USCG

FINDING OF NO SIGNIFICANT IMPACT

FOR

U.S. COAST GUARD TRAINING CENTER CAPE MAY, NJ BEACH NOURISHMENT

This project has been thoroughly reviewed by the USCG and it has been determined, by the undersigned, that this project will have no significant effect on the human environment.

This finding of no significant impact is based on the attached adopted environmental assessment **U.S. ARMY CORPS OF ENGINEERS ENVIRONMENTAL ASSESSMENT FOR THE ALTERNATE OFFSHORE BORROW AREA FOR THE CAPE MAY INLET TO LOWER TOWNSHIP STORM DAMAGE REDUCTION PROJECT AND THE LOWER CAPE MAY MEADOWS – CAPE MAY POINT ENVIRONMENTAL RESTORATION PROJECT CAPE MAY COUNTY, NEW JERSEY** which has been independently evaluated by the USCG and determined to adequately and accurately discuss the environmental issues and impacts of the proposed project and provides sufficient evidence and analysis for determining that an environmental impact statement is not required. The USCG takes full responsibility for the accuracy, scope, and content of the attached environmental assessment insofar as it considers impacts associated with USCG project to provide nourishment of beaches located on TRACEN Cape May, NJ.

25 JUL 11 — Date

Mr. Frank A. Blaha
*Environmental Reviewer

Chief, Environmental Compliance, CEUC
Title/Position

I have considered the information contained in the EA, which is the basis for this FONSI. Based on the information in the EA and this FONSI document, I agree that the proposed action as described above, and in the EA, will have no significant impact on the environment.

29 JUL 11 — Date

W. G. Kelly, CAPT, USCG
W. G. Kelly, CAPT
Responsible Official

Commanding Officer
TRACEN Cape May
Title/Position

U.S. COAST GUARD

ENVIRONMENTAL ASSESSMENT

FOR

U.S. COAST GUARD TRAINING CENTER CAPE MAY, NJ BEACH NOURISHMENT

ALTERNATE OFFSHORE BORROW AREA FOR THE CAPE MAY INLET TO LOWER TOWNSHIP STORM DAMAGE REDUCTION PROJECT AND THE LOWER CAPE MAY MEADOWS – CAPE MAY POINT ENVIRONMENTAL RESTORATION PROJECT
CAPE MAY COUNTY, NEW JERSEY

This U.S. Army Corps of Engineers Environmental Assessment For The Alternate Offshore Borrow Area For The Cape May Inlet to Lower Township Storm Damage Reduction Project and The Lower Cape May Meadows – Cape May Point Environmental Restoration Project Cape May County, New Jersey was prepared consistent with Commandant's Manual Instruction M16475.1D and is in compliance with the National Environmental Policy Act of 1969 (P.L. 91-190) and the Council of Environmental Quality Regulations dated 28 November 1978 (40 CFR Parts 1500-1508). The US Coast Guard has determined that the Environmental Assessment adequately considers the environmental impacts associated with the USCG proposed action.

This Environmental Assessment (EA) serves as a concise public document to briefly provide sufficient evidence and analysis for determining the need to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

This Environmental Assessment concisely describes the proposed action, the need for the proposal, the alternatives, and the environmental impacts of the proposal and alternatives. This Environmental Assessment also contains a comparative analysis of the action and alternatives, a statement of the environmental significance of the preferred alternative, and a list of the agencies and persons consulted during EA preparation.

7/22/11	Kathleen Shilling	Design Branch Chief
Date	Ms. Kathleen Shilling Environmental Project Manager	Title/Position
25 JUL 11	Frank A Blaha	Chief, Environmental Compliance Section, CEUC
Date	Mr. Frank A. Blaha Environmental Reviewer	Title/Position

In reaching my decision/recommendation on the USCG's proposed action, I have considered the information contained in this EA on the potential for environmental impacts.

29 JUL 11	W. G. Kelly, CAPT, USCG	Commanding Officer, TRACEN Cape May
Date	W. G. Kelly, CAPT Responsible Official	Title/Position

FINAL
ENVIRONMENTAL ASSESSMENT (EA)

ALTERNATE OFFSHORE BORROW AREA FOR THE CAPE MAY INLET TO LOWER TOWNSHIP STORM DAMAGE REDUCTION PROJECT AND THE LOWER CAPE MAY MEADOWS – CAPE MAY POINT ENVIRONMENTAL RESTORATION PROJECT CAPE MAY COUNTY, NEW JERSEY

AUGUST 2008

PREPARED BY:

U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR ALTERNATE OFFSHORE BORROW AREA FOR THE CAPE MAY INLET TO LOWER TOWNSHIP STORM DAMAGE REDUCTION PROJECT AND THE LOWER CAPE MAY MEADOWS – CAPE MAY POINT ENVIRONMENTAL RESTORATION PROJECT, CAPE MAY COUNTY, NEW JERSEY

In 1980, the United States Army Corps of Engineers, Philadelphia District, evaluated the potential environmental impacts associated with the construction of the Cape May Inlet to Lower Township Storm Damage Reduction Project, and prepared a Final Supplement to the Final Environmental Impact Statement (EIS). The selected plan involved the extension of two existing groins and the placement of sand obtained from an offshore borrow source to construct a berm for the purpose of storm damage reduction. To maintain the design template, this plan also included periodic nourishment every two years. The initial construction of the project was completed in July 1991 in two major phases: placement of 465,000 cubic yards (cy) of sand on the US Coast Guard Training Center beach completed in August 1989, followed by a separate contract placing 900,000 cy on the Cape May City beach completed in July 1991. Also as part of initial construction were the extension of existing groins at Baltimore and Trenton Avenues. Following the initial construction, 7 periodic nourishment cycles were completed. The next nourishment cycle is scheduled for September 2008. The total quantity of sand placed to date is 3,923,145 cy.

In 1998, the District similarly evaluated the potential environmental impacts associated with environmental restoration activities at the Lower Cape May Meadows (The Meadows) and Cape May Point. The selected plan for this project involved protective dune/berm restoration extending from the 3rd Avenue terminal groin in Cape May City to the Central Avenue groin in Cape May Point. Periodic nourishment would be required every four years. The selected plan also involved the restoration of freshwater wetlands through the elimination of *Phragmites australis*, planting wetland vegetation, restoration of drainage ditches, installation of four water control structures, and creating three "piping plover" ponds behind the dune. Initial dune and beach construction was completed in 2005 with the placement of 1,406,000 cy of sand.

Two borrow areas were previously identified for use for the Cape May City and The Meadows projects. The use of these areas (Borrow Areas 4 and 5) was evaluated in an Environmental Assessment in 2002. Subsequently, Borrow Areas 4 and 5 were used for the initial construction of The Meadows in 2004-2005 and periodic nourishment of Cape May City in 2002 and 2006. During dredging activities in 2006, it was discovered that a significant amount of fine-grained material had been deposited in the borrow areas. The borrow areas also contained areas of larger "cobble" sized material. The combination of these features makes the overall grain size of this material incompatible with the existing beach sand, making it necessary to investigate additional sources of material.

In 2007, benthic, cultural and geotechnical investigations were conducted on four additional offshore borrow areas in the vicinity of the Cape May projects. One of these

areas (Borrow Area K) is currently being proposed for the future nourishment cycles for Cape May City and The Meadows.

In compliance with the National Environmental Policy Act of 1969, as amended, and CEQ regulations, the Philadelphia District prepared an Environmental Assessment (EA) to document the proposed alternative borrow area. The EA for the change to these projects was forwarded to the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the New Jersey State Historic Preservation Office (SHPO), NJDEP, and all other known interested parties for comment. Comment letters received from these agencies can be found in Appendix A.

The EA has determined that the utilization of Borrow Area K for beach nourishment and restoration activities at Cape May City and The Meadows 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 has concluded that the project can be conducted in a manner which should not violate New Jersey's Water Quality Standards. Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate was requested from the NJDEP during the review of the draft EA. Based on the information developed during preparation of the EA, 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. In a letter dated July 31, 2008, NJDEP granted the Corps a Water Quality Certificate and a Coastal Zone Consistency Determination for this project which can be found in Appendix A.

There are no known properties listed on, or eligible for listing on, the National Register of Historic Places that would be affected by the proposed activity. The plan has been designed to avoid archaeologically sensitive areas, and is therefore not expected to impact any cultural resources. NJ SHPO concurred with this determination in a letter dated June 23, 2008.

Because the EA concludes that the changes to the Cape May Inlet to Lower Township Storm Damage Reduction Project (1980) and the Lower Cape May Meadows – Cape May Point Environmental Restoration Project (1998) do not constitute a major Federal action significantly affecting the human environment, I have determined that a Supplemental Environmental Impact Statement is not required.

Aug 6, 2008

Date

Thomas J. Tickner
Lieutenant Colonel, Corps of Engineers
District Engineer

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1.0 PROJECT DESCRIPTION

The purpose of this Environmental Assessment (EA) is to address the need to find a new source of borrow material for two ongoing Corps beach restoration projects. The information in this document updates and identifies changes to the previously published National Environmental Policy Act (NEPA) documents for the two applicable projects, Cape May Inlet to Lower Township Storm Damage Reduction Project (Cape May) and Lower Cape May Meadows – Cape May Point Environmental Restoration Project (The Meadows) (Figure 1-1). The USACE completed a Phase I General Design Memorandum, Final Supplement to the Final Environmental Impact Statement (EIS), dated August 1980 for the Cape May project and a Final Feasibility Report and Final EIS, dated August 1998 for The Meadows project. Additionally, a supplemental Environmental Assessment (EA) was completed in 2002 to address changes in borrow area locations for the two projects. To reduce duplication, only items involving new pertinent information and changes to the plans as previously proposed are addressed in this document. Items covered previously in the General Design Memorandum, Feasibility Report, and Final EISs and EA are incorporated by reference and are referenced herein as USACE (1980,1998 and 2002).

USACE (1980) identified a plan of improvement for Cape May consisting of the extension of two existing groins, placing beachfill to an elevation of +6.7 feet NAVD with a variable width of 25 to 180 feet, and periodic nourishment of 360,000 cy of material every two years. The project area includes the U.S. Coast Guard (USCG) Training Center and the City of Cape May (Figure 1-2). Initial construction of the project was completed by the District in July 1991 in two major phases: placement of 465,000 cy of sand on the USCG Training Center beach completed in August 1989, followed by a separate contract placing 900,000 cy of sand on the Cape May City beach completed in July 1991. Also, as part of initial construction, the existing groins at Baltimore and Trenton Avenues were extended. Following initial construction, periodic nourishment was completed in 1993, 1995, 1997, 1999, 2003, 2004 and 2006. The next cycle of periodic nourishment is scheduled to take place in September 2008. To date, approximately 3,923,145 cy of material have been placed on the beaches of the Coast Guard and Cape May City. This material has been obtained from a total of 3 offshore borrow areas (M1, 4 and 5).

USACE (1998) identified a plan of improvement for The Meadows consisting of protective dune/berm restoration with a berm width of 20 feet at elevation +6.7 feet NAVD and a dune elevation of +16.7 feet NAVD. The dune/berm extends from the 3rd Avenue terminal groin in Cape May City to the Central Avenue groin in Cape May Point (Figure 1-3). The total length of fill is 10,050 linear feet (1.9 miles). Initial beachfill construction was completed in 2005 with the placement of 1,406,000 cy of sand. The plan also included planting 18 acres of dune vegetation. Environmental restoration of the wetlands behind the dune was also included in the project plan. These features consisted of the control of 95 acres of *Phragmites australis*, planting 105 acres of emergent

