ENVIRONMENTAL ASSESSMENT

Raritan Bay and Sandy Hook Bay
Hurricane and Storm Damage Reduction Study
Port Monmouth, New Jersey
Modification to the Feasibility Report's Recommended Plan
For the Bay Shoreline Protection Reach

Prepared by: U.S. Army Corps of Engineers
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In Partnership with the New Jersey
Department of Environmental Protection

February 2008

Executive Summary

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The U.S. Army Corps of Engineers (USACE), New York District (District) in partnership with the New Jersey Department of Environmental Protection (NJDEP) prepared a Draft Feasibility Report and a Draft Environmental Impact Statement (EIS) (USACE 1998) and a Final Feasibility Report and Final EIS (USACE 2000) (from herein these Reports will be cited as the Feasibility Report) for hurricane and storm damage reduction at Port Monmouth, New Jersey (NJ); however, a National Environmental Policy Act (NEPA), Record of Decision (ROD) has not been signed. The Recommended Plan resulting from the Feasibility Report provides reduction of storm damages from coastal erosion and flooding and inland flooding caused by high tide surge events in the Raritan Bay and Sandy Hook Bay (RBSHB) during hurricanes and severe storms. Three areas (the Bay Shoreline, Pews Creek and Compton Creek) within the Port Monmouth community were identified in the Feasibility Report as areas justified receiving protection from damages caused by hurricanes and severe storms.

As part of the USACE internal review policy, the Office of Chief of Engineers Value Engineering Study Team (OVEST) suggested a modification to the Recommended Plan for the Bay Shoreline Protection Reach as discussed in the Feasibility Report. OVEST suggested a design change that substitutes a stone terminal groin in lieu of a lengthy sand taper to provide closure to the existing bay shoreline. Use of one terminal groin at the western end of the Bay Shoreline area as a closure structure provides a lower annual cost design than use of a sand taper closure and has a smaller footprint, while maintaining the same level of protection.

The District conducted an assessment of the impacts of the proposed design modification to the Bay Shoreline Protection Reach and concluded a Finding of No Significant Impact (FONSI) because: 1) there were no significant issues identified during the Draft and Final EIS public and agency review and comment phases; 2) there is no known new significant information to justify the preparation of a supplemental EIS, and; 3) except for only ~7,400 square feet, the construction of the proposed modification is within the footprint of alternatives that were considered during the feasibility phase. Accordingly, the preparation of this Environmental Assessment (EA) with a FONSI is to subject the proposed

modification to the Bay Shoreline Protection Reach of the Feasibility Report's Recommended Plan to the NEPA process.

A proposed change to the Bay Shoreline Protection Reach of the Feasibility Report's Recommended Plan consists of the substitution of one terminal groin in lieu of a sand taper to connect the improved bay shoreline to the existing bay shoreline at the western end of the Port Monmouth Bay Shoreline. Use of a terminal groin closure does not alter the primary protective beach berm and dune system presented in the Feasibility Report's Recommended Plan. The dune length, width, landward position and side slopes are unchanged, as well as the design berm width, elevation, side slopes fronting the dune, and bay shoreline extent. Initial nourishment is still scheduled to come from the Sea Bright Offshore Borrow Area (SBOBA), which was previously subjected to separate NEPA documents (USACE 1989 and 1994), Essential Fish Habitat (EFH) Assessment (USACE 2005a), Endangered Species Act (ESA) (USACE 1993a and USDC 1995) and has received all Federal and state permits. The sand for each periodic renourishment is still scheduled to be trucked in and remains at 10-year intervals but with a reduction of required renourishment volume. The extension of the existing fishing pier is still planned. Since the proposed modification includes a terminal groin at the west end of the dune line instead of a sand taper terminus, a reduced section of taper fill will be placed down drift of the groin equivalent in volume to the amount of sand impounded in the up drift fillet to offset local groin-induced sand losses. The construction of the terminal groin adds only 7,400 square feet or 0.17 acres that were not analyzed as discussed in the Feasibility Report. Finally, the Bay Shoreline plan proposes to install 3 Osprey (*Pandion haliaetus*) nesting platforms. The osprey is listed by the NJDEP, Division of Fish and Wildlife (DFW) as a threatened species.

A terminal groin performs the following coastal engineering functions:

A. Provides efficient transition from a placed beachfill to existing shoreline;
B. Reduces beach fill erosion rates by:

    1. Impoundment in updrift fillet (short term);
    2. Reducing the length of shoreline to be renourished (long-term), and;
    3. Reorientation of the shoreline (long term).

C. Reduces quantity of channel infilling.

When compared to the Feasibility Report's Recommended Plan, the implementation of the proposed modification to the Bay Shoreline Protection Reach provides equal hurricane and severe storm damage protection, has a lower annual cost, a higher benefit to cost ratio and advances the USACE's

Environmental Operating Procedures (EOPs) by further minimizing impacts and providing ecological and recreational benefits as follows:

A. The overall footprint is reduced by ~ 9.9 acres of which the intertidal footprint is reduced by ~ 3.1 acres;
B. The volume of initial nourishment is estimated at 336,200 cubic yards (c.y.), which is 101,300 c.y. less material;
C. The volume of nourishment for each periodic renourishment is less by 47,800 c.y.;
D. The total volume of nourishment over the 50-year life of the project, which includes the initial placement of sand and 4 periodic renourishments, is reduced by 292,500 c.y.;
E. The western terminal groin provides the following ecological benefits:

    1. Add hard physical habitat diversity to the intertidal bay bottom;
    2. Increase habitat diversity for fishery resources to forage;
    3. Improve habitat diversity for sessile shellfish to attach themselves upon and grow;
    4. Enhance habitat diversity for macroinvertebrates to forage and hide from predators, and;
    5. Offer an isolated habitat for avian resources to loaf and rest.

F. The western terminal groin will offer another location for recreational fishing opportunities;
G. The duration to restore the sandy beach, berm and dune will be reduced, and;
H. The installation of 3 Osprey nesting platforms.

The cost for the modified selected plan is based on October 2006 price levels and the FY 07 Federal interest rate of 4-7/8%. The economic analysis of the modified selected plan will provide annual benefits of $4,714,000 which, when compared to the total annual cost of the modified selected plan of $3,011,100 yields a benefit to cost ratio of 1.6 with $1,702,400 in net excess benefits. The modified selected plan is the National Economic Development (NED) plan.

The initial cost for the construction of the modified selected plan, including the advance nourishment, is estimated at $43,704,000 (Oct 2006 price levels). The Federal share of this first costs is $28,408,000 (65%), and the non-Federal share is $15,296,000 (35%). The annualized cost for periodic nourishment is currently estimated at $202,000 that will be cost shared at a rate of 50% Federal and 50% non-Federal. The non-Federal sponsor, the NJDEP, has indicated general support for the modified selected plan and would be willing to enter into a Project Cooperation Agreement with the USACE for the implementation of the selected plan. Local municipalities would cost share the non-Federal share with the State.

These include Monmouth County and Middletown Township, which are also supportive of the proposed modification.

Mitigation includes avoidance and minimization of affects (in addition to minimization efforts as described in the Feasibility Report), conversion of *Phragmites* to saltmarsh, biological monitoring and habitat restoration. Avoidance could be accomplished by restricting the placement of sand and rock to the months between May and November; this avoids an impact to eggs from the EFH designated Winter flounder (*Pleuronectes americanus)* because they spawn in the Raritan Bay and Sandy Hook Bay (RBSHB) estuary from December to April (USACE 2006). However, the District decided not to implement a non-placement window to minimize potential winter flounder effects because: 1) the placement of sand in winter months will have an overall benefit to benthic resources as their abundances are naturally diminished during the winter, and; 2) the footprint for sand placement is insignificant when compared to the total quantity of subtidal habitat of the RBSHB. Minimization of impacts is achieved because the proposed modification has a smaller footprint when compared to the selected Bay Shoreline Protection Reach alternative described in the Feasibility Report. To better understand and quantify impacts of beach nourishment in an estuarine ecosystem, biological monitoring is planned in the intertidal and nearshore subtidal zones at the sand placement site, dune vegetation and tidal marsh hydrology. The monitoring of dune vegetation will be performed to ensure 85% vegetative success rate; short-term replanting of vegetation is anticipated to achieve an 85% vegetative success rate. The results of biological monitoring is expected to considerably add to the existing ecological knowledge base of the RBSHB and also cited for other future actions. Habitat restoration involves the raising of 3 Osprey (*Pandion haliaetus)* nesting platforms. The osprey is a state-listed species, as the NJDEP, Division of Fish and Wildlife (DFW) classifies the osprey as a threatened species in the State of New Jersey. Endangered species monitoring is scheduled too. The newly restored wider sandy beach can provide suitable habitat for Federal and state-listed threatened and endangered species, such as the Piping plover (*Charadrius melodus*) and Least terns (*Sterna antillarum*) to nest and Seabeach amaranth (*Amaranthus pumilus*) to grow. As a result of this potential, monitoring for these significant species is scheduled to take place for the first 3 years after initial construction. Should any of these species use the restored sandy beach, the District will reinitiate consultation with the U.S. Fish and Wildlife (USFWS) pursuant to the Section 7 of the ESA.

The placement of sand and rock along the Port Monmouth Bay Shoreline is not expected to have any significant and long-term lasting effects on the "spawning, breeding, feeding, or growth to maturity" of the designated EFH species that occupy the intertidal and nearshore zones (USACE 2006). However, proposed activities would have immediate, short-term, direct and indirect impacts on some life history stages of EFH designated fish species that occur in the immediate vicinity of sand and rock placement.

The proposed modification of the Bay Shoreline Protection Reach is expected to have a direct, short-term impact on benthic resources. Beach nourishment is expected to smother benthic organisms causing their mortality; but, this impact is expected to be temporary and limited to the placement area during construction. The recoveries of benthic resources to pre-construction conditions are expected to begin immediately in each beach segment right after the placement of sand is completed for that beach segment. Full recover of benthic resources in terms of their diversity, richness and biomass to pre-construction conditions is anticipated within a 6-12 month period.

The proposed modification of the Bay Shoreline Protection Reach is expected to cause short-term, localized increase in surface water turbidity and push the intertidal and subtidal zones further offshore. Short-term reduction in shellfish feeding efficiency and localized mortality would be offset by the overall benefit of additional sand, which is considered a high quality benthic substrate material. As a result, the Bay Shoreline plan may benefit the Horseshoe crab (*Limulus polyphemus*), as their larvae are an important food source for numerous species of migratory birds along the Atlantic migratory pathway. More recently, the USACE (2004) has found that horseshoe crab larvae is a dominate food source for Atlantic silversides (*Menidia menidia*), which are a preferred prey for migratory Bluefish (*Pomatomus saltatrix*) and Striped bass (*Monroe saxatilis*); these 2 species are highly sought-after by many recreational fisherman. A wider, sandy beach and improved intertidal habitat conditions may provide more suitable spawning habitat for the horseshoe crab, thus potentially increasing prey resources available for consumption by both migratory birds and fish.

The implementation of the proposed modification will provide an immediate and long-term benefit to the existing dune ecosystem along the Port Monmouth Bay Shoreline. Currently these dunes, which represent excellent wildlife habitat and are very limited within the RBSHB estuary, are experiencing erosion during each high tide and excessive erosion during storm events. In addition, implementation of the proposed modification can provide benefits to navigation, due to the burial of existing wood pilings. Once buried, these structures would lose the ability to dislodge and become floating hazards to recreational boats and commercial vessels. However, the terminal groin is a hard structure, and as such will be a hazard to recreational boats.

The placement of rock to construct the terminal groin is expected to smother benthic organisms, and possibly limited numbers of macroinvertebrates and juvenile and larval fish causing their mortality. The placement of rock will also result in the permanent loss of 0.64 acres of intertidal and nearshore subtidal habitat; however, this loss is negligible when compared to the total amount of intertidal habitat within the RBSHB complex. The loss of these habitats will permanently be replaced by rocky, hard bottom material that will add diversity to the bay bottom habitat. This added hard bottom habitat can attract and

concentrate prey fish species and sessile shellfish creating an optimal foraging area for predatory and migratory fish species such as Bluefish and Striped bass.

The emissions from the construction of the proposed modification do not exceed the threshold limits for carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate 10 and 2.5. As such, a Record of Non-Applicability was prepared pursuant to the Clean Air Act.

The allocation of Federal, state, and local funds to construct the proposed action will provide an environmental justice benefit for the low and lower-than-average-income populations living in the community. The construction of Bay Shoreline plan will have a positive effect on the local population by reducing their costs associated with storm water damage, as well as costs incurred from their temporary relocation during and after storm events.

The placement of sand in this area will not adversely affect known cultural resources and may help to protect unknown cultural resources located behind the beach. No additional analysis of effects of the proposed Bay Shoreline protection plan on cultural resources will be necessary unless the nature of the proposed protection plan changes over its duration. Should the nature of the Bay Shoreline proposed protection plan change (e.g., a different borrow area) additional consultation with the State Historic Preservation Office (SHPO) would become necessary.

In addition to this proposed action, the District is currently studying 2 other proposed actions along the NJ shoreline of the RBSHB complex that either includes only beach nourishment or beach nourishment with placement of groins. The construction of these projects is expected to have similar adverse and beneficial impacts as described for the current proposed action, as they also interact with the intertidal and nearshore subtidal zones of RBSHB shoreline. Cumulative adverse effects are anticipated to be minimal because these zones are extremely dynamic and very energetic areas subject to periods of naturally occurring high turbidity and sediment movement. Storm events have been shown to increase both turbidity and total suspended sediment load to levels several orders of magnitude higher than those observed from localized beach nourishment operations (USACE 2001). Also, these natural events occur over hugh entire geographic regions that affect hundreds of miles of coastline. Whereas, all proposed beach nourishments within the RBSHB will be limited to just a couple of miles of bay shoreline. Both designated EFH species and other aquatic resources successfully exist within this system where such natural events are common.

The cumulative amount of intertidal and nearshore subtidal habitat converted to rocky hard bottom habitat is insignificant when compared to the total area of intertidal and nearshore subtidal within the RBSHB estuary. Due to the localized

nature and the limited degree of scale of expected impacts, it is highly unlikely that there will be any significant direct or indirect cumulative effects due to the construction of these projects along the bay shoreline of the RBSHB estuary. Overall, no significant adverse cumulative ecological, biological and cultural resource impacts are anticipated as a result of the construction of the proposed modification of the Bay Shoreline Protection Reach in the community of Port Monmouth, NJ.

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List of EA Acronyms & Abbreviations

ac	acre(s)
CAFRA	Coastal Area Facility Review Act
CENAB	USACE, Baltimore District
CERC	Coastal Engineering Research Center
cm	centimeter(s)
CO	Carbon monoxide
CSMA	Consolidated Metropolitan Statistical Area
c.y.	cubic yards
dB	decibel
DDT	Dichlorodiphenyltrichloroethane
District	USACE, New York District
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOPs	Environmental Operating Principles
FONSI	Finding on No Significant Impact
FRRP	Feasibility Report's Recommended Plan
ft.	feet/foot
HRE	Hudson-Raritan Estuary
HTRW	Hazardous, Toxic and Radioactive Waste
HwB	Hooksan sand
NEPA	National Environmental Policy Act
Ldn	day-night noise level
LPIL	Lowest Practical Identification Level
m	meter(s)
MC	Marine Commercial
MLW	Mean Low Water
MCPB	Monmouth County Planning Board
N.J.A.C.	New Jersey Administrative Code
NJ	New Jersey
NJDEP	New Jersey Department of Environmental Protection
NJDEP, DFW	NJDEP, Division of Fish and Wildlife
NJL	New Jersey Law
N.J.S.A.	New Jersey State Act
NJSHPO	New Jersey State Historic Preservation Office
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRHP	National Registry of Historic Places
O3	Ozone
O&M	Operation and Maintenance
OVEST	Office of Chief of Engineers Value Engineering Study Team

PA	Preliminary Assessment
PAHs	Polynucleararomatic hydrocarbons
PCBs	Polychlorinated biphenyls
RBSHB	Raritan Bay and Sandy Hook Bay
ROD	Record of Decision
SBOBA	Sea Bright Offshore Borrow Area
UA	Udorthents
UD	Urban land complex
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDC	U.S. Department of Commerce
USDI	U.S. Department of the Interior
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
YOY	Young-of-the-Year

1.0 INTRODUCTION

1.1 Project Description

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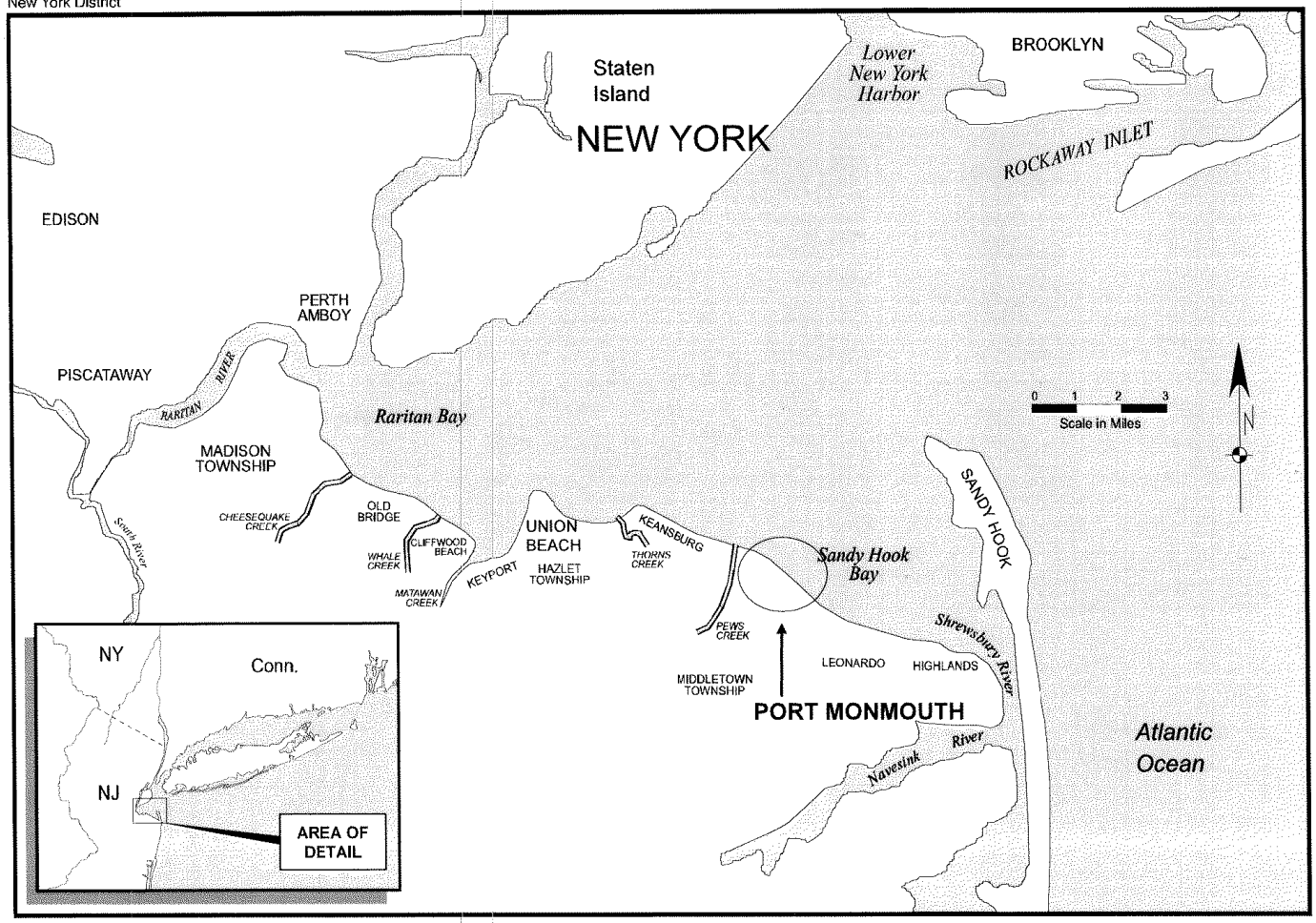
As part of the USACE internal review policy, the Office of Chief of Engineers Value Engineering Study Team (OVEST) suggested a modification to the Recommended Plan for the Bay Shoreline Protection Reach as discussed in the Feasibility Report. OVEST suggested a design change that substitutes a stone terminal groin in lieu of a lengthy sand taper to provide closure to the existing bay shoreline. Use of one terminal groin at the western end of the Bay Shoreline area as a closure structure provides a lower annual cost design than use of a sand taper closure and has a smaller footprint, while maintaining the same level of protection.

The District conducted an assessment of the impacts of the proposed design modification to the Bay Shoreline Protection Reach (EA Figure 1) and concluded a Finding of No Significant Impact (FONSI) because: 1) there were no significant issues identified during the Draft and Final EIS public and agency review and comment phases; 2) there is no known new significant information to justify the preparation of a supplemental EIS, and; 3) except for only ~7,400 square feet, the construction of the proposed modification is within the footprint of alternatives that were considered during the feasibility phase. Accordingly, the preparation of this Environmental Assessment (EA) with a is to subject the proposed modification to the Bay Shoreline Protection Reach of the Feasibility Report's Recommended Plan to the NEPA process.

US Army Corps of Engineers
New York District

Raritan Shoreline – Port Monmouth, New Jersey



1.2 Study and Project Authorization

This EA/FONSI was prepared pursuant to:

A. A January 6, 1955 amendment to the State of New Jersey, Department of Conservation and Economic Development basic application of September 22, 1952 requesting a beach erosion control study;

B. Chief of Engineers August 15, 1955 approval of a supplemental agreement dated June 22, 1955 amending the basic application in accordance with Section 2 of Public Law 520 (River and Harbor Act), 71st Congress, approved July 3, 1930, as amended and supplemented pertaining to cooperative beach erosion control investigations;

C. State of New Jersey authority to participate in a study established by Chapter 258, New Jersey Law (N.J.L.) 1946 and Chapter 448, N.J.L. 1948 and appropriation acts of the State;

D. A hurricane study authorized by Public Law 71, 84th Congress, 1st Session on June 16, 1955, funded by Chief of Engineers allocation letter dated October 1, 1957, and approved on February 12, 1960;

E. The existing Federal Project, Raritan Bay and Sandy Hook Bay (RBSHB), New Jersey, authorized by the Flood Control Act of October 12, 1962 in accordance with House Document No. 464, 87th Congress, 2nd Session;

F. The RBSHB shorefront area study resolution authorized by the U.S. House of Representatives, Committee of Public Works and Transportation, adopted August 1, 1990, which states "Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, that the Board of Engineers for Rivers and Harbors is requested to review the report of Chief of Engineers on RBSHB, New Jersey, published as House Document 464, Eighty-seventh Congress, Second Session, and other pertinent reports, to determine the advisability of modifications to the recommendations contained therein to provide erosion control and storm damage prevention for the RBSHB".

G. Construction of the Port Monmouth, NJ project was authorized under Section 101 of the Water Resources Development Act of 2000, as follows:

H. "(23) RARITAN BAY AND SANDY HOOK BAY, PORT MONMOUTH, NEW JERSEY. – The project for hurricane and storm damage reduction, Raritan Bay and Sandy Hook Bay, Port Monmouth, New Jersey, at a total cost of $32,064,000, with an estimated Federal cost of $20,842,000 and

an estimated non-Federal cost of $11,222,000, and at an estimated average annual cost of $173,000 for periodic nourishment over the 50-year life of the project, with an estimated annual Federal cost of $86,500 and an estimated annual non-Federal cost of $86,500."

1.3 Purpose and Need

Over time, storm events have significantly altered the composition of the Port Monmouth shoreline. Significant erosion has removed much of the natural beachfront and dune complexes that provide coastal protection to the Port Monmouth community (USACE 1993b). The Port Monmouth shoreline historically has eroded at an annual beach retreat rate of approximately 2.7 ft per year (USACE 1993b). In addition, severe storms damaged and destroyed structures (USACE 1993b). Accordingly, to prevent future damages caused by severe storms, the District conducted a comprehensive and detailed feasibility study of alternatives to provide protection against flood damages (USACE 1998 and 2000).

1.4 Proposed Action

A primary mission of the USACE is to provide solutions to reduce damages caused by hurricanes and severe storm events. Shoreline protection measures usually include structures such as dunes, beach restoration, periodic beach nourishment, groins, seawalls, bulkheads and/or a combination of these structures. This document identifies a proposed modification to the Feasibility Report's Recommended Plan for the Bay Shoreline Protection Reach and its beneficial and adverse affects.

2.0 Alternatives

An array of alternatives to include No-Action, non-structure and structure alternatives was examined in detail in the Feasibility Report.

The purpose of this EA is stated in EA Section 1.1 above, and thus the discussion of alternatives is limited to the proposed modification to the Feasibility Report's Recommended Plan, for the Bay Shoreline Protection Reach as identified by OVEST also in EA Section 1.1

2.1 Modification to the Feasibility Report's Recommended Plan, Bay Shoreline Protection Reach

A proposed change to the Bay Shoreline Protection Reach of the Feasibility Report's Recommended Plan consists of the substitution of one terminal groin in lieu of a sand taper to connect the improved bay shoreline to the existing bay shoreline at the western end of the Port Monmouth Bay Shoreline. Use of a terminal groin closure does not alter the primary protective beach berm and dune system presented in the Feasibility Report's Recommended Plan. The dune length, width, landward position and side slopes are unchanged, as well as the design berm width, elevation, side slopes fronting the dune, and bay shoreline extent. Initial nourishment is still scheduled to come from the Sea Bright Offshore Borrow Area (SBOBA), which was previously subjected to separate NEPA documents (USACE 1989 and 1994), Essential Fish Habitat (EFH) Assessment (USACE 2005a), Endangered Species Act (ESA) (USACE 1993a and USDC 1995) and has received all Federal and state permits. The sand for each periodic renourishment is still scheduled to be trucked in and remains at 10-year intervals but with a reduction of required renourishment volume. The extension of the existing fishing pier is still planned. Since the proposed modification includes a terminal groin at the west end of the dune line instead of a sand taper terminus, a reduced section of taper fill will be placed down drift of the groin equivalent in volume to the amount of sand impounded in the up drift fillet to offset local groin-induced sand losses. The construction of the terminal groin adds only ~7,400 square feet or~ 0.17 acres that were not analyzed as discussed in the Feasibility Report. Finally, the Bay Shoreline plan proposes to install 3 Osprey (*Pandion haliaetus*) nesting platforms. The osprey is listed by the NJDEP, Division of Fish and Wildlife (DFW) as a threatened species.

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2. Reduces beach fill erosion rates by:

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    C. Reorientation of the shoreline (long term).

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When compared to the Feasibility Report's Recommended Plan, the implementation of the proposed modification to the Bay Shoreline Protection Reach provides equal hurricane and severe storm damage protection, has a lower annual cost, a higher benefit to cost ratio and advances the USACE's Environmental Operating Procedures (EOPs) by further minimizing impacts and providing ecological and recreational benefits as follows:

A. The overall footprint is reduced by ~ 9.9 acres of which the intertidal footprint is reduced by ~ 3.1 acres;
B. The volume of initial nourishment is estimated at 336,200 cubic yards (c.y.), which is 101,300 c.y. less material;
C. The volume of nourishment for each periodic renourishment is less by 47,800 c.y.;
D. The total volume of nourishment over the 50-year life of the project, which includes the initial placement of sand and 4 periodic renourishments, is reduced by 292,500 c.y.;
E. The western terminal groin provides the following ecological benefits:

    1. Add hard physical habitat diversity to the intertidal bay bottom;
    2. Increase habitat diversity for fish resources to forage;
    3. Improve habitat diversity for sessile shellfish to attach themselves upon and to grow;
    4. Enhance habitat diversity for macroinvertebrates to forage and hide from predators, and;
    5. Offer an isolated habitat for avian resources to loaf and rest.

F. The western terminal groin will offer another location for recreational fishing opportunities;
G. The duration to restore the sandy beach, berm and dune will be reduced, and;
H. The installation of 3 Osprey nesting platforms.

See EA Table 1 below for a side-by-side comparison of the Feasibility Report's Recommended Plan to the Proposed Modification to the Bay Shoreline Protection Reach.

2.2 Duration of Construction

The construction to initially restore the sandy beach, berm and dune is scheduled to take less than 2 months. The construction of the western terminal groin is expected to take 3.5 months. Each periodic renourishment is anticipated to take less than 2 months. Accordingly, it's reasonable to conclude that the duration of construction is insignificant and negligible.

EA Table 1: Comparison of the Feasibility Report's Recommended Plan (FRRP) Bay Shoreline Protection Reach to the Proposed Modification to the Bay Shoreline Protection Reach (BSPR) as discussed in the Engineering Documentation Report.

Plan Component	*FRRP*	*Proposed BSPR Modification*	*Difference*
Footprint[1]	~ 34.6 acres (ac.)	~ 24.7 ac.	~ 9.9 ac. less
Beach Length	4,640 feet (ft)	3,400 ft.	1,240 ft. less
Dune Length	2,640 ft.	2,640 ft.	same
Initial Fill Volume[2]	437,500 cubic yards (c.y.)	336,200 c.y.	101,300 c.y less.
Each Renourishment[4]	127,300 c.y.	79,500 c.y.	47,800 c.y. less
Total Fill Volume	946,700 c.y.	654,200 c.y.	292,500 c.y. less
Crest Width of Dune	25 ft.	25 ft.	same
Width of Beach	50 ft.	50 ft.	same
Elevation of Dune	16 ft. NGVD[3]	16 ft. NGVD	same
Elevation of Beach	9 ft.	9 ft.	same
Dune Slopes:			
Landward	1 on 5	1 on 5	same
Seaward	1 on 10	1 on 10	same
Beach Slope	1 on 15	1 on 15	same
Fishing Pier Extension	200 ft.	200 ft.	same
Osprey Nesting Platforms	0	3	3 more
Western Terminal Groin:			
Footprint	N/A	0.64 ac.[1]	
Crest Length	N/A	305 ft.	
Crest Width	N/A	13 ft.	
Side Slopes	N/A	1 on 2	
Crest Elevation (Onshore)	N/A	+10 ft. NGVD	
Crest Elevation (Offshore)	N/A	+5 ft. NGVD	
Excavation[5]		260 c.y.	
Channel Maintenance[6]	5,700 c.y/year	2,800 c.y/year	2,900 c.y. less/year
Total Initial Cost[7]	$46,971,600	$47,268,600	$297,000 more
Total Annual Cost[7]	$3,105,500	$3,011,100	$94,400 less
Benefit to Cost Ratio	1:1	1:6	higher
Level of Protection			same

1 Includes beach, dune and advanced and tolerance fill with and without the western terminal groin. Although the western terminal groin encompasses a total of 0.64 acres, 0.47 acres of the western terminal groin falls within the footprint of the FRRP; thus the western terminal groin only adds ~ 0.17 acres or 7,400 square feet of footprint that was not evaluated in the Recommended Plan discussed in the Feasibility Report (USACE 1998 and 2000).

2 Includes design, advance, and tolerance fill based on an updated (Engr citation 2003) profile survey.

3 National Geodetic Vertical Datum.

4 Periodic renourishment is scheduled every 10 years from date of initial construction.

5 Excavation to occur at the landward end of the terminal groin.

6 Volume includes both Pews Creek and Compton Creek federal navigation channels, and the estimated volume is an increase in the amount of c.y. that needs to be dredged from both channels when compared to the No-Action alternative.

7 Includes interest during construction. See Table 17 in the ERD for further discussion.

N/A: Not Applicable.

2.3 Mitigation

In addition to avoidance and minimization, mitigation to offset impacts involves the replacement of lost wildlife habitat value, not acres. The recommended mitigation also includes intertidal monitoring of benthos recovery and recolonization, adaptive management and habitat restoration. These include:

2.3.1 Avoidance and Minimization

Avoidance can be accomplished by restricting the placement of sand and rock to the months between May and November; this avoids an impact to winter flounder eggs because they spawn in the RBSHB estuary from December to April (USACE 2006). However, the District decided not to implement a non-placement window to minimize potential winter flounder egg effects because: 1) the placement of sand in winter months will have an overall benefit to benthic resources as their abundances are naturally diminished during the winter, and; 2) the footprint for sand placement is insignificant when compared to the total quantity of subtidal habitat of the RBSHB.

When compared to the Bay Shoreline Protection Reach in the Feasibility Report, the proposed modification to the Bay Shoreline Protection Reach is a clear demonstration to minimize impacts because the footprint is reduced by 9.9 acres. See EA Section 2.1 and EA Table 1 above for further discussion that presents reasons to justify why the proposed modification of the Bay Shoreline Protection Reach will further minimize impacts.

2.3.2 Replacement of Lost Wildlife Habitat Value

Mitigation to offset impacts involves the replacement of lost wildlife habitat value, not acres. Impacts to wildlife habitat value and subsequent mitigation were determined by employing the USFWS Habitat Evaluation Procedure (HEP) methodology. Conversion of 12.8 acres of Phragmites to salt marsh to restore 100% of the wildlife habitat values lost.

2.3.3 Adaptive Management

During the feasibility phase, the District in partnership with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) and the NJDEP formed an interagency team to assess the impacts of the alternatives of the Feasibility Report's Recommended Plan. A consensus was reached by this interagency team to monitor at the Bay Shoreline Protection Reach the following: 1) the recovery of intertidal and nearshore resources (from hereon nearshore is defined as the space from MLW out into bay water that is approximately 5 ft. deep); 2) dune planting to ensure a high percentage of vegetative success, and; 3) tidal wetland monitoring. The following sections provide a brief description of

the interagency proposed adaptive management biological monitoring components.

