially covering groins

Direct And Indirect Impacts On Federally Managed Species And Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
			dredge. Some intertidal and subtidal rocky habitat may be impacted due to sand partially covering groins along the shoreline. **Indirect:** Temporary disruption of benthic food prey organisms.	along the shoreline. **Indirect:** Temporary disruption of benthic food prey organisms.
19. Surf clam *(Spisula solidissima)*	n/a	n/a	**Direct:** Complete removal within borrow sites during dredging. Exposure of similar substrate is expected to allow for future recruitment. **Indirect:** Temporary reduction in reproductive potential. *See shellfish section for more discussion.	**Direct:** Complete removal within borrow site during dredging. Similar substrate would allow for recruitment. **Indirect:** Temporary reduction in reproductive potential. *See shellfish section for more discussion.
20. Ocean quahog *(Artica islandica)*	n/a	n/a		
21. Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
22. King mackerel *(Scomberomorus cavalla)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
23. Spanish mackerel *(Scomberomorus maculatus)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
24. Cobia *(Rachycentron canadum)*	**Direct Impacts:** Eggs are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	**Direct:** Cobia are pelagic and migratory species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Cobia are pelagic and migratory species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
25. Dusky shark *(Charcharinus obscurus)*		**Direct:** Physical habitat in borrow site should remain basically similar		

Direct And Indirect Impacts On Federally Managed Species And Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
		to pre-dredge conditions. Mortality from dredge unlikely because embryos are reported up to 3 feet in length (McClane, 1978). Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
26. Sandbar shark *(Charcharinus plumbeus)*		**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. However, some mortality of larvae may be possible from entrainment into the dredge or burial in nearshore, but not likely since newborns are approx. 1.5 ft. in length (pers. conv. between J. Brady-USACE and H.W. Pratt-NMFS) and are considered to be mobile. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Juveniles are mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults are highly mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
27. Tiger shark *(Galeocerdo cuvieri)*		Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Mortality from dredge or fill placement unlikely because newborn are reported up to 1.5 feet in length (McClane, 1978). Therefore, the newborn may be mobile enough to avoid a dredge or placement areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Juveniles are mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	
28. Clearnose skate (*Raja eglanteria*)			**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredged conditions. Juveniles are highly mobile, and most are capable of avoiding impact areas. Some entrainment into	**Direct**: Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Adults are highly mobile and are capable of avoiding impact areas. **Indirect:** Temporary

Direct And Indirect Impacts On Federally Managed Species And Essential Fish Habitat (EFH) In The 10 Min. X 10 Min. Squares Affected by the Project (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
			dredge is possible. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow area and placement sites.	disruption of benthic food prey organisms and food chain within borrow and placement sites.
29. Little skate (*Raja erinacea*)			**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredged conditions. Juveniles are highly mobile, and most are capable of avoiding impact areas. Some entrainment into dredge is possible. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow area and placement sites.	**Direct**: Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Adults are highly mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
30. Winter skate (*Raja ocellata*)			**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredged conditions. Juveniles are highly mobile, and most are capable of avoiding impact areas. Some entrainment into dredge is possible. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow area and placement sites.	**Direct**: Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Adults are highly mobile and are capable of avoiding impact areas. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.

Minor elevation differences resulting from dredging may serve to enhance bottom habitat for a number of these species. Post-construction monitoring will be useful in determining the severity of habitat alterations and its direct and indirect impacts on EFH. Important physical/chemical parameters such as changes in substrate composition, dissolved oxygen levels, and bathymetry will be monitored. Biological monitoring would involve benthic grab samples to measure recruitment of the infaunal community, and commercial surfclam surveys within affected areas. This monitoring would serve to provide valuable information early on in the project concerning the effects on EFH to base future adaptive management measures to minimize any adverse effects in subsequent periodic nourishment cycles.

The change in borrow area utilization as described in Section 4.2 is not expected to have any significant new impacts to EFH as originally described in USACE (2002).

The use of Borrow Area F2 is currently being evaluated and any impacts to EFH in F2 will be described in a separate NEPA document at a later date.