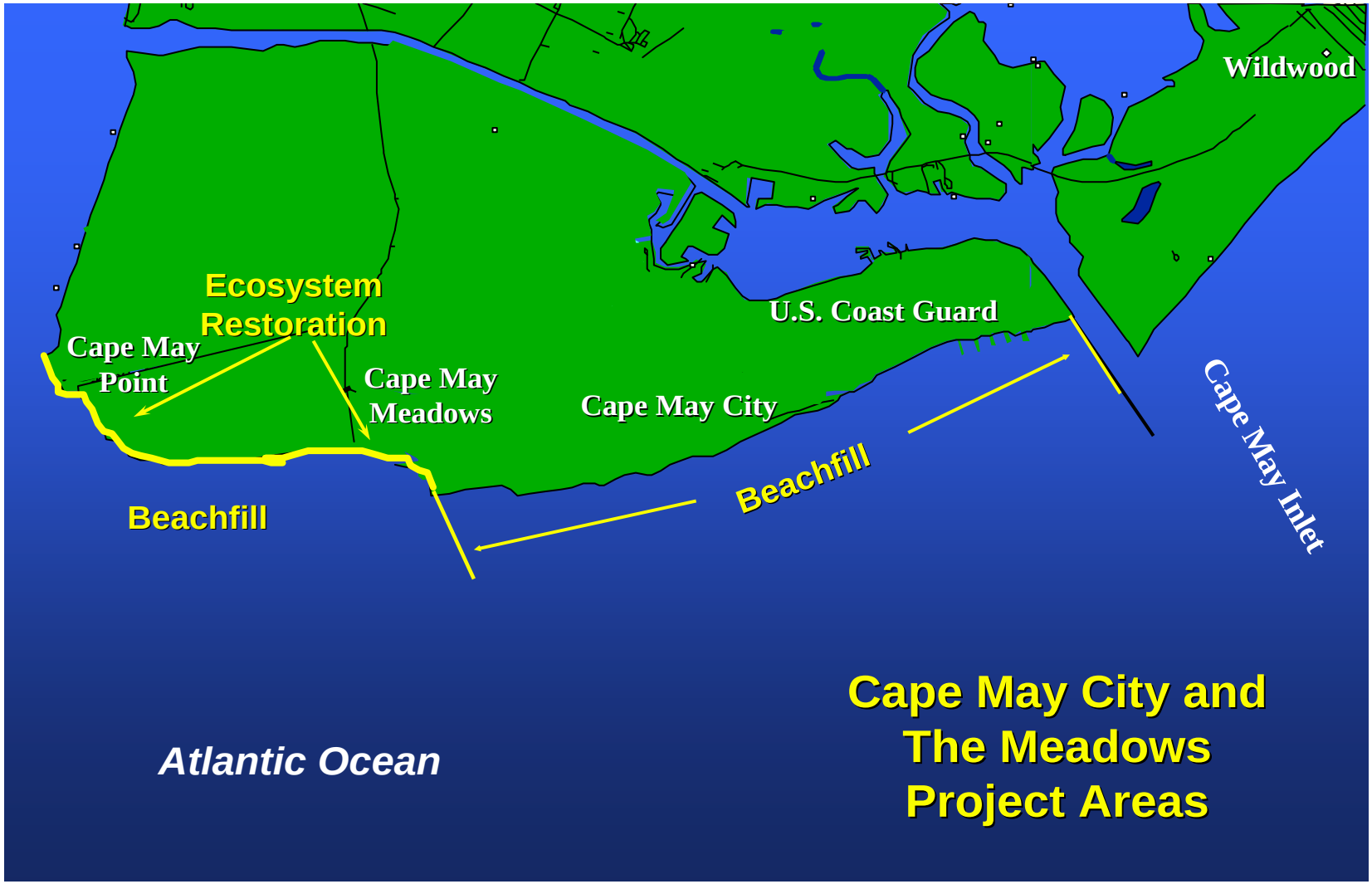


Figure 1-1 Cape May City and Cape May Meadows (The Meadows) Project Areas

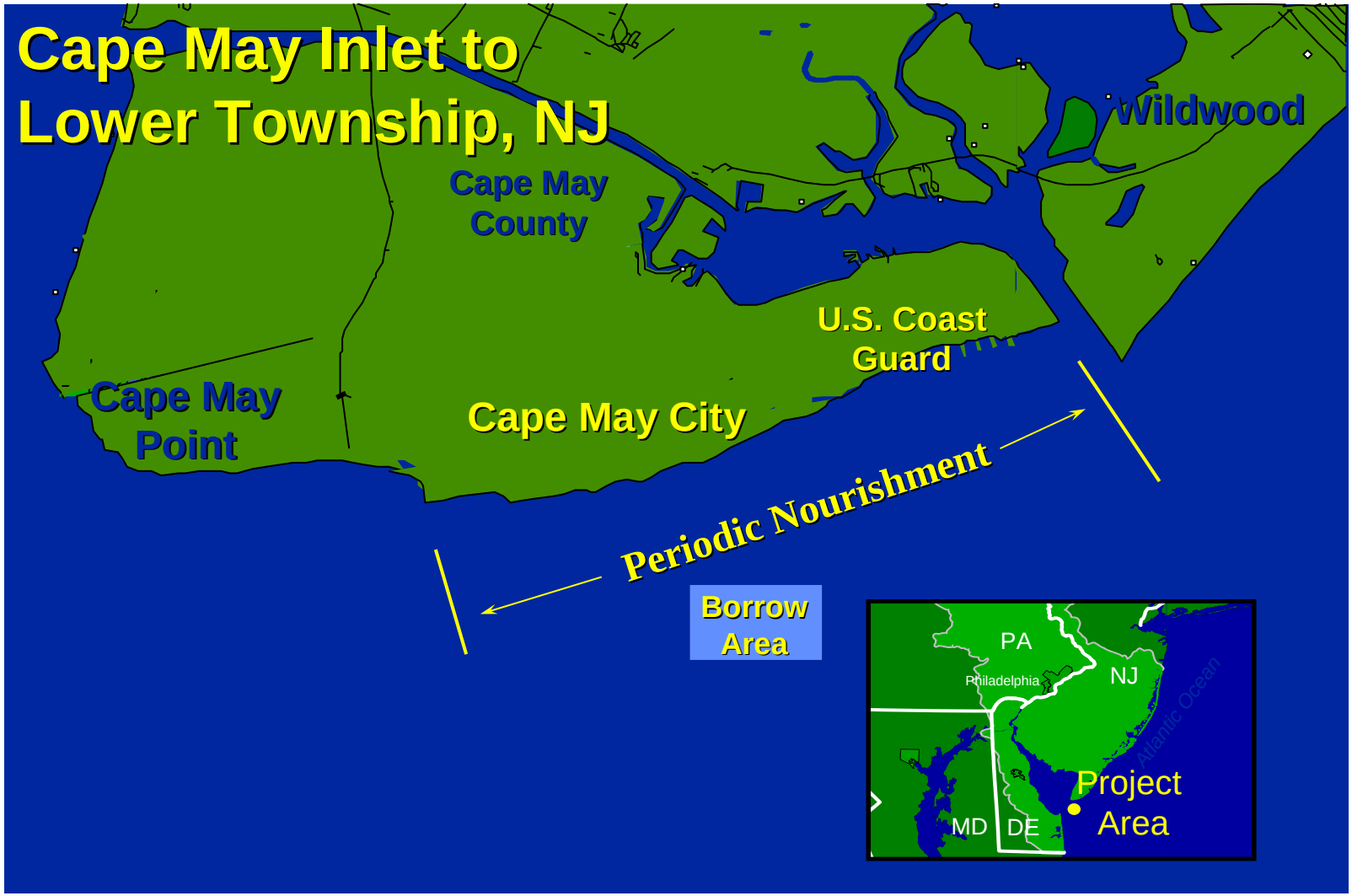


Figure 1-2 Cape May City Project Area

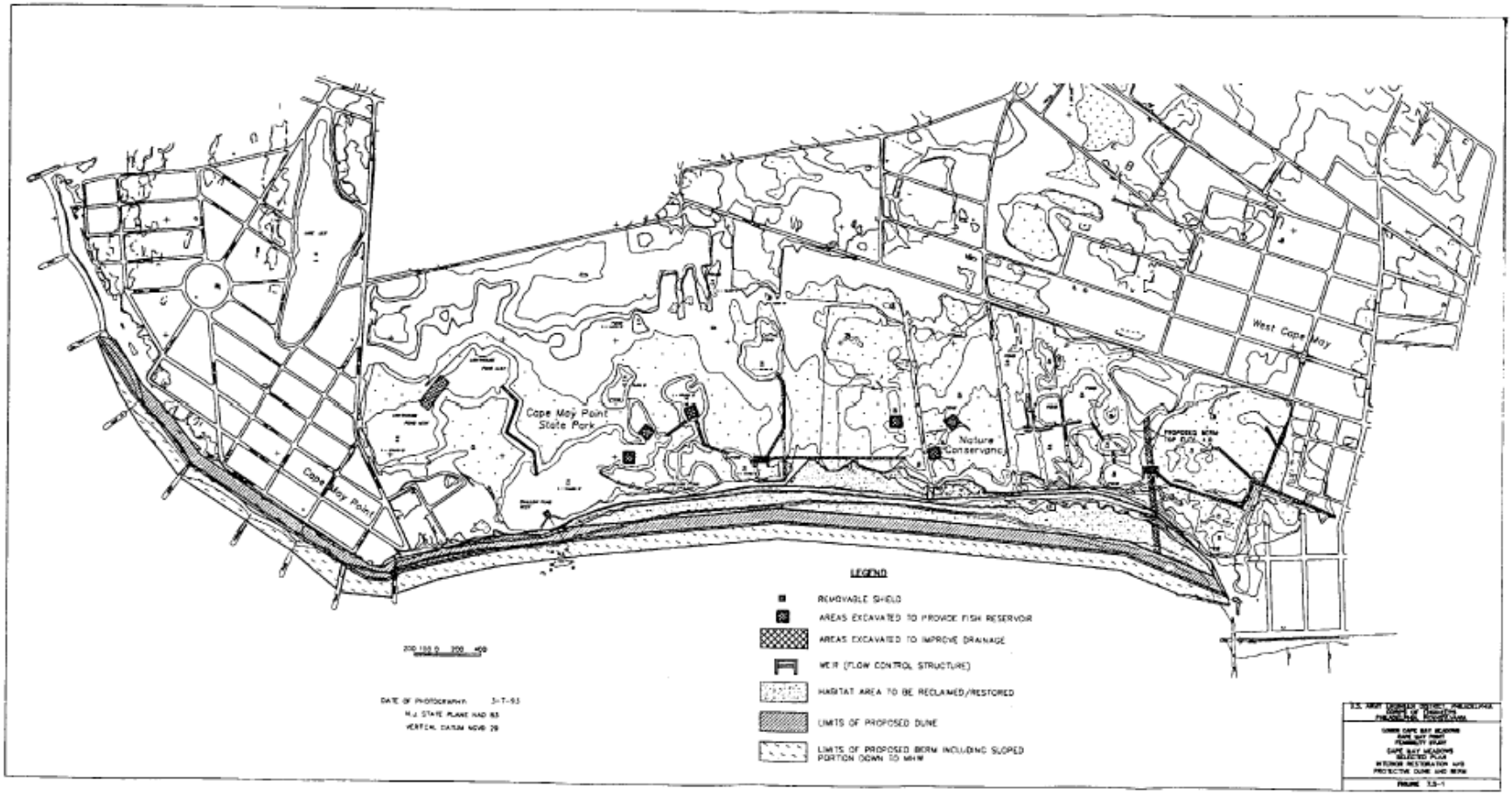


Figure 1-3 Cape May Meadows Project

wetland vegetation, excavation of existing drainage ditches to restore freshwater flow, linking the hydrological segments of the project area, installing four water control structures, and the creation of 3 "piping plover" ponds behind the dune. Initial construction was completed using sand from Borrow Areas 4 and 5.

Both projects are currently in the periodic nourishment phase with sand being placed every 2 years on the Cape May City beaches and every 4 years at The Meadows. These nourishment cycles coincide every 4 years and, when possible, the work is done at the same time to save on mobilization costs. For the 2008 nourishment cycle, the projects will be combined with an estimated quantity of approximately 425,000 cy of material being placed in Cape May City and 375,000 cy of material being placed within the Meadows. Nourishment quantities for the projects will vary for each nourishment cycle as the amounts are based on current beach conditions and the amount of sand needed to restore the beach to the design profiles discussed above.

During the 17 years since the Cape May project was initiated, the approved borrow area (M1) has failed to replenish itself with sand as previously expected. This is mainly due to a weak sand transport mechanism and a lack of supply. In addition, borrow areas 4 and 5 have been found to contain significant quantities of both fine grain and "cobble-sized" material, making them currently unsuitable for use as beachfill material. These borrow areas are at a depth at which normal wave and tidal currents are too weak to move appreciable amounts of coarse material in a short time period. There is also a limited supply of coarse grain material to feed the borrow areas. The shoals are detached from the nearshore littoral drift and from adjacent shoals. Influx of coarser sand to the borrow areas would be expected to occur only during major storms or over a long time period. For these reasons, it was necessary to identify new potential sources of borrow material for the two projects.

1.1 Location

The beachfill placement area for Cape May extends along the coast of New Jersey from the USCG Training Center beach at Cape May Inlet to the 3rd Avenue groin in Cape May City. The beachfill placement area for The Meadows begins at the 3rd Avenue groin in Cape May City and extends to the Central Avenue groin in Cape May Point, at which point the fill transitions to tie into the existing beach and dune. The total length of fill for The Meadows is approximately 1.9 miles.

The borrow area identified as the current primary sand source for these projects, Borrow Area K, is located approximately 14,000 feet (2.6 miles) south of the Cape May jetties (Figure 1-4).

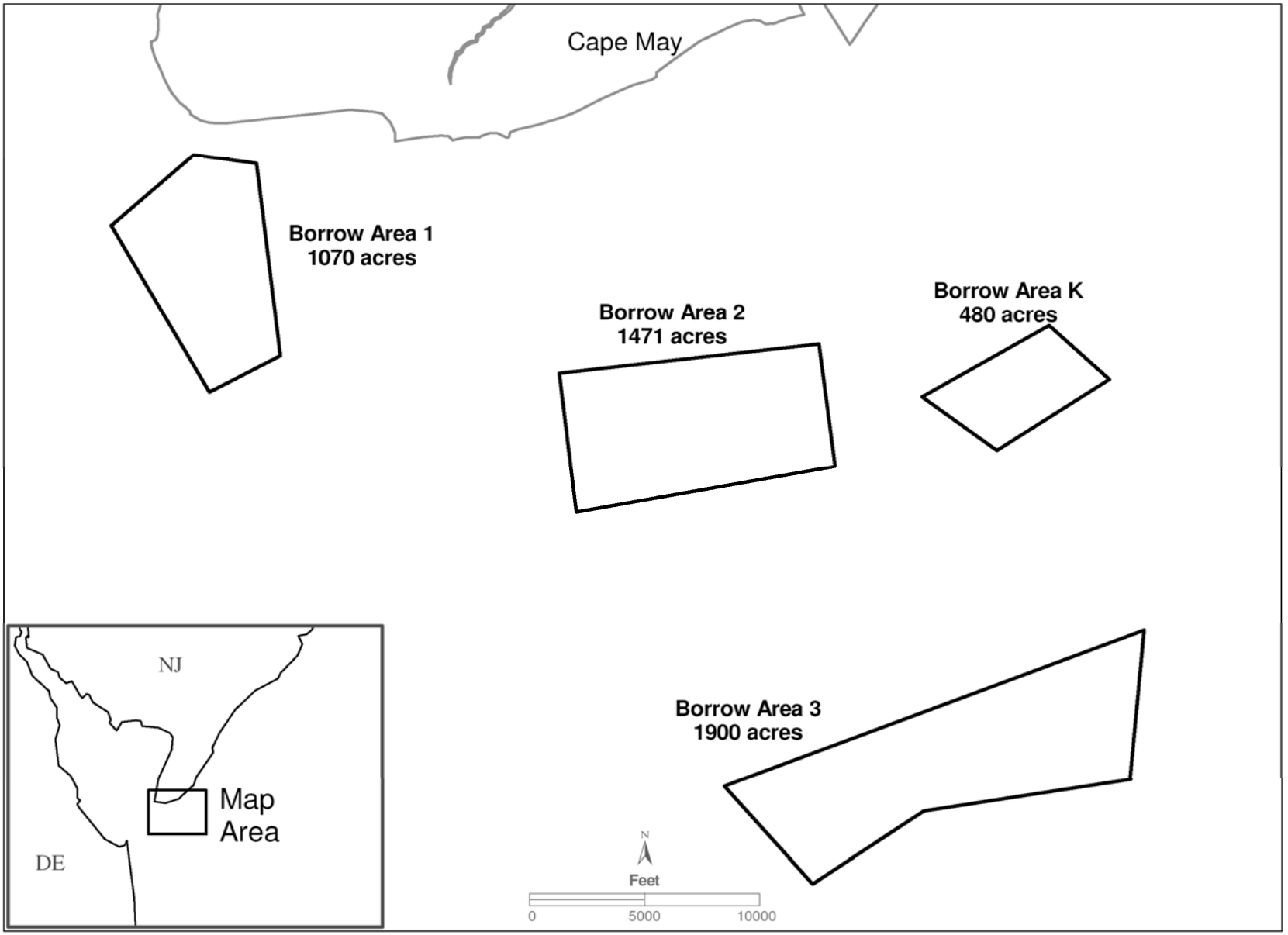


Figure 1-4. Location of the four additional (current) Cape May borrow areas in the Cape May, New Jersey region. Borrow Area K is currently being proposed for use.

2.0 PURPOSE AND NEED

As stated in USACE (1980), the purpose of the beachfill at Cape May is to reduce storm damages to the properties in Cape May City and at the US Coast Guard Training Center. Similarly, USACE (1998) reports that the purpose of beachfill at The Meadows is long-term ecosystem restoration with incidental storm damage reduction benefits. Both areas have been subjected to severe erosion, tidal inundation, wave attack and degradation since the implementation of the Federal navigation project at Cape May Inlet completed in 1911. The severe erosion resulted in the installation of numerous groins in both Cape May City and Cape May Point, as well as the subsequent placement of beachfill in Cape May City. Meanwhile, the erosion and breaching of the beach and dune and the subsequent degradation of the freshwater wetlands, has severely impacted The Meadows.

This document addresses the need to evaluate alternative sand sources to be utilized for the selected plans in USACE (1980 and 1998), berm and dune restoration. The need to evaluate alternative sources arose from the depletion of compatible sand in the previously used borrow areas identified as 4 and 5 (USACE 2002) due to an influx of fine grained material and cobbles.

3.0 ALTERNATIVES

Within the offshore, inshore and nearshore areas between Cape May City and Cape May Point, numerous locations have been investigated as potential sources of borrow material for Cape May and The Meadows (USACE 1980,1998, and 2002). Table 3-1 summarizes these investigations and the current status of the potential borrow areas.

Initially, USACE (1980) identified four potential sources of beachfill material; Borrow Areas M1, M2, K and an island source designated as Borrow Area L, located in a dredged material disposal area adjacent to the Cape May Canal (Figure 3-1). M1 was ultimately chosen as a borrow source and was used for initial construction and 4 subsequent nourishment cycles.

During the Reconnaissance Phase of investigation for The Meadows (USACE 1994), potential borrow areas identified during USACE 1980 were re-evaluated for compatibility and potential use for The Meadows. The results of the re-evaluation, with regard to available quantity, location, and grain size compatibility for The Meadows determined that Borrow Areas M2 and K were compatible sources of borrow material based on previous investigations and beach sampling. Borrow Areas M1 and L were rejected due to the fact that insufficient quantities were present in these areas to satisfy the long-term project needs. Borrow Area M2 was subsequently dropped after the discovery that the area fell within the boundaries of the Cape May Battery Site firing fan and therefore has the potential (though slight) to contain the danger of unexploded

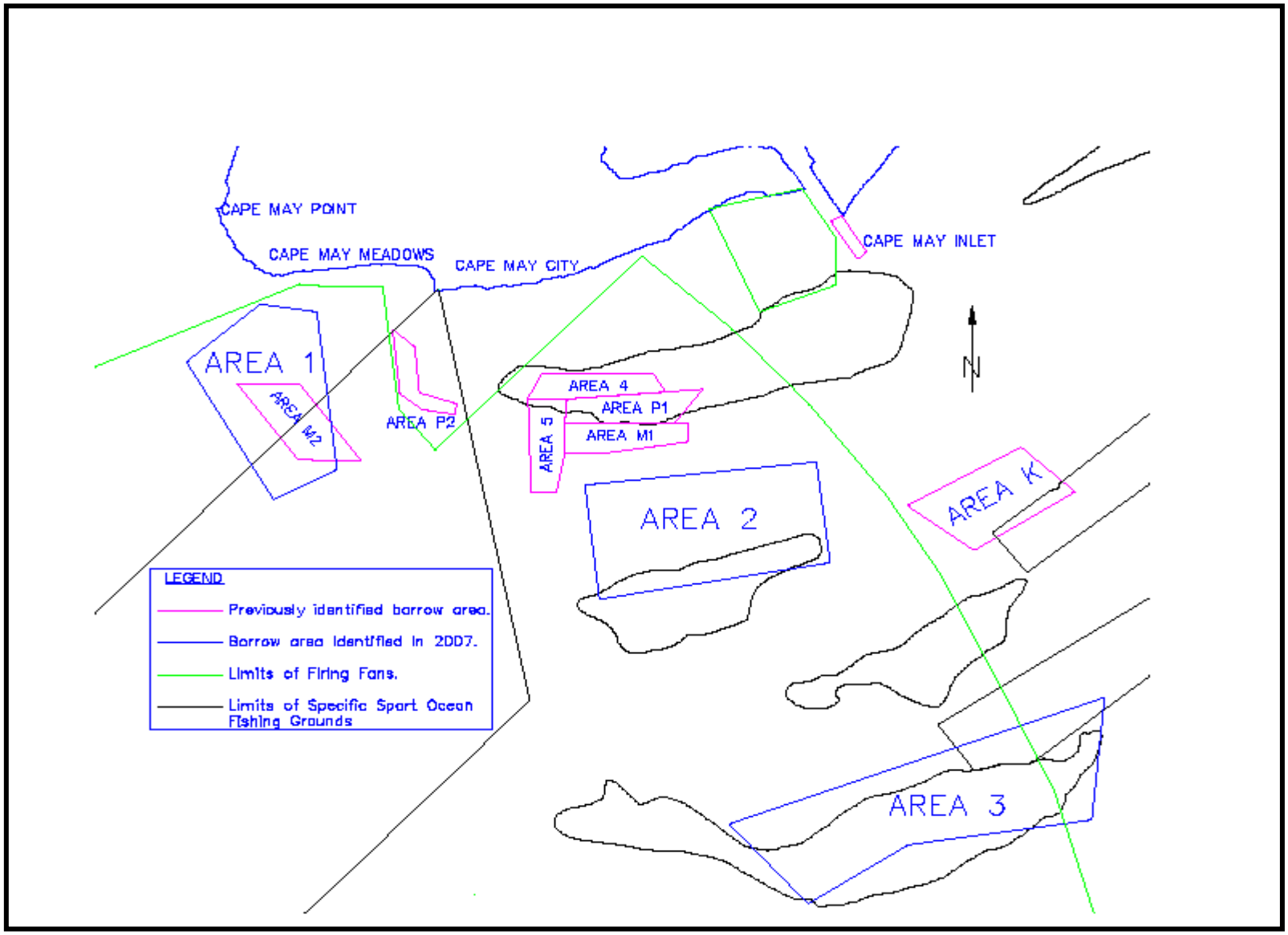


Figure 3-1 Previously Identified Borrow Areas

ordnance within its boundaries. Borrow Area K was eliminated for financial reasons as the distance from the shoreline to the borrow area was too great and would have increased project costs significantly.