2.3.3.1 Intertidal and Subtidal Monitoring

Currently, there is a lack of specific knowledge about the affects of beach nourishment on intertidal and nearshore subtidal resources in an estuarine ecosystem. As such, monitoring of intertidal and nearshore subtidal resources will be performed to provide information on impacts to these estuarine faunal assemblages. The results of this monitoring effort will provide data to quantify impacts by establishing the time needed for the recovery of benthic resources, as well as to characterize the recolonized benthic community. In addition finfish resources will be identified, as well as stomach contents of benthic feeding fish. Analysis of data obtained through intertidal and subtidal monitoring will provide a firm technical base upon which to plan other beach nourishment projects in the RBSHB as well as other similar estuaries. The District proposes to conduct sampling and analysis according to the following times and frequencies:

A. Using a 3-inch hand held core, benthic sampling will be performed at mean low water (MLW) and 1-meter below MLW in the spring and fall in at least two years prior to construction and the two years following construction. During the year of construction the District will perform monthly benthic sampling in addition to the spring and fall efforts. Samples to determine grain size will be taken at every benthic sampling location. Benthic resources will be analyzed to establish species diversity, species abundance and the total biomass of each species.

B. Fish sampling will be conducted in the intertidal zone six times per year (once per month from May to October) for at least two years prior to construction, and during construction, and two years following construction. Fish resources will be analyzed to establish species diversity, species abundance and average and total biomass of each species. Stomach contents of benthic feeding fish will be collected and analyzed to characterize their prey/food selection before, during and after construction.

C. Sample water quality (i.e., dissolved oxygen, temperature, salinity, and turbidity) during each benthic and finfish sampling event.

2.3.3.2 Dune Monitoring

The District proposes to conduct post-construction dune monitoring for the success of planting for the first 5 years following its construction. In addition, the post-construction dune monitoring is to document the stability of the constructed

dune and to record annual changes in vegetation. The monitoring effort also intends to identify changes in the structure and composition of vegetation over time. Replanting of dune vegetation to achieve 85% vegetation success is scheduled, but its implementation is dependant on the availability of funding.

2.3.3.3 Tidal Marsh Hydrology Monitoring

Tidal marsh hydrological monitoring will be conducted to monitor the tidal marsh system associated with proposed Pews Creek storm gate. The purpose of this monitoring is to substantiate the position that placement of a storm gate has minimal affect on the hydrology of the saltmarsh.

2.3.4 Habitat Restoration

To advance the USACE EOPs, 3 nesting platforms for the Osprey (*Pandion haliaetus)* will be erected within the Port Monmouth community. The osprey is listed in NJ as threatened and was not observed within the Project area during numerous field investigations. Making nesting platforms available to ospreys can attract them to the open waters of the estuary and coastal marshes in the Port Monmouth area, which will add biodiversity to the area. Nesting platforms are self-sustainable, and since the osprey is state-listed as threatened, their placement addresses the scarcity of ospreys. In addition, this initiative is expected to be recognized by additional Federal and state resource agencies, as well as the general public and private organizations such as the Audubon Society, the Baykeeper and the American Littoral Society as an advancement of their policies, goals and interests.

2.4 Threatened and Endangered Species Monitoring

The restoration of the sandy beach will expand the existing beach potentially creating suitable habitat for the Piping plover (*Charadrius melodus*) and Least terns (*Sterna albifrons)* to nest. Furthermore, Seabeach amaranth (*Amaranthus pumilus)* has the potential to grow in the expanded sandy beach. All three species are know to occur on restored sandy beaches along the Atlantic coast of northern New Jersey, which is approximately 6 miles from the project area. The monitoring plan will consist of one year pre-construction and then take place the first 3 consecutive years following initial construction. Should any of the three species discussed above or any other Federally or State-listed threatened or endangered species nest upon or grow within the restored sandy beach, the District will initiate reconsultation with the USFWS pursuant to Section 7 of the ESA. For further discussion see EA Appendix E.

3.0 EXISTING ENVIRONMENT

The location where sand will come from for its initial placement to restore the existing narrow beach and dune is known as the Sea Bright Offshore Borrow Area (SBOBA). The SBOBA is located approximately 1 nautical mile east of Sandy Hook, NJ and has been subjected to the NEPA process (USACE 1989 and 1994), the ESA (USACE 1993a and U.S. Department of Commerce [USDC] 1995) and a NMFS Essential Fish Habitat assessment (USACE 2005a). Accordingly, the discussion below regarding existing resources targets only those resources that are associated with the Port Monmouth Bay Shoreline and areas that are adjacent and nearby.

3.1 Topography, Geology and Soils

The Port Monmouth Bay Shoreline section is located in the Coastal Plain Physiographic Province, which forms the eastern margin of the North American continent. Its surface has a gentle slope to the southeast that generally does not exceed 5 or 6 ft. to the mile (Wilber and Johnson 1940).

The major rock unit consists of the Englishtown Sand of the Cretaceous (NJDEP 1999). This unit consists of white or yellow quartz sand with some mica and is sparingly glauconitic. Some beds of this unit have been cemented by iron oxide into massive stone. Thin laminae of fine clay can also be found in some locals. The thickness of the unit decreases from 140 ft. near the Atlantic Highlands to less than 20 ft. thick in southern portions of the state (Wilber and Johnson 1940). The material to build the western terminal groin will be trucked into the Bay Shore and will come from a licensed facility.

The sand used to initially restore the dune and berm will come from an existing permitted and authorized offshore borrow area known as the SBOBA. The SBOBA was previously subjected to the NEPA process (USACE 1989 and 1994). The sand used for each periodic renourishment event is scheduled to come from an upland licensed facility and is presumed to posses all required licenses and permits.

The existing Bay Shoreline dune is composed of Hooksan sand (HwB) and Udorthents (UA)-Urban land complex (UD) soils. HwB soil has a 0 to 5% slope and is of no significant state or local importance (U.S. Department of Agriculture, Natural Resource Conservation Service [USDA, NRCS] 1990). The HwB soil exhibits rapid permeability, sand consistency, and excessive drainage creating a severe erosion hazard potential. The low available water capacity makes the soil

unsuitable for farming (USDA, NRCS 1989). UD and UA soils occur on 0 to 3% slopes and exhibit variable drainage ability. They are also not of significant state or local importance. Erosion hazards are minimal because UD and UA soils are typically covered by concrete or roads (USDA, NRCS 1989). No prime, unique, or important farmland exists within the Port Monmouth Bay Shoreline; thus, the Farmlands Protection Policy Act does not apply.

3.2 Water Resources

3. 2.1 Regional Hydrogeology and Groundwater Resources

The Port Monmouth Bay Shoreline is located directly above the Coastal Plain aquifer system, which is a Nationally Designated Sole Source Aquifer (U.S. Environmental Protection Agency [USEPA] 1999). This aquifer is a complex, multi-layered system comprised of five major aquifers, one unconfined and four confined (NJDEP 1990a), that outcrop in irregular bands trending northeast to southwest. The Bay Shoreline is underlain by two of these five major aquifers, the Englishtown Formation and the Potomac-Raritan-Magothy system, whereas the remaining major aquifers outcrop to the south of the site.

Although groundwater is contained in many of the formations of the Coastal Plain, not all are drinking water sources. Groundwater in the Coastal Plain is generally considered to be naturally good (NJDEP 1994b). Groundwater held in storage within the aquifers is transmitted by hydraulic gradients toward points of discharge. Fluctuations in groundwater levels may occur as a result of recharge from precipitation, interflow to streams, changes in atmospheric pressure, evapotranspiration, groundwater withdrawals, and tidal fluctuations.

Infiltration of precipitation on outcrop areas, seepage from overlying surface waters, and vertical seepage from adjacent aquifers typically recharge aquifers. Based on records of fluctuations in the water table, a small amount of recharge occurs from precipitation to aquifers during the growing season in the Coastal Plain (Jablonski 1968).

3.2.2 Tidal Influences

The Port Monmouth Bay Shoreline tends to be sheltered from direct ocean waves by Sandy Hook. East and east-northeast winds, which is the direction of the longest fetch for wave generation, tend to exacerbate coastal flooding and erosion. The tides at the Bay Shoreline are semi-diurnal, have mean spring tide levels of +3.46 ft NGVD. The highest recorded water level is +9.9 ft NGVD, measured on September 12, 1960 (Coastal Planning & Engineering, Inc. 1993).

The RBSHB shoreline is prone to high rates of erosion. An expanse of bay shoreline encompassing the project area to the Highlands consists of approximately 7 miles of relatively straight shore that has historically been subject to extensive coastal erosion. To evaluate the potential for shore erosion, data were examined on long-term shore erosion from the project area to the Highlands. Over the entire recording period, only Belford and Leonardo showed a net loss of shoreline, wherein the project area showed a gain that was primarily a result of a 1967 State dune construction project (Coastal Planning & Engineering, Inc. 1993). In spite of the net gain of shore at the project area from 1836 to 1988, this section of the coastline is prone to excessive erosion due to wave attack caused by storms. For example, from 1836 to 1957 the Port Monmouth Bay Shoreline retreated at a rate of 1.3 ft per year (Coastal Planning & Engineering, Inc. 1993).

Some of the fill placed along the Port Monmouth Bay Shoreline has, at times, originated from the dredging of Pews and Compton Creeks. The long-term net erosion rate in the project area has averaged 3,000 c.y. per year and the central half of the Bay Shoreline was recently discovered to have a loss rate of 4,600 c.y. per year. Studies suggest that a nodal point for littoral drift exists at the Bay Shoreline and exacerbates erosion in this area (Coastal Planning & Engineering, Inc. 1993).

3.2.3 Surface Water

The Bay Shoreline is an element of the RBSHB, which is part of the Hudson-Raritan Estuary Complex. The project area is located within the Raritan Bay Watershed, which is part of the RBSHB Drainage Basin. Specifically, the study site is within the Pews and Compton Creek sub-watersheds, which both discharge directly into RBSHB. Several studies have documented the chemical and biological quality of the RBSHB ecosystem (Wilk et al 1996).

The waters within the Hudson-Raritan Estuary Complex have been classified by NJDEP as fresh water-2/SE1 (NJDEP 1994c). Designated uses under this classification include shellfish harvesting (in accordance with New Jersey Administrative Code [N.J.A.C.] 7:12), maintenance, migration and propagation of natural and established biota, primary and secondary contact recreation, and other reasonable uses (NJDEP 1994c).

The macrobenthic community of the RBSHB has been described as impoverished because of low concentrations of dissolved oxygen (McGarth 1974). A number of other studies have documented environmental impacts to the RBSHB attributable to a variety of pollutants, including heavy metals, polynucleararomatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), excessive nutrient and organic carbon loading, and pathogenic bacteria and

viruses (Breteler 1985, NJDEP 1983, NJDEP and 1993b). RBSHB water and sediments have been documented to have levels of environmental concern for heavy metals, chlorinated pesticides, total dichlorodiphenyltrichloroethane (DDT), total PCBs and total PAHs. For example, the highest lead concentration in the nation was reported at a RBSHB station (Squibb 1991). Other problems that have been documented in the RBSHB, just off the shoreline of the project area, include diseased fish, turbid and oily waters, noxious odors, beach and shellfish bed closings and restricted shellfish harvesting (U.S. Department of the Interior [USDI] 1992).

Of all of the water quality problems that have been experienced along the Bay Shoreline, phytoplankton blooms have been the most visible and appear to have had the most substantial impact. Large algae blooms have plagued the coastal waters of RBSHB (NJDEP 1987, 1988a, 1989, 1990a, 1991, 1994a, and 1995). Through the late 1980s and into the 1990s, phytoplankton samples collected from the Hudson-Raritan Estuary (Lower New York Bay) to Delaware Bay reported samples from Sandy Hook to have some of the highest coastal nutrient and algal concentrations in New Jersey (NJDEP 1987, 1988a, 1989, 1990a, 1991, 1994a and 1995).

Depending on the specific algal species, green, brown or red tides are frequently experienced during the spring and summer seasons. In addition to the aesthetic problems associated with such blooms, densities become high enough to create hypoxic conditions (depletion of dissolved oxygen) that in turn have led to fish kills. Although to date the bloom-producing algae in the Sandy Hook region have not been species/strains known to produce acute toxins, a few blooms have been associated with complaints of mild irritation by bathers. Based on the available data, it appears that the blooms observed in the RBSHB area originate in the Hudson-Raritan Estuary (Lower New York Bay) (Monmouth County Health Department 1999).

As part of the BMP, a HydroLab® water quality meter was deployed during each sampling period approximately 100m offshore. See EA Table 2 for further discussion.

The only other available data relating to environmental conditions for fish in nearshore RBSHB coastal waters were surface and bottom measurements of temperature, salinity, and dissolved oxygen made at 20 stations west of Conaskonk Point in June and September, 2000 (USACE 2000d and e). These stations were located in depths of <6 ft, mostly within 0.5 miles of the bay shoreline, in a line paralleling the coast between Keyport Harbor and Conaskonk Point. Temperature readings averaged 17.9 degree Celsius (°C) in June and 22.0°C in September, the average salinity was 20.6 parts per thousand (ppt) in June and 21.2 ppt in September, and dissolved oxygen averaged 8.1 milligrams per liter (mg/l) in June and 10 mg/l in September.

EA Table 2: Summary of Biological Monitoring Program pre-construction water quality parameters (USACE 2004a and 2004b).

Sample Area	*Date*	*Temp. (°C)*	*Salinity (ppt)*	*DO (mg/l)*	*DO (%Sat.)*	*Turbidity (NTU)*	*pH*
Port Monmouth	Sept 5-6, 2002	22.69	23.1	4.1	54.85	26.7	7.55
Keansburg	Sept 5-6, 2002	23.73	22.9	3.5	48.02	12.3	7.46
Union Beach	Sept 5-6, 2002	21.55	22.6	4.3	56.49	31.9	7.53
Port Monmouth	June 25-26, 2003	23.17	13.3	2.7	33.68	2.0	8.52
Keansburg	June 25-26, 2003	21.70	16.6	2.8	35.14	19.5	8.64
Port Monmouth	Sept 9-10, 2003	21.10	24.4	9.6	125.57	80.1	8.85
Union Beach	Sept 9-10, 2003	21.82	21.9	9.4	122.23	281.5	8.34

Key: Temp. = temperature; ppt = parts per thousand; DO = Dissolved oxygen; mg/l = milligrams per liter; % Sat = % saturation; NTU = nepholometry units.

Temperatures in September were about the same as the average for bottom water in the entire Hudson-Raritan estuary during the summer (22.5oC), but salinity was lower (27.1 ppt for the estuary) (Cerrato et. al 1989). These conditions (warm, brackish water with plenty of oxygen) are optimum for most fish species except marine species that do not tolerate moderate salinity. Based on bottom temperature values reported by Cerrato et al. (1989) for the Hudson-Raritan estuary, winter temperatures near the shore probably get as low as 3°C. Salinity probably remains about the same as in the summer and oxygen concentrations would be expected to increase since oxygen is more soluble in colder water.

Although no recent phytoplankton studies have been conducted in RBSHB, studies conducted by Jeffries (1962), Patten (1962), Walker (1967), O'Reilly et al (1976), and Brinkhuis (1980), show that the RBSHB has historically supported a high diversity and density of plankton. The USFWS (1992) speculated that the rich nutrient supplies, from natural and domestic sources, support dense plankton populations in the HRE. Dominant phytoplankton taxa have historically been diatoms, dinoflagellates, and *Mannocloris atomis* (Patten 1962); whereas dominant zooplankton includes typical estuarine copepods such as *Acartia tonsa* and *Eurytemora americana* (Jeffries 1962, Brinkhuis 1980).

3.3 Vegetation

Historically, the Bay Shoreline was composed of a relatively narrow beach and dune. Erosive forces, which have been documented from as early as 1836 (USACE 1993b), and the extensive coastal salt marshes associated with Pews and Compton Creeks immediately landward of the shore, limited the extent to which mature dune systems could develop. More recently, increasing human development has encroached on the narrow dune. The predominant cover types are sand, upland disturbed and upland herbaceous scrub shrub with significant

areas supporting upland herbaceous and upland beachgrass (USACE 2000a). Non-native and "weed" species such as mugwort *(Artemisia annua*), crabgrass (*Digitaria sanguinalis*), and Japanese knotweed (*Polygonum cuspidatum*) are commonly found in the bay shoreline. The foredune vegetated with a variety of herbaceous species including: beachgrass (*Ammophila breviligulata*), common reed (*Phragmites australis*), seaside goldenrod (*Solidago sempervirens*), and sandbur (*Cenchrus spp.*).

There are no Federally-listed threatened or endangered vascular plant species within the Port Monmouth Bay Shoreline (Staples 1998). In addition, no state-listed endangered or threatened species were identified during field investigations. However, Seabeach amaranth (*Amaranthus pumilus*), which is Federally-listed as endangered is known to occur nearby in Sandy Hook, NJ and on beaches throughout the Atlantic coastline of NJ.

3.4 Wetlands

The Port Monmouth Bay Shoreline contains no jurisdictional wetlands (USACE 1997b). Due to development near the beach and dune area, the narrow dune along the Bay Shoreline lacks any wetland swales, which are often found in fully developed dune systems.

3.5 Uplands

The dune system in the Port Monmouth Bay Shoreline consists of beachgrass, a shrub-scrub community with some mature trees. The vegetation of the primary dune is dominated by American beachgrass (*Ammophila breviligulata*). The plant communities of the back dune, which is between Port Monmouth Road and the primary dune consist of a mosaic of successional back dune woodlands interspersed with patches of successional herbaceous vegetation. The remaining Bay Shoreline consists of unvegetated sand and developed land.

The plant species composition of the Bay Shoreline reflects its history of erosion and disturbance. Non-native, weedy plant species are common in a shoreline shrub thicket community.

3.6 Wildlife

The types and quality of habitats in the RBSHB region are suitable for a diverse group of migratory and resident wildlife species. These habitats include deepwater habitats, tidal creeks and wetlands, and natural and artificial dunes that provide habitat for many species of fish and wildlife in and near the Port Monmouth Bay Shoreline. Furthermore, fish and shellfish play an important role

in the local economy and can effectively act as an indicator of the overall health of the ecosystem in the relatively developed Project area.

3.7 Fish

Like many estuarine systems, the RBSHB supports a diverse assemblage of fish. The NMFS, National Oceanic Atmospheric Administration (NOAA), NJDEP Bureau of Shellfish, and the Northeast Fisheries Science Center have collected a wide variety of species throughout the RBSHB estuary. Many studies have characterized seasonal distribution and abundance of fish species within the deeper open waters of RBSHB area (Wilk and Silverman 1976, Zich 1978, Woodhead 1991). However, in recent years the District has been engaged in an effort to characterize the intertidal fish resources within the RBSHB estuary and to supplement previous NJDEP data.

As part of the pre-construction intertidal and subtidal monitoring component (see EA section 2.3.1 above) beach seines were taken in 2002 and 2003 along the Bay Shoreline in Port Monmouth, Keansburg, East Keansburg and Union Beach, NJ. A total of 37 taxa was collected and identified (USACE 2004a). High numbers of species and high total numbers of fish in the catch generally co-occurred in late summer and early fall sampling periods. Samples were overwhelming dominated by the Atlantic silverside (*Menidia menidia)* (35%) and menhaden, (*Brevoortia tryannus)* (30%) with anchovies (*Anchoa mitchelli* and *A. hepsetus*) contributing another 16% to the total catch. Weakfish (*Cynoscion regalis)*, bluefish (*Pomatomus saltatrix)* and winter flounder (*Pseudopleuronectes americanus)* constituted 7.9%, 3.9%, and 1.5% of the catch respectively. See EA Table 3 for further discussion.

Additional beach seine surveys conducted by the District at nearby Cliffwood Beach and Union Beach, NJ and were dominated by alewife (*Alosa pseudoharengus)*, blueback herring (*Alosa aestivalis)*, Atlantic silverside, and weakfish (USACE 1996b). Small numbers of recreational fish species (e.g.: bluefish, winter flounder, and striped bass [*Morone saxatilis]*) were also captured during these surveys.

In 1982 and 1983, the NJDEP Bureau of Marine Fisheries conducted beach seine surveys near the Study area. Striped killifish (*Fundulus majalis)* and Atlantic silverside dominated the overall catch at the Whale Creek station, while mummichog (*Fundulus heteroclitus)* and bay anchovy (*Anchoa mitchilli)* were present in large numbers during spring and summer sampling. Fall collections included Atlantic silverside, striped killifish, and a large number of bluefish (NJDEP 1984). No anadromous fish spawning areas were identified in the Port Monmouth Bay Shoreline area (USACE 1993b).

EA Table 3: Identifies fish that were caught and their percentage of the total catch using a beach seine during the pre-construction phase of the Biological Monitoring Plan (USACE 2004a).

Common Name	*Scientific Name*	*% of Total Catch*
Atlantic Silversides	*Menidia menidia*	35.047
Menhaden	*Brevoortia tyrannus*	30.443
Anchovy	*Anchoa spp.*	16.542
Weakfish	*Cynoscion regalis*	7.935
Bluefish	*Pomatomus saltatrix*	3.967
Winter Flounder	*Pseudopleuronectes americanus*	1.580
Northern Pipefish	*Syngnathus fuscus*	0.955
Northern Kingfish	*Menticirrhus saxatilis*	0.765
Windowpane	*Scophthalmus aquosus*	0.704
Permit	*Trachinotus falcatus*	0.463
Cunner	*Tautogolabrus adspersus*	0.427
Northern Sea Robin	*Prionotus carolinus*	0.195
Atlantic Herring	*Clupea harengus*	0.151
Northern Puffer	*Sphoeroides maculatus*	0.123
Stargazer	*Astroscopus guttatus*	0.098
American Eel	*Anguilla rostrata*	0.095
Scup	*Stenotomus chrysops*	0.095
White Mullet	*Mugil curema*	0.087
Summer Flounder	*Paralichthys dentatus*	0.053
Needlefish	*Strongylura marina*	0.042
Striped Killifish	*Fundulus majalis*	0.042
Atlantic Mackerel	*Scomber scombrus*	0.039
Round Herring	*Etrumeus teres*	0.028
Mumichog	*Fundulus heteroclitus*	0.025
Blueback Herring	*Alosa aestivalis*	0.020
Lookdown	*Selene vomer*	0.020
Small Mouth Flounder	*Etropus microstomus*	0.011
Striped Bass	*Morone saxatilis*	0.011
Hake	*Urophycis spp.*	0.006
Oyster Toadfish	*Opsanus tau*	0.006
Spotted Hake	*Urophycis regia*	0.006
Tautog	*Tautoga onitis*	0.006
Alewife	*Alosa pseudoharengus*	0.003
Crevalle Jack	*Caranx hippos*	0.003
Gizzard Shad	*Dorosoma cepedianum*	0.003
Sea Horse	*Hippocampus sp.*	0.003
Striped Sea Robin	*Prionotus evolans*	0.003
White Perch	*Morone americana*	0.003

Fish species diversity and abundance in the RBSHB system typically changes seasonally as migratory and resident species use the bay as a nursery ground, spawning, and feeding area. Migratory species such as striped bass are found to be present in the RBSHB system throughout the year (Woodhead 1991, USACE

1996b). Anadromous species such as alewife, blueback herring, American shad, and hickory shad use the RBSHB as a migratory pathway to freshwater rivers and creeks to spawn (Zich 1978).

3.8 Designated EFH Species

An EFH assessment was prepared under separate cover (USACE 2006). There are 16 EFH designated species that are identified to potentially occur within the intertidal and nearshore subtidal zones along the Port Monmouth Bay Shoreline. Of the 16 EFH designated species, only 5 species have been caught as a result of the pre-construction biological monitoring (see EA Section 2.3.3.1).

EA Table 4: EFH-Designated Finfish Species and their life stages that occur in the Intertidal and Nearshore Zones within the RBSHB.

Species	***Life Stage***				***Verified[1]***
	E	L	J	A	
Red hake (*Urophycis chuss*)		x	x	x	J
Winter flounder (*Pseudopleuronectes americanus*)	x	x	x	x	J,A
Windowpane flounder (*Scophthalmus aquosus*)	x	x	x	x	J,A
Atlantic sea herring (*Clupea harengus*)		x	x	X	
Bluefish (*Pomatomus saltatrix*)			x	X	J,A
Atlantic butterfish (*Peprilus triacanthus*)		x	x	X	
Atlantic mackerel (*Scomber scombrus*)			x	X	
Summer flounder (*Paralichthys dentatus*)		x	x	X	J,A
Scup (*Stenotomus chrysops*)	x	x	x	X	
Black sea bass (*Centropristis striata*)			x	X	
King mackerel (*Scomberomorus cavalla*)	x	x	x	X	
Spanish mackerel (*Scomberomorus maculatus*)	x	x	x	X	
Cobia (*Rachycentron canadum*)	x	x	x	X	
Winter Skate (*Leucoraja ocellatus*)			x	X	
Clear nose Skate (*Raja eglanteria*)	x	x	x	X	
Little Skate (*Leucoraja erinacea*)	x	x	x	X	
Sandbar shark (*Charcharinus plumbeus*)		x		X	

[1]: USACE 2004

Key: E = eggs; L = larvae; J = juveniles; A = adults

3.9 Shellfish

Some common shellfish in the RBSHB estuary include the surf clam (*Spisula solidissima*), hardshell clam (*Mercenaria mercenaria),* softshell clam (*Mya arenaira)*, gem clam (*Gemma gemma,* Common razor clam (*Enis directus*) blue mussel (*Mytilus edulis)*, blue crab (*Callinectes sapidus)*, horseshoe crab (*Limulus polyphemus*), lady crab (Ovalipes ocellatus) and American lobster (*Homarus americanus).*

Surf clam and blue mussel beds are present in the RBSHB ecosystem, but are not located in the vicinity of the Port Monmouth Bay Shoreline. Similarly, there are no known naturally occurring oyster beds located within or near the Project area (NJDEP 1984). However, there is an ongoing effort by the Baykeeper to reestablish the oyster population. An oyster bed was created in the RBSHB by the Baykeeper between Conaskonk Point and Keyport, NJ. This area is located well outside of the Port Monmouth Bay Shoreline.

Softshell clam beds are widely distributed throughout the RBSHB system, and were identified along inshore areas between Keansburg and Port Monmouth as well as offshore from Whale Creek (NJDEP 1984). Based on organisms collected from certain stations, McCloy (1988) concluded that these areas are capable of producing significant populations of softshell clams.

Hardshell clams are the most abundant shellfish in the RBSHB area, with their greatest concentration located near the eastern portion of the RBSHB region (NJDEP 1984). However, McCloy (1988) determined that hardshell clam densities in the Study area were low (i.e., occurrence only).

Active commercial fisheries for the blue crab and American lobster currently exist in RBSHB. Blue crab dredge areas are found in the waters off Keyport Harbor and Whale Creek, which is outside of the Project area (Figley 1988). Lobster fisheries are typically located in deep water, and are not expected to occur in the intertidal water along the Port Monmouth Bay Shoreline (USACE 1993b).

The narrow width of the existing beach suggests that either minimal or no horseshoe crab mating presently occurs along the Port Monmouth Bay Shoreline. The District does acknowledge that restoration of a wide gently sloping sandy beach may improve the mating and spawning habitat of the horseshoe crab.

Larger invertebrates were collected near the Cliffwood Beach Study area during beach seine surveys conducted by the NJDEP, Bureau of Marine Fisheries (1984) in Laurence Harbor, Whale Creek, and Keansburg. The NJDEP documented the presence of four species: the black-fingered mud crab

(*Panopeus herbstii*), blue crab, mud crab (*Eurypanopeus depressus*) and white-fingered crab (*Rhithropanopeus harrisii*). Lady crab, rock crab (*Cancer irroratus*), common spider crab (*Libinia emarginata)*, and horseshoe crab are also common in RBSHB (MacKenzie 1990).

In 1994, sampling of Port Monmouth shorelines revealed the soft-shell clam to be the most abundant macroinvertebrate species (USACE 1996a). In 1995, sampling of Port Monmouth shorelines revealed the gem clam to be the most abundant macroinvertebrate species (USACE 1996a). As part of the pre-construction intertidal and subtidal monitoring component (see EA section 2.3.1 above) benthic samples were taken in 2002 and 2003 along the Bay Shoreline in Port Monmouth, Keansburg, East Keansburg and Union Beach, NJ. The gem clam was the most abundant species overall (53% of all benthic macroinvertebrates) and was particularly numerous at -1m MLW (USACE 2004b).

3.9 Benthic Resources

Benthos can be described as the complex community of plants and animals that live on or in bottom sediments of oceans, bays, streams, and wetlands. The benthic community in the RBSHB area has historically been rich but unevenly distributed (McCormick et al. 1984), and can be characterized as transitional due to changes in water quality and pollution (Steimle and Caracciolo-Ward 1989).

Most studies of Raritan Bay infauna have focused on open-bay waters (Dean, 1975; Dean and Haskin, 1960; Cerrato et al., 1989; Steimle and Caracciolo-Ward, 1989). Only five studies describe the RBSHB intertidal sediments and fauna: Simeone (1977), Ettinger (1996), and USACE (2000b, 2000c and 2004a). In November of 1975 Simeone (1977) sampled intertidal infauna at six locations along Sandy Hook Bay. In 1994 Ettinger (1996) sampled three tide levels, ranging from Mean Low Water (MLW) to approximately MLW -1m, at nine stations on Port Monmouth Beach (Belford Harbor to Pews Creek), 20 stations on Keansburg Beach (Pews Creek to Point Comfort), and 7 stations at Point Comfort (between the point and Waacaack Creek). These sites and an additional 5 at Lawrence Harbor were sampled again in1995. USACE (2000a) sampled MLW and MLW -1m stations at 12 locations along both Cliffwood Beach and the eastward facing portion of Union Beach (Conaskonk Point to Chinngarora Creek) in June and September of 1999. Twelve sites along Union Beach (Flat Creek to Conaskonk Point) were also sampled in September 1999 (USACE, 2000b).

Based on these studies, sediments were found to vary widely along the bay shoreline ranging from fine sands at Sandy Hook Bay to gravelly medium and coarse sands at Union Beach. Dominant infauna encountered in the various studies included softshell clams (*Mya arenaria*), gem clams (*Gemma gemma*), a

variety of euryhaline soft-sediment polychaetes (i.e.: *Leitoscoloplos fragilis* and *Heteromastus filiformis*) and amphipods (i.e.: *Gammarus lawrencianus*).

Benthic invertebrate composition and abundance is highly dependent on sediment type and grain size distribution (Diaz and Boesch 1982, McGrath 1974). McGrath (1974) noted that powerful storms have the ability to shift sediments, thereby causing distributional changes in communities dependent on a specific sediment type. Localized benthic communities can also exhibit large fluctuations between seasons.

More recently, as part of the BMP pre-construction effort, intertidal and subtidal benthic samples were taken in 2002 and 2003 along the bay shoreline along Port Monmouth, Keansburg, East Keansburg and Union Beach, NJ (USACE 2004a). A grand total of 155 taxa and over 42,000 animals were collected; dominant taxa included the gem clam, *Gemma gemma*, which made up 53% of all animals, and the spionid polychaetes *Streblospio benedicti* and *Polydora cornuta* which each accounted for approximately 6% of all animals (USACE 2004a). The oligochaete family Tubificidae and the tubificid species *Tubificoides heterochaetus* together made up an additional 10% of the total collection, while specimens identifiable only to the level of Oligochaeta constituted nearly 3%. Ribbon worms (Rhynchocoela) and the sabellariid polychaete *Sabellaria vulgaris* also supplied more than 2% of the total number of animals. Taxa making up approximately 1% of the collection included the snail *Ilynassa (Nassarius) obsoletus)*, the polychaetes *Mediomastus* lowest practical identification level (LPIL), *Heteromastus filiformis*, *Streptosyllis pettiboneae*, and *Protodriloides* LPIL.

Average total abundances within the study area ranged from a low of 2,681 animals/m^2 at Point Comfort to a high of 38,271 animals/m^2 at Port Monmouth. These values are similar to those from previous studies. For instance, Ettinger (1996) reported averages of 5,000-6,000 animals/m^2 for Port Monmouth and Keansburg. Ray (2001a and b) computed averages of 15,000-21,000 animals/m^2 for Union and Cliffwood Beaches. Biomass has only previously been reported for this area by Ettinger (1996) who found an average of 25.1 g/m^2 at Port Monmouth and 192.0 g/m^2 at Keansburg and was highest at subtidal depths (EFH Appendix A, Table 6, page 31). Annelids dominated biomass at MLW and subtidal depths of Port Monmouth, while gastropods (principally *I. obsoleta*) made up most of biomass at mid-tide depths. At Keansburg, annelids and gastropods dominated upper- and mid-tide levels and bivalves comprised most of subtidal biomass. This same pattern is seen in the present study where annelids were the most important component of biomass at Port Monmouth and Keansburg MLW depths while bivalves constituted the majority of biomass elsewhere.

EA Table 5: Summary of relative Total abundances (% of numbers of animals) of dominant taxa in the intertidal zone of the RBSHB (USACE 2004a).