6.6 Wildlife

6.6.1 Birds

The project impact area is host to a variety of migratory shorebirds, colonial nesting waterbirds, migratory waterfowl, raptors, and other passerine bird species. Of particular concern, are potential adverse impacts to migratory shorebirds and colonial nesting birds, which include several Federal and State listed threatened and endangered species. USACE (2002) discussed the potential impacts on birds from noise and disturbance caused by construction activities on the beach. Recently, the NJDEP – Division of Fish and Wildlife and the Conserve Wildlife Foundation of New Jersey (Pover and Egger, 2012) conducted a post storm assessment after Hurricane Sandy for beach nesting and migratory birds at a number of locations along the New Jersey coast, including the Island Beach State Park. Beach nesting bird habitat was noted as severely eroded, but the impact on beach nesters is less certain. The losses of sand could reduce the quantity of habitat, but the washover areas especially in areas that previously had thick vegetation would be an improvement of habitat. Beachfill placement in nesting areas with severe erosion could be beneficial provided that the construction is scheduled outside of nesting seasons. Timing restrictions and/or buffer zones should be established to avoid adversely impacting any nest sites in the project vicinity.

6.6.2 Mammals, Reptiles and Amphibians

The impacts are expected to be temporary and minor. Wildlife inhabiting the beach and dune areas are expected to temporarily relocate from the impact area to adjacent habitats during placement of material on the beach, and are expected to return after construction is completed. Habitat value for terrestrial wildlife may improve slightly with a more stable vegetated dune and wider beach.

A number of marine mammals could be within the affected area during construction activities, and be affected by noise. A discussion on the effects of noise on marine life is provided in Section 6.9. The project changes as proposed in Section 4.2 are not expected to have any significant adverse impacts on marine wildlife beyond the impacts discussed previously in USACE (2002).

6.7 Rare, Threatened and Endangered Species

USACE (2002) identified potential project impacts on beach nesting birds such as the piping plover, which is Federally listed as threatened and State listed as endangered, and the least tern and black skimmer (both State endangered species).

Beach replenishment can potentially have significant direct and indirect adverse impacts on these species. Sand placement can bury nests, and machinery on the beach can crush eggs, nestlings, and adults. Human disturbance related to noise and lights can disrupt successful nesting of these birds (Louis Berger Group, 1999). Also, pipelines used during construction may become barriers to young chicks trying to reach intertidal areas to feed. The presence of these species will require the implementation of protection measures, which may include the establishment of a buffer zone around the nest, and limiting construction to be conducted outside of the nesting period (15 March – 15 August). The 2012 NJDEP Division of Fish and Wildlife survey of nesting sites indicated that the last known documentation of nesting piping plovers in the study area was in 2005 at Island Beach State Park.

Other indirect impacts associated with the proposed plan include the temporary reduction in the quality of forage habitat for piping plover and other shorebirds within the intertidal zone until the area becomes recolonized by benthic fauna such as polychaete worms, mollusks, and crustaceans. This impact may be short-lived as the area could become recolonized as early as a few weeks after filling is completed. The construction of a wider beach may result in the beach becoming more attractive to nesting birds such as piping plover, least tern, and black skimmers. Although this may appear beneficial, it is believed that this could have adverse impacts on these species. This is based on the fact that a replenished wider beach may attract these birds away from natural areas where human disturbance effects are less.

The candidate species, red knot, is a migratory shorebird that can be found on Atlantic Coast beaches during spring and fall migrations. Construction during this period (especially the fall migration) could affect foraging patterns by disturbing habitat and temporarily displacing a food source by burying intertidal benthic organisms. Since the affected area is a highly dynamic beach area, this would be a temporary effect.

Another species which may be found within the project area is the Federally-listed threatened plant, seabeach amaranth, which inhabits overwash flats, accreting ends of coastal barrier beaches and lower foredunes of non-eroding beaches. Seabeach amaranth has sporadically appeared in the project area within the last ten years. Therefore, it is possible that seabeach amaranth may become naturally established within the project area within the life of the project. Since the proposed project may actually create habitat for the seabeach amaranth, impacts to this species are also possible related to construction of beach stabilization structures, beach erosion and tidal inundation, beach grooming, and destruction by off-road vehicles (USFWS, 1999b).