As a result of the elimination of these potential borrow areas during the Reconnaissance Phase, additional borrow areas needed to be identified. For this reason, USACE 1998 identified two new potential areas, Borrow Areas P1 and P2. Borrow Area P2 was eliminated due to concerns regarding fisheries resources so it was again necessary to identify additional sources of compatible material for the proposed project. Based on coordination and guidance from NJDEP, Division of Fish and Wildlife, three additional areas were investigated as potential sand sources. These areas were identified as Borrow Areas 4 and 5 and Cape May Inlet (See Figure 3-1). Geotechnical investigations discovered that the sand within Cape May Inlet was not compatible with the sand on the beaches of Cape May Meadows and Cape May Point. Borrow areas 4 and 5 were found to be acceptable sources of sand from both an environmental and engineering standpoint and approximately 2,200,000 cy of material was removed from these sites during the initial construction of The Meadows and two Cape May nourishment cycles. Currently, suitable sand no longer exists within these borrow areas. Much of the surface of these areas is either very gravelly with some cobble size material or at the other extreme of the grain size spectrum and covered with silts and clays.

Since these previously used borrow areas no longer have suitable quantities of acceptable beachfill material, it was once again necessary to investigate alternative offshore areas as potential borrow sources. Four borrow areas, identified as 1, 2, 3 and K underwent benthic, cultural and geotechnical evaluations in 2007. These investigations indicated that all four areas would be acceptable for use for the two Cape May projects. Only Borrow Area K is being pursued at this time however because the other areas are all within the historical artillery firing fans of the WW II era Fort Miles complex which include the artillery batteries that fired out of Cape May as well as Cape Henlopen. Due to potential safety issues, NJDEP is currently requesting that the Corps not use any borrow areas that fall within historic firing fans.

Table 3-1. History of Borrow Area Investigations in the Cape May Vicinity

Borrow Area	Planning/NEPA Document	Project	Current Status
M2	USACE 1980 & 1994	Cape May & The Meadows	(Falls inside of Borrow Area 1) Not currently being considered due to presence of important finfish habitat in ½ the borrow area and being located within a historic firing fan.
M1	USACE 1980 &1994	Cape May & The Meadows	Sand source has been depleted after use for initial construction and 4 nourishment cycles for Cape May.
K	USACE 1980, 1994, & 2008	Cape May & The Meadows	Previously eliminated in favor of closer borrow areas. Currently being considered for use.
L	USACE 1980 & 1994	Cape May & The Meadows	Rejected due to the fact that insufficient quantities were present to satisfy long-term project needs and the logistics of moving sand by truck to the beach.
Cape May Inlet	USACE 2002	Cape May & The Meadows	Originally eliminated because sand was not compatible with target beaches. New analysis indicates presence of suitable sand. Area was used for Cape May nourishment in 2007.
P1	USACE 1998	The Meadows	Some fisheries concerns but available for future use. Currently unavailable due to NJDEP's ban on use of areas within historic firing fans.
P2	USACE 1998	The Meadows	Eliminated due to concerns regarding fisheries resources.
1	USACE 2008	Cape May & The Meadows	(Expansion of Borrow Area M2) Currently unavailable due to NJDEP's ban on use of areas within historic firing fans.
2	USACE 2008	Cape May & The Meadows	Currently unavailable due to NJDEP's ban on use of areas within historic firing fans. Portion of area falls within Specific Sport Ocean Fishing Grounds.
3	USACE 2008	Cape May & The Meadows	Currently unavailable due to NJDEP's ban on use of areas within historic firing fans. Most of area falls within Specific Sport Ocean Fishing Grounds.
4	USACE 2002	Cape May & The Meadows	Previously used as borrow material for both projects. Currently does not contain enough suitable material due to presence of both fine and coarse grained material.
5	USACE 2002	Cape May & The Meadows	Previously used as borrow material for both projects. Currently does not contain enough suitable material due to presence of both fine and coarse grained material.

3.1 Borrow Area 1

Borrow Area 1 is approximately 1070 acres, ranging from 1500 to 12,000 feet offshore of the western edge of The Meadows. This area is an expansion of a previously designated borrow area (M2), which had not been pursued beyond the feasibility phase due to the concerns described in Table 3-1. It is within the limits of the Cape May, Fort Miles firing fan, but due to the District's success in dealing with ordnance through a dual screening process, it was decided to examine an expansion of M2 as a Cape May sand source. Recent new information however, has reduced the available area of usable sand to only about 430 acres as the southern portion of the borrow area is within the newly reconfigured limits of the New Jersey Specific Sport Ocean Fishing Grounds (SSOFG). In addition, cultural magnetometer surveys indicate that the northern portion of the site is within a cable area that is believed to contain a WWII era communications cable between Fort Miles at Cape Henlopen and the batteries at Cape May. The District needs to conduct further geotechnical evaluations, but existing data indicates that within the remaining 430 acres, it is anticipated that approximately 7 million cubic yards of fine to med sand could be available for beachfill operations.

3.2 Borrow Area 2

Borrow Area 2 is approximately 1471 acres, ranging between 11,000 and 22,000 feet to the southeast of Cape May City. It is an area that the District, working with the NJGS identified on preliminary information and would still require further geotechnical evaluation. A small portion, approximately 325 acres, is within the limits of SSOFG, therefore reducing the total area available to approximately 1150 acres that could provide as much as 15 million cubic yards of beachfill material. Again, additional investigations will be required to refine the quality and quantity of beachfill material available. This area is completely within one of the largest firing fans of the Fort Miles complex.

3.3 Borrow Area 3

Borrow area 3 is approximately 1900 acres, ranging between 4 and 5 miles to the southeast of Cape May City. Unfortunately, like the two areas above, this area was identified prior to the District receiving the new limits of SSOFG from NJDEP. Most of area 3 lies within these limits. It, like area 2 was based on preliminary geotechnical and geophysical data by the District working with NJGS and would require additional investigations to refine the quality and quantity of beachfill material available, but could potentially provide approximately 25 million cubic yards. It, like Area 2 is also predominately within one of the largest firing fans of the Fort Miles complex. Use of this borrow area would require further coordination with Minerals Management Service (MMS) under the Outer Continental Shelf Lands Act due to the fact it is located more than 3 miles from the shoreline.

3.4 Borrow Area K

Borrow area K is approximately 480 acres and lies approximately 14,000 to 19,000 feet offshore of Cape May Inlet. It was originally identified for the Cape May City project but, as stated in Table 3-1, was eliminated in favor of closer borrow areas. Since it is currently the only area containing sufficient quantity of quality beachfill material, that is not within the limits of any of the historic Fort Miles firing fans, it has been chosen to be pursued for permitting for the near-term beachfill projects at both Cape May Meadows and Cape May City. Approximately 50 acres of this borrow area falls within the recently reconfigured limits of SSOFG, but that area will be designated as off-limits during any dredging operations therefore reducing the available area to approximately 430 acres. Geotechnical analyses of the available sand showed predominately fine to medium sands with a mean grain size of 0.37mm, which is highly compatible with the native beach materials in Cape May. It is estimated that approximately 5 million cubic yards of beachfill material are available to a dredge depth of 8 feet below the current bathymetric surface.

3.5 No Action

The no action alternative was presented in USACE (1980 and 1998) and is incorporated here by reference. The no action alternative would impact the selected plan for The Meadows and Cape May, and would therefore have made berm and dune restoration unfeasible. By not continuing the nourishment cycles at Cape May and The Meadows, the no action alternative would allow beach erosion to continue resulting in the continued loss and degradation of the wetlands and migratory bird habitat in The Meadows and an increased risk of property damage and destruction during storms at Cape May. Aquatic resources in the proposed sand sources would remain unaffected.

The no action alternative also has the potential to reduce the quantity and quality of available piping plover nesting habitat at both Cape May and The Meadows. As a result of initial beachfill placement and subsequent nourishment cycles, piping plovers have nested fairly consistently along the beaches of Cape May City and The Meadows for the past several years. In The Meadows, plover numbers and nesting success have been increasing since the project was completed. Without the continuation of the nourishment cycles, the width of the beach would be reduced, most likely eliminating the existing plover nesting habitat and jeopardizing the existence of the plover feeding ponds at The Meadows.

4.0 AFFECTED ENVIRONMENT

4.1 Terrestrial

While native vegetation is practically non-existent in Cape May due to extensive development in the area, the vegetation within The Meadows is unique in its diversity and actually comprises several successional communities. According to the 1986 Cape May Point Natural Area Management Plan, Cape May Peninsula is a geographic merging point for many northern and southern plant species. An example of this is that both the northern bayberry and southern wax myrtle can be found growing within the project area. The vegetation in The Meadows is also unique in that it has experienced and adapted to various ecological, geological, and man-made changes. Prior to beach fill activities, the "freshwater" ponds and wetlands were frequently inundated with ocean water when the dunes surrounding the area were breached or overtopped during large storms. Only plants adapted to this dynamic environment of salt air, high winds, variable soil moisture content, and varying salinity survive.

The vegetated areas in The Meadows span several different habitat types. Upland vegetation is primarily confined to forested and old field/scrub shrub areas. Most of the forested areas are found in the State Park section of The Meadows while the old field/scrub shrub habitat is confined to the area managed by The Nature Conservancy. Typical species inhabiting the forested area include sassafras (*Sassafras albidum*), common persimmon (*Diospyros virginiana*), black oak (*Quercus velutina*), white oak (*Quercus alba*), and red maple (*Acer rubrum*). Evergreen species found in the area include American holly (*Ilex opaca*), eastern red cedar (*Juniperus virginiana*), and pitch pine (*Pinus rigida*).

Understory species and species located in the old field/scrub shrub habitats include sumac (*Rhus sp.*), poison ivy (*Rhus radicans*), briers (*Smilax sp.*), rose (*Rosa sp.*), marsh elder (*Iva frutescens*), bayberry (*Myrica pensylvanica*), wax-myrtle (*Myrica cerifera*), seaside goldenrod (*Solidago sempervirens*), sheep sorrel (*Rumex acetosella*), sweet everlasting (*Gnaphalium obtusifolium*), purple vetch (*Vicia americana*), Japanese honeysuckle (*Lonicera japonica*), and *Polygonum sp.* (Biohabitats, Inc., 1996).

4.1.2 Dunes

Although typical beach dunes and the habitats associated with them are almost non-existent within the Cape May City and Cape May Point portions of the project areas, some elements of beach dune flora and fauna are still present within The Meadows. The following discussion on beach dunes mainly pertains to healthy, undisturbed beach and dune areas, however, some of the dune flora and fauna discussed are still present within a portion of The Meadows that remained largely undisturbed by storms and the recent construction activities.

In typical undisturbed beach profiles along the Atlantic Coast of New Jersey, the primary dune is the first dune landward from the beach. The flora of the primary dune are adapted to the harsh conditions present such as low fertility, heat, and high energy from the ocean and wind. The dominant plant on these dunes is American beachgrass (*Ammophila breviligulata*), which is tolerant of salt spray, shifting sands and temperature extremes. American beachgrass is a rapid colonizer that can spread by horizontal rhizomes, and also has fibrous roots that can descend to depths of 3 feet to reach moisture. Beachgrass is instrumental in the development of dune stability, which opens up the dune to further colonization with more species like seaside goldenrod (*Solidago sempervirens*), sea-rocket (*Cakile edentula*) and beach cocklebur (*Xanthium echinatum*).

The secondary dunes lie landward of the primary dunes, and tend to be more stable resulting from the protection provided by the primary dunes. The increased stability also allows an increase in plant species diversity. Some of the plant species in this zone include: beach heather (*Hudsonia tomentosa*), coastal panic grass (*Panicum amarum*), saltmeadow hay (*Spartina patens*), broom sedge (*Andropogon virginicus*), beach plum (*Prunus maritima*), seabeach evening primrose (*Oenothera humifusa*), sand spur (*Cenchrus tribuloides*), seaside spurge (*Ephorbia polygonifolia*), joint-weed (*Polygonella articulata*), slender-leaved goldenrod (*Solidago tenuifolia*), and prickly pear (*Opuntia humifusa*).

4.1.3 Upper Beach

The upper beach or supralittoral zone typically lies below the primary dune and above the intertidal zone. An upper beach zone is present within the study area, however, it is subject to some disturbance from human activity. The upper beach zone is generally only covered with water during periods of extremely high tides and large storm waves. Within the project area however, continued erosion has left much of the beach in a condition where this area is regularly inundated by normal high tides. The upper beach habitat is characterized by sparse vegetation and few animals. This zone has fewer biological interactions than the dunes, and organic inputs are scarce. The most active organism in this zone is the ghost crab (*Ocypode quadrata*). This crab lives in semi-permanent burrows near the top of the shore, and it is known to be a scavenger, predator, and deposit sorter. The ghost crab is nocturnal in its foraging activities, and it remains in its burrow during the day. In addition to ghost crabs, species of sand fleas or amphipods (*Talitridae*), predatory and scavenger beetles and other transient animals may be found in this zone.

Many species of shorebirds inhabit the beach during the spring and fall migrations, although most are even more likely to be found on more protected sand and mud flats within The Meadows, tidal marshes, or along the Delaware Bay shoreline (especially in spring when large numbers of horseshoe crab eggs are available). Shorebirds feed on small individuals of the resident infauna and other small organisms brought in with waves. Common shorebird species include sanderling (*Calidris alba*),

dunlin (*C. alpina*), semipalmated sandpiper (*C. pusilla*), western sandpiper (*C. mauri*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), and willet (*Catoptrophorus semipalmatus*). Sanderling, dunlin, and western sandpiper also occur on the beach throughout the winter. Colonial nesting shorebird habitat is increasingly under pressure from development and human disturbance along New Jersey's Atlantic beaches. Nesting birds such as common tern (*Sterna hirundo*), least tern (*Sterna antillarum*), black skimmer (*Rynchops niger*), and American oystercatcher (*Haematopus palliatus*) are frequent spring and summer inhabitants on unvegetated dunes and upper beaches within the study area.

Several species of gulls are common along New Jersey's shores, and are attracted to forage on components of the beach wrack such as carrion and plant parts. These gulls include the laughing gull (*Larus atricilla*), herring gull (*L. argentatus*), and ring-billed gull (*L. delawarensis*).

4.2 AQUATIC ECOLOGY

4.2.1 Upper Marine Intertidal Zone

The upper marine intertidal zone is also primarily barren, however, more biological activity is present in comparison to the upper beach. Organic inputs are derived primarily from the ocean in the form of beach wrack, which is composed of drying seaweed, tidal marsh plant debris, decaying marine animals, and miscellaneous debris that washed up and deposited on the beach. The beach wrack provides a cooler, moist microhabitat suitable to crustaceans such as the amphipods *Orchestia spp*. and *Talorchestia spp*., which are also known as beach fleas. Beach fleas are important prey to ghost crabs. Various foraging birds and some mammals are attracted to the beach fleas, ghost crabs, carrion and plant parts that are commonly found in beach wrack. The birds include gulls, shorebirds, fish crows, and grackles.

4.2.2 Intertidal Zone

The intertidal zone contains more intensive biological activity than the other zones. Shifting sand and pounding surf dominate a habitat which is inhabited by a specialized fauna. The beach fauna forms an extensive food-filtering system which removes detritus, dissolved materials, plankton, and larger organisms from in-rushing water. The organisms inhabiting the beach intertidal zone have evolved special locomotory, respiratory, and morphological adaptations which enable them to survive in this extreme habitat. Organisms of this zone are agile, mobile, and capable of resisting long periods of environmental stress. Most are excellent and rapid burrowers. Frequent inundation of water provides suitable habitat for benthic infauna, however, there may be a paucity in numbers of species. Intertidal benthic organisms tend to have a high rate of reproduction, and a short (1 to 2 years) life span (Hurme and Pullen, 1988). This zone

contains a mixture of herbivores, primary carnivores, and some high order carnivores such as the mole crab (*Emerita* sp.). 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.

Benthic macroalgae grow attached to the bottom substrate in the intertidal zone, where they are alternately exposed and submerged as the tides ebb and flow. The substrate along the Atlantic Coast of New Jersey is mainly composed of shifting sands and shell fragments, making it too unstable for large colonies of benthic algae to proliferate. Colonies do attach on hard, stable substrates provided by peat banks, shell bottoms, reefs, and man-made structures such as pilings, jetties, buoys and bridges. Various species of benthic macroalgae representing the phyla Chlorophyta and Phaeophyta are found in New Jersey's coastal waters.

4.2.3 Nearshore and Offshore Zones

The nearshore coastal zone generally extends seaward from the subtidal zone to well beyond the breaker zone (U.S. Army Corps of Engineers, 1984). This zone is characterized by intense wave energies that displace and transport coastal sediments. The offshore zone generally lies beyond the breakers, and is a flat zone of variable width extending to the seaward edge of the Continental Shelf. Hurme and Pullen (1988) describe the nearshore zone as an indefinite area that includes parts of the surf and offshore areas affected by nearshore currents. The boundaries of these zones may vary depending on relative depths and wave heights present.

The following paragraphs discuss planktonic, pelagic and benthic biological resources associated with New Jersey coastal waters, which may overlap nearshore waters with offshore waters. The proposed sand borrow site for this project will be referred to as the proposed offshore borrow site.

4.2.3.1 Plankton

Plankton are collectively a group of interacting minute organisms adrift in the water column. Plankton are commonly broken into two main categories: phytoplankton (plant kingdom) and zooplankton (animal kingdom).