Taxon	*Total*	*PM*	*KB*	*PC*	*UB*	*MLW*	*MLW-1*
Gemma gemma	53.4	75.8	13.5	3.1	12.2	31.7	58.4
Streblospio benedicti	6.6	2.1	16.9	10.2	9.7	1.9	7.7
Polydora cornuta	6.3	3.6	14.1	4.6	4.7	8.1	5.8
Tubificidae (LPIL)	6.2	4.9	6.5	19.0	12.5	2.0	7.2
Tubificoides heterochaetus	4.1	2.2	5.4	1.1	13.5	1.4	4.7
Enchytraeidae (LPIL)	3.2	*	11.0	10.2	1.5	17.0	*
Oligochaeta (LPIL)	2.9	1.8	6.3	12.2	*	15.4	A
Sabellaria vulgaris	2.2	1.0	6.2	*	1.1	4.7	1.7
Ilyanassa obsoleta	1.4	*	*	3.5	8.9	*	1.6
Mediomastus (LPIL)	1.4	*	2.9	5.3	3.8	*	1.6
Heteromastus filiformis	1.2	*	*	1.4	7.0	*	1.3
Streptosyllis pettiboneae	1.0	*	*	*	7.3	*	1.2
Protodriloides (LPIL)	1.0	1.3	*	1.9	*	5.1	A
Paraonis fulgens	*	*	1.3	*	*	1.9	*
Microphthalmus (LPIL)	*	*	*	3.8	*	1.7	*
Polygordius (LPIL)	*	*	*	2.8	*	1.1	*
Lumbriculidae (LPIL)	*	*	2.1	1.9	*	*	*
Mulinia lateralis	*	*	1.6	3.9	*	*	*
Phyllodocidae (LPIL)	*	*	1.2	*	1.7	*	*
Hypereteone fauchaldi	*	*	1.0	1.1	1.5	*	*
Mediomastus ambiseta	*	*	*	2.4	1.7	*	*
Spionidae (LPIL)	*	*	*	1.1	*	*	*
Leitoscoloplos (LPIL)	*	*	*	1.3	*	*	*

PM: Port Monmouth; KB: Keansburg; UB: Union Beach;
MLW: mean low water; MLW-1: I meter below mean low water;
LPIL: lowest practical identification level;
*: present but not in abundances <1% of total numbers of animals;
A: Absent.

In conclusion, the sediments and infauna of the three study areas are similar to those previously reported for the RBSHB shoreline. Species composition, abundance, and biomass differ slightly among the three areas, between depths, and over time but all values are within the degree of variability that is typical of intertidal benthic communities.

3.10 Reptiles and Amphibians

No species of reptiles or amphibians were observed in the Bay during field surveys conducted between October and November 1997. Based on historical records, four species of reptiles are known to occur in similar habitat at the nearby Sandy Hook National Park, including diamondback terrapin (*Malaclemys terrapin*), eastern painted turtle (*Chrusemys picta*), northern brown snake (*Storeria dekayi*), and spotted turtle (*Chemmys guttata*) (USDI 1989a). Fowler's

toad (*Bufo woodhousei*) is the only amphibian known to historically occur at Sandy Hook National Park where it is reported as extirpated (USDI 1989a). The lack of wetlands for breeding and/or nesting in the shoreline may be a limiting factor resulting in the rarity of reptiles and amphibians along the Bay Shoreline.

3.11 Avians

Over 275 species of birds have been documented at nearby Sandy Hook National Park (Eastern National Park and Monument Association undated), and 187 bird species are known to use Cheesequake State Park (New Jersey Division of Parks and Forestry undated). Based on the habitat similarity of these areas and the Port Monmouth Bay Shoreline, many of the species could potentially use the area for breeding, nesting, or as a staging area during migration.

A total of 27 bird species were observed in the shoreline during field surveys conducted between October and November 1997 (USACE 2000a). The primary habitat for birds in the shoreline consisted of scrub-shrub upland interspersed with areas of forest and herbaceous cover. Common bird species that were observed foraging in the scrub-shrub areas include black-capped chickadee (*Parus atricapillus*), yellow-rumped warbler (*Dendroica coronata*), song sparrow (*Melospiza meloida*), and dark-eyed junco (*Junco hyemalis*). Additionally, crows (*Corvus spp.*) and gulls (*Larus spp.*) were often present in the area.

3.12 Mammals

There are 13 species of mammals that would potentially utilize the Bay Shoreline based on their historical presence at nearby Sandy Hook (USDI 1989b). Of these 13 species, four were observed in the area during field surveys conducted between October and November 1997 (USACE 2000a). The eastern cottontail rabbit (*Sylvilagus floridanus*) and raccoon (*Procyon lotor*) were the most commonly observed species of mammal in the Bay Shoreline, although observations were confined to upland communities, often near disturbed areas and residential homes.

3.13 Threatened and Endangered Species

3.13.1 Federal Species

The Federally-listed threatened Loggerhead turtle (*Caretta caretta*), endangered Kemp's ridley (*Lepidochelys kempi*) and green (*Chelonia mydas*) turtles and endangered shortnose sturgeon (*Acipenser brevirostrum*) historically have occurred in the RBSHB area (Bigford 1992). There is currently no available information regarding the distribution of the turtle species listed above (Bigford

1992). Additionally, the federally listed threatened Piping plover (*Charadrius melodus*) is known to nest nearby at Sandy Hook, Sea Bright and Monmouth Beach, NJ. With the exception of the occasional migrating bald eagle (*Haliaeetus leucocephalus*), no other additional federally listed threatened or endangered species are known to occur within the vicinity of the Project area (USFWS 2006; EA Appendix). None of the above mentioned species were observed during field surveys or site visits conducted between 1997 to the present.

3.13.2 State Species of Concern

Habitat for four state-listed endangered species, including Black skimmer (*Rynchops niger*), Least tern (*Sterna antillarum*), Pied-billed grebe (*Podilymbus podiceps*), and Piping plover, may occur within the RBSHB (Breden 1992). Additionally, one state-listed threatened species, Osprey (*Pandion haliaetus*) may occur within the RBSHB (Breden 1992). None of the above state listed endangered or threatened species were observed during numerous field investigations.

3.14 Socioeconomics

Hurricanes, northeasters, and severe storms have caused extensive and costly damage in the RBSHB region. Flood-induced damages in the Port Monmouth community have included damaged roads and bridges, destruction or failure of Bay Shoreline structures (including dunes, bulkheads, and boardwalks), damage to utility lines, sewers, commercial and industrial properties, and numerous homes; destruction of at least nine homes; and suspension of work schedules at businesses. In addition, looting of evacuated homes has been a major security problem during some storms. Overall, severe storm effects have resulted in numerous evacuations, costly repairs to personal and public properties, and constraints to commerce and regional economic development.

3.14.1 Demographic Characterization

The community of Port Monmouth is located in the Township of Middletown in Monmouth County, New Jersey. Port Monmouth is one of several communities within Middletown, all of which are governed by the township's municipal government.

Approximately 7% of New Jersey's population of 7.7 million resides in Monmouth County. Of the 553,124 people whom live in Monmouth County, approximately 68,183 (12%) live in Middletown Township, which comprises 8% of the county's total land area. Of the total population in Middletown, 3,558 people reside within the Port Monmouth community (U.S. Bureau of the Census 1992).

The average population density in Middletown Township is 1,660 residents per square mile, which is slightly higher than the county average of 1,173 residents per square mile. However, population density in the predominantly residential Port Monmouth community is significantly higher than both the township and the county averages, at 2,740 people per square mile (Coastal Planning and Engineering 1993).

Population growth in Monmouth County was up to 48% increase per decade during the 1950s and 1960s, but has leveled off to approximately 9% per decade since the 1970s. Current population projections predict a similar moderate pattern of growth in the county for the next decade (U.S. Bureau of the Census 1992 and Monmouth County Planning Board [MCPB] undated).

Similar to Monmouth County, Middletown Township also experienced a population boom during the 1950's and 1960's, with the population increasing in each decade by 38% and 145%, respectively. However, similar to patterns in the county, this growth has tapered off since the 1970s to between 9 and 15% per decade. Current population projections for Middletown predict a more conservative pattern of growth of 3 to 4% for the next decade. (U.S. Bureau of the Census 1992 and MCPB undated). The majority of the projected growth and development is expected to occur in areas outside the Project area, due to the current, almost fully developed condition of the Port Monmouth community.

3.14.2 Economy and Income

The economy of Monmouth County has undergone extensive growth over the past several decades, with much of the development concentrated along the major transportation routes. However, the local economy has been burdened to an extent by property damage and accessibility issues resulting from frequent, storm-induced flooding in the coastal areas.

Historically, the Bay Shoreline area played a role as a market and distribution center for the agricultural goods produced in Monmouth County. Later the Bay Shoreline's local commercial resources were developed, which included clay used for brick and tile manufacturing, and the waterfront has developed as a tourist attraction. In addition, the RBSHB contribute to the regional economy as a commercial fishery. In 1991, the Bay Shoreline area provided over one hundred million live pounds of commercial finfish and shellfish, valued at approximately $23.5 million (Coastal Planning and Engineering, Inc. et al 1993). In Port Monmouth, the Belford Fish Co-operative represents an important regional commercial resource related to this fishery. The largest employers in the Bay Shoreline area are International Flavor and Fragrances Company in Union Beach, and the Naval Weapons Station Earle in Middletown (Monmouth County Planning Board [MCPB] 1997). Other important industries in the county

focus on electronics, resort and tourism, chemicals, apparel, farming, horse breeding, and nursery stock (MCPB 1994).

The net valuation (total taxable value) of property (excluding tax exempt properties) in Middletown Township is $4,751,312. The taxable value of residential property in the township represents a significant portion of this total (approximately 84%), while commercial properties account for approximately 13%. Vacant lands, apartments, farmland, and industrial properties account for only a small portion of the taxable land values in Middletown Township.

In 1989, per capita income in Middletown Township was $21,882, which was slightly higher than the Monmouth County average of $20,565. Per capita income in the Port Monmouth community in 1989 ($13,610) was substantially lower than the county and township averages and was also lower than the statewide per capita income of $18,714. In 1989, 3.9% of the total population of Port Monmouth had incomes that were classified below the poverty level.

3.14.3 Housing

During the 1980's and early 1990's, housing prices in Monmouth County experienced a high degree of appreciation. Then in the latter part of the decade, there was a substantial increase in the construction of new residential housing units. These increases in price and development were attributed to the increase in demand caused by the population growth, where migration of residents from other areas of the state and country to Monmouth County was responsible for 70% of the county's population increase from 1980 to 1988 (MCPB 1989).

In 1990 there were approximately 218,408 housing units in Monmouth County, including the 23,495 units located in Middletown Township. Of these, 1,281 were located in the Port Monmouth community. Approximately 12% of the houses in Port Monmouth were built during the construction boom of the 1980's; 59% were built between 1940 and 1980 and the remainder were built prior to 1940 (U.S. Bureau of the Census 1992).

A major objective of the Project is to reduce the cost of future flood and storm damage to existing properties within the Project area. In 1996, an inventory of the existing structures located in the selected plan area was conducted. The limits of the survey area corresponded to the anticipated geographic limits of protection afforded by the flood control and shore protection Project. A total of 1,142 structures were identified along Pews and Compton Creeks; of these, 1,058 structures were residences and 84 supported non-residential uses (e.g., related to commercial, business, industrial or public uses) (URS Grenier 1997).

Due to incomplete historical data on the costs associated with past flood and storm damage to properties in the Project area, a computer model was utilized to calculate expected annual damages associated with future flooding and storm events. Using the base year 2002, the annual damages estimated to occur if no new flood control and storm protection actions or programs were implemented was approximately $3,183,550 (URS Grenier 1997).

3.15 Cultural Resources

Historical research and collection of background materials was carried out for the Port Monmouth Bay Shoreline area at the New Jersey State Historic Preservation Office (NJSHPO), the New Jersey State Museum, the New Jersey State Library and the Monmouth County Historical Society. A site visit was conducted on January 23, 2004 at the location of proposed modification. This cultural resources study has been conducted in order to ensure that the project complies with Section 106 of the National Historic Preservation Act of 1966, as amended. Other regulations that specifically apply to this cultural resources investigation include Section 101(b)(4) of the NEPA of 1969 and the Advisory Council Procedures for the Protection of Cultural Properties (36 CFR Part 800).

The American Indians who occupied the area of Monmouth County are called the Lenni-Lenape. Native Americans have crossed the Bay Shoreline over many centuries in their yearly migrations from the Hudson River to the Delaware River or from the Minisink Mountains in the north to the shores further south. The American Indians who frequented the RBSHB area relied mainly on a subsistence lifestyle, moving in a round pattern, to the shore and further inland as game and fishing became available.

Middletown Township is one of Monmouth County's oldest townships. European settlement of the project area vicinity dates to the 17th Century. The first recorded property owner was Thomas Whitlock, who in 1676 was recognized by the Proprietors of East Jersey as having rights to lands in Middletown, including acreage at what was then known as "Shoal Harbor." A road connecting Whitlock's bayshore property to King's Highway was opened in 1687 occupying the general corridor of Wilson Avenue. Sometime between 1687 and 1688, Whitlock built a residence on his Shoal Harbor property. It is unknown if this is the present Seabrook-Wilson House which today stands between the bay shoreline and the intersection of Wilson Ave and Port Monmouth Road.

The first major changes to this landscape occurred during the early 1850s when a series of critical transportation features were introduced. The Port Monmouth Steamboat and Sloop Transportation Company Pier, a structure that extended from the northern end of the present Church Street more than 2000 feet into the

bay in order to provide access to vessels moored in deep water was the first of this transportation features to be introduced.

3.16 Land Use and Zoning

Land use in the Port Monmouth community primarily consists of residential and undeveloped tidal wetlands, with business and commercial/industrial areas of smaller size located along NJSH 36 and the navigable waterfront areas.

Historically, Port Monmouth was a summer vacation destination for part-time residents, but since the 1960s, the small homes along the Bay Shoreline have been converted to year-round homes, and many newer year-round homes have been constructed in the area between Pews Creek and Compton Creek. Virtually all of the homes in the Port Monmouth community are located within the 500-year flood zone, and a majority of these homes are within the 100-year flood zone (URS Grenier 1997).

The land use along the Port Monmouth Bay Shoreline consists of a very narrow sandy beach and dune, with several right-of-way easements that provide public access from roadside parking areas to the narrow beach. A public fishing pier is located within the Bay Shoreline, and is adjacent to the historic Whitlock/Seabrook Wilson House, commonly referred to as the Spy House Museum. A small residential area is situated between the dunes and Port Monmouth Road adjacent to the marina along Pews Creek. In the middle portion of the Bay Shoreline are scattered residences and undeveloped land parcels situated between the Bay Shoreline and Port Monmouth Road. In the eastern portion of the Bay Shoreline is a commercial area that supports the local fishing industry, recreational boating activities and ferry service to New York City.

The Township of Middletown has established two zoning Districts within the Port Monmouth community: high-density, single family residential (R-7) and marine commercial (MC) (Middletown Township 1994). In the R-7 District, the standard interior residential lot size is 7,500 square ft with 75 ft of road frontage. The MC District supports facilities and activities associated with fishing and boating use, including outdoor storage of fishing-related equipment, seafood unloading and processing facilities, and boat repair service (Middletown Township 1994).

3.17 Floodplain Issues

3.17.1 Flooding Events

Severe storm events have historically caused extensive flooding and significant damages to the housing, property, and community infrastructure in the Port Monmouth community (USACE 1993b). In particular, severe flooding occurred

as a result of a September 14, 1944 hurricane; extra tropical storms of November 25, 1950, and November 6-7, 1953; Hurricane Donna in 1960; and northeasters of March 6-8, 1962, March 12, 1984, and December 11, 1992 (USACE 1997a). The Project area has experienced the most extensive flood damage in the region between South Amboy (located at the mouth of the Raritan River) and the Highlands (located near Sandy Hook) (USACE 1993b).

Based on modeling conducted at the Coastal Engineering Research Center (CERC), located at the USACE Engineering, Research and Development Center in Vicksburg, Mississippi, the flood stage associated with a 100-year storm event is +12.2 ft NGVD (USACE 1997a). A tidal stage of +10 ft NGVD results in severe flooding that strands most residents north of NJSH 36 (USACE 1993b). The mean spring high tide along the Bay Shoreline is +3.46 ft NGVD. Based on a 1972 USACE storm surge study of the Monmouth County Bay area, the highest water level recorded at Port Monmouth was +9.9 ft NGVD in September 1960, which is equivalent to water levels with a 24-year return interval. The 100-year fluvial flood stage for Compton Creek is +7.0 ft NGVD, more than 4 ft below the 100-year tidal flood stage (USACE 1993b).

Extensive erosion is prominent throughout the Bay Shoreline beach, where the highest shoreline retreat rate (-1.3 ft/year) and greatest rate of volume loss (-3,100 cubic yards/year) in the Project area was recorded from 1836 to 1933 (USACE 1993b). Historic losses have been offset by a 1967 state dune construction Project, and deposition of beach quality sand dredged from the channels located at the mouths of Pews and Compton creeks (USACE 1993b). However, the Bay Shoreline beach has been identified as a littoral drift nodal point, from which net littoral drift moves outward (USACE 1997a).

3.17.2 Floodplain Values

As previously described, the Bay Shoreline is subject to frequent storm surges and tidal inundation. It presently provides minimal protection to inland areas against moderate storm surges and serves as a community recreational area. However, these values are diminished by continual erosion of the beach and dune.

3.18 Coastal Zone Management

Pursuant to the Coastal Zone Management Act of 1972 and the Coastal Zone Reauthorization Act Amendments of 1990, New Jersey has defined its coastal zone boundaries and developed policies to be utilized to evaluate and issue permits for activities located within the designated coastal zone, as set forth in New Jersey's Rules on Coastal Zone Management (New Jersey Administrative Code [N.J.A.C.] 7:7, 7:7E, dated July 18,1996 and addenda to 7:7E-5 and 7:7E-8.7, dated August 19, 1996).

The NJDEP administers the coastal permit program through the Coastal Area Facility Review Act (CAFRA, New Jersey State Act [N.J.S.A.] 13:19-1 et seq.), the Wetlands Act of 1970 (N.J.S.A. 13:9A-1 et seq.), and the Waterfront Development Law (N.J.S.A. 12:5-3). Each of these acts provides a slightly different definition of the coastal zone; therefore, the designated coastal zone consists of the cumulative total of these three definitions.

In the Project area, the coastal zone boundary defined by CAFRA extends from the Bay Shoreline to NJSH 36. The Waterfront Development Law defines the coastal zone as any tidal waterway within the coastal area defined by CAFRA, up to and including the high water line. Based on these definitions, the entire Bay Shoreline is located within the designated coastal zone. Therefore, a Federal consistency determination is required (see EA Appendix C, New Jersey Coastal Zone Management Consistency Statement).

3.19 Hazardous, Toxic, and Radioactive Wastes (HTRW)

Various pollutants are present in the HRE, including: heavy metals, PAHs, PCBs, excessive nutrient and carbon loadings, and pathogenic bacteria and viruses (Breteler 1985). Hudson-Raritan Bay complex sediments contain the following sediment contamination: antimony, arsenic, cadmium, chromium, copper, mercury, lead, silver, tin, zinc, total chlorinated pesticides, total DDT, total PCBs, and total PAHs in concentrations that rank in the top 20 contaminated estuaries in the country (Squibb et al 1991).

A HTRW Preliminary Assessment (PA) was conducted by the District to identify potential HTRW concerns. The PA concluded that there were no HTRW concerns (see USACE, Baltimore District [CENAB] letter dated October 19, 1995 in FEIS Appendix D).

3.20 Navigation

Navigation along the Port Monmouth Bay Shoreline consists primarily of recreational boats and commercial fishing and commuter vessels that are associated with the federal channels and marinas at the mouths of Pews Creek and Compton Creek. Pews Creek and Compton Creek empty into RBSHB and establish the west and east limits of the Port Monmouth Bay Shoreline.

3.21 Aesthetics and Scenic Resources

Aesthetics and scenic resources along the Bay Shoreline influence the feasibility of future development of this area as a prime public recreation area of the Bayshore Waterfront Park, as described in the Bayshore Waterfront Access Plan (MCPB 1993). As a result of this future role, the Project area is anticipated to be

subject to more public use. To this end, the Bayshore Waterfront Access Plan has resolved to prevent visual obstructions to views of the water as part of its Bayshore Trail proposal, as well as resolving to maximize existing scenic views of New York Bay, wetlands, Belford fishing boats and activities, Leonardo Site Marina, and New York Harbor (MCPB 1993).

The Monmouth County Parks and Recreation Department has identified the scenic quality of the Bay Shoreline as extremely sensitive (Wickham 1997a and 1997b), and is concerned with the visual impacts of the proposed shore stabilization aspect of the selected plan. The Monmouth County Parks and Recreation Department is particularly concerned with the infringement of shore protection structures along the beach that may infringe on the scenic quality of the RBSHB shoreline.

3.22 Recreation

Recreational opportunities are plentiful within the Port Monmouth Bay Shoreline area, due to the recent and ongoing expansion of the Monmouth County park system pursuant to the Bayshore Waterfront Access Plan. This county plan provides the framework for the preservation, enhancement, and expansion of public access to Monmouth County's Bayshore waterfront, and the county has focused substantial efforts on the beachfront in the Project area. The plan seeks to provide continuous visual, pedestrian, and bicycle access to and along the entire Bayshore waterfront for the general public. The Bayshore Trail and Bikeway is a major component of this plan, which provides a linear park system designed to link recreation areas, preservation areas, open space, and specific points of interest. In addition, Port Monmouth is one of five areas in the region selected for establishment of a Regional Park and Preservation Area under the plan (MCPB 1987).

As part of the regional Bayshore Waterfront Access Plan, over the past years Monmouth County has been acquiring a significant amount of beachfront property in Port Monmouth for beachfront access and public recreational use. Currently the county owns or is acquiring virtually every parcel along the bayshore from Pews Creek to Main Street in Port Monmouth (Wickham 1997a and 1997b). In addition, the Whitlock/Seabrook Wilson House historical museum (the Spy House) was recently transferred from the Town of Middletown to Monmouth County ownership.

The Whitlock/Seabrook Wilson House and the county-owned fishing pier located just west of the museum are integral components of the Bayshore Waterfront Park. Three public parking areas are located intermittently along Port Monmouth Road to provide access to the beach and waterfront areas, and the remainder of the public Bay Shoreline will be accessible via a continuous pedestrian trail

across the dunes, known as the Bayshore Trail. In addition, Port Monmouth Road is designated as a bike trail in the Bayshore Waterfront Access Plan (MCPB 1987).

A portion of the Bay Shoreline located between Wilson Avenue and Main Street in Port Monmouth is intended to become the most intensively used public area of the Bayshore Waterfront Park in Port Monmouth. Here, the existing historical museum, fishing pier, and public restrooms will be supplemented with nature interpretation displays and park offices (Wickham 1997a and 1997b).

3.23 Transportation

In general, the Project area is geographically linked to surrounding population centers through local roads and a network of arterial and collector streets and highways. The majority of roads in the Port Monmouth community are classified as local streets, which primarily function to provide access to abutting residential properties and serve as easements for various public utilities.

Collector streets such as Broadway, Church Street, and Wilson Avenue provide access from local residential streets to primary and secondary arterial roads. Secondary arterial roads, which include the Port Monmouth Road, Thompson Avenue, and two Main Streets (one in Port Monmouth, the other in Belford), provide transition between smaller collector streets and primary arterial roads. NJSH 36, located along the southern edge of the Project area, is one of four primary arterial roads in Middletown Township, and functions as a primary feeder road to the Garden State Parkway and is a conductor of major traffic movement in the region.

In addition, Middletown Township is served by passenger rail provided by New Jersey Transit Corporation, which provides access to Newark and New York City from the local station on Middletown-Lincroft Road, approximately 3 miles from Port Monmouth. New Jersey Transit also provides the local bus service and the regional commuter bus service to northern New Jersey and New York. In Port Monmouth, regional and/or local bus lines run along NJSH 36, Main Street (Belford), Campbell Avenue, and Bray Avenue. In addition, there is a privately-owned commuter ferry line that operates between Port Monmouth/Belford and New York City.

Port Monmouth Road runs parallel to the bay shoreline, and functions as the main arterial transportation route in this portion of the Project area. This road crosses both Pews Creek and Compton Creek, and was recently reconstructed and raised in elevation to approximately +5 ft NGVD (Mercantante 1997). In addition, Port Monmouth Road was realigned toward the southwest in the western portion of the bay shoreline area near Pews Creek.

3.24 Air Quality

The Port Monmouth Bay Shoreline is within the New York-Northern New Jersey-Long Island Consolidated Metropolitan Statistical Area (CMSA), which is designated as a severe non-attainment area for ozone (O3). This area was previously designated as a non-attainment area for carbon monoxide (CO), but now is designated as attainment for CO. Therefore, this area is considered as a maintenance area for CO. This area has recently been designated as non-attainment for the new PM2.5 standards, but is designated as attainment for nitrogen dioxide, sulfur dioxide, PM10 and lead.

3.25 Noise

Noise is generally defined as unwanted sound. The day-night noise level (Ldn) is the most widely used descriptor of community noise levels. The unit of measurement of the Ldn is the A-weighted decibel (dB) that closely approximates the frequency responses of human hearing.

The primary source of noise in the Project area is vehicular traffic on local roadways. Noise level measurements have not been obtained in the Project area. In lieu of measurement, the noise levels in the Project area can be approximated based on the existing land uses. The USEPA document Protective Noise Levels (1978) lists typical day-night sound levels at various locations. The primary land use in the Project area is residential. Typical day-night sound levels in residential areas range from 39 to 59 dB (USEPA 1978). Therefore, it can be assumed that the existing sound levels in the Project area are within this range.

4.0 ENVIRONMENTAL AFFECTS

The location from where sand will come from for its initial placement to restore the existing narrow beach and dune is known as the Sea Bright Offshore Borrow Area (SBOBA). The SBOBA is located approximately 1 nautical mile east of Sandy Hook, NJ and has been subjected to the NEPA process (USACE 1989 and 1994), the ESA (USACE 1993a and USDC 1995) and a NMFS Essential Fish Habitat assessment (USACE 2005a). Accordingly, the discussion below will focus just on impacts, to include indirect and cumulative impacts, which are associated with the Port Monmouth Bay Shoreline and to areas that are adjacent and nearby.

4.1 Topography, Geology and Soils

Topography under the No-Action alternative will result in the continued erosion and degradation of the existing narrow beach and dune.

Topography along the Port Monmouth Bay Shoreline would be permanently impacted by the restoration of the existing narrow beach berm and dune, as the placement of sand during initial nourishment would increase the current elevation to +16 ft. NGVD. Initial nourishment involves the placement of clean sand on top of the existing narrow beach and dune, and in the intertidal area. Beach renourishment also involves the periodic placement of sand on the restored beach berm. The sand to be used for each periodic renourishment is still planned to be trucked in from a nearby upland facility. It's anticipated that this facility possesses all of the necessary required permits and is operating within permit requirements. In addition, the topography along the Port Monmouth Bay Shoreline would also be permanently impacted by the construction of the terminal groin. The height of the landward end of the terminal groins is proposed at +10 ft. NGVD, while the height of the bay end is proposed at +5 ft. NGVD.

No impacts on geology would occur because bedrock elevations are below the depth of initial nourishment and each periodic beach nourishment event. However, a small amount (260 c.y.) of excavation at the landward end of the terminal groin is required and some rock material may be removed. Since the amount of rock to be removed is negligible, no impacts on the local geology are expected from the construction of the terminal groin. The material to construct the terminal groin will come from an existing facility. It's anticipated that this facility is in the possession all of the required permits and is operating within permit conditions.

Soil erosion under the No-Action alternative will result in the continued erosion and degradation of the existing narrow beach and dune. No significant or long-term impacts would occur on native soil grain size, structure, nutrient status, or

organic matter content, because only clean sand will be used for dune and beach replenishment. Initial beach restoration would immediately result in a reduction in soil erosion along the Port Monmouth Bay Shoreline, and periodic beach renourishment would offset the long-term beach retreat rate of about 2.7 ft per year.

4.2 Water Resources

4.2.1 Regional Hydrogeology and Groundwater Resources

The construction of the terminal groin and the initial restoration of the existing narrow beach berm and dune, as well as periodic beach nourishments, will have no impact on regional hydrogeology and groundwater resources.

4.2.2 Tidal Influences

Influence of the terminal groin on tidal circulation would be to create eddies near the groin, and to move the tidal currents bay ward parallel to the widened fill. Conservative estimate of the distance eddies would extend from the groin would be 500 ft to either side. Eddies will be lessened as the fillet builds up on the updrift side, and will be lessened by placed fill on the down drift side that is included in the construction template.

4.2.3 Surface Water

The construction of initial beach restoration, as well as periodic beach nourishments, and the terminal groin is expected to release sediments into the water column. But this condition should be short-term and limited to the immediate placement area. Since the material that is being used to restore the beach is >99% sand (USACE 1989 and 1994), it's expected that the sand will swiftly settle on the bay bottom thus limiting the duration of turbidity. Also, it's anticipated that an increase in suspended sediments will be limited to the immediate placement site, be short-term in duration and negligible when compared to naturally occurring storm events (USACE 2001). No long-term, adverse affects to surface waters are expected.

4.3 Vegetation

The construction of the terminal groin will have a permanent but negligible impact on vegetation. The removal of about 0.007 ac. of vegetation will occur during excavation at the landward end of the terminal groin. The initial restoration of the beach berm and dune will result in the temporary loss of a small amount of vegetation. Some of the existing dune vegetation will be buried by the placement of sand to meet engineering design and storm protection benefits. The

vegetation that is covered has the opportunity to re-establish by growing through the sand to expose itself to sunlight. The dune vegetation plan includes the planting of 2 dunes grasses, American beachgrass (*Ammophilia breviligulata*) and Atlantic-coast panic-grass (*Panicum amarum*) Seaside goldenrod (*Solidago aempervirens*) , which is an indigenous dune species, Virginia creeper (*Parthenocissus quinquefolia*) and Eastern red cedar (*Juniperus virginiana*). Also, the monitoring of the success of these dune species is scheduled to ensure their high survival rate. In addition, each periodic renourishment should have no adverse affect to vegetation, because the placement of sand is expected to occur only on the sandy beach and in the intertidal zone, which are typically void of vegetation.

Overall, the vegetation that is associated with the existing dune that is along the Port Monmouth Bay Shoreline will receive an immediate and significant long-term benefit because the construction of the proposed plan will prevent its long-term loss as a result of wave driven erosion that is currently the existing condition.

4.4 Wetlands

There will be no impact to wetlands because no wetlands occur along the Port Monmouth Bay Shoreline (USACE 1997b). Additionally, there will be no indirect hydrological impacts as construction of the selected plan will not affect the existing tidal hydrodynamic that is associated with Pews and Compton Creeks and their adjacent coastal marshes.

4.5 Uplands

Overall, the vegetation and soils that are associated with upland that is along the Port Monmouth Bay Shoreline will receive an immediate and significant long-term benefit because the construction of the proposed plan will prevent its long-term loss as a result of wave driven erosion that is currently the existing condition.

4.6 Wildlife

The effect on wildlife resources is expected to be direct and short-term, and nominal at worst. The primary short-term direct impact to wildlife would be temporary displacement of mobile species and possible mortality of less mobile species during construction.

4.7 Fish

The placement of sand and rock to restore the sandy beach and build the terminal groin are expected to have a direct, short-term impact on fish species in the immediate area of their placement. Adult and juvenile species are likely to avoid burial during the placement of sand and rock by relocating outside of the

placement areas. However, the potential for some fish mortality due to their burial does exist.

Beach restoration and placement of rock along the Port Monmouth Bay Shoreline will result in the placement of large quantities of rock and sand on the beach extending from above MHW to distances up to 350 ft. bayward of the existing MLW line, causing intertidal and subtidal zones and their associated benthic communities to be initially buried. Benthos recolonization is expected to be rapid but the duration of recovery is dependent on the time of placement. (i.e.: if sand placement is completed in the beginning of winter, recovery is expected to take longer because the benthos is naturally low during the winter). Diversity and abundance is expected to be similar to, but not identical to preconstruction conditions at least initially, since the new substrate will not be precisely (99% not 100%) identical to the substrate that will be covered. In addition, due to the increased slope of the new beachfront, the intertidal zone will become narrower. This is not likely to affect bottom-feeding species since they feed on a wide variety of intertidal and nearshore subtidal prey species and the amount of area changed by the project is only a fraction of the available forage habitat within the RBSHB estuary. Eventually, this slope will level out under the influence of tidal action, waves and storms. Similarly, offshore displacement of the nearshore subtidal zone will not affect fish habitat since fish that utilize the nearshore subtidal habitat for feeding or spawning will simply move bayward following beach nourishment. Executing placement during seasonal lows in biological activity can minimize impacts of initial fill and future periodic renourishments.

The placement of large amounts of clean sand will temporarily increase turbidity and suspended sediments in the intertidal and nearshore zones. These increases are not expected to cause significant impacts because of minute amounts of fine material and the mobility of most fish species. However, the placement of sand is expected to have an indirect, short-term benefit and unfavorable consequence on fish feeding habits (USACE 2001). Fish species that feed on organisms in the water column such as kingfish and silversides may be attracted to the sand placement area, because of the increase of benthos being released into the water column. At the same time, ocular feeding piscaviours predators such as bluefish and striped bass are expected to vacate to adjacent areas due to the increase of suspended sediments, which limits their ability to see their prey. In addition, abrasions to soft tissue, such as gill epithelial tissues of fish that are associated with their breathing function may occur due to the increase of suspended sediments (USACE 2001). However, overall the increase in turbidity and suspended sediments are expected to be short-term and limited to the immediate placement site because of minute amounts of fine sediments of the placement material.

The construction of the selected plan may provide a benefit to fish resources because the restored wider sandy beach can provide enhanced habitat for the

spawning of horseshoe crabs. Recently, the USACE (2004b) has reported that horseshoe crab larvae are a dominate forage species for silversides, which in turn benefit predatory species such as blue fish and striped bass because they are known to feed on silversides.

Impacts to dissolved oxygen are also not expected to be of concern because of the naturally low organic content of the placement sand and the shallow nature of the RBSHB nearshore, which is well oxygenated from wind mixing and wave action.

The placement of rock to construct the terminal groin is expected to smother benthic organisms and possible juvenile fish causing their mortality and will result in the permanent loss of 0.64 acres of intertidal and nearshore subtidal habitat; this loss is a negligible fraction when compared to the total amount of intertidal habitat within the RBSHB complex. The loss of these habitats will permanently be replaced by rocky, hard bottom material. This will add diversity of bay bottom habitat. This added hard bottom habitat could attract and concentrate prey species such as silversides, juvenile menhaden and anchovy spp. and sessile shellfish like blue mussels, creating an optimal foraging area for predatory species such as bluefish and striped bass. In addition, the USACE (2001) reported that silversides were feeding on fly larvae, which may be associated with rock groins.