To address these issues, the Philadelphia District developed and submitted a programmatic Biological Assessment (BA) for the piping plover and seabeach amaranth as part of formal consultation requirements to the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act in 2001. In 2005, the USFWS developed a Biological Opinion (BO) based upon their review of the BA. Formal consultation will be ongoing throughout the project life where the USFWS requires individual Tier 2 consultation prior to construction and each periodic nourishment cycle. The terms and conditions of the BO require construction monitoring, timing restrictions in active nesting areas, and avoidance during the construction through the use of buffer zones. Other issues addressed in the BO include dune fence orientation, local practices such as beach raking, off-road vehicles, permanent easements for monitoring and management activities, and general public access in or near nesting locations. The project area, specifically the foredune area, would be periodically monitored for the seabeach amaranth. Contingency plans for the presence of seabeach amaranth at the time of initial construction or periodic maintenance may involve avoidance of the area (if possible), collection of seeds to be planted in non-impacted areas, and timing restrictions. If the red knot becomes listed as Federally threatened or endangered, coordination will be conducted with USFWS under the Endangered Species Act to address potential impacts to the species.

From June through November, New Jersey's coastal waters may be inhabited by transient sea turtles, especially the loggerhead (Federally listed threatened) or the Kemp's ridley (Federally listed endangered). Sea turtles have been known to be adversely impacted during dredging operations that have utilized a hopper dredge. Dredging encounters with sea turtles have been more prevalent among waters of the southern Atlantic and Gulf coasts; however, incidences of "taking" sea turtles have been increasing in waters of the Middle Atlantic Coast in hopper dredges, which utilize high-suction heads. Endangered whales such as the highly endangered Right whale may also transit the project area. As with all large vessels, there is a potential for a collision of the dredge with a whale that could injure or kill a whale.

Formal consultation with the National Marine Fisheries Service (NMFS) in accordance with Section 7 of the Endangered Species Act has been undertaken on all Philadelphia District Corps of Engineers dredging projects utilizing a hopper dredge that may have impacts to Federally threatened or endangered species (including shortnose sturgeon, sea turtles, and marine mammals). A Biological Assessment (USACE, 1995) that discusses Philadelphia District hopper dredging activities and potential effects on Federally threatened or endangered species of sea turtles, marine mammals and shortnose sturgeon has been prepared, and was formally submitted to NMFS in accordance with Section 7 of the Endangered Species Act. A subsequent Programmatic Biological Opinion (BO) (NMFS, 1996) from NMFS was completed and submitted to the Corps in 1996. As a term and condition of the incidental take statement included in this opinion, the NMFS required monitoring of all hopper dredge operations in areas where sea turtles are present between June and November by trained endangered species observers. Adherence to the findings and conditions of the Biological Opinion ensures compliance with Section 7 of the Endangered Species Act. Since 1996, projects that have utilized a hopper dredge between June and November have included NMFS approved sea turtle observers on the dredge to monitor for sea turtles during dredging. Observers inspect the hopper, skimmer, and draghead after each load looking for signs of interaction with endangered or threatened species. Recent changes to dredging protocols in the State of New Jersey now require all dredges being used for beach nourishment to be outfitted with munitions screening of

1 ¼ inches. This size screening makes it highly unlikely that turtle monitors would be able to observe any impacts to turtles during the dredging activities. For this reason, NMFS has not required the presence of monitors for recent hopper dredging activities where munitions screens are required. The Corps will continue to coordinate this issue with NMFS for upcoming work.

As discussed previously, the New York Bight Distinct Population Segment (DPS) of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) was recently listed as endangered by the NMFS, and although transient in the marine environment, this species could be present within the project area. With regard to physical injuries to the Atlantic sturgeon, the potential exists for them to become entrained during dredging operations. It is expected, however, that most adult sturgeon would actively avoid a working dredge. As with other fish species, the temporary impacts to water quality due to increased turbidity can impact prey availability during construction activities. Noise generated from a working dredge at the dredge site and beachfill placement could potentially be a factor affecting sturgeon. However, it is expected that sturgeon will avoid the borrow areas and beaches during construction. Due to the open water nature of the borrow sites, this temporary movement away from the borrow areas does not constitute a significant effect on this species. For these reasons, the Philadelphia District has concluded that project activities could affect, but is not likely to adversely affect the NYBDPS of the Atlantic sturgeon. By letter of February 21, 2013, the Philadelphia District reinitiated consultation in accordance with 50 CFR 402.14(c) under Section 7 of the Endangered Species Act to address the District's beach nourishment project's effects on Atlantic Sturgeon. A Programmatic Biological Assessment is currently being prepared by the Philadelphia District to cover all existing and proposed storm damage reduction projects within the Philadelphia District. This will be followed by a new BO to be issued by NMFS. In the interim, the Philadelphia District has determined, through coordination with NMFS, that allowing the District's beach nourishment program to continue to operate during the re-initiation period will not violate Section 7(a)(2) or 7(d). The Philadelphia District recognizes that this 7(a)(2) determination is only applicable during the re-initiation period, and does not address the Corps' longer term obligation to ensure the action is not likely to jeopardize the continued existence of listed species.