Phytoplankton play an essential role in the food web because they are the primary producers in the aquatic marine ecosystem. Phytoplankton convert light and chemical energy into organic compounds which can be assimilated by higher organisms in the food chain. Phytoplankton production is dependent on light penetration, available nutrients, temperature and wind stress. Phytoplankton production is generally highest in nearshore waters. Seasonal shifts in species dominance of phytoplankton are frequent. Dinoflagellates are generally abundant from summer through fall, and diatoms are

dominant during the winter and early spring. Approximately 126 species of phytoplankton were identified in New Jersey's coastal waters representing the following phyla: Chlorophyta, Chromophyta, Pyrrophyta, Euglenophyta, and Procaryota.

Zooplankton provide an essential trophic link between primary producers and higher organisms. Zooplankton represent the animals (vertebrates and invertebrates) that are adrift in the water column, and are generally unable to move against major ocean currents. Many organisms may be zooplankton at early stages in their respective life cycles only to be able to swim against the currents (nektonic) in a later life stage, or to be a part of the benthic community. Zooplankton are generally either microscopic or barely visible to the naked eye. Zooplankton typically exhibit seasonal variances in species abundance and distribution, which may be attributed to temperature, salinity and food availability. In marine environments, seasonal peaks in abundance of zooplankton distinctly correlate with seasonal phytoplankton peaks. These peaks usually occur in the spring and fall.

4.2.3.2 Macroinvertebrates

The nearshore and offshore zones of the New Jersey Coast contain a wide assemblage of invertebrate species inhabiting the benthic substrate and open water. Invertebrate phyla existing along the coast are represented by Cnidaria (corals, anemones, jellyfish), Platyhelminthes (flatworms), Nemertinea (ribbon worms), Nematoda (roundworms), Bryozoa, Mollusca (chitons, clams, mussels, etc.), Echinodermata (sea urchins, sea cucumbers, sand dollars, starfish), and the Urochordata (tunicates).

The diversity and composition of benthic communities are often reliable indicators of the overall quality of any particular habitat for supporting life (New Jersey Bureau of Fisheries, 1979). Benthic macroinvertebrates are those dwelling in the substrate (infauna) or on the substrate (epifauna). Benthic invertebrates are an important link in the aquatic food chain, and provide a food source for most fishes. Various factors such as hydrography, sediment type, depth, temperature, irregular patterns of recruitment and biotic interactions (predation and competition) may influence species dominance in benthic communities. Benthic assemblages in New Jersey coastal waters exhibit seasonal and spatial variability. Generally, coarse sandy sediments are inhabited by filter feeders, and areas of soft silt or mud are more utilized by deposit feeders.

In October 2007, Versar, Inc., conducted a benthic-sediment assessment focusing on infauna species in the proposed offshore sand borrow sites located offshore of Cape May (Borrow Areas 1, 2, 3 and K), to establish a baseline for the benthic macroinvertebrate assemblages within the proposed borrow sites (Versar 2008). Other objectives were to identify the presence of any commercial and/or recreationally important benthic macroinvertebrates, and to identify the presence of ecologically important benthic communities within the proposed sand borrow sites. The data obtained from each borrow area were compared to each other, other local borrow areas sampled

under other contracts, and nearshore reference points. Similar studies were conducted on the previously investigated borrow areas (Borrow Areas P1, P2, 4, 5 and Cape May Inlet) and are hereby incorporated by reference (USACE 1998 and 2002 and Versar 1997 and 2000).

For the purposes of this EA, only the sampling results from Borrow Area K are presented since it is the only borrow area not in a firing fan and thus, available for use at this time. For the current study, 29 benthic macroinvertebrate samples were collected from the Borrow Area K (Figure 4-1). The results of this sampling reveals that Borrow Area K is dominated by the bean clam, *Donax variabilis*, which led to over 60% of the total composition being mollusks. Of the four borrow areas sampled during this effort, Borrow Area K had the highest mean abundance of epifauna species as well as the highest infauna biomass. These results were not significantly different from the abundance and biomass parameters at Borrow Areas 2 and 3. According to Versar, Inc. (2008), the borrow areas sampled do not contain unique or rare macroinvertebrate communities that would preclude their use as a sand borrow source for beach placement activities. The benthic community in Borrow Area K was also similar to other benthic communities found in and along the New Jersey Coast.

As stated above, the analysis also looked for the presence of benthic species with commercial and/or recreational value. One species of commercial or recreational value was collected during the macroinvertebrate survey, the Atlantic surf clam. NJDEP has been conducting surf clam surveys off the coast of New Jersey since 1988. During that time, Borrow Area K was sampled 5 times with an average catch of 7.1 bushels/100 m^2. In the 2007 Versar sampling effort, juvenile and small adult surf clams were collected in 52% of the stations sampled within Borrow Area K. The mean number of juvenile surf clams was approximately 1.5 clams per grab (equivalent to $35/m^2$) and the abundance of clams was not significantly different between the 4 borrow areas. Mean biomass was also low, similar to result obtained from other sampling efforts in this area. Due to historically low densities of surf clams in the Cape May region, NJDEP, Division of Fish and Wildlife agreed with the USACE that additional adult surf clam dredge tows were not necessary in these borrow areas at this time.

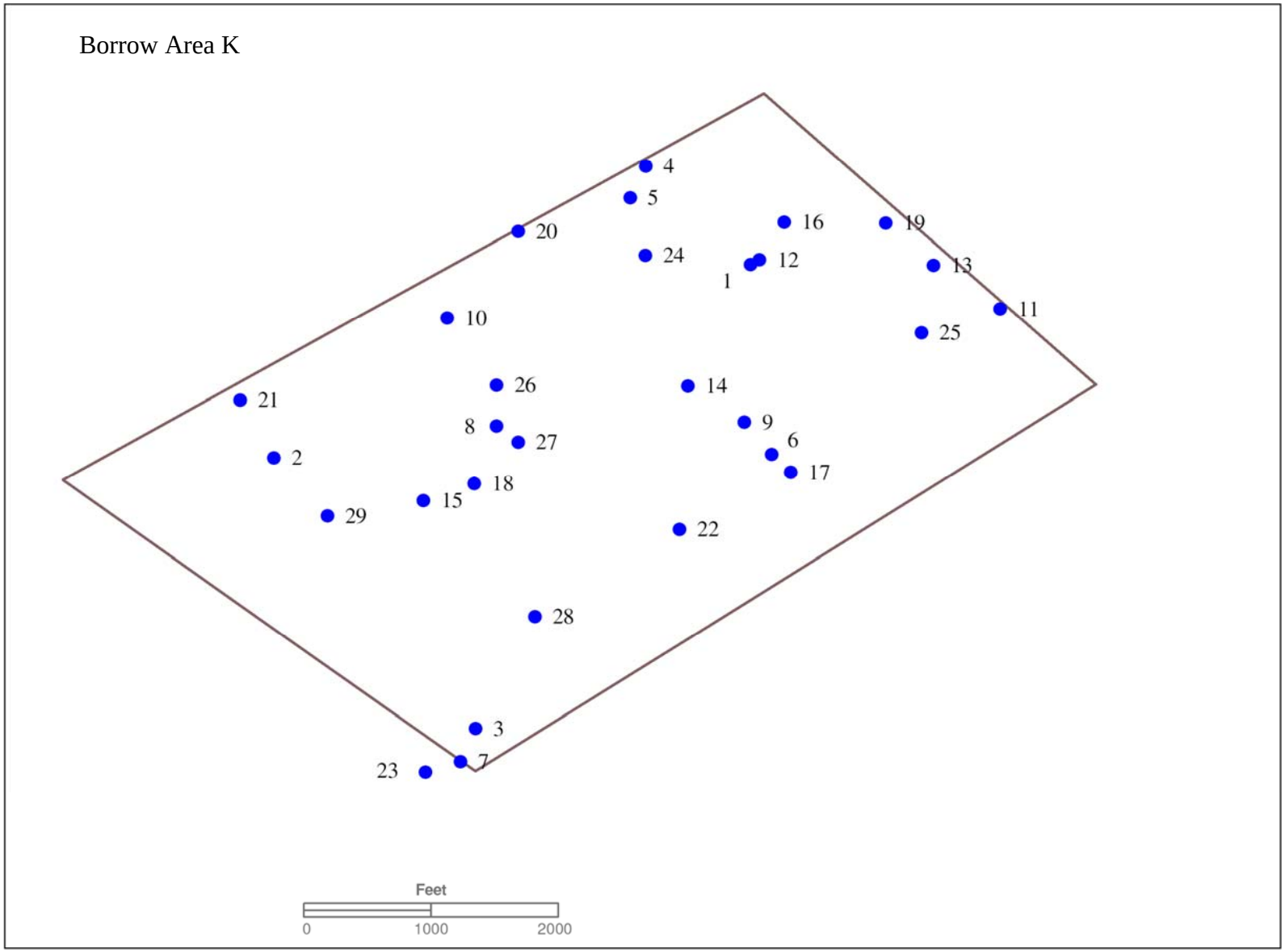


Figure 4-1 Location of benthic stations sampled within Borrow Area K in 2007.

4.2.3.3 Fisheries

4.2.3.3.1 Shellfish/Aquatic Invertebrates

Extensive shellfish beds, which fluctuate in quality and productivity are found in the shallow ocean waters of the study area. Atlantic surf clams (*Spisula solidissima*) are found offshore the barrier islands along with hard clams (*Mercenaria mercenaria*), blue mussel (*Mytilus edulis*) and blue crab (*Callinectes sapidus*). Surf clams are the largest bivalve community found off the Atlantic coast from the Gulf of Saint Lawrence, Canada to North Carolina. The clams usually spawn twice off the coast of New Jersey, once in July and August and then again in October. The blue crab and the hard clam are two of the most important invertebrates of recreational and commercial value along the New Jersey Coast. Since many of these animals are filter feeders and tend to bioaccumulate toxins and bacteria within their systems, bivalves are often used as indicators of water quality. Indications of this can be seen when shellfish areas are closed or have restricted harvests. In areas where this occurs, there are generally water quality or pollution problems associated with the closings.

The area immediately offshore from the Lower Cape May Meadows has been classified as approved for the harvesting or shellfish according to the New Jersey Shellfish Growing Water Classification Charts. Most of the area between the 3rd Avenue Groin in Cape May City and the Cape May Inlet is classified as prohibited, most of which extends .25 nautical miles from shore. In prohibited areas, the waters are condemned for the harvest of oysters, clams, and mussels.

Invertebrates common to the New Jersey coast include sea stars (*Asterias forbesi*), salt marsh mosquito (*Aedes cantator* and *Aedes sollicitans*), bay scallop (*Aequipecten irradians*), mosquito (*Anopheles sp.*), blue crab (*Callinectes sapidus*), common rock crab (*Cancer irroratus*), horsefly (*Chrysops sp.*), snapping shrimp (*Crangon septemspinosa*), oyster (*Crassostrea virginica*), mosquito (*Culex sp.*), American lobster (*Homerus americanus*), Atlantic longfinned squid (*Loligo peali*), salt marsh snail (*Melampus bidentatus*), hard clam (*Mercenaria mercenaria*), ribbed mussel (*Modiolus demissus*), common blue mussel (*Mytilus edulis*), roundworms (*Nematoda*), grass shrimp (*Palaemonetes sp.*), moon snails (*Polinices heros*), surf clams (*Spisula solidissima*), horsefly (*Tabanus sp*.), and Fiddler crab (*Uca sp*.).

Typically, the sublittoral areas, below the low tide level to the maximum depth of plant growth, consist of variable mixtures of sand, gravel, shells, and mud. Filter feeders and deposit feeders inhabit coarse sandy sediment and soft silts and muds, respectively. Surf clams and moon snails burrow in sand bottoms from the edge of the intertidal zone into deeper water. Sessile invertebrates, such as sponges, hydroids, barnacles, and gribbles, are found on rock jetties, bulkheads, pilings and sunken debris.

4.2.3.3.2 Finfish

In regard to the fish species present in the coastal region offshore of The Meadows, a comprehensive survey of finfish was conducted from June 1973 through December 1977 in the Hereford Inlet Estuary which is slightly northeast of the study area. This survey collected a total of 105 species of finfish at various stages of life. The most frequently collected species included such year-round residents as the Atlantic silverside (*Menidia menidia*), mummichog (*Fundulus heteroclitus*), winter flounder (*Pseudopleuronectes americanus*), and tidewater silversides (*Menidia beryllina*). Several species of spring migrants were also collected, as well as some species which are considered rare occurrences for southern New Jersey.

The finfish found along the Atlantic Coast of New Jersey are principally seasonal migrants. Winter is a time of low abundance and diversity as most species leave the area for warmer waters offshore and southward. During the spring, increasing numbers of fish are attracted to the New Jersey Coast, because of its proximity to several estuaries which are utilized by these fish for spawning and nurseries.

Species known to utilize estuaries along the Atlantic Coast of New Jersey include summer flounder (*Paralichtys dentatus*), sea bass (*Centropristis striata*), striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), winter flounder (*Pseudopleuronectes americanus*), tautog (*Tautoga onitiss*), weakfish (*Cynoscion regalis*), scup (*Stenotomus chrysops*), white perch (*Morone americana*), and Atlantic menhaden (*Brevoortia tyrannus*). In a study conducted at nearby Peck Beach, 178 species of saltwater fishes were recorded. Of these, 156 were from the nearshore waters. Of the 124 species recorded in nearby Great Egg Harbor Inlet, 28 are found in large number in offshore waters. North of the study area, 87 species were found in the near shore ocean, bay and inlets adjacent to Peck Beach. Of these, 46 were located in the near shore waters. Sixty-two species were identified in Great Egg Harbor Inlet.

Recreational fishing in southern New Jersey consists of scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), summer flounder (*Paralichtys dentatus*), weakfish (*Cynoscion regalis*), bluefish (*Pomatomus saltatrix*), striped bass (*Morone saxatilis*), red hake (*Urophycis chuss*), white hake (*Urophycis tenuis*), silver hake (*Merluccius bilinearis*), Atlantic mackerel (*Scomber scombrus*), chub mackerel (*S. japonicus*), Atlantic cod (*Gadus morhua*), northern kingfish (*Menticirrhus saxatilis*), and tautog (*Tautoga onitiss*). Northern puffer (*Sphaeroides maculatus*), spot (*Leiostomus xanthurus*), red drum (*Sciaenops ocellatus*), pollock (*Pollachius virens*), and Atlantic bonito (*Sarda sarda*) may also be taken occasionally.

Commercial species may include menhaden (Brevoortia tyrannus), winter flounder, weakfish, bluefish, scup, mackerel, silver hake, red hake, yellow flounder, black sea bass, butterfish (*Perpilus triacanthus*), and shad (*Alosa mediocris*). Harvesting is accomplished by purse seining, otter trawling, pots, and gill netting.

4.2.3.3.2.1 Essential Fish Habitat (EFH)

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 (FMPs), and their important prey species. The National Marine Fisheries Service has identified EFH within 10 minute X 10 minute squares. The study areas contain EFH for various life stages for 27 species of managed fish and shellfish. There are two 10' X 10' squares that encompass the beachfill placement areas and the sand borrow areas. Table 4-1 presents the managed species and their life stage that EFH is identified for within the corresponding 10 X 10 minute squares (#'s 72 and 73) that cover 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 4 -2.

TABLE 4 -1. SUMMARY OF SPECIES WITH EFH DESIGNATION IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Atlantic cod *(Gadus morhua)*				72
Red hake *(Urophycis chuss)*	72, 73	72, 73	72, 73	
Redfish *(Sebastes fasciatus)*	n/a			
Witch flounder (*Glyptocephalus cynoglossus)*	73			
Winter flounder (*Pleuronectes americanus*)	72, 73	72, 73	72, 73	72, 73
Windowpane flounder *(Scopthalmus aquosus)*	72, 73	72, 73	72, 73	72, 73
Atlantic sea herring *(Clupea harengus)*			72	72, 73
Monkfish *(Lophius americanus)*	72, 73	72, 73		
Bluefish *(Pomatomus saltatrix)*			72	72
Long finned squid *(Loligo pealei)*	n/a	n/a		
Short finned squid *(Illex ilecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus tricanthus)*		72	72	72
Summer flounder *(Paralicthys dentatus)*		72	72, 73	72, 73
Scup *(Stenotomus chrysops)*	n/a	n/a	72, 73	72, 73
Black sea bass *(Centropristus striata)*	n/a		72, 73	72, 73
Surf clam *(Spisula solidissima)*	n/a	n/a	73	
Ocean quahog *(Artica islandica)*	n/a	n/a		
Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
King mackerel *(Scomberomorus cavalla)*	72, 73	72, 73	72, 73	72, 73
Spanish mackerel *(Scomberomorus maculatus)*	72, 73	72, 73	72, 73	72, 73
Cobia *(Rachycentron canadum)*	72, 73	72, 73	72, 73	72, 73
Sand tiger shark (*Odontaspis taurus*)*		72, 73		72, 73
Atlantic angel shark (*Squatina dumerili*)		72, 73	72, 73	72, 73
Atl. sharpnose shark (*Rhizopriondon terraenovae*)				72, 73
Dusky shark *(Charcharinus obscurus)*		72, 73		
Sandbar shark *(Charcharinus plumbeus)*		72, 73	72, 73	72, 73
Sandbar shark *(Charcharinus plumbeus)*		HAPC	HAPC	HAPC
Tiger shark *(Galeocerdo cuvieri)*		72, 73		
Scalloped hammerhead shark (*Sphyrna lewini*)			72, 73	

TABLE 4 -1. SUMMARY OF SPECIES WITH EFH DESIGNATION IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS

*Candidate species for listing under the endangered Species Act

Square "72" Description: This square is bounded on the north and east at 39° 00.0' N, 74° 50.0' W and south and West at 38° 50.0' N, 75° 00.0' W. Waters within the Atlantic Ocean surrounding Cape May, NJ, from east of Wildwood Crest, NJ, south around the tip past Cape May Inlet, Sewell Pt., Cape May, NJ, Cape May Pt., Cape May Canal, up to just north of North Cape May, NJ. The waters within this square affect the New Jersey Inland Bay estuary and the following as well: Overfalls Shoal, Eph Shoal, McCrie Shoal, Prissy Wicks Shoal, Middle Shoal, North Shoal, Cape May Channel, Bay Shore Channel, Cape May Harbor, Skunk Sound, Cape Island Creek, Middle Thorofare, Jarvis Sound, Jones Creek, Swain Channel, Taylor Sound, Sunset Lake, and Richardson Channel. The waters on the northwest corner of the square, just south and just west of the tip of the cape, are found within the salt water salinity zone of the Delaware Bay Estuary.