Impacts related to each periodic renourishment will be similar to those resulting from the initial fill but will occur to a lesser degree in terms of both changes in diversity and scale. Less significant diversity changes will arise from the fact that future existing sediment characteristics will more closely resemble the placement materials that will be used during future renourishments. For each periodic renourishment will consist of a significantly smaller volume of fill than the initial fill, thus a smaller zone of the benthos will be affected.

4.8 Designated EFH Species

The District has assembled 2 EFH assessment documents: 1) a Programmatic Essential Fish Habitat Assessment. For the Placement of Sand Along the Raritan Bay and Sandy Hook Bay Shoreline (USACE 2005b), and; 2) an Essential Fish Habitat Assessment. For the Placement of Sand Along the Port Monmouth, New Jersey Bay Shoreline (USACE 2005c). In addition to the impacts discussed in EA Section 4.7 above, which are also applicable to designated EHF species, below is a brief summary of impacts as they specifically apply to only designated EFH species as discussed in the above cited EFH assessments.

The placement of sand and rock along the Port Monmouth Bay Shoreline has the potential to directly impact winter flounder by burying their eggs and possibly

early juveniles in intertidal and nearshore subtidal waters. Juveniles of other demersal species including windowpane and summer flounder could also be impacted. Winter flounder in RBSHB have demonstrated spawning activity from December to April. Spawning might initially be reduced in areas of new sand, but once the substrate has "aged," the enlarged area of sand (with less mud than the presently existing surface sediments) should provide an improved spawning habitat for winter flounder eggs. Egg mortalities could be minimized by limiting construction activities to non-spawning times of year (June-November). However, the District decided not to implement a non-placement window to minimize potential winter flounder effects because: 1) the placement of sand in winter months will have an overall benefit to benthic resources as there abundances are naturally diminished during the winter, and; 2) the footprint for sand placement is insignificant when compared to the total quantity of subtidal habitat of the RBSHB. Mortalities of small juvenile flounder, which begin to appear on the bottom in the spring and remain in the nearshore throughout the year, could also be minimized by restricting the placement of sand and rock to the late summer and fall, after young-of-the-year (YOY) juveniles have grown and are more capable of escaping burial. With regard to construction techniques, placement of the sand slurry is pumped-up onto the degraded narrow beach above the high tide mark and then graded and contoured to design specifications. Direct placement of sand into the water does not generally occur. Thus, mortalities of small flounder could be further minimized by pumping sand only at low tide, thus reducing the potential magnitude of direct impacts. Highly mobile juveniles and adults of other designated species can easily avoid any direct impacts caused by placement activity.

Although small forage fish might be temporarily displaced during construction, this will not affect the feeding success of piscaviours EFH-designated species, since they would simply re-locate to nearby shallow water areas where they could continue to feed successfully. On the other hand, fish have been observed feeding on benthic invertebrates that are being delivered into the water during pumping and re-grading operations. Demersal designated EFH fishes (e.g., winter flounder, windowpane and summer flounder) are expected to temporarily vacate the placement area until invertebrate species return to recolonize the area. Finally, each periodic renourishment is anticipated to have similar short-term, indirect affects as discussed above.

EA Table 6: Potential direct and indirect impacts for EFH-Designated Species in the Intertidal and Nearshore Subtidal Waters of the RBSHB.

Species	*Life Stage*	*Potential Impacts*	*Impact*
Winter flounder	E	Burial/mortality of eggs in intertidal zone.	D
	J	Burial of some fish and their prey polychaetes, amphipods).	D/I
	A	Displacement to undisturbed areas, temporary loss of infaunal food items and offshore displacement (no loss) of spawning habitat; long-term improvement of spawning habitat.	I
Windowpane	J	Burial of some fish and their prey.	D/I
	A	Temporary loss of infaunal food items, displacement to undisturbed areas.	I
Summer flounder	J,A	Temporary loss of infaunal food items; displacement to undisturbed areas.	I
Bluefish	J,A	Temporary displacement of fish and their prey (crustaceans, other fish).	I
Scup	J	Temporary displacement of fish, burial of some prey organisms.	I
Atlantic and Spanish mackerel	J	Temporary displacement of fish and their prey (other fish).	I
Black sea bass	J	Burial of some prey organisms (crustacean's temporary displacement of fish.	I
Atlantic herring	J	No impact	NA
Butterfish	J	No impact	NA
Sandbar shark	A	No impact	NA
Cobia	J	No impact	NA
Winter Skate	J	Displacement/ loss of prey	D/I
Clear nose Skate	J	Displacement/ loss of prey	D/I
Little Skate	J	Displacement/ loss of prey	D/I

E = egg; J =juvenile; A = adult; D = direct; I = indirect; N/A = not applicable.

4.9 Shellfish

The placement of sand and rock to restore the sandy beach and build the terminal groin are expected to have a direct, short-term impact on some shellfish species in the immediate area of their placement. Sessile shellfish that are present in the immediate placement area during construction such as the razor clam and blue mussel are likely to be buried during initial beach nourishment and subsequent renourishments. However, no shellfish with significant commercial or recreational importance were identified in the placement area. Motile shellfish such as the blue claw crab are expected to leave the placement area during active nourishment and therefore would not be impacted.

Long-term benefits to horseshoe crabs are expected to result from the construction of the selected plan. The USFWS's Horseshoe Crab Habitat Suitability Index Model, identifies four habitat variables necessary for horseshoe crab spawning: depth of sand over peat, sediment moisture, beach slope, and

grain size (Brady and Schrading 1997). The implementation of the selected plan can maintain or improve the value of each variable for the horseshoe crab and, therefore may increase the suitability of the area for horseshoe crab spawning. Preliminary research conducted by the Delaware Coastal Management Program on beaches in the Delaware Bay indicates that almost no horseshoe crabs will spawn in an area during the first season after sand placement, but that spawning may be moderate in the second season, and maximized by the third season (Carter 2000). The restoration of the beach could lead to increased utilization by horseshoe crabs resulting in an increased number of eggs available for consumption by migratory shorebirds. Recently, the USACE (2004b) has reported that silversides feed on horseshoe crab larvae, which in turn benefit predatory species such as blue fish and striped bass that prey on silversides.

Placement of beach sand will cause a short-term increase in turbidity, and will relocate the intertidal zones further offshore. Sessile shellfish, such as the razor calm and blue mussel, have been documented to rapidly recolonize the new substrate from surrounding areas (Wilber and Clarke 1998). Accordingly, any short-term reduction in feeding efficiency and localized mortality should be offset by the rapid recolonization in the new substrate, and there may be benefits associated with placement of a higher quality benthic substrate material.

The placement of rock to build the terminal groin is anticipated to cause the mortality of less mobile shellfish. However, the creation of a terminal groin should provide a long-term benefit to sessile and mobile shellfish. The addition of a hard structure can provide habitat for sessile shellfish to attachment themselves to and grow. At the same time, the hard rocky habitat can offer mobile macroinvertebrates such as lady, rock and calico crabs a place to forage and numerous niches to hide and escape from predators.

No long-term adverse effects to shellfish are expected from the implementation of selected plan. Finally, each periodic renourishment is anticipated to have similar short-term, indirect affects as discussed above.

4.10 Benthos

The placement of sand and rock to restore the sandy beach and build the terminal groin are expected to have a direct, short-term impact on benthos in the immediate area of their placement. The placement of material is expected to smother benthic organisms causing their mortality. However, once buried by sand some polychaete worms have the ability to burrow upwards and survive.

Since the grain size to restore the beach and berm is 99% similar to existing grain size, benthic resources should begin to recolonize immediately following the completion of construction. Infaunal organisms are likely to recolonize the

area from nearby communities and should re-establish to a similar pre-construction community; however, it is possible that the benthic community species composition might be slightly different than the pre-construction composition.

The recovery rate and recolonization of benthic resources from beach nourishment in an estuarine ecosystem has not yet been evaluated. Accordingly, a benthic monitoring plan will be implemented to quantify impacts, determine recovery rates, and characterize the recolonized benthic community. Refer to EA Sections 2.3.3.1 for further discussion. Effects to benthos can be minimized by placing sand during the winter, as their abundances are naturally diminished during this time of the year.

No long-term, adverse impacts to benthic resources are expected. Finally, it's expected that impacts to benthos as stated above and their recovery rates as established by the proposed monitoring plan will be a similar for each periodic renourishment

4.11 Reptiles and Amphibians

The implementation of the proposed modification of the Bay Shoreline Protection Reach is not expected to directly or indirectly affect reptiles and amphibians.

4.12 Avians

Birds that currently use the area would be indirectly affected, but just in the short-term. Increased noise and heavy machine activity could cause their displacement or disruption in foraging within the immediate vicinity of construction; however, construction activities may attract birds, such as gulls, to the construction area. The discharge of sand to build the beach and berm will release significant amounts of food that can be available for their consumption. Birds that use the dune to nest are expected to do so by moving to nearby dune habitats to avoid construction activities. However, nest failure can occur if nesting is close to the construction area.

The restoration of the sandy beach, berm and dune is expected to have a long-term benefit to birds. Species, such as the Common tern (*Sterna hirundo*), Sanderling (*Calidris alba*), Spotted sandpiper (*Actitis macularia*) and Gulls (*Larus ssp.*) that use wide sandy beaches and berms habitats to forage would be permanently displaced if the existing sandy habitat is allowed to continually erode and eventually disappear. The restored wider sandy beach and berm would immediately increase the available of this type of habitat for their use. The same is expected to result from the expansion of the existing dune habitat. In addition, the restoration of a wide sandy beach can provide roosting space for wintering

waterfowl and increase the amount of potential nesting habitat for shorebirds and seabirds such as the Federally- and state-listed threatened piping plover, the state-listed endangered least tern and the state-listed endangered black skimmer (*Rynchops niger*). The wider sandy beach and berm is likely to improve horseshoe crab spawning, resulting in an increased number of eggs available for consumption by migratory shorebirds. Periodic renourishments would provide long-term (50-year project life) stabilization of this sandy beach, berm and dune habitat.

The construction of the terminal groin is expected to provide a long-term benefit to avian resources by providing a protective, isolated habitat for birds to loaf and rest.

4.13 Mammals

The construction of the sandy beach and berm is expected to have both a direct and indirect affect on mammals. A short-term, indirect affect is anticipated because mammals will likely vacate to nearby areas to avoid the noise and commotion that is associated with construction. A direct affect could be the added foraging area via the expansion of the existing beach. Potentially, a wider sandy beach can attract nesting birds making their eggs and chicks vulnerable to predation by foxes and cats. Similar affects are anticipated for each periodic renourishment. The construction of the terminal groin is not expected to effect mammals.

4.14 Threatened and Endangered Species

4.14.1 Federal Listed Species

No impacts are expected to any Federally-listed threatened or endangered species during the initial construction to restore the sandy beach, berm and dune, as well as the terminal groin (USFWS 2006; see EA Appendix E for further discussion). However, once restored the wide sandy beach has the potential for the piping plover to nest on and seabeach amaranth to establish and grow. The District plans to monitor the restored wide beach for the presence of piping plovers and seabeach amaranth for the first 3 consecutive years following the initial placement of sand. The District in partnership with the USFWS and the NJDEP will develop and implement a monitoring plan. If either of these species is found to use the restored sandy beach, the District will reinitiate consultation with the USFWS pursuant to Section 7 of the ESA, which will likely result in the commencement of the formal process as established by the ESA. Based upon the results of monitoring after the initial placement of sand, a decision by the interagency team (the District, USFWS and the NJDEP) will be made to determine if T&E monitoring will take place for the first periodic renourishment.

4.14.2 State Species of Concern

The raising of 3 osprey nesting platforms is planned and will advance the EOPs of the USACE. The osprey is a state-listed species, as the NJDEP, Division of Fish and Wildlife (DFW) classifies the osprey as a threatened species in the State of New Jersey. No adverse impacts are expected to any New Jersey-listed threatened or endangered species during the initial construction to restore the sandy beach, berm and dune, as well as the terminal groin. However, once restored the wide sandy beach has the potential for the least tern and black skimmer to nest on. The District plans to monitor the restored wide beach for the presence of least terns and black skimmers for the first 3 consecutive years following the initial placement of sand. The District in partnership with the NJDEP, Division of Fish and Wildlife (DFW) will develop and implement a monitoring plan. If either of these species is found to use the restored sandy beach, the District will reinitiate consultation with the NJDEP DFW pursuant to NJDEP Coastal Zone Management Rules and Regulations prior to the first periodic renourishment. Based upon the results of monitoring after the initial placement of sand , a decision by the interagency team (the District and the NJDEP DFW) will be made to determine if monitoring will take place for the first periodic renourishment.

4.15 Socioeconomics

4.15.1 Demographic Characterization

The implementation of the Bay Shoreline Protection Reach plan will neither induce growth nor inhibit growth of existing or future demographic characteristics in the Port Monmouth community because the area is almost completely developed, with no real potential for significant expansion. Furthermore, the Bay Shoreline Protection Reach plan will have no impact on the number, density, or racial composition of residents living within the Port Monmouth community.

4.15.2 Economy and Income

The implementation of the Bay Shoreline Protection Reach plan should have a positive direct economic benefit to existing business in the Port Monmouth area because of the reduction of future storm damages and improved accessibility to businesses during storm events. There may also be a minor, indirect economic benefit on the local economy during initial construction, as well as for each periodic renourishment. The introduction of construction workers should result in their purchasing of supplies and food during the initial construction phase and each periodic renourishment.

4.15.3 Housing

The implementation of the Bay Shoreline Protection Reach plan is expected have a direct positive impact on housing and structures due to a reduction in future storm damage to existing properties, and the subsequent reduction in associated costs to repair such damages. Also, an indirect benefit to residential property values in the Port Monmouth community is expected to increase due to the added protection from storm damages.

4.16 Cultural Resources

Site 28-MO-272 lies near the project area, but is not expected to be impacted by construction.

It is not expected that the dune construction portion of the selected plan will impact any historic or prehistoric resources. It is believed that the area where the dune will be constructed is mainly fill.

However the construction of the terminal groin has the potential to affect buried cultural resources. Accordingly, a remote sensing effort was performed and the results conclude that the footprint of the terminal groin and its immediate surrounding area contain no significant cultural resources (USACE 2006).

4.17 Land Use and Zoning

The implementation of the proposed modification will not have any direct or indirect impacts on the existing land use and zoning within the Port Monmouth community. The Bay Shoreline Protection Reach plan will involve a total of 10.11 acres (9.54 acres for the beach, berm and dune; 0.57 acres for the terminal groin) in permanent easements. The real estate is publicly owned and will continue to be after construction. Zoning designations should not be changed, nor will any homes or businesses be removed or displaced.

4.18 Floodplain

4.18.1 Flooding Events

The construction of the Bay Shoreline Protection Reach plan will result in a direct, long-term benefit to the community of Port Monmouth. The restoration of the sandy beach, berm and dune and subsequent periodic renourishments will provide 50 years of protection for storm induced flooding and its associated damage.

4.18.2 Floodplain Values

The restoration of the sandy beach, berm and dune will result in both short-and long-term impacts to floodplain values. Temporary indirect effects, which are associated with construction activities, include the displacement of aquatic and terrestrial resources, loss of recreational opportunities, and an increase in suspended sediments should a severe storm event occur during construction. The effect to wildlife should be minimal because existing wildlife habitat along the Port Monmouth Bay Shoreline is of low value, as it is fragmented and subject to relatively high levels of disturbance. Public access to the beach would be temporarily impeded during the construction period because of safety concerns.

The restoration of the sandy beach, berm and dune will provide long-term (50-year Project life) enhancement of floodplain values including storm damage protection, recreational opportunities, and wildlife habitat. Increased storm damage protection will result from the initial beach, berm and dune restoration, and by periodic renourishments. Recreational opportunities, such as sun bathing, walking and surf fishing, will be enhanced due to public access to a wider recreational beach. Wildlife habitat will improve as a result of expanding and maintaining, and vegetating dune habitat.

The construction of the terminal groin is expected to offer another location for recreational fishing.

4.19 Coastal Zone

In conformance with the established policies of New Jersey's Coastal Zone Management Program, the District has determined that the proposed modification to the Bay Shoreline Protection Reach plan is consistent with New Jersey's Rules on Coastal Zone Management. For further discussion see EA Appendix A.

4.20 Hazardous, Toxic, and Radioactive Wastes

There are no impacts from or to HTRW (USACE 1995).

4.21 Navigation

The implementation of the Bay Shoreline plan will have a long-term, indirect impact to navigation channels in both Pews Creek and Compton Creek. The littoral transport of placed sand will occur and result in the deposition of an additional 2,800 c.y./year for both creeks (Pews Creek 1,800 c.y./year; Compton Creek 1,000 c.y./year) that will need to be dredged as part of normal O&M dredging.

The restoration of the sandy beach and berm and periodic renourishments will not interfere with any recreational or commercial boat traffic. In addition, neither of the existing marinas and docking structures (USACE 1993b), nor the ferry terminal near the mouth of Compton Creek will be affected. The terminal groin and extension of the existing wooded pier will be permanent hard structures that can slow down and potentially pose a hazard to recreational boats. The terminal groin or the pier extension are not expected to affect commercial traffic. Prior to the initiation of construction, it's "Standard Operating Procedure" for the District to coordinate with the U.S. Coast Guard to ensure that new permanent structures, such as the terminal groin and pier extension are placed on appropriate maps and are equipped with appropriate navigation aids, if needed. Finally, there are numerous exposed wooden structures located within the sand placement site that have the potential to be dislodged and become hazards to navigation. Once they are buried by the placement of sand they'll loose their potential to become a navigation hazard.

4.22 Aesthetics and Scenic Resources

The Port Monmouth Bay Shoreline has two areas of potential impact on aesthetic and scenic resources: 1) Visual impacts to scenic views of New York Bay and Harbor, along with associated fishing and boating activities along the Bay Shoreline; and 2) Visual impacts to the Spy House, a property listed in the National Registry of Historic Places (NRHP). Visual impacts in both areas will be from inward- and outward-facing perspectives.

The Monmouth County Parks and Recreation Department has requested that the Bay Shoreline Protection Reach plan preserve current visual resources and be compatible with current and planned recreational use of the Port Monmouth community (Wickham 1997a and 1997b). The restoration of the sandy beach, berm and dune will be consistent with landform, vegetation, color, and scenery of the existing dune and beach landscape. The Bay Shoreline Protection Reach plan will preserve the majority of existing aesthetic and scenic qualities of the Bay Shoreline for visual enjoyment from both an outward-looking perspective across the water, and from an inland perspective from the Bay Shoreline as identified by the MCPB (1993) and the Monmouth County Parks and Recreation Department (Wickham 1997a and 1997b).

The construction of the terminal groin is expected to have a direct, long-term effect on aesthetic and scenic resources. The terminal groin will be constructed in the Bay Shoreline where currently there is no terminal groin, but it's not anticipated to impede views from land out into the bay and from on the baywater looking to the bay shoreline. From an aesthetic perspective, the terminal groin

may have an impact because the groin can trap floating debris and trash that can attract flies and other unwanted insects, and have an unpleasant odor.

4.23 Recreation

All of the Port Monmouth Bay Shoreline is publicly owned and is zoned specifically for recreational purposes as described in EA Section 3.20 above. Monmouth County plans to develop the historic Whitlock/Seabrook Wilson House (e.g., Spy House) Museum and adjacent areas into a public recreation area as part of the Bayshore Waterfront Park. Recognizing the need to reduce damage caused by storms, impacts to recreational uses will be both short-term and long-term.

Short-term impacts to recreational uses are anticipated to include limiting and/or blocking access to the beach front during the construction of the terminal groin, initial restoration of the beach, berm and dune, and each periodic renourishment. However, walkways will be constructed across the restored dune to provide permanent access to the sandy beach. The existing fishing pier will be extended further into the bay to allow recreational anglers continued access to deeper water. It's expected that access to this fishing pier will be temporarily restricted during its extension into deeper waters.

A long-term (50-year project life) benefit will occur because the implementation of the Bay Shoreline Protection Reach plan will protect structures that are associated with recreation such as bathrooms, parking lots, signs, lamp posts, dune cross-overs, trails and handicap access structures from damages caused by severe storms. Furthermore, periodic renourishments will ensure the long-term existence of the sandy beach, berm and dune to preserve future recreational uses such as sunbathing, walking, birding and surf-fishing. Finally, fishing from the terminal groin is highly discouraged and not supported by the USACE because fishing from and walking on stone groins is known to be unsafe resulting in bodily injury to include the possibility of mortality.

4.24 Transportation

The initial construction to restore the sandy beach, berm and dune is expected to be small and brief (see EA Section 2.2 above for duration of construction) with regards to traffic flow and volume that's associated with periodic use of area roads by construction equipment and workers' vehicles. However, the construction of the terminal groin and periodic renourishments involve recurring transport of rock and sand to the beach via heavy (most likely 20 c.y. - 40 tons and/or 40 c.y. – 80 ton) trucks. This is also expected to have a short-term (see EA Section 2.2 above for duration of construction) impact on local traffic, but will result in a high frequency of heavy truck traffic.

Port Monmouth Road functions as the main arterial transportation route along the Bay Shoreline. Three public Bayshore Waterfront Park access points (public parking areas) will most likely become staging areas during construction. The increase in vehicles due to the reduction in public parking, coupled with the introduction of large, slow moving construction vehicles will likely reduce traffic flow speed and increase volume. Furthermore, it's "Standard Operating Procedure" for the District to meet with the construction contractor and local (municipal and possibly county) officials prior to the commencement of construction to reach a collaborative agreement with how construction traffic shall proceed. Upon the completion of construction, the local transportation system is expected to return to pre-construction conditions.

Over the long term, the effect of the Bay Shoreline Protection Reach plan will substantially improve transportation conditions during storms, including routine and emergency access to and from residences and businesses. Finally, to a large extent the plan will significantly reduce and possibly eliminate the occurrence and subsequent costs of road damages caused by tidal flooding.

4.25 Air Quality

As stated an analysis was performed to determine the emission levels to implement the proposed modification the Port Monmouth Bay Shoreline Protection Reach plan. Emissions to construct this plan do not exceed threshold levels for any emission variable (USACE 2005d). As a result, a "Finding of Non-Applicability" has been assembled and can be found in EA Appendix C.

4.26 Noise

The noise level to construct the Bay Shoreline plan is expected to increase, be limited to the placement site and be brief (see EA Section 2.2 above for duration of construction). Yet, local residents and businesses are not expected to be directly effected by this increase in noise because they are not located in close proximity to the construction site.

However, local residents and businesses may be indirectly affected by increased noise levels, because the construction of the terminal groin and periodic renourishments involve reoccurring transport of rock and sand to the beach via heavy trucks. This is also expected to be a short-term (see EA Section 2.2 above for duration of construction) impact.

4.27 Environmental Justice

In accordance with Executive Order 12898 (dated February 11, 1994) Federal agencies are required to identify and address the potential for disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations.

The neighborhoods within the Port Monmouth community are not considered to be minority neighborhoods. According to the 1990 Census, only 2 % of the population residing within the Port Monmouth community consists of racial minorities. Therefore, the selected plan would not disproportionately affect minority populations.

Per capita income in this small community is lower than the county and state averages, and approximately 3.9 % of the population had incomes below the poverty level in 1989. However, the Bay Shoreline Protection Reach plan would have a beneficial impact on this low-income community by significantly reducing storm damages and their subsequent repair costs, and could potentially increase property values.

No adverse human health impacts are anticipated to result from the implementation of the plan. The implementation of the Bay Shoreline Protection Reach plan will provide an increased level of protection from damages caused by hurricane and severe storms to the Port Monmouth community, and residents would experience benefits in terms of protection of property and life. In addition, the plan would allow for improvements to businesses and recreational amenities in the Port Monmouth community. Therefore, no mitigation measures are required to address disproportionately high and adverse impacts to minority and low-income populations.

4.28 Unavoidable Adverse Environmental Effects and Considerations that Offset Adverse Effects

The implementation of the Bay Shoreline Protection Reach plan is expected to cause unavoidable adverse impacts on resources that either use or occur within the Port Monmouth Bay Shoreline. These impacts to specific resources are discussed above. No long-term undesirable effects are expected, as only short-term, minor impacts are projected. Furthermore, the employment of mitigation measures as discussed in EA Section 2.2 above will further minimize these anticipated temporary and diminutive impacts.

4.29 Relationship Between Short-Term Uses of the Environment and Enhancement of Long-Term Productivity

The implementation of the Bay Shoreline Protection Reach plan entails a short-term commitment of resources, including construction equipment; construction materials; labor; public monies to fund the Project; petroleum fuels, and equipment necessary to minimize and offset environmental, ecological and cultural resource impacts.

Resources within the Port Monmouth Bay Shoreline will be subject to the removal of some vegetation, temporary disruption of habitats, a short-term increase in noise and NOx emissions, and a brief disruption of aesthetic views, recreational use, the local transportation system and infrastructure along roads in the community during initial construction and mitigation, and future periodic renourishments. Although temporary and minor, these disruptions will preclude the use of local recreational facilities and transportation routes for local residents and tourists, and habitats by indigenous animal and aquatic species; further, there may be a short-term loss of revenue as a result of decreased attraction for tourism, and a loss of business as a result of the use of alternate routes around the area.

To contrast these short-term, minor effects, there are several long-term enhancements in productivity that will result from the construction of the Bay Shoreline plan. There will be beneficial impacts on the local community such as decreased costs to residents and businesses as a result of a significant reduction of damages caused by severe storms. There may also be an increase in recreational value and attractions to the area as a result of the restored sandy beach and berm, as well as long-term protection of unique, sensitive dune habitat. Species with Special designations may benefit from a wider sandy beach and the erection of 3 Osprey nesting platforms, which are self sustaining.

Finally, the implementation of the plan in the long-term is expected to facilitate a more economically and environmentally stable community, both in the immediate Port Monmouth area and in the surrounding communities. Accordingly, the long-term productivity of the region is expected to experience benefits from this short-term use of the environment.

4.30 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resources will be committed to implement the plan by the District, NJDEP, Monmouth County, and Middletown Township. Resources committed include construction and mitigation materials and costs; labor costs for planning the selected plan; natural resources such as soil, water, air; sand, rock, energy resources such as fossil fuels (gasoline, diesel and

lubricants) and electricity; and, land to accommodate the shore protection structures.

Not all of these resources are irretrievable. The monies committed to the Project will be offset through savings in municipal, residential, and commercial storm damage costs in the future, and potentially through increased commercial success for the community as a result of a more safe and secure business area. This may also result in an increase in the revenues of the local municipalities in the event of increasing property tax values. Also, the increase in recreational opportunities can boost expenditure within the local economy.

The investment of materials and disposable goods from the implementation of the Bay Shoreline plan, to include mitigation, will result in the irretrievable commitment of resources. This commitment is expected to enhance the diversity of bay bottom habitat, a wider sandy beach, utilization by threatened, endangered and species of special concern, and long-term protection to sensitive dune habitat.

4.31 Cumulative Impacts

The USACE currently has 2 other projects along the NJ bay shoreline of the RBSHB complex that includes beach nourishment and placement of groins and involves the following communities: 1) Raritan Bay Section 506, which includes the communities of Keansburg, East Keansburg and Laurence Harbor, and; 2) the Borough of Union Beach, NJ. These projects are nearing the completion of their feasibility study phase.

The restoration of sandy beaches and their long-term stabilization will significantly benefit the region by providing increased protection from damages, such as tidal surges and flooding caused by hurricanes and severe storms. As a result, property values are expected to increase while community costs that are associated with evacuations during flooding events, and homes and infrastructure repair costs will be reduced, and emergency vehicle access will be improved. Beach replenishment is also expected to facilitate the advancement of the Bayshore Waterfront Access Plan (MCPB 1993).

Potential cumulative benefits for protected and migratory shorebirds and seabirds may result from beach restoration. The long-term stabilization of sandy beach habitat may increase the overall value of the RBSHB for protected shorebirds, including the Federally- and state-listed threatened piping plover and the state-listed endangered least tern. These protected species prefer a sandy shoreline for courtship, nesting and the rearing of their chicks. Horseshoe crabs also prefer sandy beaches for spawning, and the increase of sandy beach habitat may result in an overall added attraction to use of the RBSHB for their spawning.

Many species of migratory shorebirds utilize horseshoe crab eggs as food source, thus indirectly benefiting from increased horseshoe crab spawning. Recently, the District (USACE 2004b) found prey fish feed on horseshoe crab eggs; thus, a reasonable linkage can be made that migratory and predatory piscaviours, such as bluefish and striped bass, may also benefit from increased horseshoe crab spawning because they feed on the prey fish that are consuming horseshoe crab eggs.

The restoration of sandy beaches, where there is currently either no or minimal beach, will provide new and improved recreational opportunities, such as sunbathing, surf-fishing, birding and walking.

Data collected during the District's proposed monitoring programs would contribute to the overall knowledge of the estuary, to include intertidal and subtidal ecosystems that function in RBSHB. In conjunction with data gathered in other areas of the RBSHB from other projects, the level of knowledge is expected to contribute significantly to the overall understanding of the synergy among aquatic resources in the estuary. This knowledge may assist the development of sustainable management, preservation, and harvest planning for various stocks in the RBSHB.

The extent of proposed housing or other proposed structural development in the vicinity of the Study areas has not been formally identified. However, based on the current land development practices, building construction is not permitted on the beach or dune areas where potential selected plans will be constructed. Therefore, there are no known or expected cumulative impacts to dunes and beaches as a result of the implementation of the selected plan combined with other local development projects.

The construction of the selected plan and similar planned projects will contribute to a cumulative benefit to existing dunes within the RBSHB by acting as a buffer against wave attack, which will reduce the erosion effect of waves to existing dune complexes. The addition of beach fill and the resulting expansion of beach width from this and similar projects in the RBSHB area will contribute to the overall stability and preservation of dune habitat around the RBSHB, and the protection of the natural resources that associate with dune habitat.

Potential impacts to natural resources and navigation resulting from implementation of the selected plan and similar plans may occur as a result of increased sedimentation. Placement of sand from the borrow area onto the beach will increase the amount of sand that is available to be transported along the shoreline, and potentially into navigation channels. Also, initial beach fill and subsequent renourishments will involve accelerated erosion during sediment sorting. Although the amount of additional sand being transported is not expected to be significant, there is a possibility that the combined effects of sand

transported from the Port Monmouth project area and other similar projects may contribute to increased sedimentation in and around navigation channels. In the event that the selected plan contributes to impacts affecting navigation in the RBSHB channels, additional operation and maintenance (O&M) costs may be incurred.

The implementation of the selected plan in conjunction with similar projects in the RBSHB area may contribute to sedimentation and disturbance of intertidal and subtidal resources. Some mortality to fauna and epifauna will occur, but is expected to be minimal and take place only during construction. Cumulative impacts for the removal of sand from the Sea Bright borrow area were addressed in a separate NEPA document.

Finally, it is not anticipated that the implementation of the selected plan will have any cumulative effects on the cultural resources along the Bay Shoreline as a result of other District initiatives within the RBSHB. The initial consultation with the New Jersey State Historic Preservation Office was conducted in 1998 and further consultation will begin with the onset of the near shore and remote sensing survey in order to supplement the previously submitted and approved report.

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EA APPENDIX A

New Jersey Coastal Zone Act Consistency Statement

COASTAL ZONE ACT CONSISTENCY STATEMENT

Raritan Bay and Sandy Hook Bay
Hurricane and Storm Damage Reduction Study
Port Monmouth, New Jersey
Modification to the Feasibility Report's Recommended Plan for the Bay Shoreline Protection Reach

I Introduction

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. §§1451-1464) was enacted by Congress in an effort to balance the often competing demands of growth and development with the protection of coastal resources. Its stated purpose is to "...preserve, protect, develop, where possible, to restore or enhance, the resources of the nation's coastal zone...". The Act established the framework for achieving this balance by encouraging the states to develop coastal zone management programs, consistent with minimum federal standards, designed to regulate land use activities that could impact coastal resources. The Coastal Zone Act Reauthorization Act Amendments of 1990 further strengthened the act by requiring the state programs to focus more on controlling land use activities and the cumulative effects of activities within designated coastal zones.

The State of New Jersey administers its federally approved coastal zone program through the Department of Environmental Protection, Land Use Regulation Program (LURP). Pursuant to the federal CZMA, New Jersey has defined its coastal zone boundaries and developed policies to be utilized to evaluate projects within the designated coastal zone, as set forth in New Jersey's Rules on Coastal Zone Management (CZM) (N.J.A.C. 7:7, 7:7E, dated July 18, 1994 and addendum to 7:7E-5 and 7:7E-8.7, dated August 19, 1996). The Waterfront Development Law (N.J.S.A. 12:5-3) and related requirements (N.J.A.C. 7:7-23) provide the authority for issuance of permits for, among other activities, the placement or construction of structures, pilings, or other obstructions in any tidal waterway. New Jersey's Rules on Coastal Zone Management are employed by the State's Land Use Regulation Program in the review of permit applications and coastal decision-making; they address issues of location, use, and resources. New Jersey's rules provide for a balance between economic development and coastal resource protection, recognizing that coastal management involves explicit consideration of a broad range of concerns, in contrast to other resource management programs that have a more limited scope of concern.

The selected Port Monmouth Bay Shoreline Protection Reach plan is located within the coastal zone of New Jersey. The following assessment identifies the coastal zone management policies relevant to the proposed shore protection project.

II Subchapter 3 – Special Areas

7:7E-3.2 Shellfish Habitat

This policy generally limits disturbance of shellfish habitat. The selected Bay Shoreline Protection Reach plan will affect the mean low tide line by moving it further out into the bay.