6.8 Visual and Aesthetic Values

The temporary adverse impacts and the permanent aesthetic impacts of the proposed project were discussed in USACE (2002) and have not significantly changed. However, following the severe beach and dune erosion that occurred across the study area during Hurricane Sandy, a new permanent positive impact will result from the proposed project. If the beach berm and dune are restored by the construction of the project, it would re-establish the beachfront resort environment that constitutes the main aesthetic draw within the study area.

6.9 Noise

Project-related noise at the placement site during construction will consist of the sound of dredged material passing through the pipe and discharging in a plume of water. Earth-moving equipment, such as bulldozers, will shape the newly deposited dredged material and produce engine noise in the nearby vicinity.

At the offshore borrow areas, hydraulic suction dredging involves raising loosened material to the sea surface by way of a pipe and centrifugal pump along with large quantities of water. Suction dredges produce a combination of sounds from relatively continuous sources including engine and propeller noise from the operating vessel and pumps and the sound of the drag head moving across the substrate. Robinson et al. (2011) carried out an extensive study of the noise generated by a number of trailing suction hopper dredges during marine aggregate extraction. Source levels at frequencies below 500 hertz (Hz) were generally in line with those expected for a cargo ship travelling at modest speed. The dredging process is interspersed with quieter periods when the dragheads are raised to allow the dredge to change positions. Clarke et al. (2003) evaluated sound levels produced by a hopper dredge during its “fill” cycle working in a sandy substrate. They found that most of the sound energy produced fell within the 70 to 1,000 Hz range, with peak pressure levels in the 120 to 140 decibel (dB) range at 40 meters from the dredge. These data correlate well with a study conducted in the United Kingdom which found trailing suction hopper dredge sounds to be predominately in the low frequency range (below 500 Hz), with peak spectral levels at approximately 122 dB at a range of 56 meters (DEFRA, 2003).

In a review by Southall et.al. (2007) several studies showed altered behavior or avoidance by dolphins to increased sound related to increased boat traffic. Clarke et al. (2003) found that cutterhead dredging operations are relatively quiet compared to other sounds in aquatic environments, whereas hopper dredges produce somewhat more intense sounds. Thomsen et al. (2009) conducted a field study to better understand if and how dredge-related noise is likely to disturb marine fauna. This study found that the low-frequency dredge noise would potentially affect low- and mid-frequency cetaceans, such as bottlenose dolphins. Noise in the marine environment has also been responsible for displacement from critical feeding and breeding grounds in several other marine mammal species (Weilgart, 2007). Noise has also been documented to influence fish behavior (Thomsen et al., 2009). Fish detect and respond to sound utilizing cues to hunt for prey, avoid predators, and for social interaction (LFR, 2004). High intensity sounds can also permanently damage fish hearing (Nightingale and Simenstad, 2001). It is likely that at close distances to the dredge vessel, the noise may produce a behavioral response in mobile marine species, with individuals moving away from the disturbance, thereby reducing the risk of physical or physiological damage. Accordingly, any resulting effects would be negligible.

6.10 Cultural Resources

Since USACE (2002), three shipwreck sites were identified within the project construction boundaries that were determined to be potentially eligible for inclusion in the National Register of Historic Places. The USACE submitted the results of the additional cultural investigations completed after 2002 and the determination of *No Adverse Effect* pursuant to 36 CFR 800.4(d) to the New Jersey State Historic Preservation Officer (SHPO) on January 23, 2006. The SHPO concurred with the determination in a letter dated February 22, 2006. The NJSHPO indicated that the dredging and beach nourishment project will have an effect on the vessels, but that the effect will not be adverse provided that no dredging, placement of pipe, mooring or anchoring of any vessel or equipment will occur within 200 feet of the center of each site. The NJSHPO also indicated that potential additional burial of the three sites resulting from the migration of sand will not result in further deterioration, and may in fact provide protection from recreational removal of objects and other physical disturbances.