Square "73" Description: This square is bounded on the north and east at 39° 00.0' N, 74° 40.0' W and south and West at 38° 50.0' N, 74° 50.0' W. Atlantic Ocean waters within the square within the one square east of the square affecting Cape May, NJ, southeast of Wildwood, NJ, from approximately ½ mile down Two Mile Beach east of Wildwood Crest, NJ, north to North Wildwood, NJ at the Hereford Inlet.

TABLE 4-2. HABITAT UTILIZATION OF IDENTIFIED EFH SPECIES AND THEIR SUMMARY OF SPECIES WITH EFH DESIGNATION IN THE 10 MIN. x 10 MIN. SQUARES OF 72 AND 73 (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).
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 mm and bottom at 35-40 mm. 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 m.			
Winter Flounder (Pseudopleuronectes americanus) (Pereira et. al., 1998)	**Habitat:** Demersal, nearshore low energy (primarily inlets and coves) shallows with sand, muddy sand, mud and gravel bottoms.	**Habitat:** Demersal, nearshore low (primarily inlets and coves) energy shallows with sand, muddy sand, mud and gravel bottoms. **Prey:** Nauplii, invertebrate eggs, Protozoans, Polychaetes	**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
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
Atlantic sea herring *(Clupea harengus)*			**Habitat:** Pelagic waters and bottom, <	**Habitat:** Pelagic waters and bottom

TABLE 4-2. HABITAT UTILIZATION OF IDENTIFIED EFH SPECIES AND THEIR SUMMARY OF SPECIES WITH EFH DESIGNATION IN THE 10 MIN. x 10 MIN. SQUARES OF 72 AND 73 (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
(Reid et al., 1998)			10 C and 15-130 m depths **Prey:** zooplankton (copepods, decapod larvae, cirriped larvae, cladocerans, and pelecypod larvae)	habitats; **Prey:** chaetognath, euphausiids, pteropods and copepods.
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. **Prey:** Squid, smaller fish	**Habitat:** Pelagic waters; found in Mid Atlantic estuaries April – Oct. **Prey:** Squid, smaller fish
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 greater than 33' deep	**Habitat:** Pelagic waters in 10 – 360 m	**Habitat:** Pelagic waters **Prey:** Jellyfish, crustaceans, worms, small fish
Summer flounder *(Paralicthys dentatus)*		**Habitat:** Pelagic waters, nearshore at depths of 10 – 70 m from Nov. – May	**Habitat:** Demersal waters (mud and sandy substrates) **Prey:** Mysid shrimp	**Habitat:** Demersal waters (mud and sandy substrates). Shallow coastal areas in warm months, offshore in cold months **Prey:** Fish, squid, shrimp, worms
Scup *(Stenotomus chrysops)*	n/a	n/a	**Habitat:** Demersal waters	**Habitat:** Demersal waters offshore from Nov – April **Prey:** Small benthic invertebrates
Black sea bass *(Centropristus striata)*	n/a		**Habitat:** Demersal waters over rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas	**Habitat:** Demersal waters over structured habitats (natural and man-made), and sand and shell areas **Prey:** Benthic and near bottom inverts, small fish, squid
Surf clam *(Spisula solidissima)*	n/a	n/a	**Habitat:** Throughout bottom sandy substrate to 3' in depth from beach zone to 60 m	
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	**Habitat:** Pelagic waters with sandy shoals of capes and	**Habitat:** Pelagic waters with sandy shoals of capes and	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars,

TABLE 4-2. HABITAT UTILIZATION OF IDENTIFIED EFH SPECIES AND THEIR SUMMARY OF SPECIES WITH EFH DESIGNATION IN THE 10 MIN. x 10 MIN. SQUARES OF 72 AND 73 (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
	offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone **Prey:** Zooplankton, fish eggs	offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone **Prey:** Zooplankton, shrimp, crab larvae, squid, herring	high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone
Spanish mackerel *(Scomberomorus maculatus)*	**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 **Prey:** Zooplankton, fish eggs	**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 **Prey:** Zooplankton, shrimp, crab larvae, squid, herring	**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 **Prey:** Squid, herring, silverside, lances
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.	**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 **Prey:** Crabs, shrimp, small fish	**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 **Prey:** Crabs, shrimp, small fish
Sand tiger shark *(Odontaspis taurus)** *Candidate species for listing under Endangered Species Act		**Habitat:** Shallow coastal waters, bottom or demersal		**Habitat:** Shallow coastal waters, bottom or demersal **Prey**: Crabs, squid, small fish
Atlantic angel shark (*Squatina dumerili*)		**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters, bottom (sand or mud near reefs)
Atl. sharpnose shark (*Rhizopriondon terraenovae*)				**Habitat:** Shallow coastal waters
Dusky shark *(Charcharinus obscurus)*		**Habitat:** Shallow coastal waters		
Sandbar shark *(Charcharinus plumbeus)*		**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters	**Habitat:** Shallow coastal waters
Tiger shark *(Galeocerdo cuvieri)*		**Habitat:** Shallow coastal waters		
Scalloped hammerhead shark (*Sphyrna lewini*)			**Habitat:** Shallow coastal waters	

4.2.4 Threatened and Endangered Species

The federally-listed (threatened) and state-listed (endangered) piping plover (*Charadrius melodus*) can currently be found nesting within the study areas, according to NJDEP and U.S. Fish and Wildlife Service field surveys. Birds have nested in Cape May City since 1997 and along the Coast Guard beaches since at least 1988. The Meadows project area has consistently supported nesting plovers since at least 1988. Piping plovers nest above the high tide line on mainland coastal beaches, sand flats, and barrier island coastal beaches. Nesting sites are typically located on gently sloping foredunes, blowout areas behind primary dunes, washover areas cut into or between dunes, ends of sand spits, and on sites with deposits of suitable dredged or pumped sand. The nesting season usually begins in March when the birds arrive and can extend as late as the end of August. Shortly after hatching, the young leave the nest and begin foraging within the intertidal zone.

Food for adult plover and chicks consists of invertebrates such as marine worms, fly larvae, beetles, crustaceans, or mollusks. Feeding areas include intertidal portions of ocean beaches, ocean washover areas, mudflats, sandflats, wrack lines (organic material left behind by high tide), shorelines of coastal ponds, lagoons, and salt marshes.

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. Although no extant occurrences of the seabeach amaranth are known within the proposed project area, the species has recently naturally recolonized coastal sites within Northern New Jersey, New York and Maryland.

The red knot (*Calidris canutus rufa*) is a Federal Candidate Species and is present in and around the Cape May area during spring and fall migration. Some birds may also be found lingering in the area through the early winter. The red knot's spring migration to this area is timed with the release of horseshoe crab eggs. This generally abundant food supply helps the red knot to increase its body weight enough to be able to continue its migration to the red knot's arctic breeding grounds.

The National Marine Fisheries Service (NMFS) has jurisdiction over four (4) Federally-designated sea turtles: the endangered leatherback (*Dermochelys coriacea*), Kemp's Ridley (*Lepidochelys kempii*), and green (*Chelonia mydas*) sea turtles, and the threatened loggerhead (*Caretta caretta*) sea turtle. These sea turtles may be found in New Jersey's continental shelf waters, inshore bays and estuaries from late spring to mid-fall. Sea turtles feed primarily on mollusks, crustaceans, sponges and a variety of marine grasses and seaweeds. The endangered leatherback sea turtle may forage on jellyfish, as well. The northern diamondback terrapin (*Malaclemys terrapin terrapin*) is a Federal

Category 2 candidate species that occupies shallow bay waters, and nests on the sandy portions of bay islands as well as the barrier islands themselves. The diamondback terrapin is considered a candidate species, as its nesting habitat is dwindling.

Federally endangered finback whales (*Balaenoptera physalus*) are the most common whales to occur in New Jersey coastal waters. Finback whales increase in relative abundance in late winter and spring, east of the Delaware peninsula, but may be found in New Jersey coastal waters in all seasons. The endangered humpback (*Megaptera novaeangliae*) and right whales (*Eubalaena spp.*) are known to occur in the nearshore waters of the mid-Atlantic on a seasonal basis, and may be found within the vicinity of the proposed borrow area(s) from late winter through early spring.

4.3 Cultural Resources

The Philadelphia District has conducted several cultural resources investigations in association with both the Cape May Inlet to Lower Township Storm Damage Reduction Project and the Lower Cape May Meadows - Cape May Point Environmental Restoration Project. In 1980, the District evaluated the potential environmental impacts associated with the construction of the Cape May Inlet to Lower Township Storm Damage Reduction Project, and prepared a Final Supplement to the Final Environmental Impact Statement (EIS). In preparation for this work, a Phase 1A cultural resources investigation was completed (Gilbert Commonwealth, 1979). Researchers identified several previously documented significant cultural resources within the communities of Cape May and Cape May Point. A follow-up Phase 2 underwater investigation of Borrow Area M1 was conducted by Kardas and Larrabee in 1982. This investigation documented known shipwreck locations off the south New Jersey coastline and noted a high shipwreck concentration centered near Cape May Inlet. Several remote sensing targets exhibiting shipwreck characteristics were identified within Borrow Area M1 and have been subsequently avoided during sand placement activities in Cape May.

In 1998, the District similarly evaluated the potential environmental impacts associated with proposed environmental restoration activities at the Lower Cape May Meadows (The Meadows) and Cape May Point. In preparation for this project, the Corps conducted a Phase 1 cultural resources investigation in 1997 (Dolan Research, Inc. and Hunter Research, Inc., 1997). Structures associated with World War II era fortifications and surface debris associated with the second Cape May Lighthouse site was identified. Researchers considered these cultural resources potentially eligible for listing in the National Register of Historic Places. No significant remote sensing targets were identified in proposed Borrow Areas P1 and P2.

Cultural resources surveys were also conducted in 2000 on Borrow Areas 4 and 5 (Dolan Research, Inc. July 2000). No significant remote sensing targets were identified.

In preparing this Environmental Assessment, the Corps consulted with the New Jersey State Historic Preservation Office (NJ SHPO) and other interested parties to identify and evaluate historic properties in proposed Borrow Areas 1, 2, 3 and K. In order to fulfill its responsibilities under the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR Part 800, the Corps conducted submerged cultural resources investigations in these proposed borrow areas. Three potentially significant submerged cultural resources were originally identified in Borrow Area K. In order to maximize the use of available sand in the borrow area, additional underwater archaeological investigations were performed to determine if the targets were culturally significant. The results of the additional investigations revealed the targets to be modern debris. As such, no further archaeological investigations are recommended and no restrictions relating to cultural resources will be required within the borrow area. .

5.0 ENVIRONMENTAL IMPACTS

The environmental impacts associated with dredging Borrow Area M1 and beachfill placement on the beaches of Cape May City are presented in USACE (1980), and are incorporated by reference. The environmental impacts associated with dredging Borrow Area P1 and beachfill placement on the beaches of Cape May Meadows and Cape May Point are presented in USACE (1998), and are incorporated by reference. The environmental impacts associated with dredging Borrow Areas 4 and 5 and beachfill placement on the beaches of Cape May Meadows and Cape May Point are presented in USACE (2002), and are incorporated by reference.

5.1 Physical Environment

Dredging within Borrow Area K would result in the excavation of shallow pits deeper than some of the surrounding bathymetry. This is due to the existing flat nature of the bottom. Initially, dredge cuts may produce abrupt edges. However, these cuts are expected to become reworked by ocean currents, which would “round-out” the edges. Based on vibracore data, similar substrate characteristics would remain following dredging. Because the areas would be deepened, minor and localized changes in hydrodynamics are expected in the vicinity of the borrow areas. Over the life of the project, Borrow Area K will be lowered to an elevation of approximately –32 feet NGVD, with cuts no greater than 8 feet, as a result of the expected excavation (Figure 5-1)

5.1.1 Water Quality

The dredging associated with the beach nourishment alternative would result in short-term adverse impacts to water quality in the immediate vicinity of the dredging and beach nourishment operations. Dredging in the proposed borrow area will generate turbidity, resulting in sedimentation impacts within the immediate vicinity of the

operations. Short-term increased turbidity can affect organisms in several ways. Primary production in phytoplankton and/or benthic algae may become inhibited from turbidity. Suspended particulate matter can clog gills and inhibit filter-feeding species. Reilly et.al. 1983 determined that high turbidity could inhibit recruitment by pelagic larval stocks. In addition, midwater nekton like finfish and mobile benthic invertebrates may migrate outside of the area where turbidity and deposition occur.

The amount of turbidity and its associated plume is mainly dependent on the grain size of the material. Generally, the larger the grain-size, the smaller the area of impact. The period of turbidity is also less with larger grain-sized materials. The proposed borrow location contains medium to fine sands, which are coarser grained than silts and clays. Turbidity resulting from the resuspension of these sediments is expected to be localized and temporary in nature. Utilization of a hydraulic dredge with a pipeline delivery system will help minimize the impact, however, some disturbance will occur.

Similar water quality effects on aquatic organisms could likely be incurred from the deposition of borrow material on the beach. Increased turbidity resulting from the deposition of a slurry of sand will be temporary in nature and localized. This effect will not be significant as turbidity levels are naturally high in the high-energy surf zone. Organisms in the surf zone versus deep water areas will be less likely to suffer adverse effects from turbidity because they have already adapted to these conditions. Fine sediments sifted from the deposited material would be transported by waves and currents into the nearshore with varying environmental impacts from a few months to at least several years (Hurme and Pullen, 1988). Parr et al, 1978 determined that fine materials were rapidly sorted out and transported offshore after beach deposition. In their study, the dredged material had a much higher silt content than the beach, however, all of the silt was removed within 5 months. The selection of borrow material from a high energy environment should minimize the fine particle content. Material taken from the proposed borrow area will have low quantities of silt, therefore, high levels of turbid waters after deposition should not persist.

5.2 Biological Environment

5.2.1 Terrestrial

Impacts on terrestrial flora and fauna are discussed in USACE (1980 and 1998), and are incorporated by reference. Existing dune vegetation, where present, would not be disturbed by renourishment activities. Rapid recolonization of other types of vegetation on the beach face such as sea rocket and seaside goldenrod is expected. Impacts to wildlife species inhabiting the beach and dune areas are expected to be short-term and minor as most species are highly mobile and capable of moving outside the impacted areas until construction ceases.