7:7E-3.3 Surf Clam Areas

This policy prohibits development that would destroy or contaminate surf clam areas. The selected Bay Shoreline Protection Reach plan is not located in a surf clam area nor will it contaminate surface water; therefore, this policy is not applicable.

7:7E-3.4 Prime Fishing Areas

This policy prohibits sand or gravel submarine mining in prime fishing areas where the activity would not significantly alter the bathymetry. For initial nourishment, the selected Bay Shoreline Protection Reach plan will use sand from the Sea Bright Offshore Borrow Area which has previously received Federal Consistency for the Section I, Sea Bright to Ocean Township, Beach Erosion Control Project.

7:7E-3.5 Finfish Migratory Pathways

This policy prohibits development such as dams, dikes, spillways, channelization, tide gates, and intake pipes that would create physical barriers to migratory fish. Development that would lower water quality so as to interfere with fish movement is also prohibited. The selected Bay Shoreline Protection Reach plan will not impede migratory fish.

7:7E-3.6 Submerged Vegetation Habitat

This policy prohibits or restricts permanent significant impacts to submerged vegetation habitats unless compensation/mitigation efforts are enacted. The selected Bay Shoreline Protection Reach plan will not have any impact on submerged vegetation.

7:7E-3.7 Navigation Channels

This policy prohibits construction that would extend into a navigation channel that would result in the loss of navigability. The implementation of the Bay Shoreline Protection Reach plan will have a long-term, indirect impact to navigation channels in both Pews Creek and Compton Creek. The littoral transport of placed sand will occur and result in the deposition of an additional 2,800 cubic yards (c.y.)/year for both creeks (Pews Creek 1,800 c.y./year; Compton Creek 1,000 c.y./year) that will need to be dredged as part of normal O&M dredging.

7:7E-3.8 CANALS

This policy prohibits actions that would interfere with boat traffic in canals used for navigation. The selected Bay Shoreline Protection Reach plan does not contain a canal as defined by the New Jersey State Department of Environmental Protection; therefore, this policy is not applicable.

7:7E-3.9 INLETS

This policy prohibits filling and discourages submerged infrastructure in coastal inlets. The selected Bay Shoreline Protection Reach plan is not located in an inlet as defined by the NJDEP; therefore, this policy is not applicable.

7:7E-3.10 MARINA MOORINGS

This policy prohibits non-water dependent development in marina mooring areas. Construction of the selected Bay Shoreline Protection Reach plan would not involve development in any marina mooring areas nor is the selected Bay Shoreline Protection Reach plan non-water dependent; therefore, this policy is not applicable.

7:7E-3.11 PORTS

This policy prohibits actions that would interfere with port uses. The selected Bay Shoreline Protection Reach plan is not located in a significant shipping port; therefore, the selected Bay Shoreline Protection Reach plan would not interfere with port uses.

7:7E-3.12 SUBMERGED INFRASTRUCTURE ROUTES

This policy prohibits any activity that would increase the likelihood of submerged infrastructure damage, or interfere with maintenance operations. There are no submerged infrastructures in the selected Bay Shoreline Protection Reach plan; therefore, this policy is not applicable.

7:7E-3.13 SHIPWRECKS AND ARTIFICIAL REEFS

This policy restricts the use of special areas with shipwrecks and artificial reefs that would adversely affect the usefulness of the area as a fisheries resource. Also, construction of new or expanded artificial reefs by the deposition of weighted non-toxic material is conditionally acceptable provided that (1) it is demonstrated that the material will not wash ashore and interfere with either navigation or commercial fishing operations; and (2) placement of material and management of the habitat is coordinated with the NJDEP Division of Fish, and Wildlife. The selected Bay Shoreline Protection Reach plan does not contain any known shipwrecks or artificial reefs, and new ones will not be constructed; therefore, this policy is not applicable.

7:7E-3.14 Wet Borrow Pits

This policy restricts the use and filling of wet borrow pits. The selected Bay Shoreline Protection Reach plan does not contain any known wet borrow pits; therefore, this policy is not applicable.

7:7E-3.15 Intertidal and Subtidal Shallows

This policy discourages disturbance of shallow water areas (i.e., permanently or twice daily submerged areas from the spring high tide to a depth of four feet below mean low water). The selected Bay Shoreline Protection Reach plan involves initial and periodic beach nourishment and a groin to stabilize the newly restored sandy beach. The filling of intertidal and subtidal shallows meets the requirements found under the filling rule (N.J.A.C. 7:7E-4.2 (j)) and the coastal engineering rule (7:7E-7.11 (d)); therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.16 Dunes

This policy protects and preserves ocean and Bay Shoreline dunes. The selected Bay Shoreline Protection Reach plan will provide long-term protection to the existing dune habitat, which is currently being lost due to erosion. In addition, the selected Bay Shoreline Protection Reach plan includes dune restoration and enhancement, including construction of walkways across the newly expanded dune, and planting of native vegetation to stabilize the dune; therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.17 Overwash Areas

This policy restricts development in overwash areas due to their sensitive nature. The creation of dunes or expansion of existing dunes and shore protection structures are acceptable activities; therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.18 Coastal High Hazard Areas

This policy restricts development in coastal high hazard areas (i.e., flood prone) as delineated on the FEMA maps. The selected Bay Shoreline Protection Reach plan involves construction of shore protection structures to increase protection to Coastal High Hazard Areas, thereby enhancing public use and enjoyment of the beach and Bay Shoreline. Therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.19 Erosion Hazard Areas

This policy prohibits development in erosion hazard areas under most circumstances, to protect public safety. The selected Bay Shoreline Protection Reach plan involves acceptable shore protection activities including restoration of erosion hazard areas; therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.20 Barrier Island Corridor

This policy restricts new development on barrier islands. The selected Bay Shoreline Protection Reach plan does not contain a barrier island corridor.

7:7E-3.21 Bay Islands

This policy restricts development on bay islands. The selected Bay Shoreline Protection Reach plan does not contain any bay islands.

7:7E-3.22 Beaches

This policy restricts development on beach areas. The selected Bay Shoreline Protection Reach plan involves beach and dune restoration and planting of vegetation for dune stabilization. These are all acceptable activities that will meet the conditions listed within this coastal zone management plan; therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.23 Filled Water's Edge

This policy seeks to promote water dependent uses at areas along the waterfront that have been previously filled. The selected Bay Shoreline Protection Reach plan does not contain any filled water edge sites; therefore, this policy is not applicable.

7:7E-3.24 Existing Lagoon Edges

This policy restricts development at lagoon edges because of potential water quality problems. The selected Bay Shoreline Protection Reach plan does not include any lagoon edges.

7:7E-3.25 Flood Hazard Areas

This policy is designed to restrict development in flood hazard areas and ensure that the waterfront is not pre-empted by uses that could function equally well at inland locations. The goal of this rule is to reduce losses of life and property resulting from unwise development of flood hazard areas, and allow uses compatible with periodic flooding. The selected Bay Shoreline Protection Reach plan would involve the restoration of shore protection measures, thereby protecting life and property; therefore, the selected Bay Shoreline Protection Reach plan is compatible with this policy.

7:7E-3.26 (Reserved)

7:7E-3.27 Wetlands

This policy restricts disturbance in wetland areas and requires mitigation if wetlands are destroyed or disturbed. The selected Bay Shoreline Protection Reach plan will not impact wetland either directly or indirectly.

7:7E-3.28 Wetland Buffers

This policy restricts development in wetland buffer areas in order to protect wetlands. The selected Bay Shoreline Protection Reach plan will not impact wetland buffers.

7:7E-3.29 (Reserved)

7:7E-3.30 (Reserved)

7:7E-3.31 Coastal Bluffs

This policy restricts development on coastal bluffs. The selected Bay Shoreline Protection Reach plan does not contain any coastal bluffs; therefore, this policy is not applicable.

7:7E-3.32 Intermittent Stream Corridors

This policy restricts actions in intermittent stream corridors. The selected Bay Shoreline Protection Reach plan does not contain any intermittent stream corridors.

7:7E-3.33 Farmland Conservation Areas

This policy seeks to preserve large parcels of land used for farming. There is no farmland conservation areas located within the selected Bay Shoreline Protection Reach plan.

7:7E-3.34 Steep Slopes

This policy seeks to preserve steep slopes by restricting development in such areas. There are no steep slopes in the selected Bay Shoreline Protection Reach plan.

7:7E -3.35 (Reserved)

7:7E-3.36 Historic and Archaeological Resources

This policy protects the value of historic and archaeological resources and may require cultural resource surveys and other protective measures. Final results of cultural resource investigations conclude that there are not impacts to cultural resources. However, the selected plan design for the Bay Shoreline Protection Reach, consisting of a combination of new sandy beach, dune construction and terminal groin, has been modified to the maximum extent possible to prevent physical encroachment on the Spy House (a National Register property) grounds. Partial mitigation of the visual impacts to the Spy House may be necessary to make them compatible with the appearance of the historic and archeological resource. The project is taking protective measures to preserve historical and archeological resources; therefore, this project is consistent with this policy.

7:7E-3.37 Specimen Trees

This policy seeks to protect specimen trees. The selected Bay Shoreline Protection Reach plan does not contain any known specimen trees.

7:7E-3.38 Endangered or Threatened Wildlife or Vegetation Species Habitats

This policy restricts development in endangered or threatened wildlife or vegetation species habitat areas. The NJNHP indicated that two states listed endangered or threatened species, the pied-billed grebe (*Podilymbus podiceps*) and the Cooper's Hawk (*Accipiter cooperii*) may occur along the Bay Shoreline; but the selected Bay Shoreline Protection Reach plan is not expected to adversely affect these species. However, the selected Bay Shoreline Protection Reach plan includes the installation of 3 Osprey (*Pandion haliaetus*) nesting platforms. The osprey is listed by the NJDEP, Division of Fish and Wildlife (DFW) as a threatened species.
No Federally-listed species have been identified in the project area.

The USACE will continue to coordinate with the USFWS, NMFS, and/or NJDEP to assess post construction impacts, because the restored sandy beach may attract the piping plover (*Charadrius melodus*) and least tern (*Sterna antillarum*) to reproduce, and seabeach amaranth (*Amaranthus pumilus*) to grow.

7:7E-3.39 Critical Wildlife Habitats

This policy discourages development that would adversely affect critical wildlife habitat. The selected Bay Shoreline Protection Reach plan would not affect any critical habitats.

7:7E-3.40 Public Open Space

This policy encourages new public open spaces and discourages development that might adversely affect existing public open space. The Spy House Museum and surrounding grounds are dedicated to permanent recreation and open space use as part of the Green Acres Local Assistance Program, sponsored by the NJDEP. The selected Bay Shoreline Protection Reach plan would serve to protect public open space from storms; therefore, the selected Bay Shoreline Protection Reach plan would be consistent with this policy.

7:7E-3.41 Special Hazard Areas

This policy discourages development in hazard areas. The selected Bay Shoreline Protection Reach plan does not contain any special hazard areas.

7:7E-3.42 Excluded Federal Lands

Federal lands are beyond the jurisdiction of the New Jersey Coastal Zone. New Jersey has the authority to review activities on Federal lands if impacts may occur in New Jersey's Coastal Zone. The selected Bay Shoreline Protection Reach plan does not involve actions on or disturbance to Federal land.

7:7E-3.43 Special Urban Areas

This policy seeks to encourage development that would help to restore the economic and social viability of certain municipalities that receive state aid. The project area does not involve a Special Urban Area; therefore, this policy is not applicable.

7:7E-3.44 Pinelands National Reserve and Pinelands Protection Area

This policy allows the Pinelands Commission to serve as the reviewing agency for actions within the Pinelands National Reserve. The project area is not located within the Pinelands Area.

7:7E-3.45 Hackensack Meadowlands District

This policy allows the Hackensack Meadowlands Development Commission to serve as the reviewing agency for actions within the Hackensack Meadowlands District. The project area is not located within the Hackensack Meadowlands District.

7:7E-3.46 Wild and Scenic River Corridors

This policy recognizes the outstanding value of certain rivers in New Jersey by restricting development to compatible uses. The project area is not located within a wild and scenic river corridor.

7:7E-3.47 Geodetic Control Reference Marks

This policy discourages disturbance of geodetic control reference marks. There are no known geodetic control reference marks in the area of the selected Bay Shoreline Protection Reach plan.

7:7E-3.48 Hudson River Waterfront Area

This policy restricts development along the Hudson River Waterfront and requires development, maintenance, and management of a section of the Hudson Waterfront Walkway coincident with the shoreline of the development property. The project area is not located within the Hudson River Waterfront Area.

III Subchapter 3A – Standards for Beach and Dune Activities

7:7E-3A.1 Standards Applicable to Routine Beach Maintenance

Routine beach maintenance is part of the selected Bay Shoreline Protection Reach plan, and is therefore consistent with this policy.

7:7E-3A.2 Standards Applicable to Emergency Post-Storm Beach Restoration

Restoration beyond the pre-storm beach condition is encouraged by the Department, but will not be considered "emergency post-storm beach restoration," pursuant to this section; therefore, this policy is not applicable.

7:7E-3A.3 Standards Applicable to Dune Creation and Maintenance

All dune restoration activities will be conducted in accordance with the specifications found in Guidelines and Recommendations for Coastal Dune Restoration and Creation Projects (NJDEP, 1985), and/or Restoration of Sand Dunes Along the Mid-Atlantic Coast (Soil Conservation Service, 1992). Construction of dune walkover structures will be in accordance with the standards and specifications described in Beach Dune Walkover Structures (Florida Sea Grant, 1981). Furthermore, the restored sandy beach and periodic renourishment will provide immediate and long-term benefits to the existing dune habitat. Accordingly, the selected Bay Shoreline Protection Reach plan is consistent with this policy.

7:7E-3A.4 STANDARDS APPLICABLE TO THE CONSTRUCTION OF BOARDWALKS

Boardwalks will not be constructed; therefore, this policy is not applicable.

IV Subchapter 3B – Wetland Mitigation Proposals

7-7E-3B.1 MITIGATION PROPOSAL REQUIREMENTS

This section details the requirements of a wetland mitigation proposal. The selected Bay Shoreline Protection Reach plan will not impact wetlands, and therefore does not require any wetland mitigation.

V Subchapter 3C – Impact Assessment for Endangered and Threatened Wildlife.

This section details the performance and reporting standards for impact assessments for endangered and threatened wildlife species. If required, based on updated relevant agency correspondence, habitat/impact assessments for endangered and threatened species will conform to the performance and reporting standards listed.

Upon its construction, the selected Bay Shoreline Protection Reach plan may benefit piping plovers, least terns and seabeach amaranth by providing nesting and growing habitat. Should this occur, the USACE will reinitiate ESA Section 7 consultation with the USFWS. Furthermore, 3 osprey nesting platform will be erected. The osprey is listed by the NJDEP, Division of Fish and Wildlife (DFW) as a threatened species.

VI Subchapter 4 – General Water Areas

7:7E-4.2 ACCEPTABILITY CONDITIONS FOR USES

This section defines the important uses of general water areas and sets conditions or standards of acceptability for certain uses. Only those standards applicable to the selected Bay Shoreline Protection Reach plan are listed:

(j) Standards relevant to filling.

Filling is necessary for the construction of the selected Bay Shoreline Protection Reach plan. There is a demonstrated need for initial and periodic beach nourishment and a terminal groin; therefore, the selected Bay Shoreline Protection Reach plan is consistent with this policy.

VII Subchapter 5 – General Land Areas

This rule defines the acceptability of development in general land areas. The selected Bay Shoreline Protection Reach plan is considered a linear development as defined in N.J.A.C. 7:7E-6.1. The requirements of this subchapter do not apply to linear developments; therefore, this policy is not applicable.

VIII Subchapter 6 – General Location Rules

7:7E-6.1 Location of Linear Development

This rule sets conditions for acceptability of linear development (*e.g.,* roads, walkways, pipelines). The selected Bay Shoreline Protection Reach plan involves construction of an approximately 3,400 feet of sandy beach and 2,640 feet of dune habitat. There is no prudent or feasible alternative alignment which would have less impact, and there will be no long term or permanent loss of unique or irreplaceable areas; therefore, the selected Bay Shoreline Protection Reach plan is consistent with the rules on location of linear development.

7:7E-6.2 Basic Location

This rule states that the NJDEP may reject or conditionally approve a project for safety, protection of certain property, or preservation of the environment. The selected Bay Shoreline Protection Reach plan involves promoting public safety and welfare and protecting public and private property, through construction of shore protection measures. An alternative and design analysis, in coordination with the NJDEP, has ensured that the selected Bay Shoreline Protection Reach plan is consistent under the location rule.

7:7E-6.3 Secondary Impacts

This rule sets the requirements for the secondary impact analysis. Additional development is not expected as a result of the selected Bay Shoreline Protection Reach plan; therefore, there will be no secondary impacts associated with the proposed shore protection project; therefore, this policy is not applicable.

IX Subchapter 7 – Use Rules

7:7E-7.2 Housing Use

These rules set standards for housing construction in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve housing construction.

7:7E-7.3 Resort Recreational Use

This rule sets standards for resort and recreational uses in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve resort recreational uses.

7:7E-7.3A Marina Development

This rule sets standards for marina development in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve marina development.

7:7E-7.4 Energy Use

This rule sets standards for energy uses in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve new construction that would require long-term energy use.

7:7E-7.5 Transportation Use

This rule sets standards for roads, public transportation, footpaths and parking facilities in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve construction of roads, public transportation, footpaths, or parking facilities; therefore, the selected Bay Shoreline Protection Reach plan is compatible with this policy.

7:7E-7.6 Public Facility Use

This rule sets standards for public facilities (*e.g.*, solid waste facilities) in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve construction of a public facility.

7:7E-7.7 Industry Use

This rule sets standards for industrial uses in the coastal area. The selected Bay Shoreline Protection Reach plan does not involve construction of industrial facilities.

7:7E-7.8 Mining Use

This rule sets standards for mining in the coastal area. The selected Bay Shoreline Protection Reach plan will get its sand for initial nourishment from the Sea Bright Offshore Borrow Area, which received federal consistency as part of the Section I Sea Bright to Ocean Township, Beach Erosion Control Project, and therefore, consistent with this policy.

7:7E-7.9 Port Use

This rule sets standards for port uses and port-related development. The selected Bay Shoreline Protection Reach plan does not involve construction of a port; therefore, this policy is not applicable.

7:7E-7.10 Commercial Facility Use

This rule sets standards for commercial facilities such as hotels, and other retail services in the coastal zone. The selected Bay Shoreline Protection Reach plan does not involve construction of commercial facilities; therefore, this policy is not applicable.

7:7E -7.11 Coastal Engineering

This section sets standards to protect the shoreline, maintain dunes, and provide beach nourishment. Only those standards applicable to the selected Bay Shoreline Protection Reach plan areas are listed:

(c) Standards relevant to dune management

Dune restoration, creation, and maintenance projects as non-structural shore protection measures are encouraged. The selected Bay Shoreline Protection Reach plan is in accordance with Subchapter 3A.

(d) Standards relevant to beach nourishment

Beach nourishment projects, such as non-structural shore protection measures are encouraged provided that certain guidelines are met. The selected Bay Shoreline Protection Reach plan will meet the guidelines.

(e) Standards relevant to structural shore protection

The construction of new shore protection structures, including seawalls, to prevent tidal waters from reaching erodible material is acceptable if it meets certain conditions. The selected Bay Shoreline Protection Reach plan will meet the conditions listed in this policy.

7:7E-7.12 Dredged Material Disposal on Land

This rule sets standards for disposal of dredged materials. The selected Bay Shoreline Protection Reach plan does not involve any dredge material disposal; therefore, this policy is not applicable.

7:7E-7.13 National Defense Facility Use

This rule sets standards for the location of defense facilities in the coastal zone. The selected Bay Shoreline Protection Reach plan does not involve location of a defense facility; therefore, this policy is not applicable.

7:7E-7.14 HIGH RISE STRUCTURES

This rule sets standards for high rise structures in the coastal zone. The selected Bay Shoreline Protection Reach plan does not involve construction of high rise structures.

X Subchapter 8 – Resource Rules

7:7E-8.2 MARINE FISH AND FISHERIES

This rule sets standards of acceptability so as to cause minimal feasible interference with the reproductive and migratory patterns of estuarine and marine species of finfish and shellfish. The selected Bay Shoreline Protection Reach plan will cause minimal feasible interference with the documented species of finfish and shellfish known to occur in the placement area; therefore, the selected Bay Shoreline Protection Reach plan is consistent with this policy.

7:7E-8.3 (RESERVED)

7:7E 8.4 WATER QUALITY

This rule sets standards for coastal development to limit effects on water quality. Short-term water quality impacts resulting from construction activities are expected and are anticipated to be localized proximal to the placement area. No long-term impacts to the offshore or nearshore water quality are anticipated as a result of the construction of the selected Bay Shoreline Protection Reach plan.

7:7E-8.5 SURFACE WATER USE

This rule sets standards for coastal development so as to limit effects on surface water. Short-term water quality impacts resulting from construction activities are expected and are anticipated to be localized proximal to the placement area.

7:7E-8.6 GROUNDWATER USE

This rule sets standards for coastal development so as to limit effects on groundwater supplies. The selected Bay Shoreline Protection Reach plan will not involve or effect future use of groundwater supplies; therefore, this policy is not applicable.

7:7E-8.7 STORMWATER MANAGEMENT

This rule sets standards for coastal development so as to limit effects of stormwater runoff. The selected Bay Shoreline Protection Reach plan will not involve or effect future stormwater management.

7:7E-8.8 VEGETATION

This rule sets standards for coastal development while protecting native vegetation. The selected Bay Shoreline Protection Reach plan involves the restoration of sandy dune habitat and will provide long-term protection to the existing dune, which is currently being lost due to erosion. Restoration of the sandy dune will include planting of native vegetation to help stabilize the dune.

7:7E-8.9 (RESERVED)

7:7E-8.10 AIR QUALITY

This rule sets standards for coastal development with requirements that projects must meet applicable air quality standards. Emissions to construct this plan do not exceed threshold levels for any emission variable. As a result, a Clean Air Act "Finding of Non-Applicability" has been assembled. Accordingly, the selected Bay Shoreline Protection Reach plan is not anticipated to increase air emissions above existing levels. Therefore, the project would be consistent with this policy.

7:7E-8.11 PUBLIC ACCESS TO THE WATERFRONT

This rule requires that coastal development adjacent to the waterfront provide perpendicular and linear access to the waterfront to the extent practicable, including both visual and physical access. The selected Bay Shoreline Protection Reach plan involves dune restoration which includes the construction of walkways over the dune to allow public access to the beach. The selected Bay Shoreline Protection Reach plan will not impede public access to the waterfront; therefore, the project is consistent with this policy.

7:7E -8.12 SCENIC RESOURCES AND DESIGN

This rule sets standards that new coastal development be visually compatible with its surroundings. The proposed design for the selected Bay Shoreline Protection Reach plan has been modified to the maximum extent possible to prevent physical encroachment on the Spy House grounds.

7:7E-8.13 BUFFERS AND COMPATIBILITY OF USES

This rule sets standards for adequate buffers between compatible land uses. The selected Bay Shoreline Protection Reach plan is compatible with adjacent land uses; therefore, it would be consistent with this policy.

7:7E-8.14 TRAFFIC

This rule sets standards that restrict coastal development that would disturb traffic systems. The selected Bay Shoreline Protection Reach plan will make every effort possible to mitigate temporary impacts on traffic during construction. Traffic flow during flooding should improve, as the project's goal is to lessen the impact of flooding, and as such the selected Bay Shoreline Protective Reach plan is consistent with this policy.

7:7E-8.15 THROUGH 8.20 (RESERVED)

7:7E-8.21 SUBSURFACE SEWAGE DISPOSAL SYSTEMS

This rule sets standards for subsurface sewage disposal systems in the coastal zone. The selected Bay Shoreline Protection Reach plan does not involve sewage disposal; therefore, this policy is not applicable.

EA APPENDIX B

Clean Water Act 404(b) (1) Evaluation

CLEAN WATER ACT 404(B) (1) EVALUATION REPORT

Raritan Bay and Sandy Hook Bay
Hurricane and Storm Damage Reduction Study
Port Monmouth, New Jersey
Modification to the Feasibility Report's Recommended Plan for the Bay Shoreline Protection Reach

I. GENERAL DESCRIPTION OF FILL MATERIAL

A. General Characteristics of Material

1. The Bay Shoreline dune, initial beach nourishment, and each periodic beach renourishment will be constructed with fill comprised of sand.

2. The Western Terminal Groin (WTG) will be constructed with rock.

B. Quantity of Materials

1. Initial Nourishment: 336,200 cubic yards (c.y.)
2. Each Periodic Renourishment: 79,500 c.y.
3. Total Nourishment: 654,200
4. WTG: 260 c.y.

C. Source of Materials

The sand used to initially restore the dune and beach will come from an existing permitted and approved offshore borrow area known as the Sea Bright Offshore Borrow Area (SBOBA). The sand used for each periodic renourishment and the rock to construct the WTG will come from an existing permitted upland facility.

II. DESCRIPTION OF THE PROPOSED DISCHARGE SITE

A. The Selected plan is described in EA Section 2.1

B. Time and Duration of Disposal/Fill Placement

The construction to initially restore the sandy beach, berm and dune is scheduled to take less than 2 months. The construction of the western terminal groin is expected to take 3.5 months. Each periodic renourishment is anticipated to take less than 2 months.

C. Description of Disposal/Fill Placement Methods

To initially restore the sandy beach, berm and dune, a hopper dredge is expected to be used. Sand of similar grain size will be removed from the SBOBA by a hopper dredge and then transport its load of sand to a location near the beach where the sand is then pumped from the vessel through a floating pipeline onto the beach as a slurry mixture. The sand is then spread and contoured to design specifications by earth-moving equipment. For each periodic renourishment, sand is anticipated to be trucked in from an upland source and dumped onto the beach. The sand is then spread and contoured to design specifications by earth-moving equipment. Rock to construct the WTG is expected to be to arrive at the site by barge where a land-based crane will remove it from the barge and place it onto the existing beach and into intertidal and nearshore water of the bayshore.

III. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

	Beach	Dune	WTG
1. Elevation:	9 ft.	16 ft.	10 ft. onshore 5.0 ft. offshore
Slope:	1 on 15	Landward 1 on 5 Seaward 1 on 10	1 on 2
Width:	50 ft.	25 ft.	13 ft.

2. Sediment Type:

(a) Beach and Dune: Sand similar to those present in the area will be utilized.
(b) WTG: large rock.

3. Dredged/Fill Material Movement:

The implementation of the Bay Shoreline plan will have a long-term, indirect impact to navigation channels in both Pews Creek and Compton Creek. The littoral transport of placed sand will occur and result in the deposition of an additional 2,800 c.y./year for both creeks (Pews Creek 1,800 c.y./year; Compton Creek 1,000 c.y./year) that will need to be dredged as part of normal O&M dredging.

4. Physical Effects on Benthos:

Benthic invertebrates will be buried/smothered by fill material. However, long-term effects are not anticipated. Monitoring the recovery of intertidal and subtidal benthos will be conducted.

5. Other Effects:

   No additional major impacts are anticipated from the Selected plan.

6. Actions Taken to Minimize Impacts:

   The Selected plan is a modification to the recommended feasibility plan, and will result in a reduction of the total footprint area by 3.45 acres.

D. Water Circulation, Fluctuation and Salinity Determinations

1. Water Quality:

   (a) Salinity – Not Applicable (N/A).
   (b) Water Chemistry (pH, etc.) – No major impacts.
   (c) Clarity – Temporary localized increases in turbidity during the placement of beach nourishment.
   (d) Color – Possible minor short-term change.
   (e) Odor – Not measurable.
   (f) Taste – N/A.
   (g) Dissolved Gas Levels - Possible short-term variations due to turbulence caused by construction activity.
   (h) Nutrients - Potential short-term increase.
   (i) Eutrophication – N/A.
   (j) Others as Appropriate – N/A.

2. Current Pattern and Circulation:

   (a) Current Pattern and Flow – Will be altered causing increased deposition into the channels of Pews and Compton Creeks.
   (b) Velocity – N/A.
   (c) Stratification – N/A.

3. Normal Water Level Fluctuations:

   The proposed action will reduce the 100-year floodplain throughout most of the Selected plan.

2. Salinity Gradients:

   No impacts are anticipated.

3. Actions Taken to Minimize Impacts:

   See Section IIIA6 above.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Construction Site(s):

   A temporary increase in turbidity due to construction activity is anticipated.

2. Chemical and Physical Properties of the Water Column:

   (a) Light Penetration – Particles will settle fairly rapidly. Localized minor impacts are anticipated.
   (b) Dissolved Oxygen - Possible localized short-term affects due to placement of nourishment.
   (c) Toxic Metals and Organics – No adverse effects are anticipated.
   (d) Pathogens – N/A.
   (e) Aesthetics – N/A.
   (f) Others as appropriate – No adverse effects are anticipated.

3. Biota:

   (a) Primary Production, Photosynthesis - None
   (b) Suspension/Filter Feeders – Localized minor short-term impacts are anticipated.
   (c) Sight Feeders – Fish and motile invertebrates may be affected due to localized temporary increases in turbidity during construction.

4. Actions taken to Minimize Impacts:

   See Section IIIA6 above.

D. Contaminant Determinations

Geotechnical analysis of beach nourishment material concluded that the material is >99% sand, and as a result is considered to be void of contaminants. The WTG is comprised of rock which is also considered to be void of contaminants.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton:

No impacts are anticipated.

2. Effects on Nekton:

   No impacts are anticipated.

3. Effects on Benthos:

   Benthic invertebrates will be buried/smothered by fill material. However, long-term effects are not anticipated. Monitoring the recovery of intertidal and subtidal benthos will be conducted.

4. Effects on Aquatic Food Web:

   No impacts are anticipated.

5. Effects on Special Aquatic Sites:

   (a) Sanctuaries and Refuges – N/A.
   (b) Wetlands –N/A.
   (c) Mud Flat – N\A.
   (d) Vegetated Shallows – N/A.
   (e) Intertidal and Subtidal – Localized short-term impact is anticipated. Monitoring program will be implemented to assess recolonization of benthic resources.

IV. FINDING OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. No significant adaptations of the guidelines were made relative to this evaluation.

B. The proposed action does not appear to violate applicable state water quality standards or effluent standards.

C. The proposed fill material placement will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. The proposal will have no adverse impact on endangered species or their critical habitats (Endangered Species Act of 1973).

E. The proposal will have no impact on marine sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

EA APPENDIX C

Clean Air Act – Record of Non-Applicability

DRAFT GENERAL CONFORMITY - RECORD OF NON-APPLICABILITY

Project/Action Name: Raritan Bay and Sandy Hook Bay, Hurricane and Storm Damage Reduction Study, Port Monmouth, New Jersey, Modification to the Feasibility Report's Recommended Plan for the Bay Shoreline Protection Reach.

Project/Action Identification Number: N/A

Project/Action Point of Contact: Mark H. Burlas, Project Senior Wildlife Biologist. 917-790-8704

Estimated Begin Date: To Be Determined

Estimated End Date: To Be Determined

General Conformity under the Clean Air Act, Section 176 has been evaluated for the project described above according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project/action because:

__X__ Total direct and indirect emission of from this project/action have been estimated that Ozone (NOx & VOC's) 64.64 & 1.82 tons, and Carbon monoxide (CO) 14.12 tons, are below the conformity threshold value established at 40 CFR 93.153(b) of 100, 25 and 100 tons per year respectively.

AND

The project/action is not considered regionally significant under 40 CFR 93.153(i).

Supporting documentation and emissions estimates are

( ) ATTACHED

(X) APPEAR IN THE NEPA DOCUMENTATION (*PROVIDE REFERENCE*)

( ) OTHER _____.

SIGNED _____.

(*Frank Santomauro, Chief, Planning Division*)

Table 1 Total Project Emissions

Pollutant	*de minimis* Emission Levels (tons/yr)	Calculated Total Project Emissions (tons)
NOx	25	5.04
VOC	25	.18
CO	100	1.29

Table 2 Individual Equipment Emissions

Equipment Type	Marine Emissions (tons)				
	VOC	**CO**	**NOx**	**PM**	
Tow Boat (870 HP)	.08	.75	3.9	-	-
Work Boat (50 HP)	-	.04	.22	-	-
Marine Sub-Total	*.08*	*.75*	*4.13*	-	-
Crane – C85LB005	.05	.16	.38	.05	.03
Excavator – H25CA016	.02	.14	.28	.04	.02
Pile Hammer – P30MK003	.03	.20	.24	.03	.02
Non-Marine Sub-Total	*.10*	*.50*	*.91*	*.12*	*.08*
Total Emissions	**.18**	**1.29**	**5.03**	**.12**	**.08**

Table 3 Equipment Identification

Equipment ID	Description	Engine Horsepower (HP)		
		Main	Carrier	Total Hrs.
C85LB005	CR, ME, CWLR, LIFTING, 75 T/150'BV	195	0	400
H25CA016	HYD EXCAV, CRWLR, 2.50 CY BKT	207	0	200
P30MK003	Pile Hammer, Vib, 107T Force DI (Add Leads & Crane)	325	0	100

Table 4

Description	Propulsion Engines			Auxiliary Engines		
	Load %	Engine HP	Total Hours	Load %	Engine HP	Total Hours
Tow Boat	70	870	600	0	0	0
Work Boat	70	50	600	0	0	0

EA Appendix D

Environmental Assessment
Finding of No Significant Impact

UNSIGNED
NATIONAL ENVIRONMENTAL POLICY ACT
FINDING OF NO SIGNIFICANT IMPACT

Raritan Bay and Sandy Hook Bay
Hurricane and Storm Damage Reduction Study
Port Monmouth, New Jersey
Modification to the Feasibility Report's Recommended Plan for the
Bay Shoreline Protection Reach

I. Purpose and Need

Over time, storm events have significantly altered the composition of the Port Monmouth shoreline. Significant erosion has removed much of the natural beachfront and dune complexes that provide coastal protection to the Port Monmouth community (USACE 1993b). The Port Monmouth shoreline historically has eroded at an annual beach retreat rate of approximately 2.7 ft per year (USACE 1993b). In addition, severe storms damaged and destroyed structures (USACE 1993b). Accordingly, to prevent future damages cause by severe storms, the District conducted a comprehensive and detailed feasibility study of alternatives to provide protection against flood damages (USACE 1998 and 2000).