6.11 Cumulative Impacts

Cumulative Impacts, as defined in CEQ regulations (40 CFR Sec. 1508.7), are the "impacts on the environment which result 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

USACE (2002) provided a comprehensive analysis of the cumulative effects of the use of sand borrow areas and affected beaches where beach nourishment projects have occurred or were in various planning stages to occur within the Philadelphia District boundaries (from Manasquan Inlet to Cape May). At that time, most of the coastal areas within this segment of the NJ Coast either had an existing Federal project or were under study for a Federal project. An exception to this is the segment from Hereford Inlet to Cape May Inlet (Wildwood, NJ), which is currently under a Federal Storm Damage Reduction Feasibility Study. The 2002 evaluation included all of the existing sand borrow areas and proposed sand borrow areas, which included inlet borrow areas and offshore borrow areas. It was estimated that over 9,000 acres of marine subtidal habitat would be affected over a period of 50 to 60 years for Corps of Engineers designated borrow areas. A separate evaluation was of potential borrow areas identified as “regions of interest” in Federal waters by the Bureau of Ocean Energy Management (formerly the Minerals Management Service). These regions of interest occupied over 23,000 acres of marine offshore habitat. At present, these regions of interest are not considered in the cumulative analysis because the Corps’ identified borrow areas are considered adequate with a few exceptions.

Since 2002, several of the Federal projects that were listed as proposed in USACE (2002) became active. These include the following projects: The Lower Cape May Meadows, Townsends Inlet to Cape May Inlet, Absecon Island (partially constructed at Ventnor and Atlantic City), Brigantine Island, and Barnegat Inlet to Little Egg Inlet (partially constructed at Surf City, Ship Bottom, Harvey Cedars, and Brant Beach). Additionally, the State of New Jersey and local municipalities conducted beachfill projects in Strathmere (Upper Township), Sea Isle City, and the City of North Wildwood in 2009-2010 where there were no existing active Federal projects in place. Presently the area from Hereford Inlet to Cape May Inlet, which includes the City of North Wildwood is in the feasibility phase. The tentatively selected plan is the back passing of sand from a donor beach to beaches that require nourishment. Because this is a different type of project than the beachfill projects described above, and specific details are not known, it is not included in this discussion. USACE (2002) estimated that approximately 71% of the New Jersey Coastline either had an active Federal project or was proposed for a Federal project. The implementation of the existing unconstructed Federal projects does not change this estimate.

Since 2002 there were some minor changes to the existing borrow area configurations for the active Federal projects at Ocean City (Great Egg Harbor and Peck Beach) and Absecon Island. These changes resulted in the expansions of two designated borrow areas, which added approximately 100 acres to the sites listed in USACE (2002). The Corson Inlet borrow area was expanded by about 46 acres for a NJDEP project in 2009-2010. A new offshore borrow area was added to the Cape May City project in 2008, which is identified as Area K, and affects 408 acres of marine offshore habitat. Although these sites resulted in approximately 550 more acres of marine habitat affected by dredging over the long-term, they do not add significant acreage to the total borrow areas designated within Philadelphia District. As discussed in USACE (2002), the impacts on borrow area habitats are considered short-term as these areas become recolonized with benthic organisms, which are an important food source for a number fish species.

In recent years, the New Jersey Coast has been affected by catastrophic coastal storms, most notably Hurricane Sandy in October 2012. In response to the devastation of the Atlantic coastal communities in New Jersey from Hurricane Sandy, the USACE and the Federal Emergency Management Agency (through aid to State and local municipalities) have undertaken unprecedented measures to repair and/or restore the affected beaches under P.L. 84-99 Flood Control and Coastal Emergencies (FCCE) and P.L. 113-2: Disaster Relief Appropriations Act. P.L. 84-99 allows for the repair of beaches with active Federal projects to pre-storm conditions and P.L. 113-2 allows for the restoration of affected beaches to full template that have existing active Federal projects. Also, as part of P.L. 113-2, there is the funding to complete authorized, but unconstructed projects, which include the Great Egg Harbor Inlet to Townsends Inlet and the Manasquan Inlet to Barnegat Inlet projects.

Since November of 2012, several of the authorized and constructed projects within the Philadelphia District have been completed repaired and restored in accordance with P.L. 84-99 and P.L. 113-2. These projects include: portions of the Barnegat Inlet to Little Egg Inlet (Harvey Cedars, Surf City, and Brant Beach), Brigantine Island, and Absecon Island (Atlantic City and Ventnor), and Townsends Inlet to Hereford Inlet (Avalon and Stone Harbor). The Ocean City - Peck Beach (Northern Ocean City) project and Lower Cape May Meadows were already scheduled for periodic nourishment at the time Hurricane Sandy struck. Cape May City sand placement is currently underway. The remaining authorized, but unconstructed projects are Great Egg Harbor Inlet to Townsends Inlet (Southern Ocean City, Strathmere, Upper Township, and Sea Isle City) and Manasquan Inlet to Barnegat Inlet. Figure 10 presents the status of these projects along the New Jersey coast.