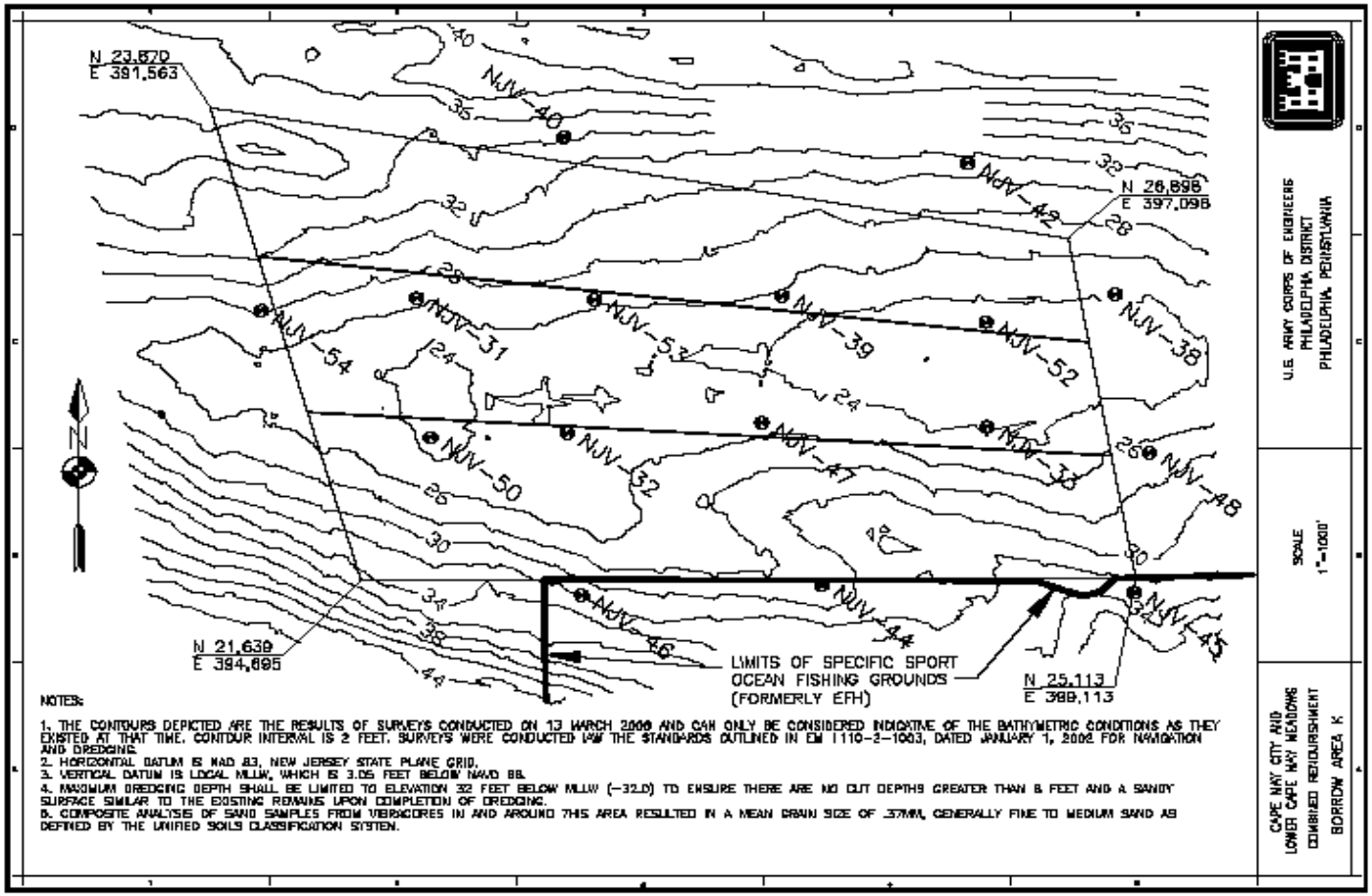


Figure 5-1 Borrow Area Topography

5.2.2 Aquatic

5.2.2.1 Effects of Beachfill Placement on Benthos

The majority of the impacts of beachfill placement will be felt on organisms in the intertidal zone and nearshore zones. The nearshore and intertidal zone is highly dynamic, harsh, and is characterized by great variations in various abiotic factors. Fauna of the intertidal zone are highly mobile and respond to stress by displaying large diurnal, tidal, and seasonal fluctuations in population density (Reilly et al. 1983). Despite the resiliency of intertidal benthic fauna, the initial effect of beachfill deposition will be the smothering and mortality of existing benthic organisms within the shallow nearshore (littoral) zone on the oceanfront. This will initially reduce species diversity and number of animals. Burial of less mobile species such as amphipods and polychaete worms would result in losses, however, densities and biomasses of these organisms are relatively low on beaches. Beach nourishment may also inhibit the return of adult intertidal organisms from their nearshore-offshore overwintering refuges, cause reductions in organism densities on adjacent unnourished beaches, and inhibit pelagic larval recruitment efforts. Parr et al. 1978 notes that the nearshore community is highly resilient to this type of disturbance, however, the offshore community is more susceptible to damage by receiving high sediment loads from fines sorting-out from a beachfill. The ability of a nourished area to recover depends heavily on the grain size compatibilities of material pumped on the beach (Parr et al.,1978). Reilly et al. 1978 concludes that nourishment initially destroys existing macrofauna, however, recovery is usually rapid after pumping operations cease. Recovery of the macrofaunal component may occur within one or two seasons if borrow material grain sizes are compatible with the natural beach sediments. However, the benthic community may be somewhat different from the original community. Hurme et. al. 1988 caution, "Macrofauna recover quickly because of short life cycles, high reproductive potential, and planktonic recruitment from unaffected areas. However, the recolonization community may differ considerably from the original community. Recolonization depends on the availability of larvae, suitable conditions for settlement, and mortality. Once established, it may be difficult for the original community species to displace the new colonizers." Based on the above mentioned studies, the benthic community may take 1-2 years to recover. With two and four-year renourishment cycles, the benthic community may be in a higher than normal state of flux due to periodic disturbances from re-nourishment. It is conceivable that the benthic community may attain a recovered state for a period of 1-2 years before being disturbed again by a re-nourishment cycle.

Geomorphological studies on the sediments within the proposed borrow sites indicate that there will be relatively low levels of fine sediments placed on the beaches of The Meadows and Cape May. Parr et.al. 1978 recommend that to minimize biological impacts, the percentage of fine sediments (smaller than 125 micrometers) should be low to minimize siltation and consequent deposition offshore, which may create anoxic conditions in the sediment. The berm restoration would be conducted in a manner that approximates the existing beach profile. The approximate area of lost intertidal and

shallow nearshore habitat resulting from the beachfill would be likewise created seaward. Therefore, no significant loss of intertidal or shallow nearshore habitat is expected.

5.2.2.2 Effects on Benthos at Borrow Site

The primary ecological impact of dredging the sand borrow site will be the complete removal of the existing benthic community through entrainment into the dredge. It is estimated that approximately 430 acres of benthic habitat will be impacted in Borrow Area K by dredging during the proposed renourishment events. Dredging will primarily impact the benthic and epibenthic organisms. 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. A secondary disturbance would be the generation of turbidity and deposition of sediments on the benthic community adjacent to the dredging. Despite the initial effects of dredging on the benthic community, recolonization is anticipated to occur within one year. Saloman et al. 1982 determined that short-term effects of dredging lasted about one year resulting in minor sedimentological changes, and a small decline in diversity and abundance within the benthic community. The recovery of a borrow area is dependent upon abiotic factors such as the depth of the borrow pits, and the rate of sedimentation in the borrow pits following the dredging. Dredging a borrow pit can result in changes that affect circulation patterns resulting in pits where fine sediments can become deposited, which may lead to hypoxia or anoxia in the pit. 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, the bottom sediments are composed of the same grain sizes as the pre-dredge bottom. Cutler et al. (1982) investigated long-term effects of dredging on the benthic community and noted that faunal composition was different than the pre-dredge community, however, the difference was attributed more to normal seasonal and spatial variations. In this study, it was determined that there were no significant differences in the benthic communities and sediment parameters between borrow sites and surrounding areas. Periodic disturbances from maintenance of the project may favor the development of benthic communities composed primarily of colonizers. Assuming that the same location is dredged every nourishment cycle, the secondary benthic community may be in a higher state of flux than the original community. This may, in effect, favor more r-selected (rapid reproduction, short life span) benthic species in the sand borrow impact area over the 50-year project life. In addition, benthic organism abundances may be lower than normal. However, this may not be the case if subsequent dredging cycles are conducted at different locations within the borrow area. This would allow disturbed areas from previous dredging disturbances to become recolonized.

Benthic investigations in and around the selected borrow site reveals benthic communities that are not unique or rare to the general project area. Recolonization of the benthic community may occur within 1-2 years following dredging, however, the effects of the two to four year periodic project maintenance over a 50 year project life may have more profound adverse effects if conducted at the same locations. Hurme et al. (1988) recommend that borrow materials be obtained from broad, shallow pits in nearshore

waters with actively shifting bottoms, which would allow for a sufficient surficial layer of similar sediments for recolonization. Measures that would minimize the effects of dredging in the borrow areas include dredging in a manner as to avoid the creation of deep pits, alternating locations of periodic dredging, dredging during lowest biological activity, and the utilization of a hydraulic dredge with a pipeline delivery system to help minimize turbidity.

5.2.2.3 Impacts on Fisheries

5.2.2.3.1 Shellfish

The existing benthic community at the proposed sand borrow site was sampled and analyzed by Versar, Inc. in October 2007. This area is designated Borrow Area K and is depicted in Figure 1-4. Only one species of commercial or recreational value was collected during the macroinvertebrate survey, the Atlantic surf clam (*Spisula solidissima).*

The Atlantic surf clam harvest along the coast of New Jersey accounts for more than 80% of the total mid-Atlantic catch (NJDEP 1997). Dredging sand for beach replenishment has the potential to impact these resources. An immediate effect is the removal of existing shellfish communities and the potential alteration of the substrate composition, which may affect important nursery habitats that could hinder surf clam recruitment success. NJDEP surveys in this area suggest that the area does not support a large amount of harvestable surf clams, for this reason, additional surf clam sampling was not conducted for this study. Grab samples used to collect smaller clams in the borrow area also contained very few clams, suggesting that currently, conditions favorable for clam recruitment in the area are poor. For this reason, it is unlikely that the use of these borrow areas would lead to a disruption of surf clam recruitment or survival (Versar 2008). Historic survey results in the area however, indicate that portions of the borrow area are within marginal surf clam habitat. In order to preserve this habitat to the greatest extent possible, the Corps has divided the borrow area into three sections (See Figure 5-1). Since the inshore portions of the borrow area had lesser abundances of surf clams in the historic survey data, dredging will begin in the borrow area subsection closest to shore, moving further seaward as needed.

5.2.2.3.2 Finfish

With the exception of some small finfish, most bottom and pelagic fishes are highly mobile, and should be capable of avoiding entrainment into the dredging intake stream. It is anticipated that some finfish would avoid the turbidity plume while others may become attracted to the suspension of food materials in the water column. Little impact to fish eggs and larvae are expected because these life stages are widespread throughout the Middle Atlantic Bight, and not particularly concentrated in the borrow site or surf zone of the project area (Grosslein and Azarovitz, 1982).

Borrow Area K is adjacent to a NJDEP designated Specific Sport Ocean Fishing Ground. As can be seen in Figure 5-1, the borrow area has been configured to avoid impacting this area. Dredging will be conducted in a manner that will not create deep anoxic pits within the borrow area which could negatively impact surrounding fish populations. The topography of the borrow area is similar to that of the Ocean Fishing Grounds. Excavation in the borrow area will not exceed a depth of 8 feet over the life of the borrow area and care will be taken to ensure that a sandy substrate remains following dredging activities. Potential impacts to the Specific Sport Ocean Fishing Ground will be similar to those outlined for essential fish habitat in the following section.

The primary impact to fisheries will be felt from the disturbance of benthic and epibenthic communities. The loss of benthos and epibenthos entrained or smothered during the project will temporarily disrupt the food chain in the impact area. This effect is expected to be temporary as these areas become rapidly recolonized by pioneering benthic and epibenthic species.

5.2.2.3.2.1 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 site 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, 1999).

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. This was accomplished by avoiding sites with prominent shoal habitat such as the "Eph Shoal" and "Prissy Wicks Shoal", which are considered important sport and commercial fishing grounds (Long and Figley, 1984). 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 surf clam 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 5-1 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 (#'s 72 and 73) that encompass the entire project impact area.

Of the 27 species identified with Fishery Management Plans, the proposed project could have immediate direct impacts on habitat for black sea bass, egg and larval stages of winter flounder and several shark species. This is attributable to the benthic or demersal nature of these species and their affected life stages. However, the affect on 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 13 months to 2 years. Minor elevation differences resulting from dredging may even 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 and bathymetry will be monitored. Biological monitoring would involve benthic grab samples to measure recruitment of the infauna community and commercial surf clam surveys within affected areas if appropriate. This monitoring would serve to provide valuable information in the early phases of the project concerning the effects on EFH to base future adaptive management measures to minimize any adverse effects in subsequent periodic nourishment cycles.

TABLE 5-1. DIRECT AND INDIRECT IMPACTS ON FEDERALLY MANAGED SPECIES AND ESSENTIAL FISH HABITAT (EFH) IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
1. Atlantic cod *(Gadus morhua)*				**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. Shoreline placement areas are not expected to have any impacts on Atlantic cod. **Indirect:** Temporary disruption of benthic food prey organisms.
2. 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.	
3. Redfish (*Sebastes fasciatus*)	n/a			
4. Witch flounder (*Glyptocephalus cynoglossus*)	Eggs are pelagic, generally over deep water, therefore no direct or indirect effects are expected.			
5. Winter flounder (Pseudop*leuronectes americanus*)	Eggs are demersal in very shallow waters of coves and inlets in Spring. Borrow sites and placement areas are primarily in high energy oceanic areas where eggs are not likely to be highly concentrated.	Larvae are initially planktonic, but become more bottom-oriented as they develop. . Borrow sites and placement areas are primarily in high energy oceanic areas where larvae are not likely to be highly concentrated.	**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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.
6. 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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.
7. Atlantic sea herring *(Clupea*			**Direct:** Occur in pelagic and near bottom.	**Direct:** Occur in pelagic and near bottom. Physical

TABLE 5-1. DIRECT AND INDIRECT IMPACTS ON FEDERALLY MANAGED SPECIES AND ESSENTIAL FISH HABITAT (EFH) IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
harengus)			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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** None, prey items are planktonic	habitat in borrow site should remain basically similar to pre-dredge conditions. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** None, prey items are primarily planktonic
8. Monkfish *(Lophius americanus)*	Eggs occur in surface waters with depths greater than 25 m; therefore, no direct or indirect effects are expected.	Larvae occur in pelagic waters with depths greater than 25 m; therefore, no direct or indirect effects are expected.		
9. Bluefish *(Pomatomus saltatrix)*			**Direct:** Juvenile bluefish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Adult bluefish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
10. Long finned squid *(Loligo pealei)*	n/a	Pre-recruits are pelagic. No effects are anticipated.		
11. Short finned squid *(Illex ilecebrosus)*	n/a	Pre-recruits are pelagic. No effects are anticipated.		
12. Atlantic butterfish *(Peprilus tricanthus)*		Larvae occur in pelagic waters. No impacts are expected.	**Direct:** Juvenile butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Adult butterfish are pelagic species. No significant direct effects anticipated. **Indirect:** Temporary disruption of benthic food prey organisms.
13. 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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.
14. Scup *(Stenotomus chrysops)*	n/a	n/a	**Direct:** Physical habitat in borrow site should remain basically similar to pre-	**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Adults

TABLE 5-1. DIRECT AND INDIRECT IMPACTS ON FEDERALLY MANAGED SPECIES AND ESSENTIAL FISH HABITAT (EFH) IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
			dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.	should be capable of relocating during impact. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms.
15. 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 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.	**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 along the shoreline. **Indirect:** Temporary disruption of benthic food prey organisms.
16. 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. Only nine adult surf clams were found in Borrow Areas 4 and 5. **Indirect:** Temporary reduction in reproductive potential. *See shellfish section for more discussion.
17. Ocean quahog *(Artica islandica)*	n/a	n/a		
18. Spiny dogfish *(Squalus acanthias)*	n/a	n/a		
19. 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.
20. Spanish mackerel *(Scomberomorus maculatus)*	**Direct Impacts:** Eggs are pelagic, therefore no	**Direct Impacts:** Larvae are pelagic, therefore no adverse impacts are	**Direct Impacts:** Juveniles are pelagic, therefore no adverse impacts are	**Direct Impacts:** Adults are pelagic and highly migratory, therefore no adverse impacts are

TABLE 5-1. DIRECT AND INDIRECT IMPACTS ON FEDERALLY MANAGED SPECIES AND ESSENTIAL FISH HABITAT (EFH) IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
	adverse impacts are anticipated. **Indirect Impacts:** None anticipated.	anticipated. **Indirect Impacts:** None anticipated.	anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.	anticipated. **Indirect Impacts:** Minor indirect adverse effects on food chain through disruption of benthic community, however, mackerel are highly migratory.
21. 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.
22. Sand tiger shark (*Odontaspis taurus*)		**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. However, some mortality of neonates could be expected from entrainment into the dredge because they may be oriented with the bottom. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. However, some mortality of young could be expected from entrainment into the dredge because they may be oriented with the bottom. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
23. Atlantic angel shark (*Squatina dumerilli*)		**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. However, some mortality of neonates could be expected from entrainment into the dredge because they may be oriented with the bottom. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. However, some mortality of juveniles could be expected from entrainment into the dredge because they may be oriented with the bottom. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions. However, some mortality of young could be expected from entrainment into the dredge because they may be oriented with the bottom. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
24. Atlantic sharpnose shark (*Rhizoprionodon terraenovae*)				**Direct:** Physical habitat in borrow sites should remain basically similar to pre-dredge conditions.

TABLE 5-1. DIRECT AND INDIRECT IMPACTS ON FEDERALLY MANAGED SPECIES AND ESSENTIAL FISH HABITAT (EFH) IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
				Adults are highly mobile and are capable of avoiding impact acres. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.
25. Dusky shark *(Charcharinus obscurus)*		**Direct:** Physical habitat in borrow site should remain basically similar 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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **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 neonates 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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **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		

TABLE 5-1. DIRECT AND INDIRECT IMPACTS ON FEDERALLY MANAGED SPECIES AND ESSENTIAL FISH HABITAT (EFH) IN THE 10 min. x 10 min. SQUARES OF 72 and 73 (NOAA, 1999)				
MANAGED SPECIES	**EGGS**	**LARVAE**	**JUVENILES**	**ADULTS**
		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. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.		
28. Scalloped hammerhead shark (*Sphyrna lewini*)			**Direct:** Physical habitat in borrow site should remain basically similar to pre-dredge conditions. Juveniles are mobile and are capable of avoiding impact areas. Shoreline placement area bottom habitats will be temporarily impacted and displaced seaward. **Indirect:** Temporary disruption of benthic food prey organisms and food chain within borrow and placement sites.	

5.2.3 Threatened and Endangered Species

The piping plover, which is State listed as endangered and Federally listed as threatened, is a frequent inhabitant of New Jersey's sandy beaches. Plovers have nested in Cape May and The Meadows for at least the past 11 years. It is expected that plovers will continue to nest in these areas, especially following beach restoration activities. Currently, the Corps is conducting plover monitoring in Cape May, through the New Jersey Department of Environmental Protection, Division of Fish and Wildlife and the U.S. Fish and Wildlife Service. This practice will continue throughout the life of the project, or until such time as the duty is handed over to the local municipalities. Similar monitoring efforts are taking place, in conjunction with NJDEP and The Nature Conservancy, at The Meadows. In addition, protection measures laid out by NJDEP, Division of Fish and Wildlife and the U.S. Fish and Wildlife Service will be followed during all renourishment activities in order to protect the piping plovers from being disturbed. These measures may include establishing a buffer zone around the nest, and limiting construction to be conducted outside of the nesting period (15 March - 15 August).