The U.S. Army Corps of Engineers (USACE), New York District (District) in partnership with the New Jersey Department of Environmental Protection (NJDEP) prepared a Draft Feasibility Report and a Draft Environmental Impact Statement (EIS) (USACE 1998) and a Final Feasibility Report and Final EIS (USACE 2000) (from herein these Reports will be cited as the Feasibility Report) for hurricane and storm damage reduction at Port Monmouth, New Jersey (NJ); however, a National Environmental Policy Act (NEPA), Record of Decision (ROD) has not been signed. The Recommended Plan resulting from the Feasibility Report provides reduction of storm damages from coastal erosion and flooding and inland flooding caused by high tide surge events in the Raritan Bay and Sandy Hook Bay (RBSHB) during hurricanes and severe storms. Three areas (the Bay Shoreline, Pews Creek and Compton Creek) within the Port Monmouth community were identified in the Feasibility Report as areas justified receiving protection from damages caused by hurricanes and severe storms.

As part of the USACE's internal review policy, the Office of Chief of Engineers Value Engineering Study Team (OVEST) suggested a modification to the Recommended Plan for the Bay Shoreline Protection Reach as discussed in the Feasibility Report. OVEST suggested a design change that substitutes a stone terminal groin in lieu of a lengthy sand taper to provide closure to the existing bay shoreline. Use of one terminal groin at the western end of the Bay Shoreline area as a closure structure provides a lower

annual cost design than use of a sand taper closure and has a smaller footprint, while maintaining the same level of protection.

The District conducted an Environmental Assessment (EA) of the impacts of the proposed design modification to the Bay Shoreline Protection Reach and concluded a Finding of No Significant Impact (FONSI) because: 1) there were no significant issues identified during the Draft and Final EIS public and agency review and comment phases; 2) there is no known new significant information to justify the preparation of a supplemental EIS, and; 3) except for only 7,400 square feet, the construction of the proposed modification is within the footprint of alternatives that were considered during the feasibility phase. Accordingly, the preparation of this EA with a FONSI and the accompanying Engineering Documentation Report (EDR) is to subject the proposed modification to the Bay Shoreline Protection Reach of the Feasibility Report's Recommended Plan to the NEPA process.

II. Project Authorization

This EA/FONSI was prepared pursuant to:

A. A January 6, 1955 amendment to the State of New Jersey, Department of Conservation and Economic Development basic application of September 22, 1952 requesting a beach erosion control study;

B. Chief of Engineers August 15, 1955 approval of a supplemental agreement dated June 22, 1955 amending the basic application in accordance with Section 2 of Public Law 520 (River and Harbor Act), 71st Congress, approved July 3, 1930, as amended and supplemented pertaining to cooperative beach erosion control investigations;

C. State of New Jersey authority to participate in a study established by Chapter 258, New Jersey Law (N.J.L.) 1946 and Chapter 448, N.J.L. 1948 and appropriation acts of the State;

D. A hurricane study authorized by Public Law 71, 84th Congress, 1st Session on June 16, 1955, funded by Chief of Engineers allocation letter dated October 1, 1957, and approved on February 12, 1960;

E. The existing Federal Project, Raritan Bay and Sandy Hook Bay (RBSHB), New Jersey, authorized by the Flood Control Act of October 12, 1962 in accordance with House Document No. 464, 87th Congress, 2nd Session;

F. The RBSHB shorefront area study resolution authorized by the U.S. House of Representatives, Committee of Public Works and Transportation, adopted August 1, 1990, which states "Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, that the Board of

Engineers for Rivers and Harbors is requested to review the report of Chief of Engineers on RBSHB, New Jersey, published as House Document 464, Eighty-seventh Congress, Second Session, and other pertinent reports, to determine the advisability of modifications to the recommendations contained therein to provide erosion control and storm damage prevention for the RBSHB".

G. Construction of the Port Monmouth, NJ project was authorized under Section 101 of the Water Resources Development Act of 2000, as follows:

"(23) RARITAN BAY AND SANDY HOOK BAY, PORT MONMOUTH, NEW JERSEY. – The project for hurricane and storm damage reduction, Raritan Bay and Sandy Hook Bay, Port Monmouth, New Jersey, at a total cost of $32,064,000, with an estimated Federal cost of $20,842,000 and an estimated non-Federal cost of $11,222,000, and at an estimated average annual cost of $173,000 for periodic nourishment over the 50-year life of the project, with an estimated annual Federal cost of $86,500 and an estimated annual non-Federal cost of $86,500."

III. Project Area Description

The community of Port Monmouth is located in the Township of Middletown in northern part of Monmouth County, New Jersey. Port Monmouth is one of several communities within Middletown, all of which are governed by the township's municipal government. This Project area includes approximately 1.5 miles of coastline between Pews Creek to the west and Compton Creek to the east. The communities of Belford and Keansburg lie immediately west and east of Port Monmouth respectively.

Approximately 7% of New Jersey's population of 7.7 million resides in Monmouth County. Of the 553,124 people whom live in Monmouth County, approximately 68,183 (12%) live in Middletown Township, which comprises 8% of the county's total land area. Of the total population in Middletown, 3,558 people reside within the Port Monmouth community (U.S. Bureau of the Census 1992). The average population density in Middletown Township is 1,660 residents per square mile, which is slightly higher than the county average of 1,173 residents per square mile. However, population density in the predominantly residential Port Monmouth community is significantly higher than both the township and the county averages, at 2,740 people per square mile (Coastal Planning and Engineering 1993).

The net valuation (total taxable value) of property (excluding tax exempt properties) in Middletown Township is $4,751,312. The taxable value of residential property in the township represents a significant portion of this total (approximately 84%), while commercial properties account for approximately 13%. Vacant lands, apartments, farmland, and industrial properties account for only a small portion of the taxable land values in Middletown Township.

In 1989, per capita income in Middletown Township was $21,882, which was slightly higher than the Monmouth County average of $20,565. Per capita income in the Port Monmouth community in 1989 ($13,610) was substantially lower than the county and township averages and was also lower than the statewide per capita income of $18,714. In 1989, 3.9% of the total population of Port Monmouth had incomes that were classified below the poverty level.

In 1990 there were approximately 218,408 housing units in Monmouth County, including the 23,495 units located in Middletown Township. Of these, 1,281 were located in the Port Monmouth community. Approximately 12% of the houses in Port Monmouth were built during the construction boom of the 1980's; 59% were built between 1940 and 1980 and the remainder were built prior to 1940 (U.S. Bureau of the Census 1992).

Land use in the Port Monmouth community primarily consists of residential and undeveloped tidal wetlands, with business and commercial/industrial areas of smaller size located along NJSH 36 and the navigable waterfront areas.

Historically, Port Monmouth was a summer vacation destination for part-time residents, but since the 1960s, the small homes along the Bay Shoreline have been converted to year-round homes, and many newer year-round homes have been constructed in the area between Pews Creek and Compton Creek. Virtually all of the homes in the Port Monmouth community are located within the 500-year flood zone, and a majority of these homes are within the 100-year flood zone (URS Grenier 1997).

The land use along the Port Monmouth Bay Shoreline consists of a very narrow sandy beach and dune, with several right-of-way easements that provide public access from roadside parking areas to the narrow beach. A public fishing pier is located within the Bay Shoreline, and is adjacent to the historic Whitlock/Seabrook Wilson House, commonly referred to as the Spy House Museum. A small residential area is situated between the dunes and Port Monmouth Road adjacent to the marina along Pews Creek. In the middle portion of the Bay Shoreline are scattered residences and undeveloped land parcels situated between the Bay Shoreline and Port Monmouth Road. In the eastern portion of the Bay Shoreline is a commercial area supports the local fishing industry, recreational boating activities. And ferry service to New York City.

The Township of Middletown has established two zoning Districts within the Port Monmouth community: high-density, single family residential (R-7) and marine commercial (MC) (Middletown Township 1994). In the R-7 District, the standard interior residential lot size is 7,500 square ft with 75 ft of road frontage. The MC District supports facilities and activities associated with fishing and boating use, including outdoor storage of fishing-related equipment, seafood unloading and processing facilities, and boat repair service (Middletown Township 1994).

IV Proposed Action

A proposed change to the Bay Shoreline Protection Reach of the Feasibility Report's Recommended Plan consists of the substitution of one terminal groin in lieu of a sand taper to connect the improved bay shoreline to the existing bay shoreline at the western end of the Port Monmouth Bay Shoreline. Use of a terminal groin closure does not alter the primary protective beach berm and dune system presented in the Feasibility Report's Recommended Plan. The dune length, width, landward position and side slopes are unchanged, as well as the design berm width, elevation, side slopes fronting the dune, and bay shoreline extent. Initial nourishment is still scheduled to come from the Sea Bright Offshore Borrow Area (SBOBA), which was previously subjected to separate NEPA documents (USACE 1989 and 1994), Essential Fish Habitat (EFH) Assessment (USACE 2005a), Endangered Species Act (ESA) (USACE 1993a and USDC 1995) and has received all Federal and state permits. The sand for each periodic renourishment is still scheduled to be trucked in and remains at 10-year intervals but with a reduction of required renourishment volume. The extension of the existing fishing pier is still planned. Since the proposed modification includes a terminal groin at the west end of the dune line instead of a sand taper terminus, a reduced section of taper fill will be placed down drift of the groin equivalent in volume to the amount of sand impounded in the up drift fillet to offset local groin-induced sand losses. The construction of the terminal groin adds only 7,400 square feet or 0.17 acres that were not analyzed as discussed in the Feasibility Report. Finally, the Bay Shoreline plan proposes to install 3 Osprey (*Pandion haliaetus*) nesting platforms. The osprey is listed by the NJDEP, Division of Fish and Wildlife (DFW) as a threatened species.

A terminal groin performs the following coastal engineering functions:

1. Provides efficient transition from a placed beachfill to existing shoreline;
2. Reduces beach fill erosion rates by:

    A. Impoundment in updrift fillet (short term);
    B. Reducing the length of shoreline to be renourished (long-term), and;
    C. Reorientation of the shoreline (long term).

3. Reduces quantity of channel infilling.

When compared to the Feasibility Report's Recommended Plan, the implementation of the proposed modification to the Bay Shoreline Protection Reach provides equal hurricane and severe storm damage protection, has a lower annual cost, a higher benefit to cost ratio and advances the USACE's Environmental Operating Procedures (EOPs) by further minimizing impacts and providing ecological and recreational benefits as follows:

A. The overall footprint is reduced by ~ 9.9 acres of which the intertidal footprint is reduced by ~ 3.1 acres;

B. The volume of initial nourishment is estimated at 336,200 cubic yards (c.y.), which is 101,300 c.y. less material;
C. The volume of nourishment for each periodic renourishment is less by 47,800 c.y.;
D. The total volume of nourishment over the 50-year life of the project, which includes the initial placement of sand and 4 periodic renourishments, is reduced by 292,500 c.y.;
E. The western terminal groin provides the following ecological benefits:

    1. Add hard physical habitat diversity to the intertidal bay bottom;
    2. Increase habitat diversity for fishery resources to forage;
    3. Improve habitat diversity for sessile shellfish to attach themselves upon and grow;
    4. Enhance habitat diversity for macroinvertebrates to forage and hide from predators, and;
    5. Offer an isolated habitat for avian resources to loaf and rest.

F. The western terminal groin will offer another location for recreational fishing opportunities;
G. The duration to restore the sandy beach, berm and dune will be reduced, and;
H. The installation of 3 Osprey nesting platforms.

The cost for the modified Bay Shoreline Protection Reach plan is based on October 2006 price levels and the FY 07 Federal interest rate of 4-7/8%. The economic analysis of the modified plan will provide annual benefits of $4,714,000 which, when compared to the total annual cost of the modified selected plan of $3,011,100 yields a benefit to cost ratio of 1.6 with $1,702,400 in net excess benefits. The modified selected plan is the National Economic Development (NED) plan.

The initial cost for the construction of the modified plan, including the advance nourishment, is estimated at $43,704,000 (Oct 2006 price levels). The Federal share of this first costs is $28,408,000 (65%), and the non-Federal share is $15,296,000 (35%). The annualized cost for periodic nourishment is currently estimated at $127,200 that will be cost shared at a rate of 50% Federal and 50% non-Federal. The non-Federal sponsor, the NJDEP, has indicated general support for the modified selected plan and would be willing to enter into a Project Cooperation Agreement with the USACE for the implementation of the selected plan. Local municipalities would cost share the non-Federal share with the State. These include Monmouth County and Middletown Township, which are also supportive of the modified selected plan.

VI. Anticipated Effects of the Proposed Action

The construction of the modified plan is expected to result in only short-term localized adverse effects and long-term benefits. No significant direct, indirect and cumulative impacts are anticipated.

Mitigation includes avoidance, minimization of affects (in addition to minimization efforts as described in the Feasibility Report), biological monitoring and the advancement of the USACE EOPs. Avoidance could be accomplished by restricting the placement of sand and rock to the months between May and November; this avoids an impact to eggs from the EFH designated Winter flounder (*Pleuronectes americanus)* because they spawn in the Raritan Bay and Sandy Hook Bay (RBSHB) estuary from December to April (USACE 2006). However, the District decided not to implement a non-placement window to minimize potential winter flounder effects because: 1) the placement of sand in winter months will have an overall benefit to benthic resources as there abundances are naturally diminished during the winter, and; 2) the footprint for sand placement is insignificant when compared to the total quantity of subtidal habitat of the RBSHB. Minimization of impacts is achieved because the proposed modification has a smaller footprint when compared to the selected Bay Shoreline Protection Reach alternative described in the Feasibility Report. To better understand and quantify impacts of beach nourishment in an estuarine ecosystem, biological monitoring is planned in the intertidal and nearshore subtidal zones at the sand placement site. The results of biological monitoring is expected to considerably add to the existing ecological knowledge base of the RBSHB and also cited for other future actions. Endangered species and dune monitoring is scheduled too. The newly restored wider sandy beach can provide suitable habitat for Federal and state-listed threatened and endangered species, such as the Piping plover (*Charadrius melodus*) and Least terns (*Sterna antillarum*) to nest and Seabeach amaranth (*Amaranthus pumilus*) to grow. As a result of this potential, monitoring for these significant species is scheduled to take place for the first 3 years after initial construction. Should any of these species use the restored sandy beach, the District will reinitiate consultation with the U.S. Fish and Wildlife (USFWS) pursuant to the Section 7 of the ESA. The monitoring of dune vegetation will be performed to ensure 85% vegetative success rate; short-term replanting of vegetation is anticipated to achieve an 85% vegetative success rate. The raising of 3 Osprey (*Pandion haliaetus)* nesting platforms is planned and will advance the EOPs of the USACE. The osprey is a state-listed species, as the NJDEP, Division of Fish and Wildlife (DFW) classifies the osprey as a threatened species in the State of New Jersey.

The placement of sand and rock along the Port Monmouth Bay Shoreline is not expected to have any significant and long-term lasting effects on the "spawning, breeding, feeding, or growth to maturity" of the designated EFH species that occupy the intertidal and nearshore zones (USACE 2006). However, proposed activities would have immediate, short-term, direct and indirect impacts on some life history stages of EFH designated fish species that occur in the immediate vicinity of sand and rock placement.

The proposed modification of the Bay Shoreline Protection Reach is expected to have a direct, short-term impact on benthic resources. Beach nourishment is expected to smother benthic organisms causing their mortality; but, this impact is expected to be temporary and limited to the placement area during construction. The recoveries of benthic resources to pre-construction conditions are expected to begin immediately in

each beach segment right after the placement of sand is completed for that beach segment. Full recover of benthic resources in terms of their diversity, richness and biomass to pre-construction conditions is anticipated within a 6-12 month period. The proposed modification of the Bay Shoreline Protection Reach is expected to cause short-term, localized increase in surface water turbidity and push the intertidal and subtidal zones further offshore. Short-term reduction in shellfish feeding efficiency and localized mortality would be offset by the overall benefit of additional sand, which is considered a high quality benthic substrate material. As a result, the Bay Shoreline plan may benefit the Horseshoe crab (*Limulus polyphemus*), as their larvae are an important food source for numerous species of migratory birds along the Atlantic migratory pathway. More recently, the USACE (2004) has found that horseshoe crab larvae is a dominate food source for Atlantic silversides (*Menidia menidia*), which are a preferred prey for migratory Bluefish (*Pomatomus saltatrix*) and Striped bass (*Monroe saxatilis*); these 2 species are highly sought-after by many recreational fisherman. A wider, sandy beach and improved intertidal habitat conditions may provide more suitable spawning habitat for the horseshoe crab, thus potentially increasing prey resources available for consumption by both migratory birds and fish.

The implementation of the proposed modification will provide an immediate and long-term benefit to the existing dune ecosystem along the Port Monmouth Bay Shoreline. Currently these dunes, which represent excellent wildlife habitat and are very limited within the RBSHB estuary, are experiencing erosion during each high tide and excessive erosion during storm events. In addition, implementation of the proposed modification can provide benefits to navigation, due to the burial of existing wood pilings. Once buried, these structures would lose the ability to dislodge and become floating hazards to recreational boats and commercial vessels. However, the terminal groin is a hard structure, and as such will be a hazard to recreational boats.

The placement of rock to construct the terminal groin is expected to smother benthic organisms, and possibly limited numbers of macroinvertebrates, and juvenile and larval fish causing their mortality. The placement of rock will also result in the permanent loss of 0.64 acres of intertidal and nearshore subtidal habitat; however, this loss is negligible when compared to the total amount of intertidal habitat within the RBSHB complex. The loss of these habitats will permanently be replaced by rocky, hard bottom material that will add diversity to the bay bottom habitat. This added hard bottom habitat can attract and concentrate prey fish species and sessile shellfish creating an optimal foraging area for predatory and migratory fish species such as Bluefish and Stripped bass.

The emissions from the construction of the proposed modification do not exceed the threshold limits for carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate 10 and 2.5. As such, a Record of Non-Applicability was prepared pursuant to the Clean Air Act.

The allocation of Federal, state, and local funds to construct the proposed action will provide an environmental justice benefit for the low and lower-than-average-income

populations living in the community. The construction of Bay Shoreline plan will have a positive effect on the local population by reducing their costs associated with storm water damage, as well as costs incurred from their temporary relocation during and after storm events.

The placement of sand in this area will not adversely affect known cultural resources and may help to protect unknown cultural resources located behind the beach. No additional analysis of effects of the proposed Bay Shoreline protection plan on cultural resources will be necessary unless the nature of the proposed Bay Shoreline protection plan changes over its duration. Should the nature of the Bay Shoreline proposed protection plan change (e.g., a different borrow area) additional consultation with the State Historic Preservation Office (SHPO) would become necessary.

In addition to this proposed action, the District is currently studying 2 other proposed actions along the NJ shoreline of the RBSHB complex that either includes only beach nourishment or beach nourishment with placement of groins. The construction of these projects is expected to have similar adverse and beneficial impacts as described for the current proposed action, as they also interact with the intertidal and nearshore subtidal zones of RBSHB shoreline. Cumulative adverse effects are anticipated to be minimal because these zones are extremely dynamic and very energetic areas subject to periods of naturally occurring high turbidity and sediment movement. Storm events have been shown to increase both turbidity and total suspended sediment load to levels several orders of magnitude higher than those observed from localized beach nourishment operations (USACE 2001). Also, these natural events occur over entire geographic regions that affect hundreds of miles of coastline. Whereas, all proposed beach nourishments within the RBSHB will be limited to just a couple of miles of bay shoreline. Both designated EFH species and other aquatic resources successfully exist within this system where such natural events are common.

The cumulative amount of intertidal and nearshore subtidal habitat converted to rocky hard bottom habitat is insignificant when compared to the total area of intertidal and nearshore subtidal within the RBSHB estuary. Due to the localized nature and the limited degree of scale of expected impacts, it is highly unlikely of any significant direct or indirect cumulative effects due to the construction of these projects along the bay shoreline of the RBSHB estuary. Overall, no significant adverse cumulative ecological, biological and cultural resource impacts are anticipated as a result of the construction of the proposed modification of the Bay Shoreline Protection Reach in the community of Port Monmouth, NJ.

VII. Conclusion

Given that there are no anticipated significant direct, indirect and/or cumulative impacts associated with the implementation of the modified Bay Shoreline Protection Reach plan, this Environmental Assessment concludes a Finding of No Significant Impact on the quality of the environment. Therefore, a supplemental Environmental Impact Statement is not required.

Date: _____

_____
Aniello L. Tortora
Colonel, U.S. Army
District Engineer

Note: This unsigned FONSI is anticipated to be signed pending agency and public review and their comment to the draft Environmental Assessment.

APPENDIX E

District Response to:

U.S. Fish and Wildlife Service
Supplement to their Endangered Species Act, Section 7 Consultation
and
Fish and Wildlife Coordination Act

District Response to the supplemental USFWS 2b Report Recommendations

Raritan Bay and Sandy Hook Bay
Hurricane and Storm Damage Reduction Study
Port Monmouth, New Jersey
Modification to the Feasibility Report's Recommended Plan for the
Bay Shoreline Protection Reach

Recommendation 1: The District concurs. Consultation with the NMFS has been completed and a Biological Opinion by the NMFS was produced for dredging sand offshore.

Recommendation 2: The District concurs and plans to monitor for the presence of the piping plover, least tern and seabeach amaranth for the first 3 consecutive years after initial beach nourishment and each periodic renourishment. Further annual monitoring will be based upon the monitoring result.

Recommendations 3 and 4: The District will work with the Service and NJDEP and their Endangered and Nongame Species Program (ENSP) to support active participation by the locals. The District will educate the locals that their active and cooperative spirit to provide stewardship to threatened and endangered species is in their best interest, as well as in the best interest of all of the stakeholders.

Recommendation 5: The District concurs and plans to reinitiate ESA Section 7 consultation with the Service prior to each periodic renourishment.

Recommendation 6: The District will make every effort not to engage in periodic renourishment during the piping plover reproductive season. The District also plans to reinitiate ESA Section 7 consultation with the Service prior to each periodic renourishment.

Recommendation 7: The District concurs, but plans to survey for seabeach amaranth for only the first 3 consecutive years after beach nourishment. After this period, the District will meet with the Service and the NJDEP ENSP to discuss the potential for additional annual surveys.

Recommendations 8 and 9: The District concurs and will continuously coordinate and work with the Service if seabeach amaranth is discovered growing on the restore sandy beach.

Recommendation 10: The District concurs and will continuously coordinate and work with the NJDEP ENSP should state-listed threatened and endangered species are found to be nesting on the restored sandy beach.

Recommendation 11: The District concurs and feels that additional sandy beach habitat within the Raritan Bay complex has the potential to benefit migratory birds.

Recommendation 12: The District concurs and has completed EFH coordination with the NMFS by submitting EFH evaluations for both the sand placement site and at the offshore borrow area.

Recommendation 13: The District has the position that only minimal adverse effect to shellfish is expected. Should new information become available to alter this position, the District will consult with the appropriate federal and State resource agencies to discuss the possibility to take measure to further minimize adverse effects to shellfish.

Recommendation 14: The District provided additional language to illustrate purpose and need for the proposed action.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Jersey Field Office
Ecological Services
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609/646 9310
Fax: 609/646 0352
http://www.fws.gov/northeast/njfieldoffice

In Reply Refer To:
06-FA006

AUG 14 2006

Colonel Richard J. Polo, Jr.
District Engineer
New York District, U.S. Army Corps of Engineers
26 Federal Plaza
New York, New York 10278-0090
Attention: Leonard Houston, Chief, Environmental Analysis Branch

Dear Colonel Polo:

The U.S. Fish and Wildlife Service (Service) provides this Supplemental Letter (supplement) to the Service's 1999 Fish and Wildlife Coordination Act (48 Stat. 401; U.S.C. 661 *et seq.*) (FWCA) Section 2(b) report to assist the U.S. Army Corps of Engineers, New York District (Corps) with activities pertaining to a *Modification to the Feasibility Recommended Plan for the Bay Shoreline Protection Reach, Port Monmouth, Middletown Township, Monmouth County, New Jersey*. A supplement to the FWCA report is needed due to a proposed design change of the Bay Shoreline component of the subject study (terminal groin closure *vs.* originally proposed terminal sand taper). The Service generally concurs with the proposed subject modification. This supplement is provided pursuant to a Fiscal Year 2006 interagency agreement.

AUTHORITY

The information presented in this supplement is provided pursuant to the FWCA and to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA) to ensure protection of federally listed (threatened and endangered) species. These comments do not preclude separate review and comments by the Service on any forthcoming environmental documents pursuant to the National Environmental Policy Act of 1969 (83 Stat. 852 as amended; 42 U.S.C. 4321 *et seq.*) (NEPA). Construction of the Port Monmouth Project was authorized under Section 101 of the Water Resources Development Act of 2000, as amended. Transfer funding between the Corps and the Service was authorized pursuant to the Economy Act (31 U.S.C. 1535).

SERVICE METHODS AND PROCEDURES

This supplement is based on the following information provided by the Corps:

- Project Mitigation Report (U.S. Army Corps of Engineers, 1998);
- Final Feasibility Report (U.S. Army Corps of Engineers, 2000a);
- Final Environmental Impact Statement (U.S. Army Corps of Engineers, 2000b);
- Engineering Documentation Report (U.S. Army Corps of Engineers, 2005); and
- Preliminary Draft Environmental Assessment (U.S. Army Corps of Engineers, 2006).

This supplement is also based on review of Service files and library material, coordination with the New Jersey Division of Fish and Wildlife (NJDFW), and a site inspection conducted on February 22, 2006.

The Service has been involved since 1992 with Corps projects in the general Raritan Bay/Sandy Hook Bay area (U.S. Fish and Wildlife Service, 1992) and completed a FWCA Section 2(b) Report for the Corps' combined flood control and shoreline protection project at Port Monmouth (Schrading, 1999). The Service's 1999 FWCA report documented the fish and wildlife resources in the project area, provided an assessment of the effects of the proposed project on fish and wildlife resources, and provided recommendations to mitigate adverse impacts to those resources.

STUDY AREA AND DESCRIPTION OF THE PROPOSED ACTION

The Port Monmouth project area comprises approximately 1.8 square miles within the Town of Port Monmouth, Middletown Township, Monmouth County, New Jersey. The project area was divided into study areas, namely: (A) Compton Creek, (B) Pews Creek, (C) Pews Creek Mitigation Site, and (D) Bay Shore. In partnership with the New Jersey Department of Environmental Protection (NJDEP), the Corps (2000) prepared a Feasibility Report for hurricane and storm damage reduction at Port Monmouth, New Jersey. The Record of Decision (ROD) pursuant to NEPA has not been signed. The aforementioned study areas were identified in the Corps' Feasibility Report as those areas needing protection from damages caused by hurricanes and severe storms (U.S. Army Corps of Engineers, 2006).

For the Bay Shore study area, the project purpose is to prevent the significant alteration of the Port Monmouth shoreline by hurricanes and other severe storms. According to the Corps (2005, 2006), much of the natural beachfront and dune complexes that provide coastal protection to the Port Monmouth community have been lost to erosion caused by storms at an annual rate of approximately 2.7 feet per year, particularly at Monmouth County's Bayshore Waterfront Park.

For the Bay Shore study area, the project need is to reinforce the existing dune by ensuring a beach cross-section seaward of the dune and periodic nourishment beginning approximately 10 years after initial construction and continuing at 10-year intervals (U.S. Army Corps of Engineers, 2005, 2006). An array of alternatives, including No-Action and non-structural and structural measures, were examined in detail in the Feasibility Report (U.S. Army Corps of Engineers, 2000a).

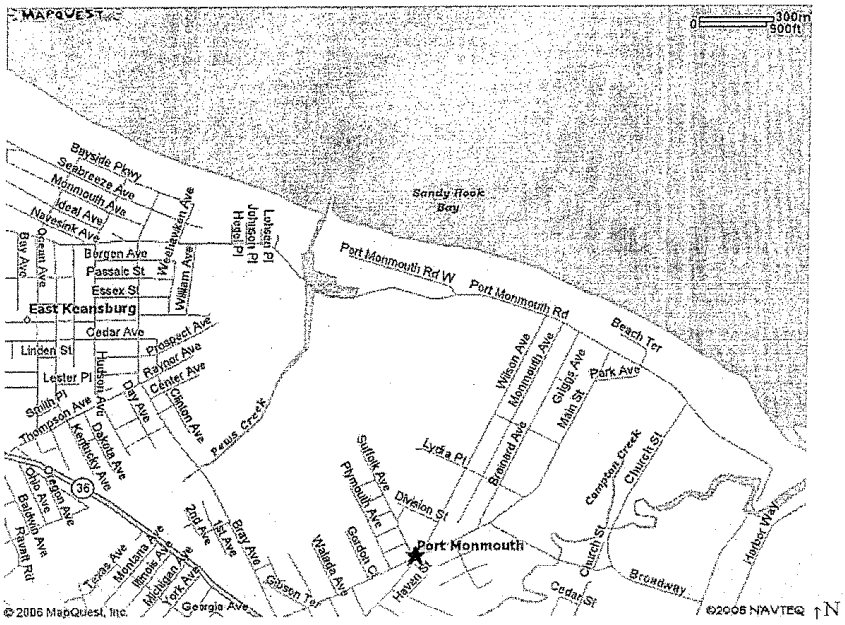

Figure 1. Port Monmouth and shoreline project area (courtesy of Map Quest, Incorporated).

The Corps' Office of Chief of Engineers Value Engineering Study Team (OVEST) suggested a design change to the Recommended Plan, as presented in the Feasibility Report, for protection of the Bay Shore study area. The OVEST recommended substituting a stone terminal groin in lieu of lengthy sand tapers to connect the improved shoreline to the existing shoreline at the western end. The OVEST rationale for suggesting this design change is that a terminal groin at the western end of the Bay Shore study area would provide a lower annual cost design than using a sand taper closure and would have a smaller footprint, while maintaining the same level of protection (U.S. Army Corps of Engineers, 2006). The terminal groin would extend 305 feet and cover approximately 0.57 acre of sandy bottom (U.S. Army Corps of Engineers, 2006).

According to the Corps (2005, 2006), construction of a terminal groin closure would not alter the primary protective beach berm and dune system as presented in the Feasibility Report's Recommended Plan. The dune length, width, landward position and side slopes, as well as the design berm width, elevation, side slopes fronting the dune, and shoreline extent would remain the same as in the Recommended Plan. Initial nourishment is still scheduled to come from the Sea Bright Offshore Borrow Area, which has received all federal and State permits. The sand for each periodic re-nourishment is still scheduled to be trucked in and remains at 10-year intervals but with a reduction of required re-nourishment volume.

According to the Corps (2006), constructing a terminal groin reduces:

1. the footprint by 3.45 acres;
2. the volume of initial nourishment by 101,300 cubic yards;
3. the volume needed for each periodic re-nourishment by 47,800 cubic yards;
4. the total volume of nourishment over the 50-year life of the project by 358,300 cubic yards; and
5. the duration of construction activities at the site.

According to the Corps (2006), the western terminal groin would provide:

1. habitat diversity to the bay bottom;
2. habitat diversity for fish resources to forage;
3. habitat diversity for sessile shellfish to attach themselves upon and to grow;
4. habitat diversity for macro-invertebrates to forage and hide from predators;
5. habitat for avian resources to loaf and rest; and
6. recreational fishing opportunities.

The proposed construction to restore the sandy beach, berm, and dune is scheduled to take less than 2 months. The construction of the western terminal groin is expected to take 3.5 months. Each periodic re-nourishment is anticipated to take less than 2 months (U.S. Army Corps of Engineers, 2006).

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

Other than an occasional transient bald eagle (*Haliaeetus leucocephalus*) or roseate tern (*Sterna dougallii*), no other federally listed or proposed endangered or threatened flora or fauna under Service jurisdiction are currently known to occur within the project area. However, beach nourishment may create suitable habitat for the federally listed (threatened) piping plover (*Charadrius melodus*) and seabeach amaranth (*Amaranthus pumilus*), as well as several other species of concern. Pursuant to Section 7 of the ESA, this supplement provides recommendations for the Corps to avoid adverse impacts to these species should they colonize the newly widened beach. If additional information on federally listed species becomes available, or if project plans change, this determination may be reconsidered. Federally listed and candidate species occurring in New Jersey are listed in Enclosure 1.