USACE (2002) estimated that approximately 71% of the New Jersey Coastline within the Philadelphia District Boundaries would be affected by a storm damage reduction project. Although nearly 71% of the beaches along the N.J. Coast south of Manasquan Inlet could potentially be impacted by beachfill placement activities, the cumulative effect of these combined activities is expected to be temporary and minor on resources of concern such as benthic species, beach dwelling flora and fauna, water quality and essential fish habitat. This is due to the fact that flora and fauna associated with beaches, intertidal zones and nearshore zones are adapted to and resilient to frequent disturbance as is normally encountered in these highly dynamic and often harsh environments. USACE (2002) concluded that among the existing and proposed projects along this stretch of coast, renourishment cycles vary from two to seven years, which would likely preclude all of the beachfill areas being impacted at one time. However, the massive effort to repair and restore the New Jersey coastline all of this area could be affected within a 2-3 year period. Given the short-term effects of the sand replenishment on the beaches, this is not a significant cumulative impact.

USACE (2002) estimated that approximately 9,000 acres of sand borrow areas, which represent both inlet ebb shoal habitats and marine offshore habitats within the Philadelphia District would be impacted. Since 2002, several borrow sites were expanded and or new ones used. These expansions and additions of sand resources account for about 550 more acres, which is about a 6% increase in borrow areas. The use of these sites to conduct repair and restoration activities for the Hurricane Sandy work do not result in a major expansion of borrow areas and effects to the marine environment compared to what was projected in USACE (2002). Therefore, the cumulative effects of this action and others are not significant.