Beach replenishment activities can potentially have significant direct and indirect adverse impacts on piping plovers. Sand placement can bury nests, and machinery and vehicles on the beach can crush eggs, nestlings, and adults. Human disturbance related to recreational activities can disrupt successful nesting of these birds by preventing birds from feeding and scaring adults off established nests. Also, pipelines used during construction may become barriers to young chicks trying to reach intertidal areas to feed. It is believed that in New Jersey, predation is probably the primary cause of mortality for plover chicks. Observations by NJDEP, however, support the finding that chick survival and susceptibility to predation is strongly influenced by other factors, especially human disturbance and the availability and access to optimal foraging areas (Jenkins, 1999).

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 days after it 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 to be 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.

Another species which may be found within the project area is the Federally-listed threatened plant, seabeach amaranth that inhabits overwash flats, accreting ends of coastal barrier beaches and lower foredunes of non-eroding beaches. While no extant populations are known to currently exist within the study area, this species has recently recolonized or has been observed in coastal sites within New York, Delaware, Maryland, and most recently New Jersey (USFWS, 1999). 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, 1999).

To address these issues, the Philadelphia District developed a programmatic Biological Assessment (BA) for the piping plover and seabeach amaranth as part of formal consultation requirements with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act. The USFWS reviewed the BA and subsequently issued a Biological Opinion in December 2005. The requirements outlined in the Biological Opinion have been adopted in order to comply with this statute. Formal consultation will be ongoing throughout the project life where the USFWS recommends formal consultation be reinitiated at least 135 days prior to construction and each periodic nourishment cycle. The Section 7 consultation process is expected to result in monitoring before, during and after construction, imposing timing restrictions if nests are found, construction of temporary protective fencing, and avoidance during construction. It is anticipated, however that nourishment activities will usually take place outside of the plover nesting season due to the quantity of fill required. Other issues to be addressed through community developed plover management plans include local practices such as beach raking, off-road vehicles, 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 periodic maintenance may involve avoidance of the area (if possible), collection of seeds to be planted in non-impacted areas, and timing restrictions.

The red knot, which is a Federally-listed Candidate species may be present at the site during the spring and fall migration, with some birds still being present in the early winter time period. As is the case with plovers, the projects have the potential to temporarily impact food resources within the placement area. Since portions of the projects will not be impacted during nourishment cycles, sufficient food should still be readily available within the project areas. In addition, due to the timing of the construction, it is not anticipated that any birds will be present during construction activities. If any birds are present, they will easily be able to move away from the construction activities to another portion of the beach where they will not be disturbed.

From June through November, New Jersey's coastal waters may be inhabited by transient sea turtles, especially the loggerhead (Federally listed threatened) and the Kemp's ridley (Federally listed endangered). Sea turtles have been known to be adversely impacted during hopper dredging operations. Dredging encounters with sea turtles have been more prevalent along waters of the southern Atlantic and Gulf coasts, however, incidences of "taking" sea turtles have been increasing in waters of the middle Atlantic coast. Endangered whales, such as the highly endangered Right whale, may also be transient visitors within 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. Coordination 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 that may have impacts to Federally threatened or endangered marine species. A Biological Assessment that discusses Philadelphia District hopper dredging activities and potential effects on Federally threatened or endangered species of sea turtles has been prepared, and was formally submitted to the NMFS in accordance with Section 7 of the Endangered Species Act. A Biological Opinion was provided by the NMFS in November of 1996. As a term and condition of the incidental take statement included in this opinion, the NMFS is requiring 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 of the Biological Opinion will insure compliance with Section 7 of the Endangered Species Act. Recent 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.

Due to recent issues regarding the potential to find munitions within offshore borrow areas, NJDEP and the Philadelphia District are now requiring the use of 1 ¼" screens on the dragarms of all dredges. These screens are designed to keep potentially dangerous ordnance off of public beaches. These smaller screens will make it more difficult to monitor the impacts to sea turtles as a result of the dredging operations. For this reason, NMFS has indicated that turtle monitors will no longer be required for dredging jobs were munitions screens are being used.

5.3 Cultural Resources

As a result of our review of the information provided in the cultural resources investigations referenced above, the District has found that implementation of the selected plan, as detailed in this EA, will have no adverse effect on significant historic resources. Although 3 remote sensing targets were originally identified in Borrow Area K, further investigations revealed these targets to be modern debris and no further archeological investigations are required. The results of all the cultural resources surveys were coordinated with the NJ SHPO and in a letter dated June 23, 2008 the agency agreed that there are no historic properties located within Borrow Area K.

5.4 Impacts on Air and Noise Quality

Minor short-term impacts to air quality and noise levels would result from the construction phases of the beach nourishment alternative. Dredging activities and grading equipment use would produce noise levels in the 70 to 90 dBA (50 feet from the source) range, but these would be restricted to the beach area. These noises would be masked by the high background levels of the surf or dissipated by distance. Ambient air quality would also be temporarily degraded, but emission controls and limited duration aid in minimizing the effects. In the case of equipment use associated with the periodic

nourishment efforts, conducting the work in the off-season would further minimize the impact.

Noise and air quality impacts would be restricted to site construction preparation (generally beginning two weeks prior to dredging) and the actual dredging and placement operation. Noise is limited to the utilization of heavy equipment such as bulldozers to manipulate the material during placement. Depending on future circumstances, the construction may be conducted overnight to meet construction schedules. Air quality impacts would similarly be limited to emissions from the heavy equipment. No long-term significant impacts to the local air quality are anticipated.

Cape May County, New Jersey is within the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE area, which is classified as moderate nonattainment for ozone. As such, emissions from the Cape May City and Cape May Meadows projects must be below 100 tons of NOx and 50 tons of VOC per year. An Air Quality Conformity Determination was completed for both project and can be found in Appendix B. The results of these analyses indicate that the total estimated emissions that would result from the maintenance/nourishment of the Cape May City project are 73.11 tons of NOx and 1.98 tons of VOCs. Similarly, the total estimated emissions that would result from the nourishment of the Cape May Meadows project are 76.27 tons of NOx and 3.08 tons of VOCs. The emissions for both projects are below the General Conformity trigger levels of 100 tons per year of NOx and 50 tons per year of VOCs.

5.5 Environmental Justice

All of the alternatives identified in this document are expected to comply with Executive Order 12989 – Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994. The selected plan is not located in close proximity to a minority or low-income community, and no impacts are expected to occur to any minority or low-income communities in the area.

5.6 Cumulative Impacts

Cumulative impacts of beach replenishment and use of borrow areas along the coast of New Jersey were addressed in USACE (2002) and are incorporated by reference. Along the Atlantic Coast of New Jersey, several existing Federal, state and municipal beach replenishment projects that utilize inlet shoals or offshore areas have been completed in the recent past or are currently active. Nine active Federal projects are located along the coast of New Jersey that each utilize either an offshore sand source or an adjacent inlet. Non-Federal projects have been conducted recently (since 1995) by NJDEP and several municipalities in Avalon, Stone Harbor, Sea Isle City, Strathmere, Southern Ocean City, and Brigantine. These areas have all used either inlet borrow sites or offshore sites, which have impacted a total area of 3,196 acres of marine habitat. Approximately 44% of the affected areas are inlet ebb shoal habitat (1,403 acres) and

22% (692 acres) of the affected areas are considered prominent offshore shoal or "lump" habitats. Two additional Federal projects that have yet to be implemented, plus the newly proposed Cape May borrow area, have the potential to impact an additional 5,948 acres of offshore habitat.

The newly proposed sand borrow site for the projects at Cape May and The Meadows represents approximately 5 % of the marine benthic habitat impacted by all of the previously impacted and the proposed (Federal) impacted sites. When choosing borrow areas for these projects, areas of lower relief were selected in an effort to avoid prominent shoal areas, which are considered valuable fish and shellfish habitat. Since lower relief areas do not contain significant "lumps" of sand, it is necessary to affect larger areas of bottom to obtain the required quantities of sand. This coupled with dredging depth restrictions (not creating deep, anoxic pits), and the available depth of sand determines the overall sizes of the borrow sites.

For these reasons, the aerial extent of habitat disturbed is unavoidable to meet the project needs. However, it should be noted that the actual impacts are considered to be temporary to the benthic community, and do not represent a permanent loss of marine benthic habitat. These areas would be impacted incrementally over the 50-year project with each periodic nourishment cycle. Each area previously disturbed from a previous nourishment cycle (and initial construction) would be untouched and allowed to become recolonized by benthic fauna, therefore, the affected areas would not be subject to continued disturbance, and there would be no permanent loss of habitat. It is anticipated that the benthic community would be recovered within several years after disturbance.

The cumulative impacts on Essential Fish Habitat (EFH) are not considered significant. Like the benthic environment, the impacts to EFH are temporary in nature and do not result in a permanent loss in EFH. The borrow site proposed for these projects does not contain prominent shoal habitat features, wrecks and reefs, or any known hard bottom features that could be permanently lost due to the impacts from dredging. These types of habitat were avoided through careful site selection and coordination with fishery resource agencies. Some minor and temporary impacts would result in a loss of food source in the affected areas. This impact would affect demersal or bottom-feeding EFH species such as summer flounder and windowpane flounder. Cumulative losses of EFH for surf clams can be avoided by not dredging deep holes, and leaving similar sandy substrate (w/ 3 feet of sand or more) for recruitment.

The proposed Federal projects combined with the existing projects would affect approximately 68 miles of beach along the New Jersey coast (south of Manasquan Inlet). This represents nearly 71% of beaches along this segment of coast. The projects proposed for Cape May and The Meadows represents approximately 7.7% of the affected beaches and 5.5% of all of the beaches along this entire stretch of coast. In reality, however, these projects represent an even smaller area of impacted beaches since initial construction of Cape May and The Meadows has already been completed and nourishment cycles are confined to small portions of the projects' length.

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. 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.

In addition to the potential impacts to benthic and fisheries resources discussed, the proposed Federal projects also have the potential of cumulative impacts to the Federally listed piping plover and seabeach amaranth. Due to the amount of uncertainty that exists regarding when and how any of the proposed projects will be built, and the uncertainty of the number and location of plover nests in any given year, it is extremely difficult to quantify the potential impacts to piping plovers for any, and all of the proposed projects. If the majority of the ongoing and proposed construction activities are accomplished outside of the nesting season, the overall impacts to plovers will be minimal, and the birds most likely will benefit from the additional beach areas. Through the implementation of plover management plans and the monitoring program, impacts related to human activities on the new beaches will be greatly reduced and in some cases eliminated. The results of the Ocean City nearshore benthic sampling which was conducted in 2001 indicated that while the abundance of major taxa within the benthic community of the lower intertidal zone was reduced 4 months after sand placement, 6 months after placement, the community appeared to be recovering to pre-placement conditions. Impacts within the upper intertidal area, where plovers directly feed, were not detected in either the 4 or 6 month sampling periods. Based on this data, it is possible that plover habitat may be negatively impacted on a temporary basis during the nesting season immediately following construction due to diminished food resources. This impact is more likely following the initial construction due to the quantity of fill and duration of the activities. The timing of the fill will also play a role in the rate of benthic recovery. Following initial fill, nourishment activities will take place only in areas with a high rate of erosion. Areas which have not eroded past the design template will not be filled. For this reason, it is even less likely that nourishment activities will affect areas with nesting plovers since it is unlikely that the birds will be nesting in areas with more narrow beaches and greater erosion. This has been the case in Ocean City where fill has not been placed south of 14th street for several cycles since this area is fairly stable.

In addition, due to the short duration of nourishment activities, and the limited quantity of sand associated with most cycles, it is anticipated that most, if not all, of these activities will take place outside of the plover nesting season. The possibility does still exist however that the fill activities may result in a reduction of prey resources available to plovers during the next nesting season. Due to the fact that, on average, only two or three of the existing or proposed locations will be impacted during any given year, however, these activities should not cause the species any undo risk or greatly impact the

species as a whole. Since newly placed sand will most likely create additional habitat for the plovers and seabeach amaranth that does not currently exist, it is expected that even with these activities, more undisturbed habitat will be available to the species than currently exists. It should be noted that large portions of the New Jersey coast will still be available for use as nesting habitat on any given year.

Similar uncertainty exists when trying to quantify the potential impacts to seabeach amaranth since the species has a very patchy distribution within southern New Jersey. The protection measures being developed with USFWS, however, should ensure that impacts are avoided or minimized to the greatest extent possible and therefore construction activities should not jeopardize the species and may actually create suitable habitat for the species. The Corps will work closely on this issue with the Service in order to develop the best protection plan for the species should it become re-established.

5.7 Mitigation Measures

Mitigation measures are discussed in USACE (1980 and 1998), and are incorporated by reference. Several measures have already been adopted to minimize the impacts associated with the proposed projects. These measures include the utilization of offshore sand borrow areas. These areas are characterized by high energy and shifting sands resulting in a benthic community of lower abundance and diversity as compared to more stable benthic environments. Therefore, biological impacts are expected to be lower. Another measure is the selected use of suitable sand grain sizes for beach nourishment. The selection of borrow areas is based on compatibility studies for sand grain sizes. The selection of coarser beach nourishment quality material will minimize impacts on water quality at the dredging site and discharge (placement) site.

Additional mitigation measures include dividing the borrow area into three sections and dredging in the landward-most section first in order to minimize impacts to surfclam habitat. Material will be removed in the first subsection down to elevation -32 feet NGVD before moving further seaward. It is anticipated that enough sand exists in subsection 1 to meet the needs of the 2008 dredging cycle.

6.0 COORDINATION

Pubic coordination for the proposed projects at Cape May and The Meadows was formally initiated during each respective Feasibility Study and continued through the circulation of the Draft and Final EISs, informal coordination, and interagency meetings.

This EA was circulated to (in addition to the aforementioned agencies) Federal, State, and local resource agencies with particular jurisdiction and interest over the affected resources and applicable statutes. In addition, the public was notified of the availability of this document for public review via a public notice, which was distributed

to interested individuals, organization, and media outlets listed on the Philadelphia District's coastal New Jersey mailing list.

7.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES

Compliance with applicable Federal Statutes, Executive Orders, and Executive Memoranda was originally discussed in the 1980 and 1998 EISs. Table 7-1 is a complete listing of compliance status relative to environmental quality protection statutes and other environmental review requirements.

A Section 404(b)(1) evaluation in compliance with Section 404 of the Clean Water Act was also prepared in the previous EISs. An updated 404(b)(1) analysis pertaining to the alternative sand sources is provided in Section 11.0 of this document. A Section 401 Water Quality Certification was obtained from NJDEP for the use of the new borrow area.

The proposed dredging and maintenance activities comply with, and will be conducted in a manner consistent with New Jersey's requirements with regard to the Coastal Zone Management Act. While coordination with regard to the Coastal Zone Management Act has previously been conducted for both projects, a modification to the existing Federal Consistency Determination was requested from NJDEP to address the new borrow area discussed in this EA.

The use of the sand borrow source described in this document is not expected to have significant changes in air quality impacts. A Clean Air Act Statement of Conformity has been prepared and is presented in Section 9.0 of this document. The Conformity Determinations prepared for these projects can be found in Appendix B. The proposed actions are expected to comply with Section 176(c)(1) of the Clean Air Act amendments of 1990.

8.0 CONCLUSIONS

This EA evaluates the impacts of the use of an additional sand borrow area to support the berm and dune restoration plans presented in the 1980 Final Supplemental EIS (USACE 1980) for storm damage reduction in Cape May City and in the 1998 Final EIS (USACE 1998) for environmental restoration activities at Lower Cape May Meadows – Cape May Point. Evaluations of impacts on resources addressed previously in USACE (1980, 1998, and 2002) were not discussed in this EA and were incorporated by reference.

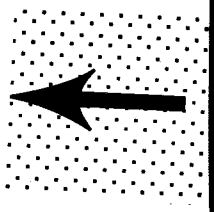
TABLE 7-1 . COMPLIANCE WITH ENVIRONMENTAL QUALITY PROTECTION STATUTES AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS	
FEDERAL STATUTES	**COMPLIANCE W/PROPOSED PLAN**
Archeological - Resources Protection Act of 1979, as amended	Full
Clean Air Act, as amended	Full
Clean Water Act of 1977	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act of 1972, as amended	Full
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	Full
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.

9.0 CLEAN AIR ACT STATEMENT OF CONFORMITY

CLEAN AIR ACT
STATEMENT OF CONFORMITY
CAPE MAY CITY, LOWER CAPE MAY MEADOWS, AND CAPE MAY POINT
CAPE MAY COUNTY, NEW JERSEY

Based on the conformity analysis in the subject report, I have determined that the proposed action conforms to the applicable State Implementation Plan (SIP). The U.S. Environmental Protection Agency had no adverse comments under their Clean Air Act Authority and they have approved the Conformity Determinations for the Cape May Projects. The proposed action would comply with Section 176(c)(1) of the Clean Air Act Amendments of 1990.



6 Aug 2008

Date

Thomas J. Tickner
Lieutenant Colonel, Corps of Engineers
District Engineer

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11.0 CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

This evaluation involves the aquatic placement of sand material obtained from the offshore borrow area identified as Borrow Area K on the beaches of Cape May and The Meadows for the purposes of beach replenishment for storm damage reduction and environmental restoration, respectively. Previous 404(b)1 evaluations for the placement of sand at Cape May and The Meadows from Borrow Areas M1, P1, 4 and 5 are presented in USACE (1980, 1998, and 2002).

I. PROJECT DESCRIPTION

A. Location

The beachfill placement area for Cape May extends along the coast of New Jersey from the USCG Training Center beach at Cape May Inlet to the 3rd Avenue groin in Cape May City. The beachfill placement area for The Meadows begins at the 3rd Avenue groin in Cape May City and extends to the Central Avenue groin in Cape May Point, at which point the fill transitions to tie into the existing beach and dune. The total length of fill for The Meadows is approximately 1.9 miles. Borrow Area K has been identified as primary sand source for renourishment activities associated with these projects. Borrow Area K is located approximately 14,000 feet (2.65 miles) south of the Cape May jetties (See Figure 1-4). The specific areas involved that are covered under this evaluation is Borrow Area K and the beaches and nearshore zones within this area.