The Service provides the above determination with respect to federally listed or proposed threatened or endangered flora and fauna under Service jurisdiction only. The proposed project may affect the marine environment of Raritan Bay. Principal responsibility for threatened and endangered marine species is vested with the National Marine Fisheries Service (NMFS). Therefore, continued coordination with the NMFS is necessary to fulfill consultation requirements pursuant to Section 7(a)(2) of the ESA. Please contact the NMFS at the following address:

Ms. Karen Greene
National Marine Fisheries Service
Habitat Conservation Division
Sandy Hook Laboratory
Highlands, New Jersey 07732
(732) 872 3023

Piping Plover

The federally listed (threatened) piping plover may occur within the Bay Shore study area following initial construction and beach nourishment. There are known occurrences of the piping plover within 10 miles of the project area, in Sandy Hook and Sea Bright Borough. This species is not expected to occur on the project site prior to beach nourishment, which lacks suitable habitat (*i.e.*, existing areas of sandy beach are too narrow to support nesting plovers). The piping plover migrates through the Atlantic coast flyway and establishes nest sites on sandy beaches above high tide elevation on mainland and barrier island coastal beaches, as well as sand flats. The Atlantic coast population nests from Newfoundland, Canada to North Carolina and winters from North Carolina to Florida, the Bahamas, and the West Indies. The nesting sites are located on gently sloping fore dunes, blowout areas behind primary dunes, wash-over areas cut into or between dunes, ends of sand spits, and on sites with deposits of suitable dredged or pumped sand. Food for adult plovers and chicks consists of invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks. Feeding areas include intertidal portions of ocean beaches, ocean wash-over areas, mud flats, sand flats, wrack lines (organic ocean material left by high tide), shorelines of coastal ponds, lagoons, and salt marshes. The piping plover is susceptible to a variety of impacts including: beach stabilization and periodic re-nourishment projects; disturbance from humans (including noise), which can cause parent birds to abandon the nests and can prevent juvenile birds from feeding during critical periods in their development; harassment from pets, especially dogs; and loss of nests, eggs, and young to predators such as foxes (*Vulpes vulpes*), gulls (*Larus* spp.), raccoons (*Procyon lotor*), domestic cats (*Felis silvestris*), and ghost crabs (*Ocypode quadrata*).

The Service requests the Corps to take the following steps to protect piping plovers following project implementation:

1. Initiate a monitoring program, funded by the Corps, to survey for piping plovers on beaches created or nourished by the Corps. Monthly piping plover surveys should commence beginning approximately March 15 each year, and may cease if no nesting activity (territorial displays, courting, nesting, or brood rearing) is detected by July 1. Surveys to determine the presence or absence of piping plovers should occur for at least 5 years after each nourishment, unless suitable habitat is eliminated sooner by erosion, and the Service concurs in writing. If no piping plovers are detected, annual assessments by the Corps and Service can be conducted to reevaluate the necessity of continued monitoring. The Corps must report monitoring results to the Service and to the New Jersey Endangered and Nongame Species Program (ENSP).

2. If piping plovers are documented to occur within the project area, ensure that Monmouth County's Bayshore Waterfront Park and the Borough of Port Monmouth initiate and sustain a management program for the protection of piping plover adults and chicks during the annual nesting and brood-rearing period (approximately March 15 through August 15). A copy of the Service's "Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act" (Guidelines) and a copy of the publication entitled "Endangered Beach Nesting Bird Management on New Jersey's Municipal Beaches" are enclosed to assist the County and Borough in understanding its management responsibilities (Enclosures 2 and 3, respectively).

3. Initiate education and outreach programs to ensure compliance with the Service's Guidelines. These programs should include participation by the Service and the ENSP, and should be targeted to public officials and staff directly responsible for recreation on County/Municipal beaches (*e.g.*, lifeguards, law enforcement, maintenance workers).

4. Re-initiate consultation with the Service pursuant to Section 7 of the ESA prior to subsequent beach re-nourishment.

According to the U.S. Army Corps of Engineers (2006), the proposed construction to restore the sandy beach, berm, and dune is scheduled to take less than 2 months. The construction of the western terminal groin is expected to take 3.5 months. Each periodic re-nourishment is anticipated to take less than 2 months. Due to the short time frame, re-nourishment could be scheduled outside the recommended seasonal restriction if nesting plovers are present. For piping plovers in New Jersey, the Service generally recommends not conducting any proposed construction activities within 100 meters (333 feet) of occupied piping plover habitat during the nesting season, March 15 through August 15. This distance may be greater if noise or other disturbances interfere with the birds' ability to reproduce or forage successfully. When unfledged chicks are present, May 15 through August 15, vehicles and motorized construction equipment are usually prohibited within 1,000 meters (3,330 feet) of chicks unless an intensive monitoring program, approved by the Service, is in place. With monitoring, the vehicle-free area may be reduced by the Service depending on the observed mobility of the chicks. The Service should be provided with a construction schedule for any on-shore staging areas. If project activities are planned during the restricted season, further consultation pursuant to Section 7 of the ESA will be required to avoid adverse affects to the piping plover. The Corps has already agreed to abide by all other recommendations provided in the Service's original FWCA report (Schrading, 1999) for the protection of the piping plover.

Seabeach Amaranth

The federally listed (threatened) plant seabeach amaranth (*Amaranthus pumilus*) may occur within the Bay Shore study area following initial construction and beach nourishment. The species had been last seen in New Jersey at Island Beach State Park in 1913 (U.S. Fish and Wildlife Service, 1996). Seabeach amaranth was re-discovered in summer 2000 on Monmouth County, New Jersey beaches. In 2001, new populations were discovered in Ocean, Atlantic, and Cape May Counties as well. Seabeach amaranth remains extant along the New Jersey shore.

There are known occurrences of the seabeach amaranth within 10 miles of the project area, in Sandy Hook and Sea Bright Borough. This species is not expected to occur on the project site prior to beach nourishment because existing areas of sandy beach are currently too narrow.

Seabeach amaranth is an annual plant, endemic to Atlantic coastal plain beaches, primarily occurring on wash-over flats at the accreting ends of barrier beach islands and lower fore-dunes of non-eroding beaches. The species occasionally establishes small temporary populations in other areas, including bay side beaches, blowouts in fore-dunes, and sand and shell material placed as beach replenishment or dredge spoil. Threats to seabeach amaranth include beach stabilization efforts (particularly the use of beach armoring, such as sea walls, jetties, and rip-rap), intensive recreational use, and herbivory by webworms.

The Service requests that the Corps take the following steps to ensure the protection of seabeach amaranth following project implementation:

1. Initiate a monitoring program, funded by the Corps, to survey for seabeach amaranth on beaches created or nourished by the Corps. A survey for seabeach amaranth should be conducted annually between August 15 and September 15. Surveys to determine the presence or absence of seabeach amaranth should be conducted for at least 5 years after each nourishment, unless suitable habitat is eliminated sooner by erosion, and the Service concurs in writing. If no seabeach amaranth is detected, annual assessments by the Corps and Service can reevaluate the necessity of continued monitoring. The Corps must report monitoring results to the Service.

2. If seabeach amaranth is documented to occur within the project area, coordinate with the Service to initiate and sustain a management program for the protection of this species. Management activities for this species may include use of string-and-post fencing to close areas of beach to vehicle and pedestrian traffic, outreach and education, monitoring, and participation in scientific research. The seabeach amaranth management program may be combined with the piping plover management program.

3. Re-initiate consultation with the Service pursuant to Section 7 of the ESA prior to subsequent beach re-nourishments.

If any work in beach, dune, or intertidal areas is to take place during the seabeach amaranth growing season (May 15 through December 1) following the initial nourishment and groin construction, the Service generally recommends surveying the entire project area within the week before the start of work. Sections of the project area where work has not yet begun should be re-surveyed each week. The Service recommends installing string-and-post fencing to allow a 3-meter buffer around each plant or group of plants. Fencing should be marked with flagging and signs. No intrusions (including personnel, equipment, or materials) should be allowed within fenced areas. Coordinate surveys and fencing with the Service before and during the re-nourishment period.

STATE-LISTED THREATENED AND ENDANGERED SPECIES

In addition to federally listed species discussed above, the proposed beach nourishment may also create suitable habitat for State-listed species and State species of special concern, such as the endangered least tern (*Sterna antillarum*) and seabeach knotweed (*Polygonum glaucum*), and the threatened black skimmer (*Rynchops niger*). Lists of State-listed endangered and threatened species and species of Special Concern status are provided in Enclosures 4 and 5. The Service recommends that the Corps coordinate with the ENSP and the New Jersey Natural Heritage Program (NJNHP), as well as this office, to avoid adverse effects to these species by implementing buffers, seasonal restrictions, or other appropriate conservation measures. The Service recommends including any endangered, threatened, or other beach species of concern that may colonize the widened beach in the endangered species management program described for federally listed species.

MIGRATORY AVIFAUNA

Federal agencies have a responsibility under various federal statutes and Executive Orders (EOs) to protect, conserve, and manage migratory birds. Migratory birds are a federal trust resource responsibility and are protected under the Migratory Bird Treaty Act of 1918 (40 Stat. 755, as amended; 16 U.S.C. 703-712) (MBTA). Also, on January 11, 2001, President Clinton signed the *Responsibilities of Federal Agencies to Protect Migratory Birds* (Executive Order 13186), intending to further the conservation purposes of the migratory bird conventions and pertinent statutes. The project area serves as an important stopover for many neo-tropical migrants. A list of migratory bird species known to occur within the project area was provided by the Service (Schrading, 1999).

VERNAL POOLS

There are no NJDFW-verified vernal pools in the vicinity of the project area.

PROTECTED COMMUNITIES

There are no NJDEP-designated Natural Heritage Priority Sites within or in the vicinity of the project area.

FISHERIES

The NMFS (Greene, pers. comm., 2006) has indicated that, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265, as amended), the Corps is required to provide an updated Essential Fish Habitat assessment for the proposed project modification.

SHELLFISH

According to the NJDFW-Bureau of Shellfisheries, the proposed Bay Shore project area is listed for occurrence of hard clams (*Mercenaria mercenaria*) (1983 and 2000) and for soft clams (*Mya*

arenaria) (1983, no 2000 data available) (Celestino and Wilkinson, pers. comms., 2006). The Service also coordinated with the NMFS regarding whether the proposed groin would result in an adverse impact to shellfisheries, but the impact was considered discountable (Greene, pers. comm., 2006). Density of hard clams increases to moderate approximately 2,600 feet (0.5 mile) east of the proposed groin (Celestino, pers. comm., 2006). The Service recommends that the Corps avoid adverse impact to shellfisheries found in moderate densities and abide by the Bureau of Shellfisheries.

SERVICE REVIEW OF CORPS DOCUMENTS

The Service has reviewed the Preliminary Draft EA (U.S. Army Corps of Engineers, 2006) and recommends that the Corps more clearly define the Purpose and Need of the proposed action in the Final EA. Pursuant to NEPA guidelines, the Purpose is the goal or end to be attained by the proposed action (*i.e.*, restore beach habitat and control flooding), and the Need is the lack of something required, desirable, or useful (*i.e.*, beach nourishment and structural shoreline protection).

CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

The Service has no objections to the proposed modification (*i.e.*, substituting a stone terminal groin in lieu of lengthy sand tapers to connect the improved shoreline to the existing shoreline at the western end of the bay shore of the project area) if the following recommendations are implemented:

1. Coordinate with the NMFS to fulfill consultation requirements pursuant to Section7(a)(2) of the ESA.

2. Initiate a monitoring program, funded by the Corps, to survey for piping plovers on beaches created or nourished by the Corps. Monthly piping plover surveys should commence beginning approximately March 15 each year, and may cease if no nesting activity (territorial displays, courting, nesting, or brood rearing) is detected by July 1. Surveys to determine the presence or absence of piping plovers should occur for at least 5 years after each nourishment, unless suitable habitat is eliminated sooner by erosion, and the Service concurs in writing. Report monitoring results to the Service and to the New Jersey Endangered and Nongame Species Program (ENSP).

3. If piping plovers are documented to occur within the project area, ensure that Monmouth County's Bayshore Waterfront Park and the Borough of Port Monmouth initiate and sustain a management program for the protection of piping plover adults and chicks during the annual nesting and brood-rearing period (approximately March 15 through August 15). The Service's Guidelines and the publication entitled "Endangered Beach Nesting Bird Management on New Jersey's Municipal Beaches" are enclosed to assist the Borough in understanding its management responsibilities (Enclosures 2 and 3).

4. Initiate education and outreach programs to ensure compliance with the Service's Guidelines. These programs should include participation by the Service and the ENSP,

and should be targeted to public officials and staff directly responsible for recreation on County/Municipal beaches (*e.g.*, lifeguards, law enforcement, maintenance workers).

5. Re-initiate consultation with the Service pursuant to Section 7 of the ESA prior to subsequent beach re-nourishment.

6. Conduct periodic beach re-nourishments outside the recommended seasonal restriction for piping plovers, if nesting plovers are present. If construction is proposed during the nesting season (March 15-August 15), avoid conducting re-nourishment events within 100 meters (333 feet) of occupied piping plover habitat (this distance may be greater if noise or other disturbances interfere with the birds' ability to reproduce or forage successfully). When unfledged chicks are present, vehicles and motorized construction equipment should be prohibited within 1,000 meters (3,330 feet) of chicks unless an intensive monitoring program, approved by the Service, is in place. For re-nourishment events, provide the Service with a construction schedule for any on-shore staging areas, if plovers are nesting in the area. If project activities are planned during the restricted season, further consultation pursuant to Section 7 of the ESA will be required to avoid adverse affects to the piping plover. Abide by all other recommendations provided by Schrading (1999) for the protection of the piping plover.

7. Initiate an annual monitoring program, funded by the Corps, to survey for seabeach amaranth between August 15 and September 15. Provide surveys for at least 5 years after each nourishment, unless suitable habitat is eliminated sooner by erosion, and the Service concurs in writing. Report monitoring results to the Service.

8. If seabeach amaranth is documented to occur within the project area, coordinate with the Service to initiate and sustain a management program for the protection of this species. Provide management activities such as using string-and-post fencing to close areas of beach to vehicle and pedestrian traffic, funding outreach and education, monitoring, and participating in scientific research. Re-initiate consultation with the Service pursuant to Section 7 of the ESA prior to subsequent beach re-nourishments.

9. If any work in beach, dune, or intertidal areas is to take place during the seabeach amaranth growing season (May 15 through December 1) following the initial nourishment and groin construction, the Service generally recommends surveying the entire project area within the week before the start of work. Re-survey each week sections of the project area where work has not yet begun. Install string-and-post fencing to allow a 3-meter buffer around each plant or group of plants. Mark fences with flags and signs. Prohibit intrusions (including personnel, equipment, or materials) within fenced areas. Coordinate surveys and fencing with the Service before and during the construction period.

10. Coordinate with the ENSP and the New Jersey Natural Heritage Program (NJNHP) and this office to avoid adverse effects to the State-listed least tern, black skimmer, and seabeach knotweed prior to re-nourishment periods by implementing buffers, seasonal restrictions, or other appropriate conservation measures. Include any endangered,

threatened, or other beach species of concern that may colonize the widened beach in the endangered species management program described for federally listed species.

11. Abide by the federal statutes and Executive Orders to protect, conserve, and manage migratory birds.

12. Coordinate with the NMFS an updated Essential Fish Habitat assessment pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

13. Avoid adverse impact to shellfisheries found in moderate densities and coordinate with the New Jersey Bureau of Shellfisheries to avoid or minimize adverse impacts to soft clams.

14. Define the Purpose and Need of the proposed action in the Final EA more clearly and pursuant to NEPA Guidelines.

Thank you for the opportunity to review and comment on the proposed project modification and to supplement our 1999 FWCA report. If you have any questions regarding this supplement, please contact me or have your staff contact John Staples or Carlo Popolizio at (609) 646-9310, extensions 12 or 32, respectively. The Service looks forward to continued cooperation with the Corps to ensure a successful completion of the proposed project.

Sincerely,

Clifford G. Day
Supervisor

Enclosures

REFERENCES

Literature Cited

Schrading, E.P. 1999. Assessment of the Raritan Bay and Sandy Hook Bay combined flood control and shoreline protection project, Port Monmouth, New Jersey. Final Fish and Wildlife Coordination Act Section 2(b) Report. U.S. Department of the Interior, Fish and Widlife Service, New Jersey Field Office, Pleasantville, New Jersey. 31 pp + appendices.

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_____. 2000a. Raritan Bay and Sandy Hook Bay, New Jersey. Feasibility report for hurricane and storm damage reduction, Port Monmouth, New Jersey. Volume 1. North Atlantic Division, New York District, New York, New York. 107 pp.

_____. 2000b. Raritan Bay and Sandy Hook Bay, New Jersey. Hurricane and storm damage reduction project, Port Monmouth, New Jersey. Final environmental impact statement. North Atlantic Division, New York District, New York, New York. 117 pp + appendix.

_____. 2005. Raritan Bay and Sandy Hook Bay, New Jersey. Engineering documentation report for hurricane and storm damage reduction, Port Monmouth, New Jersey. Terminal groin closure design for shore protection reach. Draft. North Atlantic Division, New York District, New York, New York. 47 pp + appendices.

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U.S. Fish and Wildlife Service. 1992. Planning aid report. Raritan Bay – Sandy Hook Bay reconnaissance study: fish and wildlife resources. U.S. Department of the Interior, Fish and Wildlife Service, New Jersey Field Office, Pleasantville, New Jersey.

Personal Communications

Celestino, M. Shellfisheries Biologist. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Shellfisheries, Nacote Creek Research Station, Port Republic, New Jersey.

Greene, K. 2006. Biologist. National Marine Fisheries Service, Habitat Conservation Division, Sandy Hook, New Jersey.

Wilkinson, D. 2006. Supervisory Fisheries Biologist. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Millville, New Jersey,

☐ *SPECIAL HANDLING* (Requires less than 24-hour turn around time)

NEW JERSEY FIELD OFFICE ASSIGNMENT CONTROL

CONTROL No.: FP-06152421-2006-FA-0006 Today's date: 6 - 29 - 06

SUBJECT: Fort Monmouth Date received: 6 - 29 - 06

Supplemental (Fwca 26b) report Date due: 7 - 24 - 06

Draft to Supv: 7 - 18 - 06

ACTION BY:

____ Asst. Supervisor (AS)	____ Private Lands (HR)
____ Permits/Licenses (PL)	____ Env. Contaminants (EC)
____ Enforcement (E)	____ Special Projects (SP)
Carlo Popolizio Federal Projects (FP)	____ Visual Inf./Outreach (O)
____ Endangered Spp. (ES)	____ Administration (A)

____ Optional staff survey completed; see reverse »»»

ACTION:

X Reply to: NY Corps

X For signature of: X Supervisor. ____ Asst. Supervisor. ____ Self. ____

____ You are lead, coordinate with: ____

____ Support for NJFO Assignment No.: ____

Special instructions:

RETURNED: Date: ____; Reason: ____

Due to Supervisor for surname: Date: ____; Time: ____

Rev. 6/16/99

Enclosure 1

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN NEW JERSEY

An ENDANGERED species is any species that is in danger of extinction throughout all or a significant portion of its range.

A THREATENED species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

	COMMON NAME	SCIENTIFIC NAME	STATUS
FISHES	Shortnose sturgeon*	*Acipenser brevirostrum*	E
REPTILES	Bog turtle	*Clemmys muhlenbergii*	T
	Atlantic Ridley turtle*	*Lepidochelys kempii*	E
	Green turtle*	*Chelonia mydas*	T
	Hawksbill turtle*	*Eretmochelys imbricata*	E
	Leatherback turtle*	*Dermochelys coriacea*	E
	Loggerhead turtle*	*Caretta caretta*	T
BIRDS	Bald eagle	*Haliaeetus leucocephalus*	T
	Piping plover	*Charadrius melodus*	T
	Roseate tern	*Sterna dougallii dougallii*	E
MAMMALS	Eastern cougar	*Felis concolor couguar*	E+
	Indiana bat	*Myotis sodalis*	E
	Gray wolf	*Canis lupus*	E+
	Delmarva fox squirrel	*Sciurus niger cinereus*	E+
	Blue whale*	*Balaenoptera musculus*	E
	Finback whale*	*Balaenoptera physalus*	E
	Humpback whale*	*Megaptera novaeangliae*	E
	Right whale*	*Balaena glacialis*	E
	Sei whale*	*Balaenoptera borealis*	E
	Sperm whale*	*Physeter macrocephalus*	E

	COMMON NAME	SCIENTIFIC NAME	STATUS
INVERTEBRATES	Dwarf wedgemussel	*Alasmidonta heterodon*	E
	Northeastern beach tiger beetle	*Cicindela dorsalis dorsalis*	T
	Mitchell's satyr butterfly	*Neonympha m. mitchellii*	E+
	American burying beetle	*Nicrophorus americanus*	E+
PLANTS	Small whorled pogonia	*Isotria medeoloides*	T
	Swamp pink	*Helonias bullata*	T
	Knieskern's beaked-rush	*Rhynchospora knieskernii*	T
	American chaffseed	*Schwalbea americana*	E
	Sensitive joint-vetch	*Aeschynomene virginica*	T
	Seabeach amaranth	*Amaranthus pumilus*	T

STATUS:			
E	endangered species	PE	proposed endangered
T	threatened species	PT	proposed threatened
+	presumed extirpated**		

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service.

** Current records indicate the species does not presently occur in New Jersey, although the species did occur in the State historically.

Note: for a complete listing of Endangered and Threatened Wildlife and Plants, refer to 50 CFR 17.11 and 17.12.

For further information, please contact:

U.S. Fish and Wildlife Service
New Jersey Field Office
927 N. Main Street, Building D
Pleasantville, New Jersey 08232
Phone: (609) 646-9310
Fax: (609) 646-0352

Revised 12/15/04

FEDERAL CANDIDATE SPECIES IN NEW JERSEY

CANDIDATE SPECIES are species that appear to warrant consideration for addition to the federal List of Endangered and Threatened Wildlife and Plants. Although these species receive no substantive or procedural protection under the Endangered Species Act, the U.S. Fish and Wildlife Service encourages federal agencies and other planners to give consideration to these species in the environmental planning process.

SPECIES	SCIENTIFIC NAME
Bog asphodel	*Narthecium americanum*
Hirsts' panic grass	*Dichanthelium hirstii*

Note: For complete listings of taxa under review as candidate species, refer to Federal Register Vol. 69, No. 86, May 4, 2004 (Endangered and Threatened Wildlife and Plants; Review of Species that are Candidates or Proposed for Listing as Endangered or Threatened).

Enclosure 2

GUIDELINES FOR MANAGING RECREATIONAL ACTIVITIES IN PIPING PLOVER BREEDING HABITAT ON THE U.S. ATLANTIC COAST TO AVOID TAKE UNDER SECTION 9 OF THE ENDANGERED SPECIES ACT

Northeast Region, U.S. Fish and Wildlife Service
April 15, 1994

The following information is provided as guidance to beach managers and property owners seeking to avoid potential violations of Section 9 of the Endangered Species Act (16 U.S.C. 1538) and its implementing regulations (50 CFR Part 17) that could occur as the result of recreational activities on beaches used by breeding piping plovers along the Atlantic Coast. These guidelines were developed by the Northeast Region, U.S. Fish and Wildlife Service (Service), with assistance from the U.S. Atlantic Coast Piping Plover Recovery Team. The guidelines are advisory, and failure to implement them does not, of itself, constitute a violation of the law. Rather, they represent the Service's best professional advice to beach managers and landowners regarding the management options that will prevent direct mortality, harm, or harassment of piping plovers and their eggs due to recreational activities.

Some land managers have endangered species protection obligations under Section 7 of the Endangered Species Act (see section I below) or under Executive Orders 11644 and 11989[1] that go beyond adherence to these guidelines. Nothing in this document should be construed as lack of endorsement of additional piping plover protection measures implemented by these land managers or those who are voluntarily undertaking stronger plover protection measures.

This document contains four sections: (I) a brief synopsis of the legal requirements that afford protection to nesting piping plovers; (II) a brief summary of the life history of piping plovers and potential threats due to recreational activities during the breeding cycle; (III) guidelines for protecting piping plovers from recreational activities on Atlantic Coast beaches; and (IV) literature cited.

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[1] Executive Order 11644, Use of Off-Road Vehicles on the Public Lands and Executive Order 11989, Off-Road Vehicles on Public Lands pertain to lands under custody of the Secretaries of Agriculture, Defense, and Interior (except for Indian lands) and certain lands under the custody of the Tennessee Valley Authority.

I. LEGAL CONSIDERATIONS

Section 9 of the Endangered Species Act (ESA) prohibits any person subject to the jurisdiction of the United States from harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting listed wildlife species. It is also unlawful to attempt such acts, solicit another to commit such acts, or cause such acts to be committed. A "person" is defined in Section 3 to mean "an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal Government, of any State, municipality, or political subdivision of a State, or of any foreign government; any State, municipality, or political subdivision of a State; or any other entity subject to the jurisdiction of the United States." Regulations implementing the ESA (50 CFR 17.3) further define "harm" to include significant habitat modification or degradation that results in the killing or injury of wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. "Harass" means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Penalties for violations of Section 9 are provided in Section 11 of the ESA; for threatened species, these penalties include fines of up to $25,000, imprisonment for not more than six months, or both.

Section 10 of the ESA and related regulations provide for permits that may be granted to authorize acts prohibited under Section 9, for scientific purposes or to enhance the propagation or survival of a listed species. States that have Cooperative Agreements under Section 6 of the ESA, may provide written authorization for take that occurs in the course of implementing conservation programs. For example, State agencies have authorized certain biologists to construct predator exclosures for piping plovers. It is also legal for employees or designated agents of certain Federal or State agencies to take listed species without a permit, if the action is necessary to aid sick, injured, or orphaned animals or to salvage or dispose of a dead specimen.

Section 10 also allows permits to be issued for take that is "incidental to, and not the purpose of, carrying out an otherwise lawful activity" if the Service determines that certain conditions have been met. An applicant for an incidental take permit must prepare a conservation plan that specifies the impacts of the take, steps the applicant will take to minimize and mitigate the impacts, funding that will be available to implement these steps, alternative actions to the take that the applicant considered, and the reasons why such alternatives are not being utilized.

Section 7 of the ESA may be pertinent to beach managers and landowners in situations that have a Federal nexus. Section 7 requires Federal agencies to consult with the Service (or National Marine Fisheries Service for marine species) prior to authorizing, funding, or carrying out activities that may affect listed species. Section 7 also requires that these agencies use their authorities to further the conservation of listed species. Section 7 obligations have caused Federal land management agencies to implement piping plover protection measures that go beyond those required to avoid take, for example by conducting research on threats to piping plovers. Other examples of Federal activities that may affect piping plovers along the Atlantic Coast, thereby triggering Section 7 consultation, include permits for beach nourishment or disposal of dredged material (U.S. Army Corps of Engineers) and funding of beach restoration projects (Federal Emergency Management Authority).

Piping plovers, as well as other migratory birds such as least terns, common terns, American oystercatchers, laughing gulls, herring gulls, and great black-backed gulls, their nests, and eggs are also protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712). Prohibited acts include pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting such conduct. Violators may be fined up to $5000 and/or imprisoned for up to six months.

Almost all States within the breeding range of the Atlantic Coast piping plover population list the species as State threatened or endangered (Northeast Nongame Technical Committee 1993). Various laws and regulations may protect State-listed species from take, but the Service has not ascertained the adequacy of the guidelines presented in this document to meet the requirements of any State law.

II. LIFE HISTORY AND THREATS FROM HUMAN DISTURBANCE

Piping plovers are small, sand-colored shorebirds that nest on sandy, coastal beaches from South Carolina to Newfoundland. Since 1986, the Atlantic Coast population has been protected as a threatened species under provisions of the U.S. Endangered Species Act of 1973 (U.S. Fish and Wildlife Service 1985). The U.S. portion of the population was estimated at 875 pairs in 1993 (U.S. Fish and Wildlife Service 1993). Many characteristics of piping plovers contribute to their susceptibility to take due to human beach activities.

LIFE HISTORY

Piping plovers begin returning to their Atlantic Coast nesting beaches in mid-March (Coutu et al. 1990, Cross 1990, Goldin 1990, MacIvor 1990, Hake 1993). Males establish and defend territories and court females (Cairns 1982). Eggs may be present on the beach from mid-April through late July. Clutch size is generally four eggs, and the incubation period[2] usually lasts for 27-28 days. Piping plovers fledge only a single brood per season, but may renest several times if previous nests are lost. Chicks are precocial[3] (Wilcox 1959, Cairns 1982). They may move hundreds of yards from the nest site during their first week of life (see Table 1, Summary of Chick Mobility Data). Chicks remain together with one or both parents until they fledge (are able to fly) at 25 to 35 days of age. Depending on date of hatching, flightless chicks may be present from mid-May until late August, although most fledge by the end of July (Patterson 1988, Goldin 1990, MacIvor 1990, Howard et al. 1993).

Piping plover nests are situated above the high tide line on coastal beaches, sand flats at the ends of sandspits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover areas cut into or between dunes. They may also nest on areas where suitable dredge material has been deposited. Nest sites are shallow scraped depressions in substrates ranging from fine grained sand to mixtures of sand and pebbles, shells or cobble (Bent 1929, Burger 1987a, Cairns 1982, Patterson 1988, Flemming et al. 1990, MacIvor 1990,

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[2] "Incubation" refers to adult birds sitting on eggs, to maintain them at a favorable temperature for embryo development.

[3] "Precocial" birds are mobile and capable of foraging for themselves within several hours of hatching.

Strauss 1990). Nests are usually found in areas with little or no vegetation although, on occasion, piping plovers will nest under stands of American beachgrass (Ammophila breviligulata) or other vegetation (Patterson 1988, Flemming et al. 1990, MacIvor 1990). Plover nests may be very difficult to detect, especially during the 6-7 day egg-laying phase when the birds generally do not incubate (Goldin 1994).

Plover foods consist of invertebrates such as marine worms, fly larvae, beetles, crustaceans or mollusks (Bent 1929, Cairns 1977, Nicholls 1989). Feeding areas include intertidal portions of ocean beaches, washover areas, mudflats, sandflats, wrack lines[4], and shorelines of coastal ponds, lagoons or salt marshes (Gibbs 1986, Coutu et al. 1990, Hoopes et al. 1992, Loegering 1992, Goldin 1993). Studies have shown that the relative importance of various feeding habitat types may vary by site (Gibbs 1986, Coutu et al. 1990, McConnaughey et al. 1990, Loegering 1992, Goldin 1993, Hoopes 1993) and by stage in the breeding cycle (Cross 1990). Adults and chicks on a given site may use different feeding habitats in varying proportion (Goldin et al. 1990). Feeding activities of chicks may be particularly important to their survival. Cairns (1977) found that piping plover chicks typically tripled their weight during the first two weeks post-hatching; chicks that failed to achieve at least 60% of this weight gain by day 12 were unlikely to survive. During courtship, nesting, and brood rearing, feeding territories are generally contiguous to nesting territories (Cairns 1977), although instances where brood-rearing areas are widely separated from nesting territories are not uncommon (see Table 1). Feeding activities of both adults and chicks may occur during all hours of the day and night (Burger 1993) and at all stages in the tidal cycle (Goldin 1993, Hoopes 1993).

THREATS FROM NONMOTORIZED BEACH ACTIVITIES

Sandy beaches that provide nesting habitat for piping plovers are also attractive recreational habitats for people and their pets. Nonmotorized recreational activities can be a source of both direct mortality and harassment of piping plovers. Pedestrians on beaches may crush

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[4] Wrack is organic material including seaweed, seashells, driftwood and other materials deposited on beaches by tidal action.

eggs (Burger 1987b, Hill 1988, Shaffer and Laporte 1992, Cape Cod National Seashore 1993, Collazo et al. 1994). Unleashed dogs may chase plovers (McConnaughey et al. 1990), destroy nests (Hoopes et al. 1992), and kill chicks (Cairns and McLaren 1980).

Pedestrians may flush incubating plovers from nests (see Table 2, Summary of Data on Distances at Which Plovers React to Disturbance), exposing eggs to avian predators or causing excessive cooling or heating of eggs. Repeated exposure of shorebird eggs on hot days may cause overheating, killing the embryos (Bergstrom 1991). Excessive cooling may kill embryos or retard their development, delaying hatching dates (Welty 1982). Pedestrians can also displace unfledged chicks (Strauss 1990, Burger 1991, Hoopes et al. 1992, Loegering 1992, Goldin 1993). Fireworks are highly disturbing to piping plovers (Howard et al. 1993). Plovers are particularly intolerant of kites, compared with pedestrians, dogs, and vehicles; biologists believe this may be because plovers perceive kites as potential avian predators (Hoopes et al. 1992).

THREATS FROM MOTOR VEHICLES

Unrestricted use of motorized vehicles on beaches is a serious threat to piping plovers and their habitats. Vehicles can crush eggs (Wilcox 1959; Tull 1984; Burger 1987b; Patterson et al. 1991; United States of America v. Breezy Point Cooperative, Inc., U.S. District Court, Eastern District of New York, Civil Action No. CV-90-2542, 1991; Shaffer and Laporte 1992), adults, and chicks. In Massachusetts and New York, biologists documented 14 incidents in which 18 chicks and 2 adults were killed by vehicles between 1989 and 1993 (Melvin et al. 1994). Goldin (1993) compiled records of 34 chick mortalities (30 on the Atlantic Coast and 4 on the Northern Great Plains) due to vehicles. Many biologists that monitor and manage piping plovers believe that many more chicks are killed by vehicles than are found and reported (Melvin et al. 1994). Beaches used by vehicles during nesting and brood-rearing periods generally have fewer breeding plovers than available nesting and feeding habitat can support. In contrast, plover abundance and productivity has increased on beaches where vehicle restrictions during chick-rearing periods have been combined with protection of nests from predators (Goldin 1993; S. Melvin, pers. comm., 1993).

Typical behaviors of piping plover chicks increase their vulnerability to vehicles. Chicks frequently move between the upper berm or foredune and feeding habitats in the wrack line

and intertidal zone. These movements place chicks in the paths of vehicles driving along the berm or through the intertidal zone. Chicks stand in, walk, and run along tire ruts, and sometimes have difficulty crossing deep ruts or climbing out of them (Eddings et al. 1990, Strauss 1990, Howard et al. 1993). Chicks sometimes stand motionless or crouch as vehicles pass by, or do not move quickly enough to get out of the way (Tull 1984, Hoopes et al. 1992, Goldin 1993). Wire fencing placed around nests to deter predators (Rimmer and Deblinger 1990, Melvin et al. 1992) is ineffective in protecting chicks from vehicles because chicks typically leave the nest within a day after hatching and move extensively along the beach to feed (see Table 1).