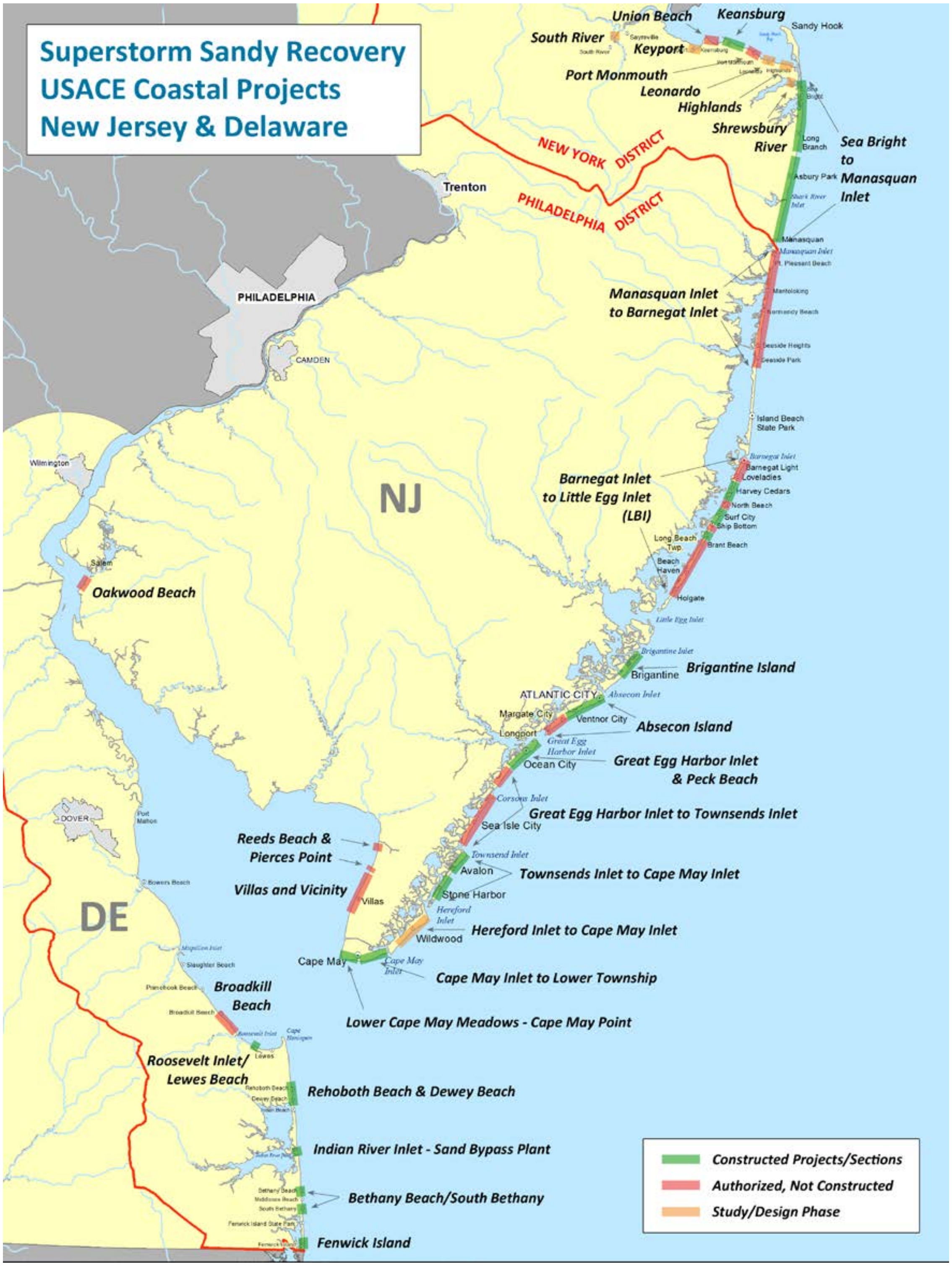

Figure 10. Status of Storm Damage Reduction Projects within the Philadelphia District

7.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES

Compliance with applicable Federal Statutes, Executive Orders, and Executive Memoranda, was originally discussed in (USACE 2002). Table 9 is a complete listing of compliance status relative to environmental quality protection statutes and other environmental review requirements.

Table 9. Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements

FEDERAL STATUTES	**COMPLIANCE W/PROPOSED PLAN**
Archeological - Resources Protection Act of 1979, as amended	Full
Clean Air Act, as amended	Partial
Clean Water Act of 1977	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act of 1972, as amended	Partial
Endangered Species Act of 1973, as amended	Full
Estuary Protection Act	Full
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act	Full
Land and Water Conservation Fund Act, as amended	N/A
Marine Protection, Research and Sanctuaries Act	Full
Magnuson-Stevens Fishery Conservation and Management Act	Full
National Historic Preservation Act of 1966, as amended	Full
National Environmental Policy Act, as amended	Partial
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act	N/A
Wild and Scenic River Act	N/A
Executive Orders, Memorandums, etc.	
EO 11988, Floodplain Management	Full
EO 11990, Protection of Wetlands	Full
EO12114, Environmental Effects of Major Federal Actions	Full
EO 12989, Environmental Justice in Minority Populations and Low-Income Populations	Full
County Land Use Plan	Full

Full Compliance - Requirements of the statute, EO, or other environmental requirements are met for the current stage of review.
Partial Compliance - Some requirements and permits of the statute, E.O., or other policy and related regulations remain to be met.
Noncompliance - None of the requirements of the statute, E.O., or other policy and related regulations have been met.
N/A - Statute, E.O. or other policy and related regulations are not applicable.

8.0 CONCLUSIONS

In 2002, USACE completed the FEIS for a Federal Storm Damage Reduction Project for the municipalities of Point Pleasant Beach, Bay Head, Mantoloking, Brick Township, Toms River Township, Lavallette, Seaside Heights, Seaside Park, and Berkeley Township. This EA is evaluating the impacts associated with changes that have occurred since the FEIS was completed in 2002. New information, new statutes and the development of different operating practices subsequent to USACE (2002) required that the proposed Federal action be evaluated pursuant to the National Environmental Policy Act of 1969, as amended.

The evaluations presented in this EA address the changes in the project area, changes in the proposed project, and regulatory changes that have occurred since 2002. These changes are consistent with the project actions previously detailed and documented, and would not result in any new or significant impacts to the project area. Based on the data presented and continuing coordination with State and Federal resource agencies, no significant adverse environmental impacts are expected to occur as a result of the proposed action. Since the potential impacts identified have been determined to be minor, localized and temporary, the preparation of a new or Supplemental Environmental Impact Statement is not warranted and a Finding of No Significant Impact (FONSI) for the proposed action is appropriate.

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APPENDIX-A

CLEAN AIR ACT STATEMENT OF CONFORMITY AND EMISSIONS ESTIMATES

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