B. General Description

The purpose of the Cape May project is hurricane and storm damage reduction through the placement of dredged material (sand) obtained from the offshore borrow sites on the beachfront in the form of a berm. The selected plan involved the extension of two existing groins and the placement of sand obtained from an offshore borrow source to construct a berm at an elevation of +6.7 feet NAVD with a variable width of 25 to 180 feet and periodic nourishment of 360,000 cy of material every two years. The initial construction of the project was completed in July 1991 in two major phases: placement of 465,000 cubic yards (cy) of sand on the US Coast Guard Training Center beach completed in August 1989, followed by a separate contract placing 900,000 cy on the Cape May City beach completed in July 1991. Also as part of initial construction were the extension of existing groins at Baltimore and Trenton Avenues. Following the initial construction, 7 periodic nourishment cycles were completed. The next nourishment cycle is scheduled for September 2008. The total quantity of sand placed to date is 3,923,145 cy.

The purpose of The Meadows project is environmental restoration through the placement of sand obtained from the offshore borrow sites on the beachfront. The plan consists of protective dune/berm restoration with a berm width of 20 feet at elevation +6.7 feet NAVD and a dune elevation of +16.7 feet NAVD. The selected plan for this

extends from the 3rd Avenue terminal groin in Cape May City to the Central Avenue groin in Cape May Point. Initial dune and beach construction was completed in 2005 with the placement of 1,406,000 cy of sand. The selected plan also involved the restoration of freshwater wetlands through the elimination of *Phragmites australis*, planting wetland vegetation, restoration of drainage ditches, installation of four water control structures, and creation of three "piping plover" ponds.

C. Authority and Purpose

The projects authority and purpose are discussed in USACE (1980 and 1998) and are incorporated by reference.

D. General Description of Dredged or Fill Material

1. General Characteristics of Material. The proposed borrow material is poorly graded fine to medium sands with some fines and gravel. Grain size analyses have demonstrated that the borrow material is comparable to the native beach sand. As such, the borrow material is considered ideal for berm and dune restoration.

2. Quantity of Material. The quantity of beachfill material required for the Cape May project is estimated to be approximately 360,000 cy of material every two years through year 2041. The Meadows will require approximately 650,000 cy of material every 4 years over the 50-year project life (through year 2055).

3. Source of Material. The current proposed source of the beachfill material for Cape May and The Meadows is Borrow Area K. This area is located approximately 14,000 feet (2.65 miles) south of the Cape May jetties. The size of Borrow Area K is approximately 430 acres.

E. Description of the Proposed Discharge Site

1. Location. The proposed beachfill discharge locations include the upper beach and potentially sections of dunes if warranted, lower beach intertidal areas and nearshore areas of Cape May and The Meadows.

2. Size. The size of the fill at Cape May and The Meadows is minimal as initial fill has already been completed and only small nourishment quantities are currently required in localized areas of erosion.

3. Type of Site. The proposed discharge areas for the two projects are comprised of eroding sandy beaches located from Cape May Inlet to the Central Avenue groin in Cape May Point. The proposed discharge sites are unconfined with placement to occur on shoreline beach areas and open water.

4. Type(s) of Habitat. The type of habitat present at the proposed discharge

locations are marine sandy beach intertidal and subtidal nearshore habitats and marine open water.

5. Timing and Duration of Discharge.

There are no seasonal restrictions for beachfill placement and associated discharges with the exception that certain areas or segments may require avoidance if piping plovers are nesting within the impact area(s) during the nesting season (March – August). Periodic nourishment would occur over a duration of approximately **6 months** every **4 years** for The Meadows and approximately **4 months** every **2 years** for Cape May.

F. Description of Discharge Method

A hydraulic dredge or hopper dredge would be used to excavate the sandy material from the borrow areas. The material would be transported using a barge with a pump-out and/or pipeline delivery system to the beachfill placement site. Subsequently, final grading would be accomplished using standard construction equipment such as bulldozers.

II. FACTUAL DETERMINATION

A. Physical Substrate Determinations

1. Substrate Elevation and Slope. For the Cape May project area, the final proposed elevation of the beach substrate after fill placement would be +6.7 feet NAVD at the top of the berm, with a variable width of 25 to 180 feet. The Meadows project consists of a 20 foot wide berm at +6.7 feet NAVD and +16.7 feet NAVD at the crest of the dune. The proposed profiles would have a foreshore slope of 1V:25H and an underwater slope that parallels the existing bottom to the depth of closure.

2. Sediment Type. The sediment type involved would be sandy beachfill material (90% or greater of fine, medium and coarse sands and gravels) obtained from offshore sources.

3. Dredged/Fill Material Movement. The planned construction would establish an initial construction template, which is higher and wider than the final intended design template or profile. It is expected that compaction and erosion would be the primary processes resulting in the change to the design template. Also, the loss of fine grain material into the water column would occur during the initial settlement. These materials may become redeposited within subtidal nearshore waters.

4. **Physical Effects on Benthos.** The proposed construction and discharges would result in initial burial of the existing beach and nearshore benthic communities when this material is discharged during berm construction. Substrate is expected to be composed of material that is similar to existing substrate, which is expected to become recolonized by the same type of benthos. The dredging within the borrow site would result in the removal of the benthic community from the substrate, however, similar conditions following dredging are expected to allow for recolonization of benthos within the offshore borrow area.

5. **Other Effects.** Other effects would include a temporary increase in suspended sediment load and a change in the beach profile, particularly in reference to elevation. Bathymetric changes in the placement sites would raise the bottom several feet, which would be offset seaward. Offshore borrow area changes would result in deepening the existing flat bottom by a maximum of 8 feet.

6. **Actions Taken to Minimize Impacts.** Actions taken to minimize impacts include selection of fill material that is similar in nature to the pre-existing substrate, and the avoidance of the creation of deep pits from sand extraction from the borrow site. Prominent shoal or "lump" areas would be avoided to maintain topographic structure of the offshore bottom. Also, standard construction practices to minimize turbidity and erosion would be employed at discharge sites.

B. <u>Water Circulation, Fluctuation, and Salinity Determinations</u>

1. Water. Consider effects on:

- **a. Salinity** - No effect.
- **b. Water chemistry** - No significant effect.
- **c. Clarity** - Minor short-term increase in turbidity during construction.
- **d. Color** - No effect.
- **e. Odor** - No significant effect.
- **f. Taste** - No effect.
- **g. Dissolved gas levels** - No significant effect.
- **h. Nutrients** - Minor effect.
- **i. Eutrophication** - No effect.
- **j. Others as appropriate** - None.

2. Current patterns and circulation

- **a. Current patterns and flow** – Minor impacts to circulation patterns and flow in the beach zone and nearshore where the

existing circulation pattern and flow would be offset seaward the width of the beachfill placement. Minor circulation differences are expected within the immediate vicinity of the borrow areas.

b. **Velocity** - No effects on tidal velocity and longshore current velocity regimes.

c. **Stratification** - Thermal stratification normally occurs beyond the mixing region created by the surf zone. There is potential for both winter and summer stratification. The normal pattern should continue after construction of the proposed project.

d. **Hydrologic regime** - The regime is largely tidal marine and oceanic. This will remain the case following construction of the proposed project.

3. **Normal water level fluctuations** - The tides are semidiurnal. The mean tide range is reported to be 4.1 feet in the Tide Tables published annually by the National Oceanic and Atmospheric Administration (NOAA). The spring tide range is reported as 5.0 feet. Construction of the proposed plan would not affect the tidal regime.

4. **Salinity gradients** - There should be no significant effect on the existing salinity gradients.

5. **Actions that will be taken to minimize impacts**- None are required: however, the borrow area would be excavated in a manner to approximate natural slopes and contours to ensure normal water exchange and circulation. Utilization of sand from a clean, oceanic environment and its excavation with either a hopper or hydraulic dredge with a pipeline delivery system would also minimize water chemistry impacts. Also, shoal or "lump" areas would be avoided to maintain topographic structure of the offshore bottom.

C. Suspended Particulate/Turbidity Determinations

1. **Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal (Beachfill Placement) Site** - There would be a short-term elevation of suspended particulate concentrations during construction phases in the immediate vicinity of the dredging and the discharge locations. Elevated levels of particulate concentrations at the discharge locations may also result from "washout" after beachfill is placed.

2. **Effects (degree and duration) on Chemical and Physical Properties of the Water Column** -

a. **Light penetration** - Short-term, limited reductions would be expected at the discharge sites from dredge activity and berm washout, respectively.

b. **Dissolved oxygen** - There is a potential for a decrease in dissolved oxygen levels but the anticipated low levels of organics in the borrow material should not generate a high, if any, oxygen demand.

c. **Toxic metals and organics** - Because the borrow material is 90% or more sand, and originates from areas where no known sources of significant contamination exist, the material is expected to be free of any significant contamination in accordance with 40 CFR 227.13(b).

d. **Pathogens** - Pathogenic organisms are not known or expected to be a problem in the borrow areas. Therefore, beachfill placement is not expected to significantly increase indicator bacteria levels above normal conditions.

e. **Aesthetics** - Construction activities associated with the fill placement site would result in a minor, short-term degradation of aesthetics. This is due to the temporary impacts to noise, sight, and smell associated with the discharges and beach de-watering during construction and periodic nourishment. Newly deposited sand may initially appear dark, however, this is expected to be short-term as the new sands undergo "bleaching" by becoming oxidized to air and sunlight.

3. **Effects on Biota**

a. **Primary production, photosynthesis** - Minor, short-term effects related to turbidity.

b. **Suspension/filter feeders** - Minor, short-term effects related to suspended particulates outside the immediate deposition zone. Sessile organisms would be subject to burial if within the deposition area.

c. **Sight feeders** - Minor, short-term effects related to turbidity.

4. **Actions taken to minimize impacts** include the selection of clean sand with a small fine grain component and a low organic content. Standard construction practices would also be employed to minimize turbidity and erosion.

D. Contaminant Determinations

The discharge material is not expected to introduce, relocate, or increase contaminant levels at either the borrow or placement sites. This is assumed based on the characteristics of the sediment, the proximity of the borrow site to sources of contamination, the area's hydrodynamic regime, and existing water quality. In accordance with 40 CFR 227.13(b), the dredged material/beachfill is not expected to contain any significant contamination.

E. Aquatic Ecosystem and Organism Determinations

1. **Effects on Plankton** - The effects on plankton should be minor and mostly related to light level reduction due to turbidity. Significant dissolved oxygen level reductions are not anticipated.

2. **Effects on Benthos** – Initially, a complete removal of the benthic community within the borrow area and burial of benthos within the discharge (beachfill) location. The losses of benthic organisms are somewhat offset by the expected rapid opportunistic recolonization from adjacent areas that would occur following cessation of construction activities. Recolonization is expected to occur rapidly in the discharge (beachfill placement) area through horizontal and in some cases vertical migrations of benthos. Recolonization within the borrow area is expected to occur within a few months to a few years via pelagic larval recruitment and horizontal migrations. Some minor losses of benthos associated with rocky intertidal habitat are expected, as portions of rock groins would become partially covered with beachfill material.

3. **Effects on Nekton** - Only a temporary displacement is expected, as the nekton would probably avoid the active work area.

4. **Effects on Aquatic Food Web** – Localized significant impacts in the affected areas due to loss of benthos as a food source through burial at the beachfill placement site or removal at the dredging site. This is expected to be short-term as the beachfill placement sites could become recolonized by benthos within a few days or weeks and the borrow areas within a few months following the impact.

5. **Effects on Special Aquatic Sites** - No special aquatic sites such as sanctuaries and refuges, mud flats, vegetated shallows, coral reefs and riffle and pool complexes are present within the project area.

6. **Threatened and Endangered Species** - The piping plover (*Charadrius melodus*), a Federal threatened and State endangered species, currently utilizes some of the sandy beach habitat within the project impact areas.

Plover nests on the beach would be impacted by beachfill placement activities if present within the affected area. Monitoring to determine the extent of nesting activity prior to periodic nourishment is required to insure that the nesting locations can be avoided during construction until the chicks fledge the nest. Monitoring will be conducted on a yearly basis in conjunction with NJDEP, Division of Fish and Wildlife. Following construction activities, it is also possible that the Federally threatened seabeach amaranth (*Amaranthus pumilus*) could become established within the project area, as it has been recently found north of the project areas. Surveys will be conducted prior to any nourishment activities to determine the presence/location of any plants in order to protect them from construction impacts. Additional issues such as local beach-use management after construction and nourishment with regard to the piping plover and seabeach amaranth are being addressed through a programmatic Biological Assessment as part of formal consultation with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act. Several species of threatened and endangered sea turtles may be migrating through the sand borrow area depending on the time of year. Sea turtles have been known to become entrained and subsequently destroyed by suction hopper dredges. Use of a hopper dredge during a time of high likely presence (June – November) in the area could potentially entrain and destroy a sea turtle(s). Sea turtle monitors would be present in accordance with the Biological Opinion (NMFS, 1996) if a hopper dredge is required from June – November.

7. Other Wildlife - The proposed plan would not significantly affect other wildlife.

8. Actions to minimize impacts - Impacts to benthic resources can be minimized at the borrow area by dredging in a manner as to avoid the creation of deep pits and allow disturbed areas in the borrow site to recover without future disturbance from dredging. Depending on the timing of the dredging and the type of dredge to be used, it may be necessary to implement mitigative measures to avoid adversely impacting threatened or endangered sea turtles. If a hopper dredge is used between June and November, measures to avoid or minimize impacts to these species may include utilizing NMFS approved turtle monitors, as required in formal Section 7 Endangered Species Act coordination. It is not necessary to implement this measure if dredging is conducted within the winter months when turtle activity is lowest in this area or if a hopper dredge is not required.

F. <u>Proposed Disposal/Discharge (Beachfill Placement) Site Determinations</u>

1. Mixing Zone Determination

a. **Depth of water** - 0 to-20 feet mean low water
b. **Current velocity** - Generally less than 3 feet per second
c. **Degree of turbulence** - Moderate to high
d. **Stratification** - None
e. **Discharge vessel speed and direction** - Not applicable
f. **Rate of discharge** - Typically this is estimated to be 780 cubic yards per hour
g. **Dredged material characteristics** – poorly graded medium to fine sands
h. **Number of discharge actions per unit time** - Continuous over the construction period

2. **Determination of compliance with applicable water quality standards** - A Section 401 Water Quality Certificate and consistency concurrence with the State's Coastal Zone Management Program was received from the State of New Jersey.

3. **Potential Effects on Human Use Characteristics** -

a. **Municipal and private water supply** - No effect
b. **Recreational and commercial fisheries** - Short-term effect during construction; there would be a temporary loss of surf clam stocks within the nearshore placement sites and within the borrow area. Loss of benthos would result in a temporary loss of food source for finfish. Beach access for recreational fishermen may be temporarily restricted in segments during construction.
c. **Water related recreation** - Short-term effect during construction where potential beachgoers, bathers, and surf-fishermen would be prohibited from accessing active construction locations.
d. **Aesthetics** - Short-term adverse effects to noise sight and smell during construction are anticipated.
e. **Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves** – The dredging and fill placement will not impact any national sites, however, state areas, specifically Cape May Point State Park, will be temporarily affected by construction activities occurring within the Park boundaries.

G. **Determination of Cumulative Effects on the Aquatic Ecosystem**- Impacts on benthos and the aquatic ecosystem in general are considered to be temporary and do not represent a significant loss of habitat. This project in concert with other existing or proposed similar actions, may produce measurable temporary cumulative impacts to benthic resources. However these impacts are short-term.

H. **Determination of Secondary Effects on the Aquatic Ecosystem** – Secondary impacts such as turbidity on aquatic organisms or temporary loss of food sources

through the burial or removal of the benthos are considered to be of short duration.

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

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

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site, Which Would Have Less Adverse Impact on the Aquatic Ecosystem. The alternative measures considered for accomplishing the projects objectives are detailed in USACE (1980 and 1998) and Section 3.0 of this Environmental Assessment. Several alternatives including No Action, Permanent Evacuation and Regulation of Future Development would likely have less adverse impacts on the aquatic ecosystem. An evaluation of alternative sand sources was conducted in the EA. Borrow Area K was identified as a likely sand source.

C. Compliance with Applicable State Water Quality Standards. This action is not expected to violate State of New Jersey Water Quality Standards. A Section 401 water quality certificate was received from the New Jersey Department of Environmental Protection.

D. Compliance with Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act. The proposed action is not expected to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. Compliance with Endangered Species Act. The proposed action will comply with the Endangered Species Act of 1973 in accordance with the U.S. Fish and Wildlife Service's Biological Opinion issued in December 2005, which addresses impacts and mitigative measures for piping plovers and seabeach amaranth. Tier II consultation will take place prior to the 2008 nourishment cycle. Formal Section 7 coordination procedures have been completed with respect to the use of hopper dredges during June – November and the potential effects on threatened and endangered sea turtles. Procedures with respect to the Biological Opinion (NMFS, 1996) will be followed to be in compliance with the Endangered Species Act.

F. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972. The proposed action will not violate the protective measures for any Marine Sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

G. **Evaluation of Extent of Degradation of the Waters of the United States.** The proposed action is not expected to result in permanent significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems; aquatic ecosystem diversity, productivity, and stability; and recreational, aesthetic, and economic values are not expected to occur or have long-term effects on impacted resources.

H. **Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem.** Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include selection of borrow material that is low in silt content, has little organic material, and is expected to be uncontaminated.

I. **On the basis of the guidelines**, the proposed discharge sites for the dredged material is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.