Vehicles may also significantly degrade piping plover habitat or disrupt normal behavior patterns. They may harm or harass plovers by crushing wrack into the sand and making it unavailable as cover or a foraging substrate, by creating ruts that may trap or impede movements of chicks, and by preventing plovers from using habitat that is otherwise suitable (MacIvor 1990, Strauss 1990, Hoopes et al. 1992, Goldin 1993).

III. GUIDELINES FOR PROTECTING PIPING PLOVERS FROM RECREATIONAL DISTURBANCE

The Service recommends the following protection measures to prevent direct mortality or harassment of piping plovers, their eggs, and chicks.

MANAGEMENT OF NONMOTORIZED RECREATIONAL USES

On beaches where pedestrians, joggers, sun-bathers, picnickers, fishermen, boaters, horseback riders, or other recreational users are present in numbers that could harm or disturb incubating plovers, their eggs, or chicks, areas of at least 50 meter-radius around nests above the high tide line should be delineated with warning signs and symbolic fencing[5]. Only persons engaged in rare species monitoring, management, or research activities should enter posted areas. These areas should remain fenced as long as viable eggs or unfledged chicks are present. Fencing is intended to prevent accidental crushing of nests and repeated flushing of

[5] "Symbolic fencing" refers to one or two strands of light-weight string, tied between posts to delineate areas where pedestrians and vehicles should not enter.

incubating adults, and to provide an area where chicks can rest and seek shelter when large numbers of people are on the beach.

Available data indicate that a 50 meter buffer distance around nests will be adequate to prevent harassment of the majority of incubating piping plovers. However, fencing around nests should be expanded in cases where the standard 50 meter-radius is inadequate to protect incubating adults or unfledged chicks from harm or disturbance. Data from various sites distributed across the plover's Atlantic Coast range indicates that larger buffers may be needed in some locations (see Table 2). This may include situations where plovers are especially intolerant of human presence, or where a 50 meter-radius area provides insufficient escape cover or alternative foraging opportunities for plover chicks.[6]

In cases where the nest is located less than 50 meters above the high tide line, fencing should be situated at the high tide line, and a qualified biologist should monitor responses of the birds to passersby, documenting his/her observations in clearly recorded field notes. Providing that birds are not exhibiting signs of disturbance, this smaller buffer may be maintained in such cases.

On portions of beaches that receive heavy human use, areas where territorial plovers are observed should be symbolically fenced to prevent disruption of territorial displays and courtship. Since nests can be difficult to locate, especially during egg-laying, this will also prevent accidental crushing of undetected nests. If nests are discovered outside fenced areas, fencing should be extended to create a sufficient buffer to prevent disturbance to incubating adults, eggs, or unfledged chicks.

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[6] For example, on the basis of data from an intensive three year study that showed that plovers on Assateague Island in Maryland flush from nests at greater distances than those elsewhere (Loegering 1992), the Assateague Island National Seashore established 200 meter buffers zones around most nest sites and primary foraging areas (Assateague Island National Seashore 1993). Following a precipitous drop in numbers of nesting plover pairs in Delaware in the late 1980's, that State adopted a Piping Plover Management Plan that provided 100 yard buffers around nests on State park lands and included intertidal areas (Delaware Department of Natural Resources and Environmental Control 1990).

Pets should be leashed and under control of their owners at all times from April 1 to August 31 on beaches where piping plovers are present or have traditionally nested. Pets should be prohibited on these beaches from April 1 through August 31 if, based on observations and experience, pet owners fail to keep pets leashed and under control.

Kite flying should be prohibited within 200 meters of nesting or territorial adult or unfledged juvenile piping plovers between April 1 and August 31.

Fireworks should be prohibited on beaches where plovers nest from April 1 until all chicks are fledged.

MOTOR VEHICLE MANAGEMENT

The Service recommends the following minimum protection measures to prevent direct mortality or harassment of piping plovers, their eggs, and chicks on beaches where vehicles are permitted. Since restrictions to protect unfledged chicks often impede vehicle access along a barrier spit, a number of management options affecting the timing and size of vehicle closures are presented here. Some of these options are contingent on implementation of intensive plover monitoring and management plans by qualified biologists. It is recommended that landowners seek concurrence with such monitoring plans from either the Service or the State wildlife agency.

Protection of Nests

All suitable piping plover nesting habitat should be identified by a qualified biologist and delineated with posts and warning signs or symbolic fencing on or before April 1 each year. All vehicular access into or through posted nesting habitat should be prohibited. However, prior to hatching, vehicles may pass by such areas along designated vehicle corridors established along the outside edge of plover nesting habitat. Vehicles may also park outside delineated nesting habitat, if beach width and configuration and tidal conditions allow. Vehicle corridors or parking areas should be moved, constricted, or temporarily closed if territorial, courting, or nesting plovers are disturbed by passing or parked vehicles, or if disturbance is anticipated because of unusual tides or expected increases in vehicle use during weekends, holidays, or special events.

If data from several years of plover monitoring suggests that significantly more habitat is available than the local plover population can occupy, some suitable habitat may be left unposted if the following conditions are met:

1. The Service OR a State wildlife agency that is party to an agreement under Section 6 of the ESA provides written concurrence with a plan that:

A. Estimates the number of pairs likely to nest on the site based on the past monitoring and regional population trends.

AND

B. Delineates the habitat that will be posted or fenced prior to April 1 to assure a high probability that territorial plovers will select protected areas in which to court and nest. Sites where nesting or courting plovers were observed during the last three seasons as well as other habitat deemed most likely to be pioneered by plovers should be included in the posted and/or fenced area.

AND

C. Provides for monitoring of piping plovers on the beach by a qualified biologist(s). Generally, the frequency of monitoring should be not less than twice per week prior to May 1 and not less than three times per week thereafter. Monitoring should occur daily whenever moderate to large numbers of vehicles are on the beach. Monitors should document locations of territorial or courting plovers, nest locations, and observations of any reactions of incubating birds to pedestrian or vehicular disturbance.

AND

2. All unposted sites are posted immediately upon detection of territorial plovers.

Protection of Chicks

Sections of beaches where unfledged piping plover chicks are present should be temporarily closed to all vehicles not deemed essential. (See the provisions for essential vehicles below.) Areas where vehicles are prohibited should include all dune, beach, and intertidal habitat within the chicks' foraging range, to be determined by either of the following methods:

1. The vehicle free area should extend 1000 meters on each side of a line drawn through the nest site and perpendicular to the long axis of the beach. The resulting 2000 meter-wide area of protected habitat for plover chicks should extend from the ocean-side low water line to the bay-side low water line or to the farthest extent of dune habitat if no bay-side intertidal habitat exists. However, vehicles may be allowed to pass through portions of the protected area that are considered inaccessible to plover chicks because of steep topography, dense vegetation, or other naturally-occurring obstacles.

OR

2. The Service OR a State wildlife agency that is party to an agreement under Section 6 of the ESA provides written concurrence with a plan that:

A. Provides for monitoring of all broods during the chick-rearing phase of the breeding season and specifies the frequency of monitoring.

AND

B. Specifies the minimum size of vehicle-free areas to be established in the vicinity of unfledged broods based on the mobility of broods observed on the site in past years and on the frequency of monitoring. Unless substantial data from past years show that broods on a site stay very close to their nest locations, vehicle-free areas should extend at least 200 meters on each side of the nest site during the first week following hatching. The size and location of the protected area should be adjusted in response to the observed mobility of the brood, but in no case should it be reduced to less than 100 meters on each

side of the brood. In some cases, highly mobile broods may require protected areas up to 1000 meters, even where they are intensively monitored. Protected areas should extend from the ocean-side low water line to the bay-side low water line or to the farthest extent of dune habitat if no bay-side intertidal habitat exists. However, vehicles may be allowed to pass through portions of the protected area that are considered inaccessible to plover chicks because of steep topography, dense vegetation, or other naturally-occurring obstacles. In a few cases, where several years of data documents that piping plovers on a particular site feed in only certain habitat types, the Service or the State wildlife management agency may provide written concurrence that vehicles pose no danger to plovers in other specified habitats on that site.

Timing of Vehicle Restrictions in Chick Habitat

Restrictions on use of vehicles in areas where unfledged plover chicks are present should begin on or before the date that hatching begins and continue until chicks have fledged. For purposes of vehicle management, plover chicks are considered fledged at 35 days of age or when observed in sustained flight for at least 15 meters, whichever occurs first.

When piping plover nests are found before the last egg is laid, restrictions on vehicles should begin on the 26th day after the last egg is laid. This assumes an average incubation period of 27 days, and provides a 1 day margin of error.

When plover nests are found after the last egg has been laid, making it impossible to predict hatch date, restrictions on vehicles should begin on a date determined by one of the following scenarios:

1) With intensive monitoring: If the nest is monitored at least twice per day, at dawn and dusk (before 0600 hrs and after 1900 hrs) by a qualified biologist, vehicle use may continue until hatching begins. Nests should be monitored at dawn and dusk to minimize the time that hatching may go undetected if it occurs after dark. Whenever possible, nests should be monitored from a distance with spotting scope or binoculars to minimize disturbance to incubating plovers.

OR

2) Without intensive monitoring: Restrictions should begin on May 15 (the earliest probable hatch date). If the nest is discovered after May 15, then restrictions should start immediately.

If hatching occurs earlier than expected, or chicks are discovered from an unreported nest, restrictions on vehicles should begin immediately.

If ruts are present that are deep enough to restrict movements of plover chicks, then restrictions on vehicles should begin at least 5 days prior to the anticipated hatching date of plover nests. If a plover nest is found with a complete clutch, precluding estimation of hatching date, and deep ruts have been created that could reasonably be expected to impede chick movements, then restrictions on vehicles should begin immediately.

Essential Vehicles

Because it is impossible to completely eliminate the possibility that a vehicle will accidently crush an unfledged plover chicks, use of vehicles in the vicinity of broods should be avoided whenever possible. However, the Service recognizes that life-threatening situations on the beach may require emergency vehicle response. Furthermore, some "essential vehicles" may be required to provide for safety of pedestrian recreationists, law enforcement, maintenance of public property; or access to private dwellings not otherwise accessible. On large beaches, maintaining the frequency of plover monitoring required to minimize the size and duration of vehicle closures may necessitate the use of vehicles by plover monitors.

Essential vehicles should only travel on sections of beaches where unfledged plover chicks are present if such travel is absolutely necessary and no other reasonable travel routes are available. All steps should be taken to minimize number of trips by essential vehicles through chick habitat areas. Homeowners should consider other means of access, eg. by foot, water, or shuttle services, during periods when chicks are present.

The following procedures should be followed to minimize the probability that chicks will be crushed by essential (non-emergency) vehicles:

1. Essential vehicles should travel through chick habitat areas only during daylight hours, and should be guided by a qualified monitor who has first determined the location of all unfledged plover chicks.

2. Speed of vehicles should not exceed five miles per hour.

3. Use of open 4-wheel motorized all-terrain vehicles (ATVs) or non-motorized all-terrain bicycles is recommended whenever possible for monitoring and law enforcement because of the improved visibility afforded operators.

4. A log should be maintained by the beach manager of the date, time, vehicle number and operator, and purpose of each trip through areas where unfledged chicks are present. Personnel monitoring plovers should maintain and regularly update a log of the numbers and locations of unfledged plover chicks on each beach. Drivers of essential vehicles should review the log each day to determine the most recent number and location of unfledged chicks.

Essential vehicles should avoid driving on the wrack line, and travel should be infrequent enough to avoid creating deep ruts that could impede chick movements. If essential vehicles are creating ruts that could impede chick movements, use of essential vehicles should be further reduced and, if necessary, restricted to emergency vehicles only.

SITE-SPECIFIC MANAGEMENT GUIDANCE

The guidelines provided in this document are based on an extensive review of the scientific literature and are intended to cover the vast majority of situations likely to be encountered on piping plover nesting sites along the U.S. Atlantic Coast. However, the Service recognizes that site-specific conditions may lead to anomalous situations in which departures from this guidance may be safely implemented. The Service recommends that landowners who believe such situations exist on their lands contact either the Service or the State wildlife agency and, if appropriate, arrange for an on-site review. Written documentation of agreements regarding departures from this guidance is recommended.

In some unusual circumstances, Service or State biologists may recognize situations where this guidance provides insufficient protection for piping plovers or their nests. In such a case, the Service or the State wildlife agency may provide written notice to the landowner describing additional measures recommended to prevent take of piping plovers on that site.

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Endangered and Nongame Species Program
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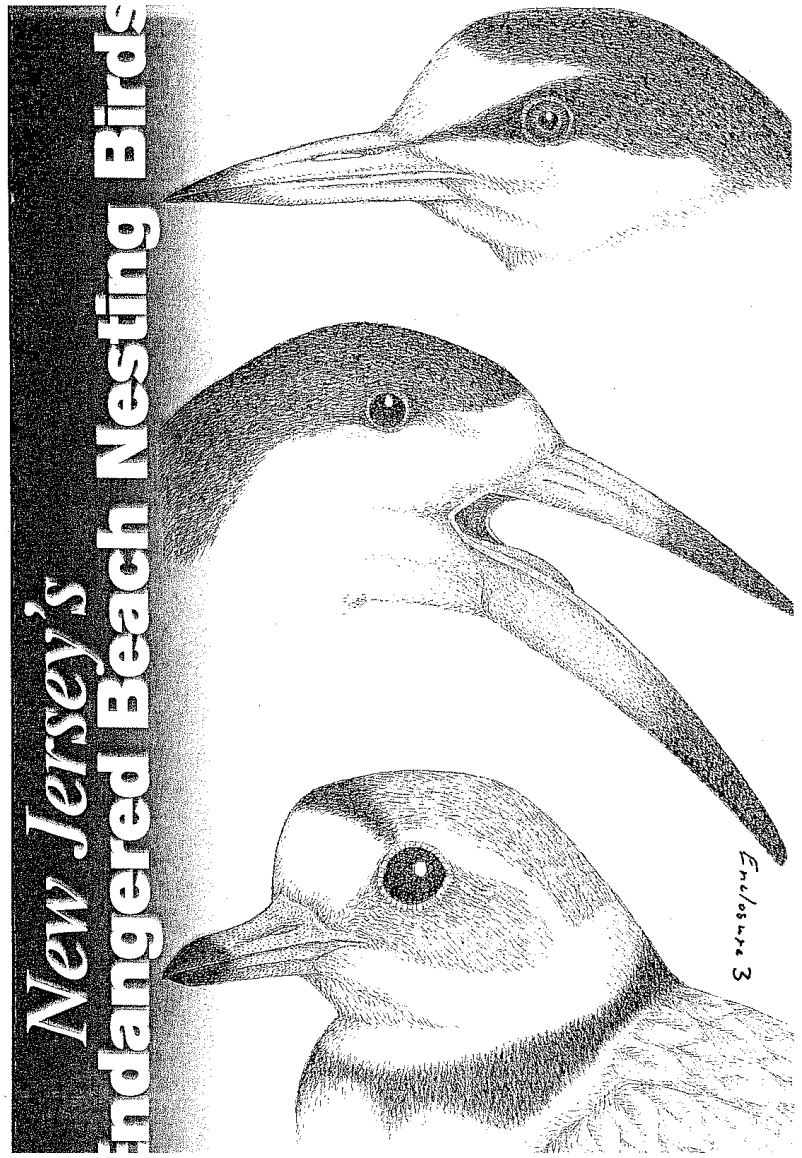
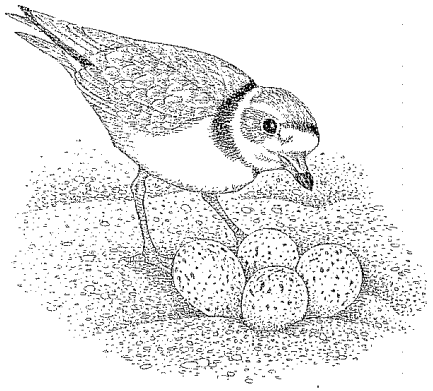
New Jersey's Endangered Beach Nesting Birds





Piping Plover

STATUS: State – Endangered, Federal – Threatened

DESCRIPTION: Piping Plovers are about the size of a Starling (7 1/2"). They are a pale, sand-colored bird with a black-tipped orange bill and orange egs, and a distinct black neckband and "eyebrow".

NEST: A shallow scrape in the sand frequently lined with clamshell fragments. The nest is often located near small clumps of vegetation such as beach grass.

WHERE THEY NEST: Directly on the sand of the open upper beach and sandy overwash areas, or in sparsely vegetated dunes.

EGGS: Usually four eggs. Cream or sand colored with small brown speckles or spots. The small ends of the eggs all point toward the center of the nest.

WHEN THEY NEST: Piping Plovers arrive in New Jersey in March and April. They lay eggs from mid-April to late June, often re-nesting if the first nest or brood of chicks fails. Small vulnerable chicks are still present on the beach until mid-August.

HOW THEY NEST: Piping Plovers are territorial and usually nest 50-100 yards from other Piping Plover nests. However, they often nest in or near Least Tern colonies.

NESTING DEFENSE: The pale sand coloration of Piping Plover eggs, adults and chicks helps camouflage them from predators. When disturbed, adults walk or fly away from their nests, often acting as if they are injured or have a "broken wing". If a bird behaves this way, leave the area since you are probably near a nest.

Least Tern

STATUS: State – Endangered

DESCRIPTION: Least Terns are about the size of a Robin (9"). They are whit with long slender gray wings, a black cap and eye line, and a bright yellow bill.

NEST: A shallow depression in the sand.

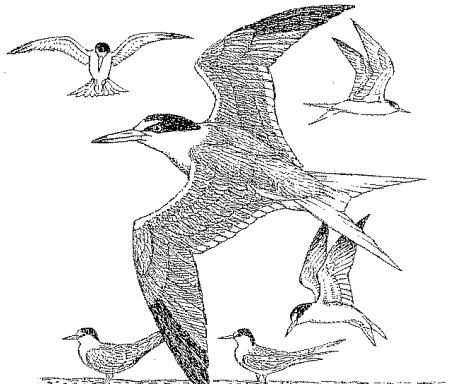
WHERE THEY NEST: On the ground on sandy beaches, sandy dredge mater al or gravel mines.

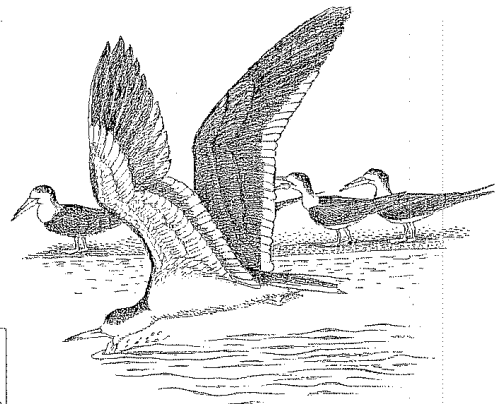
EGGS: Usually two, sometimes three. Pale olive-buff to cream colored with vari able brown spots or splotches.

WHEN THEY NEST: Least Terns arrive in New Jersey in early May, and lay eggs from late May until early July. Small vulnerable chicks are still present on the beach through late July, often into August.

HOW THEY NEST: Least Terns nest in colonies of just a few pairs to over 500 pairs. Nests may be as close as several yards or as far apart as 50 yards. They often nest near Piping Plovers and sometimes near Black Skimmer colonies.

NESTING DEFENSE: Least Terns leave their nests when predators or people come too close. They fly over, dive at, and sometimes defecate on the intruder. If a number of terns are flying over and diving at you, leave the area since you are probably in, or too close to, a colony.





Black Skimmer

STATUS: State – Endangered

DESCRIPTION: Black Skimmers are about the size of a Crow (16" to 20"). They have a black upper side and a white breast and belly. They are easily identified by their distinct long black-tipped red bill, which has a noticeably longer lower mandible.

NEST: A shallow depression in the sand.

WHERE THEY NEST: On the ground on sandy beaches or dunes, usually close to an inlet. Will also nest on eelgrass wracks or sand patches on salt marsh islands.

EGGS: Three to six (chicken egg size). Off-white with variable black blotches.

WHEN THEY NEST: Black Skimmers arrive in New Jersey in early May, and begin egg laying in late May to late July. If their nests are flooded out they will sometimes lay eggs as late as August, with chicks fledging as late as mid-September.

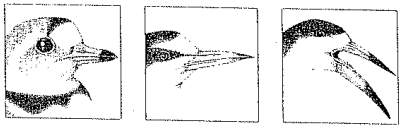
HOW THEY NEST: Black Skimmers nest in colonies of just a few pairs to over 800 pairs. Nests may be as close as one or two yards from each other, or as far apart as 50 yards. They nest in close association with Common Terns and sometimes near Least Terns.

NESTING DEFENSE: When disturbed, Black Skimmers (sometimes the entire colony) leave their nests and circle away calling. They may fly back toward the disturbance, but more frequently they land and sit nearby. They rely on the aggressive behavior of terns for some protection.

The Piping Plover, Least Tern, and Black Skimmer are New Jersey's endangered beach nesting birds. Each of these species make their summer home on our sandy barrier islands, nesting on the open beach and sometimes in the dunes. These birds spend their winters from North Carolina to South America and nest on beaches all along the Atlantic Coast. New Jersey's beach nesting birds comprise a significant portion of the entire breeding population, so their fate in our state has worldwide significance.

Without active protection these birds would probably disappear from our beaches. The Division of Fish and Wildlife's Endangered and Nongame Species Program, as well as other government agencies and conservation organizations, protect beach nesting birds in a variety of ways. Biologists locate nesting areas that are then protected with fence and posted with signs to alert people of the birds' presence. Individual Piping Plover nests are sometimes protected with predator "exclosures", wire cages that help keep predators away from eggs and just-hatched chicks. Employees and dedicated volunteers patrol the beaches to monitor nesting areas and speak with beachgoers about what they can do to help protect the birds.

If you ignore signs or enter fenced areas, you may accidentally step on the camouflaged eggs or chicks. If disturbed, parent birds will leave their nests, exposing eggs or chicks to deadly heat or predators. Exposed eggs or chicks can die in minutes on a hot summer day. Dogs may chase or harass adults and chicks, sometimes even eating or stepping on chicks and eggs. Prolonged disturbance of young chicks can interrupt their feeding and lead to starvation or increase the likelihood of predation.



New Jersey's beach nesting birds require only a very small portion of our beaches to survive. To "share the shore" and help protect these birds:

- Respect all areas fenced or posted for the protection of wildlife.
- Do not approach or linger near birds or their nesting areas.
- Control dogs. Dogs are not permitted on most beaches during the nesting season. If dogs are allowed on the beach, keep them leashed and well away from nesting areas.
- Keep cats indoors. Cats kill millions of birds each year, including our beachnesters.
- Do not leave or bury trash or food scraps on the beach. Garbage attracts predators, such as gulls, crows, raccoons, foxes, skunks and feral cats, which may prey upon eggs or chicks. Please don't feed any of these predators.

New Jersey Division of Fish and Wildlife

Enclosure 4

Conserve Wildlife

N.J. Division of Fish & Wildlife
Endangered & Nongame Species Program

Endangered and Threatened Wildlife of New Jersey

Endangered Species are those whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent future extinction in New Jersey.

Threatened Species are those who may become endangered if conditions surrounding them begin to or continue to deteriorate.

List updated 3/18/02

BIRDS			
Endangered		**Threatened**	
Bittern, American	*Botaurus lentiginosos**	Bobolink	*Dolichonyx oryzivorus*
Eagle, bald	*Haliaeetus leucocephalus* BR **	Eagle, bald	*Haliaeetus leucocephalus* NB **
Falcon, peregrine	*Falco peregrinus*	Hawk, Cooper's	*Accipiter cooperii*
Goshawk, northern	*Accipiter gentilis**	Hawk, red-shouldered	*Buteo lineatus* NB
Grebe, pied-billed	*Podilymbus podiceps**	Night-heron, black-crowned	*Nycticorax nycticorax**
Harrier, northern	*Circus cyaneus**	Night-heron, yellow-crowned	*Nyctanassa violaceus*
Hawk, red-shouldered	*Buteo lineatus* BR	Knot, red	*Calidris canutus*
Owl, short-eared	*Asio flammeus**	Osprey	*Pandion haliaetus**
Plover, piping	*Charadrius melodus***	Owl, barred	*Strix varia*
Sandpiper, upland	*Batramia longicauda*	Owl, long-eared	*Asio otus*
Shrike, loggerhead	*Lanius ludovicianus*	Rail, black	*Laterallus jamaicensis*
Skimmer, black	*Rynchops niger* BR	Skimmer, black	*Rynchops niger* NB
Sparrow, Henslow's	*Ammodramus henslowii*	Sparrow, grasshopper	*Ammodramus savannarum**
Sparrow, vesper	*Pooecetes gramineus* BR	Sparrow, Savannah	*Passerculus sandwichensis**
Tern, least	*Sterna antillarum*	Sparrow, vesper	*Pooecetes gramineus* NB
Tern, roseate	*Sterna dougallii***	Woodpecker, red-headed	*Melanerpes erythrocephalus*
Wren, sedge	*Cistothorus platensis*		
*Only breeding population considered endangered or threatened			
**Federally endangered or threatened			
BR - Breeding population only; NB - non-breeding population only			

REPTILES			
Endangered		**Threatened**	
Rattlesnake, timber	*Crotalus h. horridus*	Snake, northern pine	*Pituophis m. melanoleucus*
Snake, corn	*Elaphe g. guttata*	Turtle, Atlantic green	*Chelonia mydas***
Turtle, bog	*Clemmys muhlenbergii*	Turtle, wood	*Clemmys insculpta*
Atlantic Hawksbill	*Eretmochelys imbricata***		
Atlantic Leatherback	*Dermochelys coriacea***		
Atlantic Loggerhead	*Caretta caretta***		
Atlantic Ridley	*Lepidochelys kempi***		
**Federally endangered or threatened			

AMPHIBIANS			
Endangered		**Threatened**	
Salamander, blue-spotted	*Ambystoma laterale*	Salamander, eastern mud	*Pseudotriton montanus*
Salamander, eastern tiger	*Ambystoma tigrinum*	Salamander, long-tailed	*Eurycea longicauda*
Salamander, Tremblay's	*Ambystoma tremblayi*		
Treefrog, pine barrens	*Hyla andersonii*		
Treefrog, southern gray	*Hyla chrysocelis*		

INVERTEBRATES			
Endangered		**Threatened**	
Beetle, American burying	*Nicrophorus mericanus***	Beetle, northeastern beach tiger	*Cincindela d. dorsalis***
Copper, bronze	*Lycaena hyllus*	Floater, triangle (mussel)	*Alasmidonta undulata*
Floater, brook (mussel)	*Alasmidonta varicosa*	Elfin, frosted (butterfly)	*Callophrys irus*
Floater, green (mussel)	*Lasmigona subviridis*	Fritillary, silver-bordered (butterfly)	*Bolaria selene myrina*
Skipper, arogos (butterfly)	*Atrytone arogos arogos*	Lampmussel, eastern (mussel)	*Lampsilis radiata*
Skipper, Appalachian grizzled (butterfly)	*Pyrgus wyandot*	Lampmussel, yellow (mussel)	*Lampsilis cariosa*
		Mucket, tidewater (mussel)	*Leptodea ochracea*
		Mussel, dwarf wedge	*Alasmidonta heterodon***
		Pondmussel, eastern (mussel)	*Ligumia nasuta*
		Satyr, Mitchell's (butterfly)	*Neonympha m. mitchellii***
		White, checkered (butterfly)	*Pontia protodice*
		**Federally endangered or threatened	

MAMMALS	
Endangered	
Bat, Indiana	*Myotis sodalis***
Bobcat	*Lynx rufus*
Whale, black right	*Balaena glacialis***
Whale, blue	*Balaenoptera musculus***
Whale, fin	*Balaenoptera physalus***
Whale, humpback	*Megaptera novaeangliae***
Whale, sei	*Balaenoptera borealis***
Whale,sperm	*Physeter macrocephalus***
Woodrat, eastern	*Neotoma floridana*
**Federally Endangered	

FISH	
Endangered	
Sturgeon, shortnose	*Acipenser brevirostrum***
**Federally Endangered	

The lists of New Jersey's endangered and nongame wildlife species are maintained by the DEP's Division of Fish and Wildlife's Endangered and Nongame Species Program. These lists are used to determine protection and management actions necessary to ensure the survival of the state's endangered and nongame wildlife. This work is made possible through voluntary contributions received through Check-off donations to the Endangered Wildlife Conservation Fund on the New Jersey State Income Tax Form, the sale of Conserve Wildlife License Plates, and donations. For more information about the Endangered and Nongame Species Program or to report a sighting of endangered or threatened wildlife, contact the Endangered and Nongame Species, NJ Division of Fish and Wildlife, P.O. Box 400, Trenton, NJ 08625-0400, or call 609-292-9400.

Enclosure 5
12/15/05

NJ Endangered and Nongame Species Program

Special Concern – Species Status Listing

Status Definitions:

Endangered: Applies to a species whose prospects for survival within the state are in immediate danger due to one or several factors, such as loss or degradation of habitat, over-exploitation, predation, competition, disease or environmental pollution, etc. An endangered species likely requires immediate action to avoid extinction within NJ.

Threatened: Applies to species that may become Endangered if conditions surrounding it begin to or continue to deteriorate. Thus, a Threatened species is one that is already vulnerable as a result of, for example, small population size, restricted range, narrow habitat affinities, significant population decline, etc.

Special Concern: Applies to species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming Threatened. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.

Stable (or increasing): Applies to species that appear to be secure in NJ and not in danger of falling into any of the preceding the categories in the near future.

Undertermined: A species about which there is not enough information available to determine the status.

*** Recommended status listing, pending official adoption.**

Special Concern species listing

Birds

Species	Breeding Status	Non-breeding Status
Pied-billed Grebe (*Podilymbus podiceps*)	Endangered	Special Concern
Least Bittern (*Ixobrychus exilis*)	Special Concern	Stable
American Bittern (*Botaurus lentiginosos*)	Endangered	Special Concern
Tricolor Heron (*Egretta tricolor*)	Special Concern	Stable
Little Blue Heron (*Egretta caerulea*)	Special Concern	Special Concern
Great Blue Heron (*Ardea herodias*)	Special Concern	Stable
King Rail (*Rallus elegans*)	Special Concern	Undetermined
Whimbrel (*Numenius phaeopus*)	None	Special Concern
Spotted Sandpiper (*Actitis macularia*)	Special Concern	Stable
Sanderling (*Calidris alba*)	None	Special Concern
Common Tern (*Sterna hirundo*)	Special Concern	Stable
Black Tern (*Chlidonias niger*)	None	Special Concern
Caspian Tern (*Sterna caspia*)	Special Concern	Stable
Northern Harrier (*Circus cyaneus*)	Endangered	Special Concern
Sharp-shinned Hawk (*Accipiter striatus*)	Special Concern	Special Concern
Broad-winged Hawk (*Buteo platypterus*)	Special Concern	Stable
American Kestrel (*Falco sparverius*)	Special Concern	Undetermined
Common Barn Owl (*Tyto alba*)	Special Concern	Special Concern
Short-eared Owl (*Asio flammeus*)	Endangered	Special Concern
Common Nighthawk (*Chordeiles minor*)	Special Concern	Stable
Least Flycatcher (*Empidonax minimus*)	Special Concern	Stable
Horned Lark (*Eremophila alpestris*)	Special Concern	Stable
Cliff Swallow (*Petrochelidon pyrrhonota*)	Special Concern	Stable
Winter Wren (*Troglodytes troglodytes*)	Special Concern	Stable
Veery (*Catharus fuscescens*)	Special Concern	Stable
Gray-cheeked Thrush (*Catharus minimus*)	None	Special Concern
Solitary Vireo (*Vireo solitarius*)	Special Concern	Stable
Golden-winged Warbler (*Vermivora chrysoptera*)	Special Concern	Special Concern
Nothern Parula (*Parula americana*)	Special Concern	Stable
Cerulean Warbler (*Dendroica cerulea*)	Special Concern	Special Concern
Black-throated Green Warbler (*Dendroica virens*)	Special Concern	Stable
Kentucky Warbler (*Oporornis formosus*)	Special Concern	Special Concern
Canada Warbler (*Wilsonia canadensis*)	Special Concern	Stable
Yellow-breasted Chat (*Icteria virens*)	Special Concern	Special Concern
Grasshopper Sparrow (*Ammodramus savannarum*)	Threatened	Special Concern
Eastern Meadowlark (*Sturnella magna*)	Special Concern	Stable

Special Concern species listing – continued

Invertebrates

Dotted Skipper (butterfly), *Hesperia attalus slossonae*
Georgia [Lakehurst] Satyr (butterfly), *Neonympha areolatus septentrionalis*
Harris Checkerspot (butterfly), *Chlosyne harrisii*
Hessel's Hairstreak (butterfly), *Callophrys hesseli*
Hoary Elfin (butterfly), *Callophrys polios*
Northern Metalmark (butterfly), *Calephelis borealis*
Two-spotted Skipper (butterfly), *Euphyes bimacula*
Leonard's Skipper (butterfly), *Hesperia leonardus*
Creeper (mussel), *Strophitus undulatus*

Herps

Marbled Salamander (*Ambystoma opacum)*
Jefferson Salamander (*Ambystoma jeffersonianum*)
Northern Spring Salamander (*Gyrinophilus p. porphyriticus)*
Carpenter Frog (*Rana virgatipes)*
Spotted Turtle (*Clemmys guttata)*
Eastern Box Turtle (*Terrapene c. carolina)*
Northern Diamondback Terrapin (*Malaclemys t. terrapin)*
Eastern Kingsnake (*Lampropeltis g. getulus)*
Northern Copperhead (*Agkistrodon contortrix mokasen)*
Coastal Plains Milk Snake integrade (*Lampropeltris triangulum triangulum* x *L. t. elapsoides)*
Fowlers Toad (Bufo woodhousii fowlen)